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Adolescent sexual competence and sexual risk-taking : an ecological model of risk and protection

Kevin Harvey Gross

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I am submitting herewith a dissertation written by Kevin Harvey Gross entitled "Adolescent sexual competence and sexual risk-taking : an ecological model of risk and protection." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

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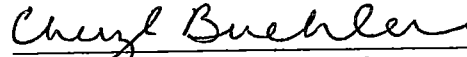
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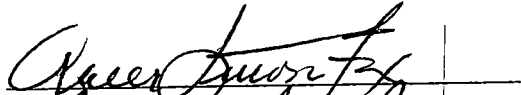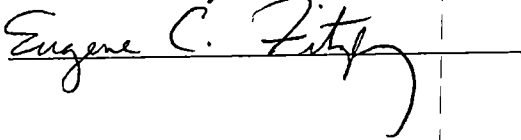
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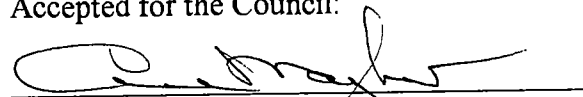
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and recommend its acceptance:

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ADOLESCENT SEXUAL COMPETENCE AND SEXUAL RISK-TAKING: AN ECOLOGICAL MODEL OF RISK AND PROTECTION

A Dissertation Presented for the

Doctor of Philosophy Degree

The University of Tennessee, Knoxville

Kevin H. Gross

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Cost of undergraduate and graduate education including student loans, $100,00 plus. Cost of this dissertation including paper, printing, and binding expenses, $500. The experiences, support, love, and wisdom that my friends, family, and mentors have given me, priceless.

ABSTRACT

Using Bronfenbrenner's ecological paradigm of human development as a framework, this study investigated the risk and protective factors associated with adolescent sexual behaviors and introduced the concept of sexual competence. Using data from the National Longitudinal Study of Adolescent Health, longitudinal and cross-sectional models were tested.

Key findings include: (a) individual-level variables as well as family, peer, and school variables contribute to the total variance explained and have a direct effect on adolescents' sexual competence; (b) the early influence of peers on sexual competence is later replaced by parental influences; (c) parent's membership in a parent-teacher organization is associated with increased sexual competence; (d) the associations between the predictor variables and sexual competence are fairly consistent across gender and ethnicity; (e) overall, risk factors seem to be stronger predictors of adolescent sexual competence than protective factors; and (f) engaging in other health-risk behaviors and perceiving that there are obstacles to contraceptive use are strong indicators of sexual competence.

These findings support the proposition that within an adolescent's sphere of influence there are specific factors that promote the development of sexual competence as well as factors that inhibit the development of sexual competence. In addition, these findings indicate that the affect of these factors is consistent across gender and ethnicity.

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CHAPTER I

INTRODUCTION AND CONCEPTUAL FRAMEWORK

Introduction

What do we know about adolescent sexual behavior? We know that approximately

10% of 15-19 year-old women experience unplanned pregnancies (Moore, 1993). We

know that adolescents account for approximately one quarter of all sexually transmitted

diseases (STDs) that occur annually (Centers for Disease Control, 1992). The literature is

full of words and phrases such as "epidemic" and "problem behaviors" in reference to

adolescent sexual behavior. In fact, the majority of research on adolescent sexual

behavior has focused on its problematic aspects (Chilman, 1990). Thus, most of what we

have learned about adolescent sexuality is based on the minority of adolescents who have

experienced a negative developmental outcome.

Chilman (1990), one of the field's most influential researchers, argues that the

problematic approach to the study of adolescent sexuality only serves to perpetuate

adolescence as a time characterized with turmoil and that "sexuality is particularly

dangerous and disturbing" and that "these attitudes prevent a positive approach to

supporting the healthy sexuality of young women and men during their adolescent years"

(p.123).

Accordingly, it is the aspect of sexuality as it relates to adolescent health that is the

focus of this study. In general, health has been defined as something good or positive.

Butler (1994) stated that "Health is good; the lack of it is bad." More specifically, health

is "the quality of people's physical, psychological, and sociological functioning that

enables them to deal adequately with the self and others in a variety of personal and social situations" (Bedworth & Bedworth, 1992).

This study uses Bronfenbrenner's ecological paradigm of human development as a framework to examine those factors that put an adolescent at risk for engaging in sexual risk-taking behaviors as well as those factors that prevent or protect an adolescent from engaging in sexual risk-taking behaviors. An ecological paradigm acknowledges that environmental determinants affect individual behaviors and that the individual is not wholly responsible for behaviors that put them at risk for disease or ill health.

In this study, adolescent sexual behavior is viewed as a part of adolescent development that, like other developmental outcomes, has the potential to be either positive or negative, or both positive and negative. Thus, the focus of this study is on those sexual behaviors that threaten an adolescent's health as well as adolescents who are "sexually competent."

Some risk model researchers have recommended that social competence be used to measure overall adjustment (Garmezy, Masten, & Tellegen, 1984; Masterpasqua, 1989; Zigler & Trickett, 1978). Two major criteria for social competence include (a) "success of the person in meeting societal expectations," and (b) "aspects of the individual's personal development or self-actualization" (Luthar & Zigler, 1991, p. 12). At least one of these should be covered in the measure of a construct.

Similarly, Garbarino and Gaboury (1992) defined the development of competence "as the ability to succeed in life's major challenges" (p. 2). In this study, the major challenge that is investigated is the mastery of one's sexual identity. Using Bedworth and Bedworth's definition of health, mastery of this role constitutes sexual health and

according to the World Health Organization (1992), "sexual health is the integration of the physical, emotional, intellectual, and social aspects of sexual being, in ways that are positively enriching and that enhance personality, communication, and love" (p. 395, Strong, Devault, & Sayad, 1999). Thus, sexual health is one aspect of an individual's personal development, which is one of the criteria for social competence. Furthermore, the outcome variable in this study is a measure of a person (i.e., adolescent) meeting societal expectations. By not engaging in sexual risk-taking behaviors, an adolescent meets societal expectations (i.e., being sexual responsible). Conceptually, both criteria for social competence are addressed, creating the developmental construct *sexual competence*.

The research objective of this study is to identify risk and protective factors at the micro-, meso-, exo-, and macro-level as they relate to adolescent sexual competence and sexual risk-taking behaviors. The primary research question is how do risk and protective factors affect adolescent sexual development so that they become either sexually competent or sexual risk-takers? To answer this question, a longitudinal analysis of existing survey data from the National Longitudinal Study of Adolescent Health (Add Health) public use version (Udry, 1998) is conducted.

The outcome measure of this study is comprised of behaviors that differentiate between sexually active adolescents who are sexually competent and those who are sexual risk-takers. This includes behaviors such as having casual sex, joint occurrences of alcohol use and sexual intercourse, and not using contraceptives consistently. On a continuum, this variable ranges from sexual risk-taking to sexual competence, thus, adolescents who are low in sexual competence are adolescents that engage in sexual risk-

taking behaviors. The predictor variables are those aspects of an adolescent's life that affect their sexual behavior decision making. These variables are conceptualized as risk and protective factors as they occur within the different ecological systems.

Four hypotheses are tested in this study. First, the presence of risk factors will increase the likelihood of engaging in sexual risk-taking behaviors (i.e., decrease sexual competence). Second, the presence of protective factors will decrease the likelihood that adolescents will engage in sexual risk-taking behaviors (i.e., increase sexual competence). Third, there are gender differences in the effects that risk and protective factor have on sexual risk-taking behaviors, such that decreases or increases in sexual risk-taking are greater or lesser for males or females. The fourth hypothesis is that there are ethnic differences in the effects that risk and protective factor have on sexual risk-taking behaviors, such that decreases or increases in sexual risk-taking are greater or lesser across ethnic groups.

Conceptually, this study is based on the theoretical works related to an ecological perspective and works related to a risk model approach. Operationally, this study builds upon Hirschi's and Jessor and Jessor's work on adolescent deviance and problem behaviors, adolescent sexual risk-taking research, and general adolescent sexual behavior research.

<div align="center">Conceptual Framework</div>

<div align="center">Sexual Risk-Taking</div>

The concept of sexual risk-taking is based primarily on the adolescent problem behavior literature. Traditionally, adolescent problem behaviors were defined as "behavior that is socially defined as a problem, a source of concern, or as undesirable by

the norms of conventional society" (Jessor & Jessor, 1977, p. 33). These behaviors

included drug and alcohol use, cigarette smoking, sexual activity, and other "mildly

deviant" behaviors. Though the traditional approach focuses on societal norms, other

researchers of adolescent problem behaviors have used a more health-oriented approach

that focuses on health-risk behaviors (e.g., alcohol use, cigarette smoking, and

unprotected sex).

Stoiber and Good (1998) defined adolescent problem or risk-taking behaviors as

"those activities or behaviors that are detrimental to the health and well-being of youth"

(p. 380). Based on this definition, sexual risk-taking behaviors are conceptualized in this

study as *those behaviors that increase an adolescent's risk for HIV infection, other STDs,*

and unintended pregnancy. Inherently, simply being sexually active with another person

puts one at risk for negative outcomes; however, there are certain behaviors that increase

this risk. In the current study, these behaviors include (a) inconsistent contraceptive use,

(b) having anal intercourse, (c) having casual sex, (d) alcohol use in connection with

sexual intercourse, (e) intoxication in connection with sexual intercourse, (f) drug use in

connection with sexual intercourse, and (g) having sexual intercourse for money or drugs.

Some researchers have argued that sexual activity should not be included with other

behaviors that are considered problem behaviors (Black, Ricardo, & Stanton, 1997;

Ensminger, 1990; Stanton, Romer, Ricardo, Black, Feigelman, & Galbraith, 1993),

especially when comparing different subcultures (e.g., variations in ethnicity, income,

urban vs. rural). Others have suggested that sexual activity is part of a larger cluster or

syndrome of related problem behaviors (Donavan & Jessor, 1985). The current study

combines these two viewpoints so that sexual activity is conceptualized as a problem

behavior only when it is characterized as risk-taking, and as such, is considered a part of

a larger cluster or syndrome of related problem behaviors.

<div align="center">Risk Model</div>

For the purposes of this study, "risk model" is inclusive of an approach to the study

of adolescent problem behaviors that includes examining risk and protective factors.

Historically, risk research began with an interest in those factors (i.e., risk factors) that

increased a child's chances for negative developmental outcomes (Werner, 1990). From

this work, researchers began to notice children who did *not* experience negative

developmental outcomes, despite the fact they experienced similar risk factors as those

children who did experience negative developmental outcomes (Rutter, 1987). These

children were labeled "resilient." Consequently, researchers became interested in factors

(i.e., protective factors) that decreased the chances for negative developmental outcomes.

More recently, risk models have been used to examine adolescent problem behaviors

(Jessor, Van Den Bos, Vanderry, Costa, and Turbin, 1995; Stoiber & Good, 1998).

In this study Jessor et al.'s (1995) definitions of risk and protective factors are used

to investigate adolescent sexual risk-taking.

> Risk factors ... [increase] ... the likelihood of engaging in problem behavior:
> through direct instigation or encouragement; through increased vulnerability for
> normative transgression; and through greater opportunity to engage in problem
> behavior.... Protective factors ... [decrease] ... the likelihood of engaging in
> problem behavior: through direct personal or social controls against its occurrence;
> through involvement in activities that tend to be incompatible with alternatives to
> problem behavior; and through orientations toward and commitments to
> conventional institutions or to adult society more generally (p.924).

It is important to note that although risk factors increase the likelihood of negative or

undesirable outcomes and protective factors decrease the likelihood, these two concepts

are not merely opposites of each other. In other words, a protective factor is not simply the absence of a risk factor. For example, if it is determined that being sexually abused as a child is a risk factor for engaging in sexual risk-taking behaviors, it does not mean that not being sexually abused is a protective factor. From this perspective, protective factors are "considered independent variables that can have their own direct effects on behavior but that, in addition, can moderate the relationship between risk factors and behavior" (Jessor et al., 1985; p. 923). Thus, it is possible for an individual to have both a high number of risk factors and a high number of protective factors.

Scaramella, Conger, and Simons (1999) indicated that protective factors "might either be manifested as a buffering or statistical interaction effect, or as a statistical main effect [i.e., compensatory]" (p. 117). Protective factors that are compensatory are related to either *more or less* of an outcome; whereas, protective factors that are buffering are related to either an *increase or decrease* of an outcome over time. For example, if high parental monitoring is associated with higher sexual competence, then it is said to be compensatory. On the other hand, if high parental monitoring is associated with an increase in sexual competence over time, a parental monitoring by time interaction, then it is said to be buffering. It is possible for both of these effects to occur simultaneously.

In their study of risk and resilience factors linked to problem behavior among urban, culturally-diverse adolescents, Stoiber and Good (1998) suggested that ecological or sociocultural system models should be used to understand the complex nature of circumstances surrounding problem behaviors. This study uses an ecological paradigm to categorize risk and protective factors into different levels or systems of influence.

Ecological Paradigm

Though an ecological paradigm has existed since the early 1900's (Klein & White, 1996), it is Urie Bronfenbrenner's ecological perspective of human development that most researchers are referring to when they say they are using an ecological perspective. Bronfenbrenner's main purpose for developing this perspective was to provide a model to be used for conducting research. He stated that the aim of the ecological paradigm is "not to test hypotheses, but to generate them" (Bronfenbrenner, 1992, p. 230).

He suggested that in order to understand human development, researchers needed to look beyond a person's immediate settings. However, in later writings, Bronfenbrenner noted that in his original model he overlooked the importance of the individual on their own development and as a result the individual characteristics of significant others and the influence of these characteristics on a person's development also was overlooked. As such, subsequent research using his model tended to limit the inclusion of individual characteristics by focusing primarily on people's environments. In an attempt to encourage models that were more inclusive, Bronfenbrenner integrated aspects of the individual and the characteristics of significant others into later definitions of the different ecological systems.

James Garbarino, a close associate and student of Urie Bronfenbrenner's, used an ecological perspective to discuss risk and opportunity for children (Garbarino, 1990, 1992). He stated that "[r]isks to development can come both from direct threats and from the absence of normal, expectable opportunities" and that "[o]pportunities for development [are] relationships in which children find materials, emotional, and social encouragement compatible with their needs and capacities as they exist at a specific

points in their lives" (Garbarino, 1990, p. 79). According to Garbarino, development could include any facet of an individual, including the development of competence or "the ability to succeed in life's major challenges" (Garbarino & Gaboury, 1992, p. 2).

According to Bronfenbrenner's ecological paradigm (referred to here after as simply an ecological paradigm), there are four different structural systems; the micro-, meso-, exo-, and macrosystems. In addition, he later added the chronosystem to reflect the dimension of time.

The microsystem "is a pattern of activities, roles, and interpersonal relations experienced by a developing person in a given face-to-face setting with particular physical and material features" (Bronfenbrenner, 1992, p. 226). In other terms, it is the relations between the developing person and environment in an immediate setting (e.g. family, school, workplace, etc.). He later added to the microsystem definition "and containing other persons with distinctive characteristics of temperament, personality, and systems of belief" (p.227) to account for the influence of individual characteristics of significant others. According to Garbarino and Abramowitz (1992), the family is the central microsystem or the headquarters for development, and as such, is one of the most important microsystems for researchers to investigate.

Two important influences of development within the family system include the child's temperament and the family's emotional regulation. Temperament "refers to relatively stable characteristics of response to the environment" (Newman & Newman, 1997). A child's temperament can influence family functioning. For example, in their discussion of how children contribute to their own development, Benn and Garbarino (1992) refer to McBride and Belsky's (1985) study "that demonstrated that mothers are

more likely to abandon plans to return to work after the birth of a difficult or fussy child" (p.122).

Emotional regulation is the "ability to inhibit, enhance, maintain, and modulate emotional arousal" (Eisenberg, 1996; p. 271). How emotions are regulated is dependent on parents' meta-emotion, their feelings, and thoughts about emotion (Gottman, Katz, & Hooven, 1996). Together with a child's temperament, emotional regulation and parent's meta-emotion shape patterns of activities, roles, and interpersonal relations within the family system.

Bronfenbrenner provided several propositions intended to aid researchers in their selection of variables to represent the different ecological systems and subsystems that combine "theoretical statements and specification of an operational research model suitable for investigating the proposition in questions" (p. 231). Those aspects of the propositions mentioned in this review but not addressed in the current study are highlighted to provide a theoretical basis to discuss the results of the study and suggest potential avenues of inquiry for future research. At the microsystem level, because the individual is an active agent in any developmental process, traditional psychological assessments (e.g., cognitive competence, socioemotional attributes, and context-relevant belief systems) should be part of the model. In addition, these assessments should come from various perspectives including the individual, significant others, and trained observers.

Microsystem measures also need to include the personal attributes of significant others included in the setting. And, because "each member of a microsystem influences every other member" (Bronfenbrenner, 1992, p. 239), it stands to reason that every

relationship in a microsystem influences other relationships in the microsystem. For example, the husband-wife relationship can influence the father-child relationship. Thus, measures that reflect dyadic relationships and the quality of these relationships should be included when possible. In this study, traditional psychological assessments include self-esteem and general well-being and the quality of the parent-child relationship is measured to assess dyadic relationships.

According to Garbarino (1990), microsystems become a risk when they are socially impoverished, when they work against competence. Three types of socially impoverished microsystems are those that are too small, those that are imbalanced, and those that are negative. When microsystems are too small, it means there are fewer resources available for the children to nurture their development; whereas, large microsystems provide plenty of resources for children to develop competence. Imbalanced microsystems exist when the level of reciprocity is one sided, either the children do not influence the parents' behaviors or the parents do not influence the children's behaviors. According to Garbarino, negative affective tone is probably the most detrimental risk at the microsystem level. This can put children at risk for being less competent and having low self-esteem.

The mesosystem "comprises the interrelations among major settings containing the developing person at a particular point in his or her life" (Bronfenbrenner, 1992, p. 515). Interactions between an individual's family and school would be an example of a mesosystem. Using the family and school microsystems as an example, an interrelation would include parents meeting with teachers.

Garbarino (1990) proposed that risk and opportunity at the mesosystem involve the quantity and quality of the linkages between microsystems. The absence of connections and conflicts of values between one microsystem and another are mesosystem risks. Strong connections and positive relations provide opportunities. Parental involvement in school-related organizations represents a mesosystem in the current study.

The exosystem "is an extension of the mesosystem embracing other specific structures, both formal and informal, that do not themselves contain the developing person but impinge upon or encompass the immediate settings in which that person is found, and thereby influence, delimit, or even determine what goes on there" (Bronfenbrenner, 1992, p. 515). The individual does not directly participate in the decisions made by the exosystem but these decisions do have a direct or indirect effect on the individual. A classic example of an exosystem is a parent's employer and the family. If family functioning is affected by a parent's employment status, it could be said that this was an exosystem influence. Parental involvement in local politics or other community-based organizations that do not directly involve their adolescent children represent an exosystem influence in this study.

In terms of including meso- and exosystems in a model, Bronfenbrenner contended that to measure their quality one needs to compare the beliefs and expectations of the different systems in an individual's environment. The "nature and developmental processes at the level of the meso- or the exosystem are influenced to a substantial degree by belief systems and expectations existing in each setting about the other" (Bronfenbrenner, 1992, p. 238). For example, the beliefs or expectations of the family and of the schools about children's social development would be a mesosystem

comparison. At the time, he was unaware of any research that had directly tested these aspects of the meso- or exosystem.

Finally, the macrosystem "refers to the overarching institutional patterns of the culture or subculture, or other broader social context, with particular reference to the developmentally-instigative belief systems, resources, hazards, life styles, opportunity structures, life course options, and patterns of social interchange that are embedded in each of these systems. The macrosystem may be thought of as a societal blue print for a particular culture, subculture, or other broader social context" (Bronfenbrenner, 1992, p. 228).

Developmentally-instigative belief systems refer to beliefs about those personal attributes (i.e., developmentally-instigative characteristics) that are "especially significant for the person's future development" (Bronfenbrenner, 1992, p.219). These are the beliefs that agents of socialization (i.e., microsystems) hold about what characteristics are important to healthy development. It is these beliefs that define how the next generation is raised.

According to Bronfenbrenner, research using an ecological perspective should compare at least two macrosystems. For example, instead of including a variable for ethnicity, he recommended that there be separate statistical analyses of the models tested for each ethnic group. Comparing groups this way would constitute a comparison of macrosystems as long as the groups in question satisfy the criteria found in the definition of a macrosystem. This also includes subcultures in which a person was raised as well as where they lived. These are defined "by the personal and background characteristics of those with whom the person associates in the settings of everyday life" (Bronfenbrenner,

1992, p. 237). Interactions between ethnicity and other predictor variables and gender and other predictor variables are included in the present study to test for macrosystem effects.

Risk and opportunities in the exo- and macrosystem involve indirect environmental influences on the individual. Risks and opportunities in the exosystem include stresses and support for parents and anti-child versus pro-child institutional practices and policies. Social, economic, and political changes of a society are risks and opportunities at the macrolevel (Garbarino, 1990).

The chronosystem is simply time or the changes over time (e.g., family composition, social class, puberty). Bronfenbrenner indicated that it is imperative to measure the stability, consistency, and predictability of any of the systems over time because extremes at either end (i.e., disorganization or rigidity) put the individual at risk for developmental problems. Thus, studies using an ecological paradigm need to examine behaviors over time. In the present study, change that occurs during one to two years of the adolescent's life is examined.

Seifer and Sameroff (1987) suggested that variables be organized at different levels as potential risk factors, incorporating the different systems that affect development. Accordingly, in the present study, risk factors and protective factors are organized according to the different levels of Bronfenbrenner's ecological perspective. However, it is important to note that there is no definitive criteria for deciding what is a risk factor, protective factor, or simply a variable that is related to the outcome (Luthar & Zigler, 1991).

According to Cowan, Cowan, and Schulz (1996), specifically what people are at risk for should guide researchers using a risk model approach. What adolescents are at risk for

in the present study is sexual risk-taking, conceptualized as a problem behavior.

Therefore, risk and protective factors are categorized within each system based upon

literature reviews of (a) adolescent problem behaviors, including adolescent sexual risk-

taking and (b) adolescent sexual behaviors.

CHAPTER II

EMPIRICAL LITERATURE

Adolescent Problem Behaviors

Some of the most influential work in the area of adolescent problem behaviors includes the works of Hirschi and Jessor and Jessor. The basic premise of Hirschi's social control model is that "delinquent acts result when an individual's bond to society is weak or broken" (p. 16, Hirschi, 1969). Bonds or attachments serve to constrain or control adolescents, preventing them from committing deviant acts. Four mechanisms promote conforming or conventional behaviors. These include the quality of the parent-adolescent bond, belief in conventional norms, commitment to conventional goals, and involvement with positive or conventional significant others.

Using data from a sample of 4,077 white and black males and females residing in the San Francisco-Oakland metro area in 1964, Hirschi (1969) found that attachment to parents, academic competence, commitment to conventional lines of action (e.g., academic or career aspirations and expectations), and involvement in conventional activities decreased the likelihood that an adolescent would commit delinquent acts. Furthermore, his findings indicated that adolescents who committed delinquent acts were more likely to form attachments to delinquent peers. Hirschi reasoned that these adolescents were more likely to seek out others like themselves as opposed to delinquent adolescents "recruiting" nondelinquent adolescents. In other words, adolescents low in conformity will be more influenced by prodelinquent influences than those high in conformity.

Building upon Hirschi's work, Jessor and Jessor developed the Problem Behavior Theory to explain the nature of adolescent problem behavior using data from a longitudinal study (Socialization and Problem Behavior in Youth Study) of 432 junior high students. The sample consisted of adolescents aged 13, 14, and 15 from 1969-1972 (four waves), and two additional waves in 1979 and 1981, along with a parallel longitudinal study (Young Adult Follow-up Study) of college freshman that began in 1970 (Costa, Jessor, & Donovan, 1989; Donovan & Jessor, 1978; Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988; Jessor, Costa, Jessor, & Donovan, 1983; Jessor & Jessor, 1973a; Jessor & Jessor, 1973b; Jessor & Jessor, 1974; Jessor & Jessor, 1975; Jessor & Jessor, 1977; Jessor, 1987).

The primary focus of their theory is on three systems of psychosocial influence, the Personality System, the Perceived Environment System, and the Behavior System. The Personality System "reflect[s] social meanings and developmental experience" (p. 332, Jessor, 1985). It is organized into three structures; (a) motivational-instigation (e.g., value on independence, expectation for independence), (b) personal belief (e.g., alienation, self-esteem), and (c) personal control (e.g., religiosity). The Perceived Environment System is divided into two structures, the distal structure represents those factors that are indirectly related to problem behaviors (e.g., parental support and control, friends' support and control); the proximal structure represents those factors that are directly related to problem behaviors (e.g., parent and friend approval of problem behavior). The Behavior System is divided into two structures, problem-behavior (e.g., marijuana use, sexual intercourse) and conventional behavior (e.g., church attendance, academic performance).

Within each system are explanatory variables that either instigate problem behaviors (i.e., risk factors) or control against problem behaviors (i.e., protective factors). These two types of explanatory variables work together within each of the systems to "generate...a dynamic state called *proneness*, that specifies the likelihood of occurrence of normative transgression or problem behavior" (p. 332, Jessor, 1985).

The conceptual structure of the theory also includes antecedent-background variables. These consist of family demography variables (e.g., father's education and mother's education) and socialization variables (e.g., parental ideologies, home climate, peer influences, media influences). Thus the flow of the model, from left to right, would be from the antecedent-background variables to the social-psychological variables (i.e., the Personality and Perceived Environment Systems) to the social behavioral variables (i.e., the Behavior System).

Jessor and Jessor's findings have supported their Problem Behavior Theory. They have shown that the three systems of psychosocial influence contribute to the overall explanation of adolescent problem behaviors when controlling for those antecedent-background variables.

In their 1995 article on protective factors in adolescent problem behaviors, Jessor and his colleagues took variables from each of the three psychosocial systems and conceptualized them as either risk or protective factors. They then tested separately for the effects of risk and protective factors on problem behaviors. Prior to this study, variables were simply combined within the different systems, thus risk and protective factors were grouped together (see for example Jessor, 1987). In actuality, only the

personality system contained variables that were conceptualized as either risk (i.e.,

instigators) or protective (i.e., controls) factors.

What sets this apart from the earlier work is that the variables were phrased in such

a way as to indicate a particular value. For example, instead of stating "orientation

towards school," the authors used "a positive orientation to school." This is key when

describing risk and protective factors. It is not enough to indicate that a variable is a

protective factor or a risk factor, instead, one must indicate what value of a variable (e.g.,

high or low) is a protective factor or a risk factor.

Protective factors from the Jessor et al. (1995) study used in this study are: (a)

positive orientation to school, (b) positive relationships with adults, and (c) actual

involvement in prosocial behaviors. Risk factors used in this study include (a) low self-

esteem, (b) a general sense of hopelessness about life, and (c) exposure to friends who

model involvement in problem behaviors (i.e., health-risk behaviors).

Sexual Risk-Taking Behaviors

Several studies that have examined adolescent sexual risk-taking provide the

foundation for the outcome measure in this study. In addition, findings from these studies

also provide several risk and protective factors that are examined in this study. Although

sexual behaviors that are considered risk-taking are prevalent within the adolescent

sexuality literature, only a few published studies were found that specifically

conceptualized these behaviors as risk-taking and that used a multiple sexual risk-taking

behaviors approach (Buzwell & Rosenthal, 1996; Gillmore, Butler, Lohr, & Gilchrist,

1992; Luster & Small, 1994; Metzler, Noell, & Biglan, 1992). These researchers

characterized specific sexual behaviors as risk-taking behaviors and they examined two

or more of these behaviors in their studies. Jointly, these studies have examined the sexual risk-taking behaviors investigated in this study.

In their study, Buzwell and Rosenthal (1996) looked at the sexual risk-taking behaviors that occurred in regular and casual relationships as well as number of partners in the previous 6 months and the number of "one-night-stands" to assess sexual risk-taking. For regular and casual relationships, participants received scores ranging from 0 (no risk) to 8 (high risk) based on their use of condoms when engaging in vaginal, oral, or anal sex.

Luster and Small (1994) used number of sexual intercourse partners and consistency of birth control use to measure sexual risk-taking. Based on these measures, three groups were constructed to reflect different levels of risk-takers. High-risk adolescents were those who had more than one sexual partner and rarely or never used contraceptives. In the low-risk group, participants reported only one sexual intercourse partner and always using contraception. Sexual abstainers comprised the third group. Adolescents who did not fit into one of these three groups were not included in the analyses.

In their development of a construct of high-risk sexual behavior in heterosexual adolescents, Metzler and her associates (1992) asked participants about the number of times they had intercourse, the number of intercourse partners in the past year, the frequency of sexual intercourse with a casual acquaintance, the frequency of intercourse with someone who they knew was having sex with someone else, alcohol, drugs or marijuana as a part of their sexual experience, sex with an IV drug user, contraction of an STD, anal sex, contraceptive use, and condom use.

Gilmore and her colleagues (1992) examined the sexual behaviors of pregnant adolescents that increased their risk of contracting AID's and other STDs. These behaviors included anal sex, sex in exchange for money, sex in exchange for drugs, multiple sex partners, and casual sex, for a total of five sexual risk-taking behaviors. Each item was scored a 0 if participants did not engage in these behaviors and a 1 if they did engage in these behaviors forming a count ranging from 0 to 5.

In the current study, seven of the sexual behaviors mentioned above are used to construct the sexual competency scale. The score represents the number of sexual behaviors present that represent responsible sexual behavior. For example, participants who report contraceptive use all of the time are given a 1. Likewise, not having sex for money or drugs is counted as 1. Thus, higher scores represent higher sexual competence and lower scores represent lower sexual competence (i.e., high sexual risk-taking).

The sexual behaviors examined in the current study include: (a) contraceptive use, (b) anal intercourse, (c) casual sex, (d) alcohol use in connection with sexual intercourse, (e) being drunk in connection with sexual intercourse, (f) drug use in connection with sexual intercourse, and (g) having sexual intercourse for money or drugs. Scale construction details, including the items that were used, are found in Chapter 3.

Similar to the present study, Luster and Small (1994) (see also Perkins, Luster, Villarruel, & Small, 1998; Small & Luster, 1994) used an ecological risk-factor approach to examine adolescent sexual risk-taking behaviors. "Integrating the risk factor model into an ecological framework suggests that there are not only multiple risk factors related to adolescent sexual activity, but that these risk factors exist at multiple levels of an adolescent's life or social ecology" (Small & Luster, 1994, p. 183).

Using Bronfenbrenner's ecological paradigm, Small and Luster (1994) used three levels to delineate the risk factors in their study: (a) individual level, (b) familial level, and (c) the extrafamilial level. Individual risk factors were conceptualized as "risks [that] may be present within adolescents themselves" (p. 183). Familial risk factors were those risks present within the family, and extrafamilial risk factors were those factors that existed outside of the adolescent and her or his family.

Among the individual-level risk factors associated with sexual risk-taking were lower grade point average, lower psychological well-being, a history of physical and/or sexual abuse (Luster & Small, 1994), and engaging in other risky behaviors such as smoking cigarettes and consuming alcohol. Gillmore et al. (1992) and Metzler et al. (1992) also found that engaging in other risky behaviors such as smoking cigarettes and consuming alcohol were related to sexual risk-taking.

At the familial level, Luster and Small's (1994) and Gillmore et al's. (1992) results indicated that lower levels of parental monitoring, parental support, and family closeness were associated with sexual risk-taking. In addition, adolescents who were characterized as sexual risk-takers were less likely to discuss contraceptive use with their mother and were more likely to have run away from home (Gillmore et al., 1992).

Extrafamilial risks examined in these studies included involvement in a committed relationship, school experiences, peer conformity, neighborhood monitoring, and affiliation with peers engaging in other risky behaviors. Of these factors, affiliating with peers who engaged in other risky behaviors (i.e., substance use) was the only factor that was associated with sexual risk-taking (Gillmore et al., 1992).

Based on these findings, lower psychological well-being, engaging in other risky behaviors, less parental monitoring, less family closeness, being less likely to discuss contraceptive use with their parents, and associating with peers who engage in other risky behaviors are additional risk factors included in this study.

A limitation of the reviewed sexual risk-taking literature is that none of these studies used the multiple level of variables in their analyses that are to be used in this study. The two studies that did include two levels of variables (i.e., individual and familial) were limited in the number of variables at each level. Also, the dependent variable in these studies has been limited to two-to-four sexual risk-taking behaviors. Another limitation is that the samples in these studies were small and/or homogenous. Lastly, all of these studies were cross-sectional.

In this study, these limitations are addressed by: (a) including multiple variables at multiple system levels; (b) using seven sexual behaviors to measure sexual risk-taking; (c) having a larger and more diverse sample; (d) including information from African Americans from well-educated families and from Hispanic, Asian, and Native American adolescents; and (e) using information that is collected over time.

<div align="center">Adolescent Sexual Behavior</div>

The literature review of adolescent sexual behavior comprises research that is considered some of the most influential in the field. These include the works of: (a) Kantner and Zelnik on young women's pathways to pregnancy; (b) Sonenstein, Pleck, and Ku on adolescent male sexuality; (c) Hogan and Kitagawa on neighborhood contextual effects on adolescent sexual behavior; (d) Fox on familial influences on

adolescent sexual attitudes and behavior; (e) Rodgers on diffusion networks; and (f) Udry on socio-biological influences on adolescent sexual behavior.

Even though some of the reviewed studies examined only females or only males, the use of risk and protective factors based on the findings of these studies is applied to both genders. It is assumed that there might be differences in risk and protective factors for females and males and as such, gender is treated as a macro level variable. Furthermore, in some instances findings that pertain to sexual behaviors (e.g., having had intercourse) that are not conceptualized as risk-taking are still utilized to construct risk or protective factors in this study. Given the influence that this work has had on the field of adolescent sexual behavior and that it is possible that risk-taking behaviors did occur within the context of general reports of intercourse, it seems justifiable to use these findings to determine risk and protective factors.

<div align="center">Kantner and Zelnik</div>

Kantner and Zelnik's work on young women's pathways to pregnancy covered three national surveys of young women in 1971, 1976, and 1979 that they codirected. The 1971 survey sample was a national probability sample of 15 to 19-year-olds in households and dorms (Kantner & Zelnik, 1972; Kantner & Zelnik, 1973; Shah, Zelnik, & Kantner, 1975; Zelnik & Kantner, 1973). In 1976, the National Survey of Young (NSYW) Women consisted of a stratified probability sample of 15 to 19-year-olds living in households in the continental United States (Shah & Zelnik, 1981; Zabin, Kantner, & Zelnik, 1979; Zelnik & Kantner, 1980; Zelnik & Kim, 1982). In 1979, the NSYW was comprised of young women 15 to19-years-old and young men 17 to 21-years-old living in households

in Standard Metropolitan Statistical Areas (Zelnik & Kantner, 1980; Zelnik & Kim, 1982;

Zelnik & Shah, 1983).

The focus of these surveys was on never-married, sexually active young women.

Interviewers asked an array of questions related to sexuality including questions about the

perception of friends' sexual experience, knowledge concerning pregnancy risks and

contraceptives, who is responsible for contraceptive (i.e., male or female), reasons for not

using a contraceptive, frequency of intercourse using a contraceptive, age at first

intercourse, parents views of sexual behaviors, peers views of sexual behaviors, sex

education, and age of first partner.

Findings from studies using these surveys consistently reported ethnic differences in

sexual and contraceptive behaviors. (Kantner & Zelnik, 1972; Kantner & Zelnik, 1973;

Shah & Zelnik, 1981; Shah et al., 1975; Zabin et al., 1979; Zelnik & Kantner, 1973;

Zelnik & Kantner, 1980; Zelnik & Kim, 1982; Zelnik & Shah, 1983). However, the

reported differences were mainly differences in the means and percentages reported for

each ethnic group. Using basic regression terminology, only the intercepts were reported

and thus no real correlational comparisons for ethnicity were made. In order to compare

ethnic groups, slope comparisons are needed for any given variable. For example, to

determine if there are ethnic differences in the association between friend's health-risk

behaviors and sexual competence scores, a ethnicity by friend's health-risk behaviors

score interaction term would need to be included. This would indicate if factors

(protective or risk) had different affects on sexual competence scores based on ethnicity.

Therefore, these findings only point to the potential for ethnic differences in what influences sexual behaviors. The remaining support for ethnic differences is based in the theoretical foundation of this study.

Using data from the 1976 NSYW, Shah and Zelnik (1981) examined the influences of parents and peers on young women's sexual behaviors and use of contraceptives. They reported that when young women's sexual attitudes were similar to their parents' attitudes, they were less likely to be sexually active; however, when their attitudes were similar to their peers' attitudes, they were more likely to be sexually active. In contrast, when sexually active young women had sexual attitudes resembling their parents' they were less likely to use a contraceptive than when their sexual attitudes were similar to their friends. The reason for this difference was that the more traditional attitudes of the parents meant that their daughters were more likely to "deny their sexual behavior and either fail to use contraceptives or to use mainly nonmedical methods, such as withdrawal, thereby implying lack of readiness on their part to engage in sex" (p. 348, Shah & Zelnik, 1981).

Zelnik and Kim (1982) used data from the 1976 and 1979 NSYW to examine the affects of sex education (i.e., formal, in-school sex education) on young women's premarital pregnancy rates and use of contraceptives. Their findings indicated that sex education decreased the likelihood of becoming pregnant and increased the likelihood of using a contraceptive.

To summarize, based on Kantner and Zelnik's work, parents' traditional sexual values and adolescents' perception that parents have traditional sexual values are considered risk factors in this study.

Sonenstein, Pleck, and Ku

In 1988, Sonenstein, Pleck, and Ku began their longitudinal study of young men, following them from adolescence to the beginning of young adulthood. The first wave of the National Survey of Adolescent Males (NSAM) consisted of a nationally representative sample of 1,880 never-married males ages 15 to 19 living in the United States that included oversampling for Blacks and Hispanics. A second wave of data were collected in late 1990 and early 1991. A 1995 version of the NSAM used a new nationally representative sample of adolescent males.

Altogether, these authors have published over a dozen journal articles and book chapters on adolescent male sexuality (Ku, Sonenstein, & Pleck, 1992; Ku, Sonenstein, & Pleck, 1993a; Ku, Sonenstein, & Pleck, 1993b; Pleck et al., 1988; Pleck, 1989; Pleck, Sonenstein, & Ku, 1990; Pleck, Sonenstein, & Ku, 1991; Pleck, Sonenstein, & Ku, 1993; Pleck, Sonenstein, & Ku, 1994; Sonenstein, 1986; Sonenstein, Pleck, & Ku, 1989; Sonenstein, Pleck, & Ku, 1991; Sonenstein, Ku, Lindberg, Turner, & Pleck, 1998). They have covered topics such as sexual activity, contraceptive/condom use, and risk for HIV infection and other sexually transmitted diseases.

Similar to Kantner and Zelnik's work, findings from this research consistently indicated that there were ethnic differences in sexual behaviors. For example, their research demonstrated that black males started having sexual intercourse at an earlier age and had more sexual partners than white males. However, when age was controlled for, differences in the number of sexual partners was not distinguishable by ethnicity (Pleck et al., 1988; Pleck, 1989; Sonenstein et al., 1989). They also found ethnic differences in contraceptive use and in the use of condoms. According to the data from the 1979 survey,

black males were less likely to report contraceptive use overall, although they reported

using a condom more than white males during their first and their last intercourse .

experience (Pleck et al., 1988; Pleck, 1989). Similarly, data from the 1988 survey showed

the same patterns of contraceptive and condom usage with the added finding that

Hispanic males were more likely to report no contraceptive use at last intercourse than

black or white males (Sonenstein et al., 1989). They suggested that ethnic differences in

condom use and general contraceptive use were the result of lower levels of knowledge

about disease transmission, specifically HIV/AIDS, and being more likely to believe that

condoms are too much trouble.

Using Ajzen and Fisheirn's (1980) Theory of Reasoned Action to build a model of

male adolescent condom use, their research indicated that for sexually inexperienced

males having high self-esteem, not having low educational aspirations, and not holding

attitudes that discounted the risk of HIV/AIDS were associated with increased intentions

to use a condom. Likewise, for sexually experienced males, not being Hispanic, rating

religion as important, having liberal attitudes about males' sex roles, and not holding

attitudes that discounted the risk of HIV/AIDS increased the likelihood that a condom

was used at last intercourse (Pleck et al., 1990; Pleck et al., 1991).

In terms of additional risk and protective factors for this study, not holding attitudes

that discounted the risk of HIV/AIDS is included as a protective factor.

<u>Hogan and Kitagawa</u>

Hogan and Kitagawa's work investigated how social and environmental factors

influenced fertility and contraceptive use among black adolescents (Hogan & Kitagawa,

1985; Hogan, Astone, & Kitagawa, 1985). Most notably, their research often is cited for their findings concerning neighborhood contextual effects on adolescent sexual behavior.

Their studies used data from the 1979 Young Chicagoans Survey that included demographic, social, economic, fertility, and contraceptive use data on 1,078 black females and 131 black males. The female respondents were drawn from two separate samples. The first sample (with 388 respondents) was representative of all black females living in the City of Chicago. The second sample (with 690 respondents) was representative of black females from poor, primarily black areas of Chicago. Data on neighborhood quality were gathered from the 1970 U.S. Census.

Hogan and Kitagawa hypothesized that low quality neighborhoods would be associated with higher levels of teenage sexual activity and higher teenage pregnancy rates. They reasoned that this was the result of the negative attributes associated with these neighborhoods (e.g., extreme poverty conditions, poor schools, and large numbers of teenagers relative to the number of adults) and a social atmosphere that discouraged academic achievement and aspirations and that normalized deviant behaviors.

Findings indicated that low neighborhood quality was associated with more females being sexually active and more females becoming pregnant (Hogan & Kitagawa, 1985). Hogan et al. (1985) found further support for the hypothesized neighborhood quality effect. Results from their study indicated a neighborhood by career aspiration interaction for contraceptive use at first intercourse. Black teenagers who resided in average quality or above average quality neighborhoods with high career aspirations were more likely to use a contraceptive at first intercourse. This suggested "that the career aspirations of

black teenagers may become an important motivation for contraceptive use only in situations where those aspirations are encouraged by others in the community" (p. 168).

Based on these findings, residing in neighborhoods that are characterized as low quality is considered a risk factor in this study.

<u>Fox</u>

Fox's work examined familial influences on adolescent sexual attitudes and behaviors (Inazu & Fox, 1980; Fox & Inazu, 1980a; Fox & Inazu, 1980b; Fox & Medlin, 1986; Fox, Colombo, Clevenger, & Ferguson, 1988). The aspects of familial influences that were studied included sexual communication, parents as role models, parental accuracy in the perceptions of teenager's level of sexual involvement, and parental division of labor in adolescent sexual socialization.

Two samples were used to study familial influences on adolescent sexuality. The first sample consisted of 449 mother-teenage daughter dyads from the City of Detroit. Fifty-six percent of the sample was black and 48% of the sample were married. The second sample included 97 middle and upper-middle class black and white one-parent and two-parent families.

Using data from the first sample, it was discovered that out of six possible sexual discussion topics, menstruation and dating and boyfriends were the two most common topics of mother and daughter discussion. Sexual intercourse and contraception were reported to be the least discussed topics (Fox & Inazu, 1980a). Other findings related to sexual communication were that being more religious and being white increased the number of topics discussed and that mothers reported being more comfortable discussing sexual issues than did daughters.

In another study that utilized data from the first sample, Fox and Inazu (1980b) found a high consistency in mother's and daughter's reports of sexual communication. Results from this study also indicated that white mothers were less likely to discuss sensitive topics than were black mothers and that mothers without a college education were less likely to discuss contraception and conception than were mothers with a college education.

Referring to the mother's influence on the sexual behavior of their adolescent daughters, Inazu and Fox (1980) concluded that "the strongest predictor of [daughters'] sexual experience was the daughter's report of her relationship with her mother; the more favorable the relationship, the less likely was she to have had sex" (p. 98).

Using data from the second sample, Fox and Medlin (1986) and Fox et al. (1988) examined the accuracy in mothers' perception of their daughters' level of sexual involvement and parental division of labor in adolescent sexual socialization, respectively. The results from Fox and Medlin indicated that mothers with warm, affectionate, and more open relationships who used direct and approachable styles of communication were more likely to be accurate in their perceptions of their daughter's level of sexual experience. The daughters of accurate mothers were more likely to have a positive view of their relationship with their mother and to rely upon their mothers "as resources, valued advisors, and confidantes" (p. 282).

Though these studies did not examine sexual risk-taking behaviors, they do demonstrate the importance of parent-adolescent sexual communication and it's affect on sexual experience. Based on these findings, it is hypothesized that discussing sex and

discussing contraceptives are protective factors. In addition, it is considered to be a protective factor when parents report recommending birth control to adolescents.

<u>Rodgers</u>

The fundamental assumption of Rodgers' model of social contagion is homophily: "the tendency for friends to be similar on relevant attributes" (p. 413, Rodgers, Billy, & Udry, 1984). Based on the earlier work of Kandel and her colleagues (1973, 1976, 1978a, 1978b) on friendship similarities and Tvesky's (1972) elimination by aspects model, Rodgers' model provides both a conceptual framework and a mathematical model to explain adolescent sexual behavior and mildly deviant behavior (e.g., drinking, smoking).

As the name implies, this model uses an epidemiological approach to explaining adolescent sexual behavior and mildly deviant behavior. Simply stated, sexual behaviors and mildly deviant behaviors spread from adolescent to adolescent through contact with one another. This model also is referred to as an epidemic model, and it contains both the active spread (i.e., social contagion) and the passive spread (i.e., social diffusion) of behaviors. Rodgers and Rowe (1993) note that their model treats the active spread and the passive spread similarly and refers to them both as contagion. It is interesting to note that later versions of the model included biosocial (see Udry below) and social control (see Hirschi above) components in the conceptual explanations and mathematical models.

The difficulty with this model is actually testing how these behaviors spread. In order to examine how behaviors are spread, researchers would not only need data from adolescents that encounter each other; they also would need to have the ability to tell who was in contact with whom. At that time, existing data sets did not contain this type of information. Hence, Rodgers and his colleagues had to create such data sets that

contained this type of information so that they could test and develop their model. The first of these samples was gathered from a junior high school located in North Carolina in 1978.

This sample contained data on 408 respondents that completed two rounds of questionnaires one year apart. Each respondent was given a list of all students at the junior high school and asked to select the I.D. number of his or her three best female and three best male friends. They were then asked to answer "yes" or "no" to questions that asked if they had ever had sex, drank alcohol, smoked cigarettes, driven a car, or cheated on a test.

Based on their findings, Rodgers et al. (1984) and Billy, Rodgers, and Udry (1984) concluded that for females, friendship structure was affected by mildly deviant behaviors, but male friendship structure was not affected by these behaviors. In other words, after controlling for ethnicity and grade, females were more likely than males to use engaging in mildly deviant behaviors as criteria for friendship selection.

The Adolescent Sexuality (ADSEX) data set was the second data set that Rodgers and his colleagues used to develop and test the contagion model. The information in this data set was collected between 1978 and 1982. In-home interviews were conducted with 1,938 participants from two schools in Raleigh, North Carolina (three waves) and Tallahassee, Florida (two waves). Similar to the other sample, respondents could be linked to up to three female and three male friends. Additionally, 581 respondents had siblings in the sample, representing 276 families.

Results from this data set suggested that the sexual experiences and mildly deviant behaviors of adolescent's friends and siblings reflected the adolescent's sexual

experiences and mildly deviant behaviors (Rodgers & Rowe, 1990; Rodgers & Rowe, 1993; Rowe, Rodgers, & Meseck-Bushey, 1989). Furthermore, same-sex siblings and same-sex friends were more alike than opposite-sex siblings and friends. Additional results indicated that for females, sexual maturation needed to be included in the model. Not only did this provide a better fit, considering that black females tend to reach sexual maturity earlier than do white females, it helped to explain females racial differences in age at first intercourse

Two recent studies using the social contagion model of adolescent sexual behavior with a nationally representative sample (i.e., the National Longitudinal Survey of Youth) supported the findings from the earlier studies that used this model (Rodgers, Rowe, & Buster, 1998; Rowe & Rodgers, 1994). However, links between adolescent's friends and siblings could not be made with that data set. It is only by discussing the results from the three sets of data in conjunction that the researchers were able to generalize their findings to adolescents in the United States.

Rodgers' work is important here because it demonstrates just how much friends influence each other's behaviors. From his work, risk and protective factors in this study include friend's health-risk behaviors or lack of health-risk behaviors.

Udry

One of the primary investigators for the Add Health study, Udry's previous work involved the development of a biosocial model of adolescent sexual behavior. Udry and his colleagues argued that although social scientists had acknowledged the indirect influence of increased hormone levels on adolescent sexual behavior, the direct influence of hormones on adolescent sexual behavior had not been tested. An indirect influence

would include the perception that an adolescent is sexually attractive or is a potential sex partner based on the physical maturation that is caused by hormones. Conversely, a direct influence would be that the increased hormone levels causes increased sexual motivation or interest.

Both the direct and indirect influences of hormones on adolescent sexual behavior would fall into the realm of a biosocial explanation. Udry's work covered both of these causal explanations, at times contrasting and comparing the two. However, given the difficulty and expense involved in collecting blood and testing it for hormone levels, only a portion of his work utilized this method and tested for the direct effects of hormones on adolescent sexual behavior. The remaining studies relied solely on self-reports of pubertal development that were used to examine the effects of hormones on adolescent sexual behaviors. It was assumed that different levels of pubertal development represented different levels of hormones present in the blood.

In three cross-sectional studies that measured the hormone levels in the blood stream (Udry; 1988; Udry, Billy, Morris, & Raj, 1985; Udry, Talbert, & Morris, 1986), the sample consisted of 8th, 9th, and 10th grade females and males from a medium-sized southern U.S. city. The researchers found that the effect of increased hormone levels on sexual behaviors was direct. That is to say that it "does not operate through pubertal development [physical maturation] or age" (p. 226, Udry et al., 1986). Specifically, it was discovered that for females, higher hormone levels were associated with increased instances of masturbation and subjective sexual experiences such as "turn-ons," thinking about sex, and sexual motivation. However, unlike males, increased hormone levels were not associated with increased occurrences of sexual intercourse for females. The authors

suggested that "coital behavior for females is influenced by social environments to a much greater extent then is true for males" (p. 224, Udry et al., 1986). Furthermore, it was determined that a biosocial model of adolescent sexual behavior explained more variance than a biological or social model alone could explain.

Based on these findings, results from studies that used only self-reports of pubertal development were interpreted as representing changes in hormone levels (Smith, Udry, & Morris, 1985; Udry, 1990; Udry & Billy, 1987). Using data from the ADSEX study (see Rodgers above), it was determined that pubertal development was related to adolescent sexual behavior as higher levels of pubertal development were associated with increased sexual behaviors.

However, more recent studies that measured hormone levels in the blood provided evidence that there is no direct effect of hormones on sexual behavior (Halpern, Udry, Campell, & Suchindran, 1993; Halpern, Udry & Suchindran, 1997). Using longitudinal data, findings from these studies suggested pubertal development was more important than hormone levels. However, the authors did state that the "results are consistent with a biosocial model proposing [hormones] as a causal factor in female sexual activity, and suggest that biological effects are moderated by relevant social variables" (p. 161, Halpern et al., 1997). This statement is also relevant to the Halpern et al. (1993) study of males.

Udry's work clearly demonstrates that pubertal development influences adolescent sexual behaviors. However, it is the timing of pubertal development that determines if it acts as either a risk or a protective factor. Generally, there are both psychological advantages and disadvantages to early- and late-maturation (Papalia & Olds, 1998). In

general, early-maturing girls and late-maturing boys are at the greatest risk for increased psychological adjustment problems (Brooks-Gunn & Reiter, 1994). However, in terms of sexual behaviors, Brooks-Gunn and Reiter (1994) suggested that both early-maturing boys and girls "may engage in adult behaviors (such as smoking, drinking, and sexual intercourse) at an earlier age than later maturers" (p. 43).

Because they lack the cognitive skills, early-maturers who become sexually active are less likely to make responsible decisions. Thus, early pubertal development is considered a risk factor for engaging in sexual risk-taking behaviors.

Add Health

In the first paper to be published from the Add Health study, Resnick and his colleagues identified risk and protective factors in relation to adolescents' health (Resnick, Bearman, Blum, Bauman, Harris, Jones, Tabor, Beuhring, Sieving, Shew, Ireland, Bearinger, & Udry, 1997). Two types of independent variables were identified in the study, generic (i.e., those factors that were hypothesized to be related to all dependent variables) and domain specific. Generic variables used in the current study include levels of parent-family connectedness, parent-adolescent activities, parental presence, and school connectedness. Higher levels of these variables are all hypothesized to act as protective factors in the current study.

Domain specific variables relevant to the current study were those variables from the sexual behavior domain. Factors that are used in this study are perceived obstacles to contraceptive use and perceived consequences of pregnancy. Perceiving that there are negative consequences related to becoming pregnant is considered a protective factor. This is supported by Resnick et al's. finding that it was a protective factor against a

history of pregnancy. It is hypothesized that having the perception that there are obstacles to contraceptive use is a risk factor. This is based on the assumption that if sexually active adolescents perceive obstacles to contraceptive use, then they are less likely to use them.

Combining the reviewed literature and the theoretical framework, a model for adolescent sexual competence and sexual risk-taking has been developed. The following section summarizes the model and provides a rational, based on Jessor et al's. (1995) conceptualization of risk and protective factors, for the inclusion of each factor as a risk factor or as a protective factor.

The Model

At the micro level, individual factors that are hypothesized to put adolescents at risk for engaging in sexual risk-taking behaviors (i.e., not being sexual competent) include a general sense of hopelessness about life, low self-esteem, engaging in other health-risk behaviors, a perception that there are obstacles to contraceptive use, early pubertal development, and a perception that parents have traditional sexual values.

According to Jessor et al. (1995), high feelings of hopelessness and low self-esteem put adolescents at risk for problem behaviors because these behaviors are a means for dealing with negative feelings. In addition, because these feeling tend to result in adolescents being disengaged from societal norms, "the social influences that usually serve as controls against engaging in problem behavior are attenuated, and the sense of vulnerability may lead to coping through problem behavior" (p. 926). Because problem behaviors tend to occur as clusters, it is expected that engaging in other health-risk behaviors is related to sexual risk-taking behaviors. A perception that there are obstacles

to contraceptive use represents risk because it provides adolescents with a justification for not using a contraceptive; thus, it encourages them not to use contraceptives. Early pubertal development comprises risk through direct instigation. Both adults and peers expect adolescents who appear older to engage in behaviors associated with being older. Lacking the cognitive skills to deal with these behaviors, these adolescents are more likely to engage in sexual risk-taking and other health-risk behaviors. The perception that parents have traditional sexual values constitutes risk because it can cause adolescents to deny their sexual behavior and thus increase their vulnerability for normative transgression. Specifically, they are less likely to use contraceptives (i.e., more likely to engage in a sexual risk-taking behavior).

At the familial level, risk factors include having parents with traditional sexual values, low parental monitoring of adolescents, and low parental presence. Similar to adolescents perceiving that their parents have traditional sexual values, parents with traditional sexual values represents risk because it increases their vulnerability for normative transgression. As well, these parents are less likely to have discussed sexual issues with their adolescent, and as such, there are fewer social influences to encourage adolescents to be sexually competent. In addition to the lack of positive social influences, less parental monitoring and low parental presence constitutes risk because it provides greater opportunity to engage in problem behaviors.

Having friends who engage in other health-risk behaviors is considered a risk factor within the peer microsystem. This factor comprise risk because it provides direct instigation and encouragement for engaging in sexual risk-taking behaviors.

Lastly, residing in neighborhoods that are characterized as low quality is considered a risk factor for engaging in sexual risk-taking behaviors. As noted earlier, Hogan and Kitagawa reasoned that the negative attributes associated with these neighborhoods (e.g., extreme poverty conditions, poor schools, and large numbers of teenagers relative to the number of adults) and a social atmosphere that discouraged academic achievement and aspirations and that normalized deviant behaviors resulted in higher levels of teenage sexual activity and pregnancy. Together, these factors constitute risk through direct instigation and encouragement (i.e., normalized deviant behaviors), increased vulnerability for normative transgression (i.e., negative attributes of neighborhoods), and greater opportunity to engage in sexual risk-taking and other health-risk behaviors.

Within the context of an ecological paradigm, the presence of these risk factors can result in socially impoverished microsystems that "work against competence" (Garbarino & Abramowitz, 1992). In other words, the microsystem itself becomes a risk factor. For example, in the current study having parents with traditional sexual values and low parental monitoring of adolescents are hypothesized to work against sexual competence. Thus, being a part of a familial microsystem that has one or more of these characteristics is a risk factor. In this way, socially impoverished microsystems can add up to increase risk, just as individual factors can accumulate to increase the amount of risk.

Individual level protective factors include not holding attitudes that discount the risk of HIV/AIDS and perceiving that there are negative consequences of becoming pregnant. These factors are hypothesized to decrease the likelihood to engage in sexual risk-taking behaviors through direct personal and social controls.

At the familial level, factors that are hypothesized to protect adolescents from engaging in sexual risk-taking behaviors (i.e., increase the likelihood of sexual competence) consist of adolescents having high levels of parent-family connectedness, adolescents and parents participating in activities together, and high levels of family sexual socialization. This last factor includes parents and adolescents discussing sex, parents and adolescents discussing contraceptives, and parents recommending birth control for adolescents.

A high level of parent-family connectedness constitutes protection because adolescents are more likely to develop orientations towards and commitments to adult society. Similar to involvement in prosocial behaviors, adolescents and parents participating in activities together constitute protective factors because they promote orientations and social networks incompatible with sexual risk-taking behaviors. Parents and adolescents discussing sex, contraceptives, and having parents recommend birth control for adolescents all function as protective factor because they convey social controls against engaging in sexual risk-taking behaviors.

Peer protective factors include having friends who do not engage in other health-risk behaviors. This is thought to operate as protective factors because it provides direct social controls against sexual risk-taking behaviors.

Within the context of the school, feeling that they are connected to or a part of their school is hypothesized to protect adolescents from engaging in sexual risk-taking behaviors. A high level of school connectedness represents protection because it reflects "positive engagement with a conventional social institution and commitment to its goals" (Jessor et al., 1995, p. 925).

At the community level, having positive relationships with adults is hypothesized to

protect adolescents from engaging in sexual risk-taking behaviors because these

relationships provide "support for conventional behavior and sanctions against problem

behaviors" (Jessor et al., 1995, p. 925). It is hypothesized that this factor has an affect on

sexual risk-taking behaviors because the potential outcomes of such behaviors are

incompatible with prosocial behaviors.

Parents' involvement in school-related organizations and parents' involvement in

community-based organizations are considered protective factors at the meso- and

exosystem level, respectively. According to Garbarino and Abramowitz (1992), greater

opportunities at the mesosystem occur when there are more connections between

microsystems. Therefore, parental involvement in school related organizations represent

a protective factor because it provides a connection between the two systems (i.e., family

and school). In addition, parental involvement models a commitment to conventional

institutions for the adolescent. According to Garbarino and Abramowitz (1992) "The

neighborhood also is a setting in which the parent participates independently of the child,

and the quality of the support, encouragement, and feedback given by the neighborhood

to the parent has an effect upon the child's development" (p. 49). Parental involvement in

community-based organizations represents multiple connections between the family and

the neighborhood that provides the developing child with additional social resources. As

with parental involvement with the schools, this models a commitment to conventional

institutions for the adolescent.

It is thought that there are ethnic differences in how risk and protective factors

influence sexual risk-taking. These ethnicity represents a macrosystem factor in the

current study. Additionally, because the sexual socialization of females differs from that of males in our culture, gender represents a macrosystem factor in the current study.

Use of the Add Health study data provides several advantages over previous adolescent sexuality research. Though it may never have been the intention of the researchers to generalize their results beyond the samples that they used; nonetheless, the most common limitation of these earlier works was the samples that were used. Although Kantner and Zelnik and Sonenstein, Pleck, and Ku constructed and used nationally representative samples, with few exceptions (see for example Rodgers & Rowe, 1998; Rowe & Rodgers, 1994), samples used in the remaining works were primarily restricted to a particular region or city. Thus, it is difficult to generalizing their findings to all adolescents in the United States.

Small sample size or a limited number of respondents representing a particular ethnic group was another limitation of some of the earlier works. Because the number of cases with a particular characteristic often was small, researchers had to combine data in order to analyze it. Sometimes this meant aggregating across racial categories (see for example Kantner & Zelnik, 1972), other times it meant having to combine responses on a particular measure, such as types of contraceptives used (see for example Zabin et al., 1979). Both of these methods reduce the validity of the measures; thus, the findings that used them become more limited.

Yet another common limitation was the use of cross-sectional data. Beyond describing what adolescents were doing sexually, at what age they were doing it, and with whom, the basic question being asked in many of these studies is why. In other words, what was causing or influencing adolescents' sexual behaviors. These early

adolescent sexuality researchers often times had to rely on retrospective accounts to assess the cause-and-effect nature of adolescent sexual behaviors. The work of Udry and his colleagues (see above) provides a prime example of the importance of using longitudinal data when trying to determine the causes or influences of adolescent sexual behaviors.

Several other limitations, though not as prevalent as those already discussed, are worth mentioning. The use of a single respondent to report on information about themselves and others (e.g., parents and peers) often was the case in these early works. It also was common to use single-item measures of sexual behavior. This seemed to oversimplify the complexities of adolescent sexual behaviors. Having no theoretical basis to guide the research process, also was a limitation of some of these works.

Because of the pioneering work of the scholars that were mentioned earlier, the Add Health study researchers were able to focus on overcoming some of the major methodological limitations experienced by previous researchers. Responding to the limitations that were mentioned above, in the order that they were presented: First, the Add Health study sample does not have limitations as severe as those of the early works, though it still has some limitations related to the use of schools as it sampling frame. Second, the Add Health study is longitudinal; therefore, cause-and-effect can be examined. Third, the Add Health study contains information from multiple respondents (e.g., parents and peers) and several sources (e.g., US Census, the Centers for Disease Control and Prevention). Fourth, many of the topics covered by the Add Health study are represented by multiple questionnaire items, sometimes from multiple informants. Finally, the Add Health study has a strong theoretical basis.

Hypotheses

Hypothesis 1

The first hypothesis is that for adolescents who are sexually active between Wave 1 and Wave 2: (a) a general sense of hopelessness about life, (b) low self-esteem, (c) engaging in other health-risk behaviors, (d) a perception that there are obstacles to contraceptive use, (e) early pubertal development, (f) a perception that parents have traditional sexual values, (g) having parents with traditional sexual values, (h) low parental monitoring of adolescents, (i) low parental presence, (j) having friends who engage in other health-risk behaviors, and (k) residing in neighborhoods that are characterized as low quality will each increase the likeliness of engaging in sexual risk-taking behaviors (i.e., decrease sexual competence), controlling for other predictors.

Hypothesis 2

The second hypothesis is that for adolescents who are sexually active between Wave 1 and Wave 2: (a) not holding attitudes that discount the risk of HIV/AIDS, (b) perceiving that there are negative consequences of becoming pregnant, (c) having high levels of parent-family connectedness, (d) participating in activities with parents, (e) having a higher level of family sexual socialization, (f) having friends who do not engage in other health-risk behaviors, (g) feeling connected to school, (h) having positive relationships with adults, (i) parents' involvement in school related organizations, and (j) parents' involvement in community based organizations will each decrease the likeliness that adolescents will engage in sexual risk-taking behaviors (i.e., increase sexual competence), controlling for other predictors.

Hypothesis 3

The third hypothesis is that gender interacts with risk factors (Hypothesis 1) and protective factors (Hypothesis 2) such that there are different affects for females and males on sexual risk-taking behaviors.

Hypothesis 4

The fourth hypothesis is that ethnicity interacts with risk factors (Hypothesis 1) and protective factors (Hypothesis 2) such that there are different affects for ethnic groups on sexual risk-taking behaviors.

CHAPTER III

METHODS

Sampling Procedures

With an emphasis on the influence of social context, "Add Health postulates that families, friends, schools, and communities play roles in the lives of adolescents that may encourage healthy choices of activities or may lead to unhealthy, self-destructive behaviors" (Bearman, Jones, & Udry, 1997, p. 1). Based on this assumption, the Add Health researchers gathered information from several different sources that are part of an adolescent's social and physical environment. Together, these data provide information about adolescents' families, peer groups/social networks, dyadic relationships (i.e., siblings, best friends, romantic partners, and sexual partners), schools, and neighborhoods/communities.

The data were collected from a nationally representative sample of adolescents in Grades 7 through 12 in the United States between April and December 1995 (Wave I) and then again between April and August 1996 (Wave II). Wave I data included an in-school questionnaire completed by more than 90,000 adolescents and an in-home interview completed by approximately 20,000 adolescents with oversampling for black adolescents from well-educated families (i.e., a parent with a college degree), Chinese adolescents, Cuban adolescents, and Puerto Rican adolescents (Bearman et al., 1997).

In addition to these elements, the study contains data from a parent of interviewed adolescents (usually the mother) and data from school administrators about the characteristics of the school. Furthermore, the study was designed so that peer groups/social networks and pairings for best friends, romantic partners, and sexual

partners could be constructed. Assessments of the neighborhood and community context also have been constructed from various outside sources and aggregated respondent reports.

Yet another design feature of the Add Health study is what the authors referred to as a "genetic sample" (Udry & Bearman, 1998). Udry and Bearman stated that "The [genetic] sample design yields the full range of genetic relationships within households, from complete similarity (identical twins) to no shared genes (unrelated adolescents)" (p. 245). This subsample consists of identical twins, fraternal twins, full siblings, half-siblings, and unrelated pairs in the same household.

Numerous topics were covered in the study, including crime, delinquency, and problem behaviors, dating and courtship, friends, social activities, and social support, physical health, mental health, nutrition, parent-child relationships, personality, religion, substance use, and sexuality. Additional information about the Add Health study can be found in Bearman, Jones, and Udry (1997), Udry and Bearman (1998), or Kelly and Peterson (1997).

The primary sampling frame for the Add Health study was all high schools in the U.S. that had an 11th grade and at least 30 students (N=26,666). From this a "systematic random sample of 80 high schools was selected proportional to enrollment size, stratified by region, urbanicity, school type, and percentage white" (p.824, Resnick et al). More then 70% of the originally selected schools agreed to participate. Replacement schools for those that refused to participate were selected from within the stratum. When available, one feeder school (i.e., middle school or junior high) for each selected high school also was selected with probability proportional to its student contribution to the

high school. Ninety percent of all students enrolled in the selected schools participated in the in-school phase of the survey. Once the in-school data were collected, all students who completed a questionnaire and those who did not complete a questionnaire but who were listed on a school roster were eligible for selection into the core in-home sample. A random sample of 16,000 students was selected for the in-home interview. Approximately 200 students from each school pair were selected, creating a self-weighted sample (Bearman, Jones, & Udry, 1997). A parent of each adolescent was interviewed with 85% of the parents participating in the survey. Adolescents that were originally in grades 7 to 11, 88% of the original in-home sample, were selected to participate in Wave 2. The 88% also included individuals that were part of a sibling pair (i.e., genetic sample) but who were not originally in grades 7 to 11.

There are several implications of the sampling design. Complex interview surveys, such as the Add Health study, often use clustering, stratification, and disproportionate stratification (i.e., oversampling) sampling techniques to increase cost efficiency. These sampling designs can cause the standard error variance in statistical tests to be either underestimated or overestimated. When underestimated, "there is a risk that the probability levels reported in significance tests are too low, leading to the rejection of the null hypothesis when, in fact, no significant differences exists" (Johnson & Elliott, 1998, p. 994). When overestimated, there is a risk that the probability levels reported in significance tests are too high, leading to the acceptance of the null hypothesis when, in fact, significant differences exist. Each of these consequences has a different influence on the standard errors and each can have different effects hypothesis testing.

To account for the effects of complex sample designs, special statistical formulas or

procedures are needed to estimate the correct standard errors. In addition, different

formulas are needed in the calculation of different parameters (e.g., standard error of

regression coefficients and means). Statistical packages such as SPSS and SAS assume

that simple random sampling was used and thus the cases are self-weighted and

independent. Though these software packages allow users to weight the data to yield

correct point estimates (e.g., means, regression parameters, proportions) "they do not

account for the effects of weights on significance tests" (Johnson & Elliott, 1998, p. 995).

To calculate the correct variance estimates, specialized statistical packages that

correct for design effects and unequal probability of selection are needed. In the current

study, Software for the Statistical Analysis of Correlated Data (SUDAAN) is utilized to

answer the major research questions posed by this study. SUDAAN is preferred for

analysis of cluster-correlated data inherent with longitudinal multistage sampling designs

(Shah, Barnwell, & Bieler, 1998). In addition to weighting the data, SUDAAN also uses

design type (e.g., with replacement or without replacement) and variables that identify or

label the sampling levels or stages used in the sample design in the analytic procedures.

Typically, these include stratification and clustering (i.e., primary sample unit) variables.

The Add Health study has a post-stratification variable that represents the region of the

U.S. where the school was located and the school identifier (i.e., a school) as the

clustering variable.

One of the differences between the contractual (i.e., full) version and the public use

version of Add Health is the exclusion of a stratification variable in the public use

version. Because the Add Health sampling plan did not include a stratification variable,

sample weights were adjusted so that region of the country could be used as a post-

stratification variable (Chantala & Tabor, 1999). The exclusion of this variable means that the full sampling design cannot be accounted for. According to the Add Health researcher, "not using a strata [i.e., stratification] variable only minimally affects the standard errors" (Add Health -FAQ, 1999).

Sample Characteristics

The public use version of Add Health consists of 5,800 variables for 6,504 cases, approximately half of the core sample (Bearman et al., 1997). The school administrator data is not included in this version nor are pairings for best friends, romantic partners, siblings or friendship networks available with the public use version.

Adolescents who reported having had sexual intercourse by Wave 2 data collection and who reported having sexual intercourse during the year prior to their second interview (i.e., Wave 2) were selected for analysis in this study (n = 1632). This selection was based on an item from the Wave 2 Contraception Section that asked adolescents about birth control use in the past 12 months. If an adolescent had reported that they had had sexual intercourse at Wave 2, they were asked a series of questions related to the use of contraception; otherwise, they were skipped out of the section. Based on the series of skip pattern in this section, it was determined that those adolescents who answered this item experienced their most recent intercourse after the time of their last interview. Additional selection criteria included eliminating those cases that had missing data for gender or ethnicity, married adolescents, and adolescents under the age of 13 at Wave 2 because relevant questions were not asked of youth 12 and under.

Table 3-1 shows sociodemographic characteristics of adolescents by gender and ethnicity. Items as they originally appeared, recodes, and scale construction appear in the

Table 3-1. Percent Distribution of Sample Characteristics by Gender and Ethnicity

Characteristics	Total	Gender		Ethnicity					
		Female	Male	Asian	Black	Hispanic	Native	White	Other
Gender									
Female	50.5	-	-	64.8	48.2	42.0	41.4	52.7	69.8
Male	49.5	-	-	35.2	51.8	58.0	58.6	47.3	30.2
Ethnicity									
Asian	2.4	3.1	1.7	-	-	-	-	-	-
Black	20.1	19.2	21.1	-	-	-	-	-	-
Hispanic	13.5	11.2	15.8	-	-	-	-	-	-
Native	2.2	1.8	2.6	-	-	-	-	-	-
White	61.0	63.7	58.4	-	-	-	-	-	-
Other	.7	1.0	.4	-	-	-	-	-	-
Parental Education									
No school	.1	.1	.	.	.	.	.	.1	.
8th grade or less	3.9	2.9	5.0	.	4.3	19.0	.	.8	.
More than 8th grade, no HS diploma	9.7	8.5	10.8	18.3	12.4	10.9	9.8	8.0	22.4
GED or HS diploma	34.2	35.6	32.7	15.6	26.5	42.4	41.9	35.4	30.8
Business, trade, or vocational school	17.3	17.5	17.1	14.1	24.3	7.7	19.5	17.4	.
Some college, no degree	18.5	18.8	18.2	26.7	20.3	9.3	12.4	19.7	30.5
College degree	10.7	10.3	11.1	19.4	7.4	7.9	10.4	12.2	3.4
Professional training beyond college	5.7	6.4	5.1	5.9	4.9	2.8	6.0	6.5	12.9
Parental Marital Status									
Married	64.3	66.5	62.1	76.2	39.7	65.7	59.7	71.6	82.4
Not married	35.7	33.5	37.9	23.8	60.3	34.3	40.3	28.4	17.6
Residence									
Rural	25.1	27.5	22.7	11.5	19.0	9.1	24.9	31.2	25.0
Suburban	33.2	33.3	33.1	36.5	20.5	26.1	32.3	38.5	61.7
Urban residential	35.9	34.8	36.9	48.1	54.6	45.8	42.8	27.0	13.3
Other	5.8	4.3	7.3	3.9	5.8	19.0	.	3.2	.

measurement section of this chapter. The mean age at Wave 2 is 16.72 and the median income is $36,000. Females and males in the sample are very similar with respect to parental education, parental marital status, and residence. For ethnicity, there are proportionately more Asian females (65%) than Asian males (35%) and more Hispanic and Native American males (58% and 59%) than Hispanic or Native American females (42% and 41%). The majority of the sample is white (61%) and nearly 2/3 live in a household with a parent who is married. The most common level of parental education is GED or high school diploma, with 16% having a college degree or higher. Urban residential (36%) and suburban (33%) are the most common community of residence. For Asian Adolescents, "some college, no degree" represents the highest portion of parental education; whereas, "GED or high school diploma" constitutes the highest portion for all other ethnic categories. Adolescents who specified ethnicity as "other" are the most likely to live in a household with a married parent (82%), followed by Asian and then white adolescents. Black adolescents are the least likely to live in a household with a married parent (40%). The majority of Asian, Black, Hispanic, and Native adolescents live in urban residential communities. Suburban communities is the most common community of residence for both white adolescents and adolescents that specified "other" as their ethnicity.

<div align="center">Data Collection Procedures</div>

Data were collected using questionnaires (in-school) and interviews (in-home, Wave I and Wave II). The following description of these procedures is taken from Bearman et al. (1997):

The in-school questionnaire, a self-administered instrument formatted for optical

scanning, was administered to students in grades 7 to 12 from September 1994 through April 1995. In each school, one 45- to 60-minute class period was devoted to completing the questionnaires. There was no "make-up" day for students not present on the day of administration. Parents were informed in advance when the questionnaire administration would occur and could direct that their children not participate.

The questionnaire included topics such as the social and demographic characteristics of respondents (of interest both in itself and as a selection criterion for the Add Health in-home special samples), the education and occupation of parents, household structure, risk behaviors, expectations for the future, self-esteem, health status, friendships, and school-year extracurricular activities.

Each participating school provided the study with a roster of its students. We [the Add Health researchers] assigned identification numbers to the names on the roster, made copies of the roster, and provided these copies to students to use in identifying their friends in the course of filling out the in-school questionnaire. Rosters were collected at the end of the class period and destroyed (p. 3).

In-home interviews were conducted between April and December 1995. All respondents were given the same interview, which took from one to two hours to complete depending on the respondent's age and experiences. The majority of interviews were conducted in the respondents' homes.

In the interests of confidentiality, no paper questionnaires were used. Instead, all data were recorded on laptop computers. For less sensitive sections, the interviewer read the questions and entered the respondent's answers. For more sensitive sections, the respondent listened to pre-recorded questions through earphones and entered the answers directly (audio-CASI). In addition to maintaining data security, this minimized the potential for interviewer or parental influence.

Some of the topics covered by the in-home interview are: health status, health facility utilization, nutrition, peer networks, decision-making processes, family composition and dynamics, educational aspirations and expectations, employment experience, the ordering of events in the formation of romantic partnerships, sexual partnerships, substance use, and criminal activities. Care was taken to screen respondents on age and experience so that only appropriate questions were asked. Additional questions concerning the joint occurrence of risk behaviors were asked of respondents who had indicated they had done the behaviors separately, for example, fighting while using drugs or drinking while carrying a weapon (p. 4).

In home interviews for Wave 1 and Wave 2 were generally the same and used the

same procedures. Information that was not expected to change over time, such as

ethnicity, was not collected again in Wave 2. In addition, questions concerning sun

exposure and more detailed nutrition questions were added to Wave 2.

Data Preparation and Transformation

The public use version of the Add Health data was purchased from Sociometrics Corporation. The full data set, as it was described above, is provided for use on a CD-ROM. Included with the data set is software that allows users to search, retrieve, and extract only the data of interest. The extracted data can be a subsample of cases, a subsample of variables, or a combination of the two. Once a data set has been created, a command file used to create a data file for one of several different statistical software packages is produced. SPSS for Windows 10.0 was used in this study for data preparation (e.g., recoding).

As recommended by Chantala and Tabor (1999), when using statistical software that corrects for design effects and unequal probability of selection, researchers need to begin with all cases or there is the possibility that "the standard errors may be computed incorrectly because the survey design structure has been compromised" (p. 10). Therefore, data for all cases were extracted for the items used in this study and then, using the SELECT function in SPSS or the SUBPOPN statement in SUDAAN, a subsample of the data was used in the analyses.

Measures

The measurement section describes how each scale was constructed, including descriptive statistics and response format for each item that was used to construct a scale. It is organized according to the systems of the ecological framework. Information for items before and after recoding is included. After recoding information is not included for those items that were only reverse scored. Because no conclusions are deduced from these statistics, unweighted data are reported to help facilitate comprehension and/or

replication of the scales. This information is included solely as a frame of reference to replicate this study.

In general, scale items are (a) summed when the response format for each item is equal or (b) a count is constructed from the items when the response formats are unequal. For example, engaging in other health-risk behaviors consists of 5 items, two with "yes/no" responses, one with a 6-point scale, and two items that are continuous. Those items that are not yes/no are recoded to a "yes/no" format. In this case, participants are scored a 0 (no) if they report never getting drunk in the past 12 months or they legitimately skip the item (i.e., they did not report drinking in the last 12 months). However, if they do report getting drunk in the past 12 months they are scored a 1 (yes). For the two items about marijuana use, participants are given scores of 0 (no) if their response indicates no use and a 1 if it indicates use. The five items are then added together, resulting in a score that ranges for 0 to 5.

<u>Measurement of Sexual Competence: Dependent Variable Scale Construction</u>

The dependent variable in this study, sexual competence, is measured as the number of sexual behaviors or behaviors related to sexual intercourse (e.g., contraceptive use) that an adolescent has or has not engaged in that are identified as decreasing the risk for pregnancy or contracting HIV or other STDs. Items as they originally appeared and recoded items are found in Table 3-2. In total, the sexual competence scale was constructed from 10 items that asked adolescents about their sexual behaviors. For six different behaviors, adolescents were scored 0 to indicate sexual risk-taking and 1 to indicate sexual competence. Two additional points were assigned to represent chronic

Table 3-2. Dependant Variable Scale Items

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Sexual Competence Wave 2	CNBA1022	H2CO11	Past year-how often use birth control *	1629	1	5	3.79	1.37
	SXBA1024	H2CO13	Ever had anal intercourse *	1462	0	1	.16	.36
	SXBA1713	H2JO1	First sex-were you drinking *	162	0	1	.13	.34
	SXBA1714	H2JO2	First sex-were you drunk *	21	0	1	.71	.46
	SXBA1717	H2JO5	First sex-using drugs *	90	0	1	.11	.32
	SXBA1715	H2JO3	Most recent sex-drink alcohol *	1073	0	2	.19	.41
	SXBA1716	H2JO4	Most recent sex-drunk *	179	0	1	.57	.50
	SXBA1718	H2JO7	Most recent sex-drug use *	714	0	2	.19	.45
	SXBA1959	H2NR4	How often-sex for drugs or money-nonflag *	1621	0	222	.25	5.70
	SXBA1960	H2NR5	Non-romance sex with anyone-nonflag *	1626	0	1	.37	.48
Sexual Competence Wave 2 (Recodes)	CNBA1022	H2CO11	Past year-how often use birth control	1629	0	1	.46	.50
	SXBA1024	H2CO13	Ever had anal intercourse	1629	0	1	.86	.35
	SXBA1713	H2JO1	First sex-were you drinking	1632	0	1	.99	.11
	SXBA1714	H2JO2	First sex-were you drunk	1632	0	1	.99	.10
	SXBA1717	H2JO5	First sex-using drugs	1632	0	1	.99	.08
	SXBA1715	H2JO3	Most recent sex-drink alcohol	1632	0	1	.89	.31
	SXBA1716	H2JO4	Most recent sex-drunk	1632	0	1	.94	.24
	SXBA1718	H2JO7	Most recent sex-drug use	1632	0	1	.93	.25
	SXBA1959	H2NR4	How often-sex for drugs or money-nonflag	1621	0	1	.97	.17
	SXBA1960	H2NR5	Non-romance sex with anyone-nonflag	1626	0	1	.63	.48
			Drug use first or most recent sex**	1632	0	1	.93	.25
			Drug use first and most recent sex**	1632	0	1	1.00	.06
			Alcohol use first or most recent sex**	1632	0	1	.88	.32
			Intoxicated first and most recent sex**	1632	0	1	1.00	.06

*Recoded item. **Computed item.

alcohol use or chronic drug use in relation to sexual intercourse, forming a scale that ranged from 0 (high sexual risk-taking) to 8 (high sexual competence).

Items concerning alcohol use and intoxication at first and most recent intercourse were aggregated to one item for concurrent alcohol use and intercourse. If adolescents reported alcohol use *or* intoxication at first intercourse *or* most recent intercourse, they were scored 0. Similarly, items concerning drug use at first and most recent intercourse were aggregated to one item for concurrent drug use and intercourse. If adolescents reported drug use at first intercourse *or* most recent intercourse, they were scored 0.

In addition, adolescents who reported being intoxicated or using drugs at first intercourse *and* most recent intercourse (the only two specific instances of intercourse that they reported on), were viewed as being higher sexual risk-takers than an adolescent that reported intoxication or drug use on one occasion but not on another. Intoxication and drug use items were used to construct two items that represented chronic alcohol use and drug use with intercourse. If adolescents reported intoxication at first *and* most recent intercourse, they were scored 0. Similarly, adolescent were scored 0 if they reported drug use at first *and* most recent intercourse.

Birth Control Use

The Birth Control Use Item was originally scored 1 (none of the time) to 5 (all of the time) in the past twelve months. Adolescents that reported using birth control all of the time were scored 1, otherwise they were scored 0.

Anal Intercourse

The Anal Intercourse Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0.

First Time Sex Drinking

The First Time Sex Drinking Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0. In addition, sexually active adolescents who legitimately skipped this question because they had not drunk alcohol were scored 1.

First Time Sex Drunk

The First Time Sex Drunk Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0. In addition, sexually active adolescents who legitimately skipped this question because they had not been drinking at first intercourse were scored 1.

First Time Sex Drug Use

The First Time Sex Drug Use Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0. In addition, sexually active adolescents who legitimately skipped this question because they had not used drugs were scored 1.

Most Recent Sex Drinking

The Most Recent Sex Drinking Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0. In addition, sexually active adolescents who legitimately skipped this question because they had not drunk alcohol and adolescents who were scored 2 (had sex only once) were scored 1.

Most Recent Sex Drunk

The Most Recent Sex Drunk Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0. In addition, sexually active adolescents who legitimately skipped this question because they had not been drinking at most recent intercourse and adolescents who were scored 2 (had sex only once) were scored 1.

Most Recent Sex Drug Use

The Most Recent Sex Drug Use Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0. In addition, sexually active adolescents who legitimately skipped this question because they had not used drugs and adolescents who were scored 2 (had sex only once) were scored 1.

It is possible that an adolescent who used alcohol or drugs at first intercourse but not at most recent intercourse received a 1, indicating sexual competence, if first intercourse occurred before the last interview. However, because the period between these two instances may have been considerable, it is less likely to demonstrate a pattern of alcohol or drug use in connection to sexual intercourse. On the other hand, for an adolescent to report that they were drunk at first intercourse and most recent intercourse in this study, both would have to have occurred since the month of the last interview (i.e., 6 to 12 months). Because this demonstrates a clear pattern of sexual risk-taking behavior, reports of being drunk or using drugs at first intercourse *and* most recent intercourse were each scored 0 (i.e., sexual risk-taking).

Sex for Money or Drugs

The Sex for Money or Drugs Item was originally scored as a frequency of the occurrence. Adolescents that reported 0 were recoded to 1 (no) and adolescents that reported 1 to 12 occurrences of having sex for money or drugs were recoded to 0 (yes).

Non-romance Sex with Anyone

The Non-romance Sex with Anyone Item was originally scored 0 (no) and 1 (yes). To fit with the sexual competence coding scheme, 0 was recoded to 1 and 1 was recoded to 0.

Measurement of Risk and Protection: Independent Variable Scale Construction

Thirty of the 35 independent variable scales were constructed for both Wave 1 (15 variables) and Wave 2 (15 variables). Scales constructed from the parent-interview data, collected only at Wave 1, comprised the remaining five scales. Table 3-3 presents each variable, indication of risk or protection (i.e., higher or lower scores represent risk or protection), number of items constituting scale, and reliability coefficients. Table 3-4 presents the items used to construct each scale.

Microsystem: Individual-Level Scales

Affect Scale (risk factor). The Affect Scale was constructed from 19 items that asked adolescents about their feelings during the past week. Each item was originally scored from 0 (never or rarely) to 3 (most of the time), producing a summed scale that ranged from 0 to 57, with higher scores indicating negative affect. Four of the items were reverse scored because they were positively worded (e.g., felt happy). The final scores were reverse coded so that higher scores represented positive affect.

Table 3-3. Variables, Indication of Risk and Protection, and Scale Reliabilities

	Variable (a), indication of risk/protection, and related hypothesis (b)	No. of items constituting scale (reliability coefficient)
Microsystem risk factors		
Individual	a. Affect	19^a (α = .87)
	b. lower score indicates risk (1a)	19^b (α = .88)
	a. Self-Esteem	6^a (α = .84)
	b. lower score indicates risk (1b)	6^b (α = .84)
	a. Health Risk Behaviors	5^a (α = .76)
	b. higher score indicates risk (1c)	5^b (α = .76)
	a. Obstacles to birth control	5^a (α = .76)
	b. higher score indicates risk (1d)	5^b (α = .81)
	a. Pubertal Development	*2^a (r = .15)
	b. higher score indicates risk (1e)	*2^b (r = .12)
Familial	a. Parents' sexual values	*2^a (r = .17)
	b. higher score indicates risk (1f)	
	a. Perception of parents sexual values	6^a (α = .88)
	b. lower score indicates risk (1g)	6^b (α = .87)
	a. Parental monitoring	3^a (α = .56)
	b. lower score indicates risk (1h)	
	a. Parental presence	6^a (α = .31)
	b. lower score indicates risk (1i)	6^b (α = .39)
Peer	a. Friend's health-risk behaviors	3^a (α = .72)
	b. higher score indicates risk (1j)	3^b (α = .70)
Neighborhood/	a. Neighborhood quality	6^a (α = .73)
Community	b. higher score indicates risk (1k)	6^b (α = .73)

Note. Sample weights were used for coefficient calculations. Text in parenthesis refers to hypothesis variable is used to test.

Table 3-3. Variables, Indication of Risk and Protection, and Scale Reliabilities (con't)

	Variable (a), indication of risk/protection, and related hypothesis (b)	No. of items constituting scale (reliability coefficient)
Microsystem protective factors		
Individual	a. HIV/AIDS vulnerability	1^a
	b. lower score indicates protection (2a)	1^b
	a. Consequences of pregnancy	6^a ($\alpha = .75$)
	b. higher score indicates protection (2b)	6^b ($\alpha = .75$)
Familial	a. Parent/family connectedness	10^a ($\alpha = .87$)
	b. higher score indicates protection (2c)	10^b ($\alpha = .85$)
	a. Parent-adolescent activities	16^a ($\alpha = .74$)
	b. higher score indicates protection (2d)	16^b ($\alpha = .75$)
	a. Family sexual socialization	3^a ($\alpha = .72$)
	b. higher score indicates protection (2e)	
Peer	a. Friend's health-risk behaviors	3^a ($\alpha = .72$)
	b. lower score indicates protection (2f)	3^b ($\alpha = .70$)
School	a. School connectedness	5^a ($\alpha = .76$)
	b. higher score indicates protection (2g)	5^b ($\alpha = .75$)
Neighborhood/ Community	a. Relationships with adults	$*2^a$ ($r = .40$)
	b. higher score indicates protection (2h)	$*2^b$ ($r = .34$)
Mesosystem protective factors	a. Parent membership parent/teacher organization	1^a
	b. higher score indicates protection (2i)	
Exosystem protective factors	a. Parent membership civic/social organization	1^a
	b. higher score indicates protection (2j)	

Note. Sample weights were used for coefficient calculations. Text in parenthesis refers to hypothesis variable is used to test.
a. Items from Wave 1 data.
b. Items from Wave 2 data.
* Pearson correlation coefficient was used to assess inter-item consistency of 2-item measure.

Table 3-4. Independent Variable Scale Items

Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Affect Wave 1							
PFE48280	H1FS1	In past week bothered by things	1631	0	3	.60	.75
PFE48281	H1FS2	In past week had poor appetite	1632	0	3	.59	.79
PFE48282	H1FS3	In past week had the blues	1632	0	3	.52	.80
PFE48283	H1FS4	In past week felt just as good as other people*	1632	0	3	1.93	1.01
PFE48284	H1FS5	In past week had trouble keeping mind focused	1632	0	3	.93	.84
PFE48285	H1FS6	In past week felt depressed	1632	0	3	.63	.83
PFE48286	H1FS7	In past week too tired to do things	1632	0	3	.84	.79
PFE48287	H1FS8	In past week hopeful about the future*	1630	0	3	1.77	1.00
PFE48288	H1FS9	In past week felt life had been a failure	1632	0	3	.27	.61
PFE48289	H1FS10	In past week felt fearful	1631	0	3	.34	.58
PFE48290	H1FS11	In past week felt happy*	1631	0	3	2.04	.82
PFE48291	H1FS12	In past week talked less than usual	1632	0	3	.60	.76
PFE48292	H1FS13	In past week felt lonely	1632	0	3	.55	.77
PFE48293	H1FS14	In past week people unfriendly to you	1632	0	3	.40	.63
PFE48294	H1FS15	In past week enjoyed life*	1632	0	3	2.16	.89
PFE48295	H1FS16	In past week felt sad	1632	0	3	.65	.73
PFE48296	H1FS17	In past week felt people disliked you	1632	0	3	.43	.67
PFE48297	H1FS18	In past week hard to start doing things	1632	0	3	.67	.68
PFE48298	H1FS19	In past week felt life not worth living	1632	0	3	.19	.54
Affect Wave 2							
PFEA1275	H2FS1	In past week bothered by things	1632	0	3	.65	.75
PFEA1276	H2FS2	In past week had poor appetite	1632	0	3	.58	.77
PFEA1277	H2FS3	In past week had the blues	1631	0	3	.51	.78
PFEA1278	H2FS4	In past week felt just as good as* other people	1632	0	3	1.97	.98
PFEA1279	H2FS5	In past week had trouble keeping mind focused	1632	0	3	.91	.80
PFEA1280	H2FS6	In past week felt depressed	1632	0	3	.62	.81

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
	PFEA1281	H2FS7	In past week too tired to do things	1632	0	3	.84	.77
	PFEA1282	H2FS8	In past week hopeful about the future*	1632	0	3	1.85	.96
	PFEA1283	H2FS9	In past week felt life had been a failure	1632	0	3	.26	.59
	PFEA1284	H2FS10	In past week felt fearful	1632	0	3	.32	.57
	PFEA1285	H2FS11	In past week felt happy*	1632	0	3	2.06	.80
	PFEA1286	H2FS12	In past week talked less than usual	1632	0	3	.63	.75
	PFEA1287	H2FS13	In past week felt lonely	1632	0	3	.51	.74
	PFEA1288	H2FS14	In past week people unfriendly to you	1632	0	3	.39	.60
	PFEA1289	H2FS15	In past week enjoyed life*	1632	0	3	2.18	.85
	PFEA1290	H2FS16	In past week felt sad	1632	0	3	.65	.72
	PFEA1291	H2FS17	In past week felt people disliked you	1632	0	3	.39	.60
	PFEA1292	H2FS18	In past week hard to start doing things	1632	0	3	.67	.69
	PFEA1293	H2FS19	In past week felt life not worth living	1632	0	3	.16	.48
Self-Esteem Wave 1	PET49255	H1PF30	Have lots of good qualities	1631	1	5	1.75	.66
	PET49257	H1PF32	Have a lot to be proud of	1630	1	5	1.76	.74
	PET49258	H1PF33	Like self as are	1631	1	5	2.04	.96
	PET49259	H1PF34	Do everything just right	1631	1	5	2.31	.90
	PET49260	H1PF35	Feel socially accepted	1631	1	5	1.91	.74
	PET49261	H1PF36	Feel love and wanted	1631	1	5	1.76	.74
Self-Esteem Wave 2	PEAA2401	H2PF21	Have lots of good qualities	1632	1	5	1.69	.64
	PEAA2403	H2PF23	Have a lot to be proud of	1632	1	4	1.69	.67
	PEAA2404	H2PF24	Like self as are	1632	1	5	1.97	.96
	PEAA2405	H2PF25	Do everything just right	1632	1	5	2.22	.88
	PEAA2406	H2PF26	Feel socially accepted	1632	1	5	1.84	.72
	PEAA2407	H2PF27	Feel love and wanted	1632	1	4	1.69	.67
Health-Risk Behaviors Wave 1	SAB49995	HITO3	Smoked cigarettes regularly	972	0	1	.53	.50
	SAB50004	HITO13	Drink alcohol outside family	1192	0	1	.80	.40

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
	SAB50009	H1TO18	Past year-times gotten drunk *	1049	1	7	5.36	1.56
	SAB50022	H1TO31	Times smoked pot *	659	1	900	43.46	99.57
	SAB50023	H1TO32	Past 30 days-times smoked pot *	694	0	666	7.89	35.61
Health-Risk Behaviors Wave 1 (Recodes)	SAB50009	H1TO18	Past year-times gotten drunk	1626	0	1	.45	.50
	SAB50022	H1TO31	Times smoked pot	1564	0	1	.42	.49
	SAB50023	H1TO32	Past 30 days-times smoked pot	1599	0	1	.24	.43
Health-Risk Behaviors Wave 2	SABA3356	H2TO3	Smoked cigarettes regularly	977	0	1	.60	.49
	SABA3367	H2TO16	Drink alcohol outside family	1073	0	1	.81	.40
	SABA3372	H2TO22	Past year-times gotten drunk *	1026	1	7	5.13	1.63
	SABA3395	H2TO45	Times smoked pot *	645	1	990	57.75	135.11
	SABA3396	H2TO46	Past 30 days-times smoked pot *	642	0	500	9.59	27.14
Health-Risk Behaviors Wave 2 (Recodes)	SABA3372	H2TO22	Past year-times gotten drunk	1629	0	1	.47	.50
	SABA3395	H2TO45	Times smoked pot	1586	0	1	.41	.49
	SABA3396	H2TO46	Past 30 days-times smoked pot	1583	0	1	.28	.45
Obstacles to Birth Control Wave 1	CNA48008	H1BC1	Birth control too bothersome to use	1471	1	5	4.02	1.14
	CNA48009	H1BC2	Birth control too expensive to buy	1464	1	5	3.92	1.05
	CNA48010	H1BC3	Too much planning to use birth control	1467	1	5	3.95	1.07
	CNA48012	H1BC5	Birth control interferes with pleasure	1463	1	5	3.80	1.14
	CNA48015	H1BC8	Birth control equals looking for sex	1466	1	5	3.61	1.19
Obstacles to Birth Control Wave 2	CNAA1008	H2BC1	Birth control too bothersome to use	1620	1	5	4.02	1.17
	CNAA1009	H2BC2	Birth control too expensive to buy	1622	1	5	3.88	1.16
	CNAA1010	H2BC3	Too much planning to use birth control	1623	1	5	3.93	1.13
	CNAA1012	H2BC5	Birth control interferes with pleasure	1619	1	5	3.76	1.19
	CNAA1015 PLEASURE	H2BC8	Birth control equals looking for sex	1618	1	5	3.73	1.18

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Pubertal Development Wave 1	IVX48724	H1IR5	Physical maturity of respondent	1630	1	5	3.44	.81
	BFS48197	H1FP6	Relative physical development-female	851	1	5	3.50	1.05
	BFS48955	H1MP4	Relative physical development-male	767	1	5	3.38	1.14
Pubertal Development Wave 2	IVXA1610	H2IR5	Physical maturity of respondent	1630	1	5	3.57	.77
	BFSA1186	H2FP9	Relative physical development-female	857	1	5	3.33	1.13
	BFSA1848	H2MP4	Relative physical development-male	766	1	5	3.32	1.20
HIV/AIDS Vulnerability Wave 1	SDA49661	H1RP6	Risk of aids without protection	1334	1	5	3.42	1.19
HIV/AIDS Vulnerability Wave 2	SDCA2900	H2RP10	Risk of aids without protection	1521	1	5	3.20	1.19
Consequences of Pregnancy Wave 1	OWE48946	H1MO9	If pregnant embarrass family	1330	1	5	2.55	1.33
	OWE48947	H1MO10	If pregnant embarrass self	1331	1	5	2.59	1.39
	OWM48949	H1MO12	If pregnant marry wrong person	1326	1	5	3.33	1.28
	OWM48950	H1MO13	If pregnant grow up too fast	1328	1	5	2.23	1.21
	CBA49656	H1RP1	Pregnant now one of the worst	1334	1	5	1.75	1.04
	CBA49657	H1RP2	Pregnant now not so bad *	1335	1	5	4.10	1.04
Consequences of Pregnancy Wave 2	OWEA1836	H2MO8	If pregnant embarrass family	1593	1	5	2.70	1.29
	OWEA1837	H2MO9	If pregnant embarrass self	1594	1	5	2.76	1.37
	OWEA1839	H2MO11	If pregnant marry wrong person	1593	1	5	3.42	1.26
	OWEA1840	H2MO12	If pregnant grow up too fast	1594	1	5	2.25	1.17
	CBAA2895	H2RP5	Pregnant now one of the worst	1523	1	5	1.82	1.10
	CBAA2896	H2RP6	Pregnant now not so bad *	1522	1	5	4.08	1.07

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Parent's Sexual Values Wave 1	PCA50488 SEX NOW	PC44B	Agree, disapprove of adolescent having	1431	1	5	1.78	1.10
	PCA50489	PC44C	Agree, sex okay for adolescent with special friend *	1432	1	5	3.97	1.23
Perception of Parent's Sexual Values Wave 1	SXA49219	H1PA1	Mom-feel about your sex life	1514	1	5	1.96	.95
	SXA49220	H1PA2	Mom-feel about you having sex with steady	1515	1	5	2.34	1.09
	CNA49221	H1PA3	Mom-feel about use of birth control	1512	1	5	3.37	1.41
	SXA49222	H1PA4	Dad-feel about your sex life	935	1	5	1.87	1.00
	SXA49223	H1PA5	Dad-feel about you having sex with steady	935	1	5	2.10	1.11
	CNA49224	H1PA6	Dad-feel about use of birth control	933	1	5	3.04	1.49
Perception of Parent's Sexual Values Wave 2	SXAA2374	H2PA1	Mom-feel about your sex life	1471	1	5	2.20	.93
	SXAA2375	H2PA2	Mom-feel about you having sex with steady	1472	1	5	2.58	1.05
	SXAA2376	H2PA3	Mom-feel about use of birth control	1468	1	5	3.67	1.29
	SXAA2377	H2PA4	Dad-feel about your sex life	1037	1	5	2.17	1.02
	SXAA2378	H2PA5	Dad-feel about you having sex with steady	1038	1	5	2.38	1.09
	SXAA2379	H2PA6	Dad-feel about use of birth control	1035	1	5	3.35	1.37
Parental Monitoring Wave 1	FSB50399	PC11	Met adolescent's best friend in person	1425	0	1	.95	.23
	FSB50400	PC12	Met parents of adolescent's best friend	1427	0	1	.79	.41
	FSB50405	PC17	Talk to how many parents of adolescent's friends *	1433	0	6	1.95	1.77
Parental Monitoring Wave 1 (Recodes)	FSB50405	PC17	Talk to how many parents of adolescent's friends	1433	0	1	.75	.43

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Parent/Family Connectedness Wave 1	PCE49226	H1PF1	Mom-warm and loving	1523	1	5	1.72	.83
	PCE49229	H1PF4	Mom-good communication	1523	1	5	2.05	1.07
	PCE49230	H1PF5	Mom-good relationship	1523	1	5	1.81	.94
	PCE50076	H1WP9	Close to mom	1524	1	5	4.45	.85
	PCE50077	H1WP10	Mom-how much does she care	1524	1	5	4.83	.50
	PCE49248	H1PF23	Dad-warm and loving	1014	1	5	2.03	.98
	PCE49249	H1PF24	Dad-good communication	1014	1	5	2.24	1.15
	PCE49250	H1PF25	Dad-good relationship	1014	1	5	2.05	1.06
	PCE50080	H1WP13	Close to dad	1016	1	5	4.06	1.04
	PCE50081	H1WP14	Dad-how much does he care	1016	1	5	4.67	.70
Parent/Family Connectedness Wave 2	PCEA2381	H2PF1	Mom-warm and loving	1479	1	5	1.76	.85
	PCEA2384	H2PF4	Mom-good communication	1479	1	5	2.06	1.05
	PCEA2385	H2PF5	Mom-good relationship	1479	1	5	1.81	.92
	PCEA3443	H2WP9	Close to mom	1480	1	5	4.31	.87
	PCEA3444	H2WP10	Mom-how much does she care	1479	1	5	4.77	.64
	PCEA2388	H2PF8	Dad-warm and loving	1047	1	5	2.02	.98
	PCEA2389	H2PF9	Dad-good communication	1047	1	5	2.34	1.11
	PCEA2390	H2PF10	Dad-good relationship	1047	1	5	2.10	1.04
	PCEA3447	H2WP13	Close to dad	1047	1	5	3.80	1.09
	PCEA3448	H2WP14	Dad-how much does he care	1046	1	5	4.54	.83
Parent-Adolescent Activities Wave 1	PCB50084	H1WP17A	Residential mom-went shopping	1523	0	1	.70	.46
	PCB50085	H1WP17B	Residential mom-played a sport	1523	0	1	.06	.25
	PCB50086	H1WP17C	Residential mom-religious service	1523	0	1	.31	.46
	PCB50087	H1WP17D	Residential mom-talked about life	1523	0	1	.61	.49
	PCB50088	H1WP17E	Residential mom-went to movie/etcetera	1523	0	1	.22	.42
	PCB50089	H1WP17F	Residential mom-discuss personal problem	1523	0	1	.45	.50

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
PCB50090	H1WP17G	Residential mom-argued about behavior	1523	0	1	.39	.49
PCB50091	H1WP17H	Residential mom-talked school-grades	1523	0	1	.64	.48
PCB50092	H1WP17I	Residential mom-worked school-project	1523	0	1	.11	.31
PCB50093	H1WP17J	Residential mom-talked school-other	1523	0	1	.52	.50
PCB50095	H1WP18A	Residential dad-went shopping	1016	0	1	.23	.42
PCB50096	H1WP18B	Residential dad-played a sport	1016	0	1	.25	.43
PCB50097	H1WP18C	Residential dad-religious service	1016	0	1	.24	.43
PCB50098	H1WP18D	Residential dad-talked about life	1016	0	1	.38	.49
PCB50099	H1WP18E	Residential dad-went to movie/etcetera	1016	0	1	.21	.40
PCB50100	H1WP18F	Residential dad-discuss personal problem	1016	0	1	.23	.42
PCB50101	H1WP18G	Residential dad-argued about behavior	1016	0	1	.31	.46
PCB50102	H1WP18H	Residential dad-talked school-grades	1016	0	1	.50	.50
PCB50103	H1WP18I	Residential dad-worked school-project	1016	0	1	.09	.29
PCB50104	H1WP18J	Residential dad-talked school-other	1016	0	1	.42	.49
Parent-Adolescent Activities Wave 2							
PCBA3451	H2WP17A	Residential mom-went shopping	1480	0	1	.62	.49
PCBA3452	H2WP17B	Residential mom-played a sport	1480	0	1	.05	.22
PCBA3453	H2WP17C	Residential mom-religious service	1480	0	1	.30	.46
PCBA3454	H2WP17D	Residential mom-talked about life	1480	0	1	.65	.48
PCBA3455	H2WP17E	Residential mom-went to movie/etcetera	1480	0	1	.18	.38
PCBA3456	H2WP17F	Residential mom-discuss personal problem	1480	0	1	.50	.50
PCBA3457	H2WP17G	Residential mom-argued about behavior	1480	0	1	.37	.48
PCBA3458	H2WP17H	Residential mom-talked school-grades	1480	0	1	.63	.48
PCBA3459	H2WP17I	Residential mom-worked school-project	1480	0	1	.10	.30
PCBA3460	H2WP17J	Residential mom-talked school-other	1480	0	1	.56	.50
PCBA3462	H2WP18A	Residential dad-went shopping	1047	0	1	.18	.39
PCBA3463	H2WP18B	Residential dad-played a sport	1047	0	1	.18	.38
PCBA3464	H2WP18C	Residential dad-religious service	1047	0	1	.22	.41
PCBA3465	H2WP18D	Residential dad-talked about life	1047	0	1	.39	.49

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
	PCBA3466	H2WP18E	Residential dad-went to movie/etcetera	1047	0	1	.16	.37
	PCBA3467	H2WP18F	Residential dad-discuss personal problem	1047	0	1	.26	.44
	PCBA3468	H2WP18G	Residential dad-argued about behavior	1047	0	1	.27	.44
	PCBA3469	H2WP18H	Residential dad-talked school-grades	1047	0	1	.51	.50
	PCBA3470	H2WP18I	Residential dad-worked school-project	1047	0	1	.09	.28
	PCBA3471	H2WP18J	Residential dad-talked school-other	1047	0	1	.44	.50
Parental Presence Wave 1	PCB49652	H1RM11	Residential mom-at home when leave for school	1521	1	6	2.15	1.61
	PCB49653	H1RM12	Residential mom-at home when return from school	1521	1	6	2.94	1.55
	PCB49654	H1RM13	Residential mom-at home when bedtime	1524	1	5	1.38	.82
	PCB49320	H1RF11	Residential dad-at home when leave for school	1015	1	6	2.99	1.69
	PCB49321	H1RF12	Residential dad-at home when return from school	1015	1	6	3.49	1.45
Parental Presence Wave 2	PCB49322	H1RF13	Residential dad-at home when bedtime	1016	1	5	1.74	1.11
	PCBA2887	H2RM11	Residential mom-at home when leave for school	1470	1	6	2.13	1.61
	PCBA2888	H2RM12	Residential mom-at home when return from school	1471	1	6	2.91	1.59
	PCBA2889	H2RM13	Residential mom-at home when bedtime	1477	1	5	1.38	.82
	PCBA2447	H2RF11	Residential dad-at home when leave for school	1041	1	6	2.89	1.68
	PCBA2448	H2RF12	Residential dad-at home when return from school	1042	1	6	3.39	1.50
	PCBA2449	H2RF13	Residential dad-at home when bedtime	1046	1	5	1.73	1.09

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Family Sexual Socialization Wave 1	PCB50485	PC43BA	How much talked with adolescent, birth control	1431	1	4	2.97	1.02
	PCB50486	PC43BB	How much talked with adolescent, about sex	1426	1	4	3.19	.87
	PCB50490	PC44D	Agree, recommend birth control to adolescent *	1429	1	5	2.81	1.42
Friend's Health-Risk Behaviors Wave 1	SAB50000	H1TO9	How many friends smoke	1614	0	3	1.15	1.17
	SAB50020	H1TO29	Three friends-drink more than one a month	1614	0	3	1.51	1.19
	SAB50024	H1TO33	Three friends-smoke pot more than one a month	1609	0	3	.92	1.11
Friend's Health-Risk Behaviors Wave 2	SABA3361	H2TO10	How many friends smoke	1616	0	3	1.33	1.20
	SABA3391	H2TO41	Three friends-drink more than one a month	1609	0	3	1.59	1.20
	SABA3398	H2TO48	Three friends-smoke pot more than one a month	1610	0	3	1.07	1.15
School Connectedness Wave 1	FSE48102	H1ED19	Feel close to people at school	1578	1	5	2.39	1.04
	EDA48103	H1ED20	Feel part of your school	1579	1	5	2.27	1.07
	EDA48105	H1ED22	Happy at your school	1578	1	5	2.50	1.20
	EDA48106	H1ED23	Teachers treat students fairly	1579	1	5	2.72	1.10
	EDA48107	H1ED24	Feel safe in your school	1578	1	5	2.32	1.08
School Connectedness Wave 2	EDAA1090	H2ED15	Feel close to people at school	1396	1	5	2.45	1.05
	EDAA1091	H2ED16	Feel part of your school	1396	1	5	2.26	1.08
	EDAA1093	H2ED18	Happy at your school	1397	1	5	2.44	1.14
	EDAA1094	H2ED19	Teachers treat students fairly	1396	1	5	2.69	1.07
	EDAA1095	H2ED20	Feel safe in your school	1396	1	5	2.21	1.03

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Relationship with Adults Wave 1	NKE49295	H1PR1	Adults care about you	1630	1	6	4.30	.86
Relationship with Adults Wave 2	NKE49296	H1PR2	Teachers care about you	1630	1	6	3.38	1.03
	NKEA2422	H2PR1	Adults care about you	1628	1	6	4.37	.86
	NKEA2423	H2PR2	Teachers care about you	1630	1	6	3.57	1.17
Neighborhood Quality Wave 1	BST90P15	BST90P15	Median household income *	1586	4999	100001	28970.37	13400.97
	BST90P19	BST90P19	Proportion below 1989 poverty level	1624	1	3	1.74	.83
	BST90P20	BST90P20	Modal education of individuals 25 years and over *	1619	1	3	1.93	.50
	BST90P22	BST90P22	Proportion females 16 and over in the civilian labor force *	1601	1	3	1.98	.56
	BST90P23	BST90P23	Unemployment rate	1601	1	3	1.77	.83
	BST90P27	BST90P27	Proportion occupied housing units moved into between 1985 and march 1990	1576	1	3	1.98	.53
Neighborhood Quality Wave 1 (Recodes)	BST90P15	BST90P15	Median household income *	1586	1	3	2.08	.71
Neighborhood Quality Wave 2	BST90P15	BST90P15	Median household income *	1578	4999	100001	28920.79	13346.69
	BST90P19	BST90P19	Proportion below 1989 poverty level	1613	1	3	1.75	.83
	BST90P20	BST90P20	Modal education of individuals 25 years and over *	1608	1	3	1.93	.50
	BST90P22	BST90P22	Proportion females 16 and over in the civilian labor force *	1590	1	3	1.98	.55
	BST90P23	BST90P23	Unemployment rate	1590	1	3	1.78	.83
	BST90P27	BST90P27	Proportion occupied housing units moved into between 1985 and march 1990	1568	1	3	1.99	.53

*Recoded item.

Table 3-4. Independent Variable Scale Items (con't)

	Sociometrics	Add Health	Sociometrics label/Add Health question	n	Min	Max	M	SD
Neighborhood Quality Wave 2 (Recodes)	BST90P15	BST90P15	Median household income *	1578	1	3	2.09	.71
Parent Membership Parent-Teacher Organization Wave 1	CPS50253	PA27A	Member, parent-teacher organization	1419	0	1	.29	.45
Parent Membership Civil/Social Organization Wave 1	CPS50257	PA27E	Member, civic/social organization	1412	0	1	.14	.35

*Recoded item.

Self-Esteem Scale (risk factor). The Self-Esteem Scale was constructed from 6 items that asked adolescents about their self-worth. Each item was originally scored 1 (strongly agree) to 5 (strongly disagree), producing a summed scale that ranged from 6 to 30, with higher scores indicating lower self-esteem. The final scores were reverse coded so that higher scores represented higher self-esteem.

Health-Risk Behaviors Scale (risk factor). The Health-Risk Behaviors Scale was constructed from 5 items that asked adolescents about cigarette, alcohol, and marijuana use. Two of the items were originally coded as 0 (no) and 1 (yes), one item ranged from 1 (everyday) to 6 (one or two days in the past year), and 7 (never), and two items asked for adolescents to report number of times they had engaged in the activity. These last three items were recoded to a yes/no format to parallel the first two items (Tables 3-9 and 3-10). In addition, where adolescent scores on an item indicated that they had legitimately skipped that question because they had never engaged in that behavior, they were recoded as 0 (no). For example, the question about cigarette use asked if adolescent smoked cigarettes regularly. However, if they responded that they had never smoked on a previous question, they were automatically skipped past this question. The final additive scale ranged from 0 to 5, with higher scores indicating more health-risk behaviors.

Obstacles to Birth Control Scale (risk factor). The Obstacles to Birth Control Scale was constructed from 5 items that asked adolescents about their attitudes concerning birth control. Each item was originally scored 1 (strongly agree) to 5 (strongly disagree), producing a summed scale that ranged from 5 to 25, with higher scores indicating a lower perception of obstacles. The final scores were reverse coded so that higher scores

represented a higher perception of obstacles. Adolescents who were less than 15-years-old skipped these questions.

Pubertal Development Scale (risk factor). The Pubertal Development Scale was constructed from 2 items. One item asked adolescents about their physical development compared to other same age females or males. This item was originally scored 1 (younger than most) to 5 (older than most). The other item asked the interviewer to report how physically mature the respondent was compared to same age females or males. This item was originally scored 1 (very immature) to 5 (very mature). Together, these items produced a scale that ranged from 2 to 10, with higher scores indicating a higher pubertal (i.e., physical) development. Originally, separate items asked females and males about their physical development. These were combined so that there was one scale with no missing data.

HIV/AIDS Vulnerability Scale (protective factor). The HIV/AIDS Vulnerability Scale was constructed from 1 item that asked adolescents about their chances of getting the AIDS virus. The item was originally scored 1 (almost no chance) to 5 (almost certain), producing a scale that ranged from 1 to 5, with higher scores indicating more vulnerable. Adolescents who were less than 15-years-old skipped these questions.

Consequences of Pregnancy Scale (protective factor). The Consequences of Pregnancy Scale was constructed from items that asked adolescents about what would happen if they got pregnant/got someone pregnant. Each item was originally scored 1 (strongly agree) to 5 (strongly disagree), producing a scale that ranged from 6 to 30, with lower scores indicating that a pregnancy would have negative results. One item was

reverse scored because it was positively worded (e.g., would not be that bad).

Adolescents who were less than 15-years-old skipped these questions.

Microsystem: Familial-Level Scales

Parental Sexual Values Scale (risk factor). The Parent Sexual Values Scale was

constructed from 2 items that asked parents about their approval level concerning their

adolescent having sex. Each item was originally scored 1 (strongly agree) to 5 (strongly

disagree), producing a summed scale that ranged from 2 to 10, with higher scores

indicating less acceptance of their adolescent having sex. One item was reverse scored

because it was positively worded (e.g., sex okay for adolescent).

Perception of Parent's Sexual Values Scale (risk factor). The Perception of Parent's

Sexual Values Scale was constructed from 6 items, 3 referring to the residential mother

and 3 referring to the residential father, that asked adolescents what they thought their

resident mother's and/or resident father's would think about the adolescent using birth

control or having sexual intercourse. Each item was originally scored 1 (strongly

disapprove) to 5 (strongly approve), producing two summed scales (i.e., a mother scale

and a father scale) that ranged from 3 to 15, with higher scores indicating a higher

approval of adolescent's sexual behaviors (i.e., less traditional values). Mother and father

scores were combined to produce one scale for parent's sexual values. When there was

only a residential mother or only a residential father, that score was used to represent

parental sexual values. When there was both a residential mother and a residential father,

the score for mother was used. This decision was based on research that has indicated that

mothers are the primary sexual socializers of their children (Fox et al., 1988).

Parental Monitoring Scale (risk factor). The Parental Monitoring Scale was constructed from 3 items that asked parents about their adolescent's friends and their friends' parents. Two items were originally scored as 0 (no) and 1 (yes). The third item was scored 0 to 5, for number of friends' parents talked to in the past week, and 6 (6 or more). This item was recoded as 0 (did not talk to a parent) for those cases that were originally scored 0 or 1 (did talk to a parent) for those cases that were scored 1 or above. These items produced an additive scale that ranged from 0 to 3, with higher scores indicating a higher parental monitoring.

Parent/Family Connectedness Scale (protective factor). The Parent/Family Connectedness Scale was constructed from 10 items, 5 referring to the residential mother and 5 referring to the residential father, that asked adolescents about their relationships with their resident mother and/or resident father. Six items were originally scored 1 (strongly agree) to 5 (strongly disagree) and 4 items were originally scored 1 (not at all) to 5 (very much), producing two summed scales that ranged from 5 to 25, with higher scores indicating a higher connectedness. Mother and father scores were combined to produce one scale for parent/family connectedness. When there was only a residential mother or only a residential father, that score was used to represent parent/family connectedness. When there was both a residential mother and a residential father, the highest of the two scores was used (Resnick et al., 1997).

Parent-Adolescent Activities Scale (protective factor). The Parent-Adolescent Activities Scale was constructed from 20 items, 10 referring to the residential mother and 10 referring to the residential father, that asked adolescents about activities that they had engaged in with their residential mother and/or father. Each item was originally scored 0

(no) and 1 (yes), producing a scale that ranged from 0 to 10, with higher scores indicating a higher number of activities. When there was only a residential mother or only a residential father, that score was used to represent parent-adolescent activities. When there was both a residential mother and a residential father, the two scores were summed for a total parent-adolescent activities score (Resnick et al., 1997).

Religious service and argued about behavior items were removed from the final scale to improve the reliability of the scales. Thus, when both a residential mother and a residential father were present, the final scale consisted of 16 items.

Parental Presence Scale (risk factor). The Parental Presence Scale was constructed from 6 items, 3 referring to the residential mother and 3 referring to the residential father, that asked adolescents about their parent's presence before and after school and at bedtime. Each item was originally scored 1 (always) to 5 (never) and 6 (brings to school or takes home from school) for the two school related items. Six was recoded to 1 (always), producing a summed scale that ranged from 3 to 15, with higher scores indicating less parental presence. The final scores were reverse coded so that higher scores represented more parental presence. When there was only a residential mother or only a residential father, that score was used to represent parental presence. When there was both a residential mother and a residential father, the two scores were summed for a total parent presence score.

Because the reliabilities for these scales were low ($\alpha < .70$), it was decided to compute a score using the above mentioned items to represent parental presence. If an adolescent reported that a residential mother *or* a residential father was present always or most the time before school, after school, or at bedtime they were given a score of 1 for

each of these. This resulted in a Parental Presence Scale that ranged from 0 to 3, with higher scores indicating more parental presence.

Family Sexual Socialization Scale (protective factor). The Family Sexual Socialization Scale was constructed from 3 items that asked about parents sexual discussions with their adolescent and if they recommend a specific method of birth control. The discussion items were originally scored 1 (not at all) to 4 (a great deal) and the remaining item was originally scored 1 (strongly agree) to 5 (strongly disagree). This last item was reverse scored so that the higher score represented increased sexual socialization. Also, this item remained a 5-point scale because it was believed that recommending birth control to an adolescent represented a more advanced sexual socialization than simply discussing sex or birth control. Together, these items produced a scale that ranged from 3 to 13, with higher scores indicating higher family sexual socialization.

Microsystem: Peer-Level Scale

Friend's Health-Risk Behaviors Scale (risk and protective factor). The Friend's Health-Risk Behaviors Scale was constructed from 3 items that asked adolescents if their best friends smoked cigarettes, drank alcohol, or smoked marijuana. For each behavior, adolescents were asked to indicate of three best friends how many engaged the behavior. Thus, each item was originally scored 0 to 3, producing a summed scale that ranged from 0 to 9, with higher scores indicating more exposure to friends engaging in health-risk behaviors.

Microsystem: School-Level Scale

School Connectedness Scale (protective factor). The School Connectedness Scale was constructed from 5 items that asked adolescents about their feelings concerning their school. Each item was originally scored 1 (strongly agree) to 5 (strongly disagree), producing a summed scale that ranged from 5 to 25, with higher scores indicating lower school connectedness. The final scores were reverse coded so that higher scores represented higher school connectedness.

Microsystem: Neighborhood/Community Level Scales

Relationship with Adults Scale (protective factor). The Relationship with Adults Scale was constructed from 2 items that asked adolescents about how much other adults (i.e., not parents) cared about them. Each item was originally scored 1 (not at all) to 5 (very much), producing a summed scale that ranged from 2 to 10, with higher scores indicating a higher level of caring.

Neighborhood Quality Scale (risk factor). The Neighborhood Quality Scale was constructed from 6 items found in the contextual data sets that were based on the 1990 U.S. Census of Population and Housing. The contextual data sets are included along with the Add Health data set and must be merged with the data extracted from the Add Health data. The 6 items used to measure neighborhood quality are based on the Brewster, Billy, and Grady (1993) study that examined the impact of community on adolescents' transition to sexual activity. The last two authors were involved in the construction the contextual data sets used in this study. Four of the six items are scored as low (1), medium (2), or high (3). Model education also is scored into three groups, 1 (no high school degree), 2 (high school degree, no college degree), and 3 (college degree). To

coincide with the other three items, the education item and the female labor force item were reverse scored so that higher scores indicated a negative neighborhood attribute. Household income was proportionally recoded to create three groups so as to correspond with the other five items. The top quartile was scored 1, the bottom quartile was scored 3, and the remaining two quartiles were scored 2 (Tables 3-39 and 3-40). Thus, all the six items had a range of 1 to 3 and together, the six items produced a summed scale that ranged from 6 to 18, with higher scores indicating lower neighborhood quality.

Mesosystem: Parent-School Level Scale

Parent Membership Parent-Teacher Organization Scale (protective factor). The Parent Membership Parent-Teacher Organization Scale was constructed from 1 item that asked parents if they were a member of a parent-teacher organization. The item was originally scored 0 (no) and 1 (yes) and was used as it was originally scored.

Exosystem: Parent-Community Level Scale

Parent Membership Civic/Social Organization Scale (protective factor). The Parent Membership Civic/Social Organization Scale was constructed from 1 item that asked parents if they were a member of a civic or social organization. The item was originally scored 0 (no) and 1 (yes) and was used as it was originally scored.

Macrosystem

Gender. The item for gender was originally coded as 1 (male) and 2 (female) (Table 3-5). The item was recoded 0 (male) and 1 (female).

Ethnicity. A single ethnicity variable was constructed from six items (Table 3-5). Adolescent were able to mark more than one category for their ethnic background. Using the guidelines provided by the Add Health researchers, a single ethnicity variable that

Table 3-5. Gender and Ethnicity Items

	Sociometrics	Add Health	Sociometrics label/ Add Health question	Response	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	GRS48004	BIO_SEX	Biological sex	Male	773	47.4	47.4	47.4
				Female	859	52.6	52.6	100.0
				Total	1632	100.0	100.0	
Ethnicity[a]	RAS48407	H1GI4	Are you of Hispanic origin	No	1430	87.6	87.6	87.6
				Yes	202	12.4	12.4	100.0
				Total	1632	100.0	100.0	
	RAS48431	H1GI6A	Race-white	No	585	35.8	35.9	35.9
				Yes	1045	64.0	64.1	100.0
				Total	1630	99.9	100.0	
	RAS48432	H1GI6B	Race-African American	No	1168	71.6	71.7	71.7
				Yes	462	28.3	28.3	100.0
				Total	1630	99.9	100.0	
	RAS48433	H1GI6C	Race-American Indian	No	1573	96.4	96.5	96.5
				Yes	57	3.5	3.5	100.0
				Total	1630	99.9	100.0	
	RAS48434	H1GI6D	Race-Asian	No	1580	96.8	96.9	96.9
				Yes	50	3.1	3.1	100.0
				Total	1630	99.9	100.0	
	RAS48435	H1GI6E	Race-other race	No	1522	93.3	93.4	93.4
				Yes	108	6.6	6.6	100.0
				Total	1630	99.9	100.0	

a. Missing data for 2 cases.

placed respondents into only one category was constructed from these six items. If a respondent answered "yes" to the question "Are you of Hispanic or Latino origin?" they were coded as "Hispanic" and eliminated from any of the remaining ethnic categories (i.e., the remaining five items) that they may have marked. If adolescents marked "black or African American" and any other ethnicity, they were coded as black or African American, and eliminated from the other marked categories. This process was repeated for the remaining ethnic categories in the following order: Asian, Native American, other, and white. The single ethnicity variable was then recoded to six ethnicity variables (e.g., Hispanic; 1 = yes, 0 = no) so that each respondent was coded as 1 in only one ethnic category. Five of the six dummy-coded ethnic variables were used to represent ethnicity in the regression analyses. White was the referent category.

Sociodemographics: Control Variables Scale Construction

Controls variables (Table 3-6) for this study were age, household income, parent's marital status, residence, and parent's education. Age and household income were used as they were originally coded, whereas, parent's marital status, residence, and parent's education were recoded for this study.

Parent's Marital Status

This item was recoded into two groups for this study; 0 (all non-married responses) and 1 (married).

Residence

This item was recoded into four groups for this study; 1 (rural), 2 (suburban), 3 (urban residential), and 4 (mostly/mostly not retail commercial properties and other).

Table 3-6. Sociodemographic Items

	Sociometrics	Add Health	Sociometrics label/Add Health question	Response	Frequency	Percent	Valid Percent	Cumulative Percent
Age	GSA1004	CALCAGE2	Calculated age	13	12	.7	.7	.7
				14	97	5.9	5.9	6.7
				15	207	12.7	12.7	19.4
				16	343	21.0	21.0	40.4
				17	440	27.0	27.0	67.3
				18	390	23.9	23.9	91.2
				19	122	7.5	7.5	98.7
				20	18	1.1	1.1	99.8
				21	3	.2	.2	100.0
				Total	1632	100.0	100.0	
Parent's Marital Status[a]	MDS50207	PA10	Marital status	Single, never married *	108	6.6	7.6	7.6
				Married	875	53.6	61.5	69.1
				Widowed *	59	3.6	4.1	73.3
				Divorced *	267	16.4	18.8	92.1
				Separated *	113	6.9	7.9	100.0
				Total	1422	87.1	100.0	
Parent's Marital Status (Recodes)	MDS50207	PA10	Marital status	Not married	593	36.3	36.3	36.3
				Married	1039	63.7	63.7	100.0
				Total	1632	100.0	100.0	
Residence[b]	NCS48729	H1IR12	Dominant land use of immediate area	Rural	447	27.4	27.6	27.6
				Suburban	534	32.7	33.0	60.7
				Urban, residential only	560	34.3	34.6	95.3
				Mostly retail commercial properties *	48	2.9	3.0	98.3
				Mostly not retail commercial properties *	16	1.0	1.0	99.3
				Other *	12	.7	.7	100.0
				Total	1617	99.1	100.0	

* Recoded item.

Table 3-6. Sociodemographic Items (con't)

	Sociometrics	Add Health	Sociometrics label/ Add Health question	Response	Frequency	Percent	Valid Percent	Cumulative Percent
Residence (Recodes)	NCS48729	H1IR12	Dominant land use of immediate area	Rural	447	27.4	27.6	27.6
				Suburban	534	32.7	33.0	60.7
				Urban residential	560	34.3	34.6	95.3
				Other	76	4.7	4.7	100.0
				Total	1617	99.1	100.0	
Responding Parent's Level of Education[c]	EDS50209	PA12	Level of education	8th grade or less	65	4.0	4.6	4.6
				More than 8th, but no HS diploma	161	9.9	11.4	16.0
				Business-trade-vocational school instead *	13	.8	.9	16.9
				High school graduate *	400	24.5	28.3	45.2
				Completed a GED *	73	4.5	5.2	50.4
				After HS, business-trade-vocational *	132	8.1	9.3	59.7
				Went to college, but no degree *	282	17.3	20.0	79.7
				Graduated from college or university *	181	11.1	12.8	92.5
				Professional training beyond college *	105	6.4	7.4	99.9
				They never went to school *	1	.1	.1	100.0
				Total	1413	86.6	100.0	
Responding Parent's Level of Education (Recodes)	EDS50209	PA12	Level of education	Never went to school	1	.1	.1	.1
				8th grade or less	65	4.0	4.6	4.7
				More than 8th grade, but no high school diploma	161	9.9	11.4	16.1
				GED or high school diploma	473	29.0	33.5	49.5

* Recoded item.

Table 3-6. Sociodemographic Items (con't)

Sociometrics	Add Health	Sociometrics label/ Add Health question	Response	Frequency	Percent	Valid Percent	Cumulative Percent
			After HS business, trade, vocational and business, trade, vocational school instead of HS	145	8.9	10.3	59.8
			Some college, no degree	282	17.3	20.0	79.8
			College degree	181	11.1	12.8	92.6
			Professional training beyond college	105	6.4	7.4	100.0
			Total	1413	86.6	100.0	
Residential Dad's Level of Education[d]	EDSA2437	H2RF1	Residential dad-education level				
			8th grade or less	11	.7	3.8	3.8
			More than 8th, but no HS diploma	36	2.2	12.5	16.4
			Business-trade-vocational school instead *	2	.1	.7	17.1
			High school graduate *	95	5.8	33.1	50.2
			Completed a GED *	15	.9	5.2	55.4
			After HS, business-trade-vocational *	17	1.0	5.9	61.3
			Went to college, but no degree *	24	1.5	8.4	69.7
			Graduated from college or university *	42	2.6	14.6	84.3
			Professional training beyond college *	15	.9	5.2	89.5
			Went to school, do not know what level *	17	1.0	5.9	95.5

* Recoded item.

Table 3-6. Sociodemographic Items (con't)

	Sociometrics	Add Health	Sociometrics label/ Add Health question	Response	Frequency	Percent	Valid Percent	Cumulative Percent
				Do not know if they went to school *	13	.8	4.5	100.0
				Total	287	17.6	100.0	
Residential Dad's Level of Education (Recodes)	EDSA2437	H2RF1	Residential dad-education level	8th grade or less	11	.7	4.3	4.3
				More than 8th grade, but no high school diploma	36	2.2	14.0	18.3
				GED or high school diploma	110	6.7	42.8	61.1
				After HS business, trade, vocational and business, trade, vocational school instead of HS	19	1.2	7.4	68.5
				Some college, no degree	24	1.5	9.3	77.8
				College degree	42	2.6	16.3	94.2
				Professional training beyond college	15	.9	5.8	100.0
				Total	257	15.7	100.0	
Household Income	WFS50244	PA55	Total household income	1252	0	900	42.28	45.81
				(n)	(Min)	(Max)	(M)	(SD)

* Recoded item.
a. Missing data for 210 cases.
b. Missing data for 15 cases.
c. Missing data for 219 cases.
d. Missing data for 1345 cases.

From this item, four items were created to represent each type of residence (e.g., Rural; 1 = yes, 0 = no). Three of the four dummy-coded residence variables were used to represent residence in the regression analyses. Rural was the referent category.

Parent's Education

Both items were recoded into seven groups; 1 (8th grade or less), 2 (More than 8th grade, but no high school diploma), 3 (GED or high school diploma), 4 (After HS business, trade, vocational school and business, trade, vocational school instead of HS), 5 (Some college, no degree), 6 (College degree), and 7 (Professional training beyond college). From these two items, the highest score was used for parent's education. There was a large percentage of missing data for residential dad education level because biological fathers were not included in this item.

Scale Construction

Scales were constructed using the extracted Add Health data for the dependent variable, the independent variables, and for selected sociodemographic variables. Table 3-2 shows the reliability alpha coefficients or correlations coefficients for the independent variable scales. These analyses were conducted before the imputation of missing values.

Four of the scales consisted of only one item and therefore no reliability coefficients were calculated. Correlation coefficients were calculated for the five scales that consisted of only two items. The coefficients for the Pubertal Development Scale (Wave 1 and 2) and the Parent Sexual Values Scale indicated only a small effect size (Cohen, 1992), but were maintained in the analyses. The coefficients for the Relationship with Adults Scale (Wave 1 and 2) indicated a medium effect size (Cohen, 1992). The low reliabilities for

the Parent Presence Scale (Wave 1 and 2) resulted in a reconstruction of the scale (see Table 3-2).

As recommended by Acock (1997), expectation maximization was used to calculate values to impute for missing data. There were several patterns of missing values. First, approximately 12 to 13 percent of the cases had missing data for the five scales that were constructed from the parent interview data. Second, items for three of the scales were from sections of the Add Health study that were restricted to adolescent that were 15-years-old or older. The remaining scales had less than 5 percent missing data and missing data analyses revealed that the data was randomly missing. For the first two patterns of missing data, mechanism variables were constructed to indicate if data was missing (1) or present (0) (Acock, 1997; Orme & Reis, 1991). These variables were then entered into the regression analyses to control for any effects of missing data on the independent and dependent variables.

Mechanism variables are similar to covariates, however, "mechanisms are controlled because of their relationship to why people did not answer items" (p. 79, Acock, 1997). Typically, the process for determining if a mechanism variable should be included in the analyses is to perform additional statistical analyses (e.g., t-test, correlation) to determine if there are differences between people who did answer the item and those who did not answer the item. If there is a relationship, the mechanism variable is then included in the analyses to control for these differences.

As indicated above, it is already known that there are differences (i.e., age) between adolescents who did and did not respond to the items that mechanism variables are computed for. On the other hand, there is no indication as to whether or not there are

differences where there is parent data missing. Even though preliminary analyses did not reveal any differences, it was determined that it would be prudent to include mechanism variables for these items because there was a substantial percentage of missing data.

When mechanism variables are shown to be significant predictors, the interpretation is that whatever difference there was between people who did and did not answer an item also is related to the outcome measure. For example, in the current study mechanism variables that represent missing data because of adolescents' age are significantly related to sexual competence. This suggests that age also is related to sexual competence.

Data Analysis

Two basic approaches to data analysis have been used to examine the effect of risk and protective factors on various outcomes. One method, which is the most common, is to test for the effect of individual risk and/or protective factors on outcome variables. The other method is to test for the effect of different amounts of risk and/or protective factors on outcome variables. In other words, the number of risk and/or protective factors is aggregated, resulting in a single risk factor score and/or a single protective factor score. How much there is to cope with, instead of what there is to cope with. Sameroff et al. (1993) referred to these as the multiple predictor and composite methods, respectively. Jessor et al. (1995) found that using the multiple predictor method accounted for almost twice as much variance (48%) as the composite method (25%). The current study used the multiple predictor method in order to maximize the amount of variance explained.

To test for longitudinal effects, both static and autoregressive models were used (Davies, Dumenci, & Windle, 1999). According to Davies et al., the autoregressive technique provides "more confident conclusions about dynamic change and causality

among the constructs" (p. 242). In the static longitudinal model, the effect of the independent variables at Wave 1 on adolescent sexual competence is tested. With the autoregressive longitudinal model, the effect of Wave 2 independent variables on the adolescent sexual competence is tested, controlling for Wave 1 independent variables. Thus, changes in the predictor variables are used to predict sexual competence. A concurrent model also is tested that includes the Wave 2 independent variables and adolescent sexual competence.

The primary analytic procedure used to test the hypotheses in this study is hierarchical multiple regression. These analyses are conducted using the regression (REGRESS) procedure in SUDAAN that fits a linear model to complex sample surveys. It estimates model parameters, tests the null hypothesis that individual regression coefficients are equal to zero, and computes tests for overall model significance as well as main effects and interaction effects (Shah et al., 1996). The REGRESS procedure does not have the capabilities to conduct hierarchical multiple regression. Therefore, a hierarchical model has to be built by running separate analyses, adding groups of variables at each step. F-changes and R-square changes are calculated by hand at each step.

Table 3-7 illustrates the type or level of variables included in each block for each model that was tested (Hypotheses 1 and 2). For the static and concurrent separate models, separate analyses are performed for individual, familial, and extrafamilial level variables, for a total of six analyses. The extrafamilial level variables are those variables that were not included as individual or familial level variables (Luster & Small, 1994; Perkins et al., 1998; Small & Luster, 1994). Variables that have a significant association

Table 3-7. Hierarchical Multiple Regression Blocks by Variable and Model

	Static Separate Model	Static Additive Model	Concurrent Separate Model	Concurrent Additive Model	Autoregressive Model
Sociodemographic controls	*Block 1*	*Block 1*	*Block 1*	*Block 1*	*Block 1*
Missing mechanisms	*Block 1*	*Block 1*	*Block 1*	*Block 1*	*Block 1*
Wave 1 individual level	*Block 2*[a]	*Block 2*			*Block 2*
Wave 1 familial level	*Block 2*[a]	*Block 3*			*Block 2*
Wave 1 extrafamilial level	*Block 2*[a]	*Block 4*			*Block 2*
Wave 2 individual level			*Block 2*[a]	*Block 2*	*Block 3*
Wave 2 familial level			*Block 2*[a]	*Block 3*	*Block 4*
Wave 2 extrafamilial level			*Block 2*[a]	*Block 4*	*Block 5*

a. Only variables from this level used in analysis.

with sexual competence are then used in the additive and autoregressive models. For the autoregressive model, significant variables from the concurrent separate analyses are used. For the static additive, concurrent additive, and autoregressive models, an analysis is performed for each model with variables from each block added to the previous block.

One reason for using this analytic approach is to avoid misspecifying the model when all three levels are included in the analysis. Specifically, this approach is used to eliminate irrelevant variables. "Including irrelevant variables increases the standard errors of all estimates without improving prediction" (p. 269, Norusis, 1990). In addition, the separate models allow for an examination of each ecological system's influence on adolescents' sexual competence.

Hierarchical multiple regression analyses also is used to test for interactions among gender and individual, familial, and extrafamilial level variables (Hypotheses 3) and five ethnic categories and individual, familial, and extrafamilial level variables (Hypothesis 4). Interaction terms are created by multiplying together two centered variables. The first variable is gender or one of five ethnic categories and the second variable is one of the 35 variables from Wave 1 and Wave 2 individual, familial, and extrafamilial levels. Each of the Wave 1 and Wave 2 individual, familial, and extrafamilial level variables is tested in a separate regression analysis with interaction terms for gender and each of five ethnic categories. Block 1 in the analysis contains the sociodemographic controls, mechanism for missing data when appropriate, and the individual, familial, or extrafamilial variable, Block 2 contains the six interaction terms for that variable. Statistical power analyses (Cohen, 1992) were conducted to determine if the sample size was sufficient to test these models. With alpha = .05 and an unweighted sample size of

1613, after listwise deletion for cases missing dependent variable data, power analyses indicated that the sample size was large enough to detect small effect sizes (i.e., variance accounted for equal to 2%) with power = 1.

Other analyses consisted of frequencies, correlations, and descriptive statistics for the dependent variable and independent variables, and examining the data for missing values. Frequencies and descriptive statistics are calculated using DESCRIPT procedure in SUDAAN. This procedure produces descriptive statistics for complex sample surveys including means and percentages and their standard errors (Shah et al., 1996). The correlation procedure in SPSS was used to produce the correlation matrix. For missing values, specific analyses included SPSS Missing Values Analysis (SPSS, 1997) and Expectation Maximization (Acock, 1997; Little & Rubin, 1987) for imputing selected missing values.

All of the statistical analyses in this study that were performed in SUDAAN also were performed in SPSS. The calculated point estimates (e.g., means, betas) from these statistical software packages were identical. Both the standard errors that are calculated using SUDAAN and the standard deviations that are calculated in SPSS are reported. Standard errors are the standard deviations of the sampling distribution of a statistic, whereas the standard deviation is a measure of data variation. In other words, a sample standard deviation indicates how much each observation can deviate from a statistic (e.g., sample mean), whereas the standard error indicates how much any given statistic (e.g., sample mean) deviates from a sampling mean, where the sampling mean is the actual population parameter. Both are included so as to compare one to the other and for

comparison to other studies that may have reported either standard errors or standard

deviations.

CHAPTER IV

RESULTS

Findings

<u>Descriptive Analyses</u>

Approximately 33% of adolescents above the age of 12 reported being sexual active during the year prior to their second interview (i.e., Wave 2). This is a nationally representation of adolescents in Grades 7 through 12 in the United States. Correlations, univariate distributions, means, and standard deviations are presented in Table 4-1, Table 4-2, Table 4-3, and Table 4-4. Using Cohen's (1992) conventions for effect size, the relationship significance for the correlations is indicated by small effect sizes ($\geq$ .10), medium effect sizes ($\geq$ .30), and large effect sizes ($\geq$ .50). Inspecting the correlations in Table 4-1 provides a way of establishing the validity of the scales.

Construct validity is the primary form of validity assessed. However, there is some evidence for also using criterion validity to assess the validity of the scales. Specifically, correlations for corresponding Wave 1 and Wave 2 scales provide evidence of predictive criterion-related validity. For example, the Wave 1 health-risk behaviors and Wave 2 health-risk behaviors correlation (r = .60) provide evidence of predictive validity. As suggested by Carmines and Zeller (1979), the nature of criterion validity is primarily atheoretical and empirical. "Nevertheless, theory usually enters the process indirectly because there must be some basis on which to select the criterion variables" (p. 18). In this case, it is theorized that Wave 1 scores predict Wave 2 scores on the same scale.

Concurrent criterion-related also can be assessed. For example, the family income and parental education correlation is a medium effect size (r = .35) and in the expected

Table 4-1. Zero Order Correlation Coefficients for All Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Age	-																			
2. Gender	.08	-																		
3. Asian[a]	.01	-.05	-																	
4. Black[a]	.01	.02	-.08	-																
5. Hispanic[a]	-.05	.07	-.06	-.20	-															
6. Native[a]	-.03	.03	-.02	-.08	-.06	-														
7. White[a]	.04	-.05	-.20	-.63	-.49	-.19	-													
8. Other[a]	.00	-.03	-.01	-.04	-.03	-.01	-.11	-												
9. Family income	.07	-.01	.03	-.14	-.11	.00	.19	-.02	-											
10. Parental education	.04	-.03	.04	-.02	-.21	.00	.15	.01	.35	-										
11. Parental marital status	.05	-.05	.04	-.26	.01	-.01	.19	.03	.29	.10	-									
12. Rural[b]	-.01	-.06	-.05	-.07	-.15	.00	.18	.00	.00	-.02	.12	-								
13. Suburban[b]	.02	.00	.01	-.13	-.06	.00	.14	.05	.15	.17	.08	-.41	-							
14. Urban residential[b]	-.02	.02	.04	.20	.08	.02	-.23	-.04	-.12	-.11	-.16	-.43	-.53	-						
15. Other[b]	.01	.06	-.01	.00	.22	-.04	-.14	-.02	-.06	-.08	-.06	-.14	-.17	-.19	-					
16. Obstacles to birth control[e]	-.49	-.08	.05	-.06	.02	.01	.02	.01	-.03	-.03	-.02	.06	-.02	-.02	-.02	-				
17. HIV/AIDS vulnerability[e]	-.72	-.05	.01	.01	.06	-.01	-.05	.00	-.09	-.09	-.05	.01	-.05	.05	-.02	.66	-			
18. Consequences of pregnancy[e]	-.72	-.05	.01	.01	.06	-.01	-.05	.00	-.09	-.09	-.05	.01	-.05	.05	-.02	.66	1.00	-		
19. Parental monitoring[c]	.11	.00	.03	.09	.07	-.04	-.11	-.03	.01	.01	.07	-.04	-.04	.05	.05	-.03	-.05	-.05	-	
20. Family sexual socialization[e]	.10	-.01	.05	.08	.06	-.04	-.10	-.02	.04	.02	.08	-.02	-.04	.03	.05	-.02	-.05	-.05	.89	-
21. Parent's sexual values[e]	.11	-.01	.05	.08	.07	-.04	-.12	-.03	.01	.02	.08	-.03	-.05	.05	.06	-.03	-.05	-.05	.92	.95
22. Parent-parent teacher organization[c]	.09	.00	.04	.07	.05	-.02	-.10	-.03	.03	.02	.11	-.03	-.04	.04	.07	.00	-.03	-.03	.85	.84
23. Parent-civic/social organization[c]	.09	.00	.04	.08	.05	-.02	-.10	-.03	.03	.03	.11	-.03	-.04	.04	.06	.00	-.03	-.03	.84	.84
24. Affect[d]	-.01	.19	-.04	-.01	-.08	-.02	.08	.04	.08	.12	.05	-.02	.08	-.04	-.04	.04	.01	.01	-.06	-.03
25. Self-esteem[d]	.01	.18	-.05	.15	-.04	-.01	-.08	.02	-.04	.01	-.03	-.05	-.01	-.05	-.05	-.01	.02	.02	-.02	.01
26. Health-risk behaviors[d]	.08	.07	.02	-.22	.00	.04	.17	-.03	.06	.10	.02	.06	.06	-.04	-.01	-.18	-.11	-.11	.02	.03
27. Obstacles to birth control[d]	-.12	.21	.05	.02	.14	.03	-.14	.00	-.13	-.13	-.03	.00	-.09	.07	.04	.02	.10	.10	.03	.03
28. Pubertal development[d]	-.04	-.10	-.05	-.12	-.05	-.01	.14	.02	.08	.15	.08	.05	.04	-.06	-.05	-.02	.00	.00	.00	.00
29. HIV/AIDS vulnerability[d]	-.07	-.14	.01	.08	.03	-.02	-.08	.00	-.07	-.03	-.02	.03	-.07	.03	.03	.08	.07	.07	.03	.02
30. Consequences of pregnancy[d]	.15	.03	-.05	.20	.05	.00	-.19	.01	-.15	-.19	-.13	-.07	-.10	.12	.07	-.11	-.09	-.09	.05	.06

Note. Italics indicates small effect size, bold indicates medium effect size, and italic bold indicates large effect size.

Table 4-1. Zero Order Correlation Coefficients for All Variables (con't)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
31. Parent's sexual values[d]	-.23	-.09	.01	-.03	-.07	-.01	.06	.01	.06	.10	.10	-.01	.09	-.04	-.10	.09	.13	.13	-.02	-.01
32. Perception of parent's sexual values[d]	.27	.19	-.06	.07	-.01	-.05	-.02	.00	-.01	-.02	-.10	-.03	-.01	.02	.04	-.26	-.22	-.22	.05	.06
33. Parental monitoring[d]	-.09	-.04	-.02	-.17	-.15	.03	.25	-.03	.13	.19	.10	.05	.10	-.11	-.07	.09	.05	.05	-.01	.00
34. Parent/family connectedness[d]	-.04	.11	-.08	.03	.01	-.01	.00	-.02	.02	-.04	.08	.00	-.03	.03	.01	.05	.05	.05	-.04	-.02
35. Parent-adolescent activities[d]	.01	-.08	.00	-.09	-.09	.01	.13	.02	.18	.15	.28	.01	.06	-.04	-.06	.00	.00	.00	-.06	-.05
36. Parental presence[d]	-.09	-.01	.00	-.05	.03	.04	.00	.02	-.02	-.07	.14	.07	.01	-.05	-.06	.02	.04	.04	-.06	-.08
37. Family sexual socialization[d]	.10	.00	-.08	.11	-.06	.01	-.02	-.01	-.05	.02	-.15	-.08	-.03	.10	.01	-.14	-.10	-.10	-.06	-.05
38. Friend's health-risk behaviors[d]	.08	.06	-.01	-.20	-.05	.03	.20	-.02	.01	.05	-.05	.01	.06	-.06	-.01	-.10	-.07	-.07	.00	.00
39. School connectedness[d]	-.14	.03	.00	.01	-.03	-.06	.02	.02	.05	.07	.04	.09	.01	-.09	-.01	.09	.08	.08	-.06	-.04
40. Relationship with adults[d]	-.04	-.07	.01	.07	-.02	-.05	-.04	.03	.01	.00	.02	.03	-.02	-.01	.00	.08	.06	.06	-.03	-.02
41. Neighborhood quality[d]	-.05	.04	-.10	.28	.11	.03	-.28	-.04	-.29	-.29	-.19	.08	-.31	.19	.09	.00	.07	.07	.03	.03
42. Parent-parent teacher organization[d]	-.01	.02	.01	.02	-.09	.03	.04	-.02	.18	.30	.10	-.04	.09	-.04	-.04	.02	-.01	-.01	-.17	-.17
43. Parent-civic/social organization[d]	.04	-.01	.02	.03	-.10	-.01	.05	-.03	.13	.23	.03	.01	.04	-.05	.01	-.04	-.04	-.04	-.09	-.09
44. HIV/AIDS vulnerability[e]	-.55	-.02	.00	.02	.05	.02	-.06	-.02	-.09	-.09	-.06	.01	-.01	.00	.00	.47	.58	.58	-.04	-.05
45. Consequences of pregnancy[e]	-.44	-.05	-.01	.01	.03	.01	-.03	.01	-.10	-.11	-.04	.04	-.03	.00	-.01	.41	.50	.50	.01	-.01
46. Affect[f]	.07	.17	-.06	-.01	-.12	.04	.10	-.03	.08	.10	.00	.04	.04	-.05	-.05	-.01	-.05	-.05	-.06	-.03
47. Self-esteem[f]	.03	.12	-.07	.15	-.06	-.01	-.07	.05	.01	-.01	.00	.00	-.04	.04	-.02	-.05	-.03	-.03	-.07	-.05
48. Health-risk behaviors[f]	.00	.04	-.01	-.21	.00	-.02	.19	-.04	.09	.10	.06	-.07	.13	-.05	-.04	-.04	.03	.03	-.02	.00
49. Obstacles to birth control[f]	-.10	.24	.08	.00	.12	.01	-.11	.00	-.09	-.07	.00	-.01	-.05	.05	.01	.04	.14	.14	.05	.05
50. Pubertal development[f]	-.06	-.03	-.07	-.11	.03	-.09	.12	.03	.06	.09	.05	.02	.02	-.04	.02	-.01	.04	.04	-.02	-.03
51. HIV/AIDS vulnerability[f]	-.02	-.13	.00	.13	.04	-.05	-.12	-.03	-.05	.01	-.03	.00	-.04	.03	.02	.03	-.01	-.01	.04	.02
52. Consequences of pregnancy[f]	.16	.00	-.10	.18	.05	-.01	-.14	-.03	-.14	-.20	-.09	-.03	-.11	.11	.04	-.09	-.06	-.06	.03	.02
53. Perception of parent's sexual values[f]	.19	.13	-.07	.06	-.02	.00	.00	-.08	-.05	-.08	-.11	-.05	-.05	.08	.03	-.18	-.11	-.11	-.01	-.03
54. Parent/family connectedness[f]	.03	.09	-.13	.03	.01	.06	-.01	-.03	.02	-.03	.07	.01	-.04	.02	.03	-.02	-.03	-.03	-.06	-.05
55. Parent-adolescent activities[f]	-.03	-.12	-.02	-.10	-.09	.03	.14	.01	.19	.22	.26	.03	.07	-.07	-.07	.02	-.02	-.02	-.11	-.08
56. Parental presence[f]	-.18	.03	.02	-.03	.02	.06	-.01	-.03	.01	-.01	.12	.03	.04	-.06	-.02	.07	.10	.10	-.12	-.12
57. Friend's health-risk behaviors[f]	.00	.06	-.06	-.21	-.03	.01	.22	-.06	.00	.03	.01	-.03	.07	-.03	-.02	.02	.02	.02	-.04	-.03
58. School connectedness[f]	-.20	.01	.02	.03	-.03	-.03	.01	-.06	.10	.13	.07	.04	.08	-.09	-.05	.12	.10	.10	-.08	-.07
59. Relationship with adults[f]	.08	-.14	.00	.06	-.05	-.03	.00	-.03	.00	.01	.05	.05	-.02	.00	-.04	-.02	-.06	-.06	-.06	-.06
60. Neighborhood quality[f]	-.05	.04	-.10	.29	.10	.04	-.28	-.05	-.29	-.29	-.18	.09	-.30	.17	.10	.00	.06	.06	.03	.03
61. Sexual competence[f]	-.01	-.09	.01	-.03	-.03	-.03	.06	.00	.03	-.01	.04	-.01	.00	.02	-.04	.02	-.03	-.03	.00	.00

Note. Italics indicates small effect size, bold indicates medium effect size, and italic bold indicates large effect size.

Table 4-1. Zero Order Correlation Coefficients for All Variables (con't)

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
21. Parent's sexual values[c]	-																			
22. Parent-parent teacher organization[c]	**.87**	-																		
23. Parent-civic/social organization[c]	**.86**	**.98**	-																	
24. Affect[d]	-.05	-.02	-.01	-																
25. Self-esteem[d]	.01	-.01	.01	**.46**	-															
26. Health-risk behaviors[d]	.02	-.01	-.01	-.18	-.18	-														
27. Obstacles to birth control[d]	.02	.02	.01	-.17	-.11	.10	-													
28. Pubertal development[d]	-.01	-.01	-.01	.02	.03	.11	-.07	-												
29. HIV/AIDS vulnerability[d]	.03	.03	.03	-.01	-.01	-.16	-.10	.01	-											
30. Consequences of pregnancy[d]	.06	.04	.04	-.13	-.06	.09	.12	-.08	-.11	-										
31. Parent's sexual values[d]	-.01	-.04	-.03	.00	-.01	-.05	.00	.07	.02	-.18	-									
32. Perception of parent's sexual values[d]	.07	.04	.04	.02	.05	.16	-.07	.05	-.04	.24	-.28	-								
33. Parental monitoring[d]	-.01	-.01	.00	.09	-.01	.02	-.05	.09	-.01	-.17	.14	-.08	-							
34. Parent/family connectedness[d]	-.02	-.02	-.01	.26	**.40**	-.16	-.08	-.02	.04	-.07	.01	.02	.08	-						
35. Parent-adolescent activities[d]	-.03	-.05	-.04	.18	.21	-.12	-.16	.08	.03	-.18	.06	-.06	.17	**.35**	-					
36. Parental presence[d]	-.07	-.06	-.06	.05	.07	-.11	.00	.00	.01	-.10	.06	-.08	.03	.18	.10	-				
37. Family sexual socialization[d]	-.04	-.06	-.06	.00	.06	.06	-.08	.08	.00	.09	-.13	.26	.09	.02	.00	-.04	-			
38. Friend's health-risk behaviors[d]	-.01	-.01	-.02	-.19	-.19	**.65**	.09	.08	-.14	.10	-.03	.13	.03	-.10	-.09	-.09	.06	-		
39. School connectedness[d]	-.04	-.03	-.03	.29	**.31**	-.22	-.12	.05	.05	-.20	.13	-.10	.11	.21	.25	.10	-.04	-.20	-	
40. Relationship with adults[d]	-.01	-.01	.01	.22	**.37**	-.19	-.18	.05	.14	-.14	-.01	-.04	.03	**.31**	.22	.04	.03	-.20	**.34**	-

Note. Italics indicates small effect size, bold indicates medium effect size, and italic bold indicates large effect size.

Table 4-1. Zero Order Correlation Coefficients for All Variables (con't)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
41. Neighborhood quality[d]	.03	.03	.04	-.02	.04	-.13	.11	-.09	.06	.15	-.09	.05	-.13	.05	-.14	.03	.12	-.09	-.02	.01
42. Parent-parent teacher organization[d]	-.18	-.18	-.17	.10	.05	-.01	-.09	.11	-.03	-.08	.07	-.05	.17	.05	.16	-.01	.04	-.03	.10	.08
43. Parent-civic/social organization[d]	-.11	-.12	-.13	.03	.02	-.02	-.04	.05	.00	-.06	.02	-.04	.09	.00	.09	.02	.02	-.02	.03	.04
44. HIV/AIDS vulnerability[e]	-.04	-.01	-.01	.00	.02	-.09	.07	-.02	.05	-.05	.10	-.19	.03	.06	-.03	.04	-.10	-.06	.03	.08
45. Consequences of pregnancy[e]	.00	.02	.02	-.01	-.01	-.09	.05	-.03	.03	-.01	.07	-.17	.03	.05	-.02	.02	-.09	-.03	.07	.07
46. Affect[f]	-.04	-.06	-.04	.54	.31	-.07	-.19	.01	-.03	-.04	-.02	.08	.06	.18	.15	.01	.01	-.12	.19	.19
47. Self-esteem[f]	-.05	-.05	-.05	.32	.53	-.14	-.12	.00	.04	-.03	-.03	.07	-.02	.26	.17	.02	.11	-.14	.21	.29
48. Health-risk behaviors[f]	-.01	-.02	-.03	-.09	.15	.60	.06	.07	-.08	-.03	-.01	.07	.09	-.12	-.02	-.09	.02	.44	-.11	-.12
49. Obstacles to birth control[f]	.05	.07	.06	-.14	-.09	.06	.41	-.08	-.05	.10	-.03	.02	-.03	-.03	-.11	-.02	-.05	.06	-.09	-.10
50. Pubertal development[f]	-.04	-.04	-.04	-.04	.03	.09	-.05	.49	.05	-.09	.04	.01	.07	.03	.08	.00	.06	.05	.06	.11
51. HIV/AIDS vulnerability[f]	.04	.06	.06	-.04	-.05	-.08	-.07	-.01	.31	-.02	.02	-.02	.01	.03	-.01	.01	.06	-.07	.03	.02
52. Consequences of pregnancy[f]	.02	.03	.02	-.13	-.07	.02	.09	-.07	-.03	.54	-.18	.21	-.11	-.09	-.16	-.07	.10	.05	-.16	-.12
53. Perception of parent's sexual values[f]	-.02	-.04	-.05	-.02	.05	.13	.00	-.01	-.06	.21	-.26	.45	-.03	.03	-.07	-.11	.25	.13	-.13	-.12
54. Parent/family connectedness[f]	-.05	-.04	-.05	.19	.26	-.12	-.09	-.01	.02	-.03	-.01	.05	.04	.51	.25	.10	.10	-.09	.14	.20
55. Parent-adolescent activities[f]	-.08	-.07	-.07	.14	.11	-.09	-.19	.09	.06	-.21	.10	-.12	.17	.22	.48	.07	-.01	-.08	.19	.13
56. Parental presence[f]	-.12	-.11	-.11	.05	.06	-.04	.05	.01	.04	-.10	.08	-.08	.02	.10	.04	.40	-.02	-.06	.09	.05
57. Friend's health-risk behaviors[f]	-.03	-.03	-.04	-.10	-.12	.47	.10	.03	-.08	.04	-.02	.09	.06	-.09	-.06	-.08	-.01	.52	-.12	-.12
58. School connectedness[f]	-.07	-.05	-.05	.20	.17	-.19	-.11	-.01	.09	-.22	.12	-.11	.13	.17	.24	.12	-.05	-.20	.38	.26
59. Relationship with adults[f]	-.05	-.03	-.03	.13	.23	-.13	-.13	.05	.06	-.04	.01	-.02	.00	.17	.16	.02	-.04	-.11	.24	.41
60. Neighborhood quality[f]	.04	.03	.04	-.02	.04	-.13	.12	-.09	.06	.14	-.06	.05	-.12	.05	-.14	.02	.10	-.09	.00	.02
61. Sexual competence[f]	.02	-.01	-.01	.15	.11	-.26	-.16	-.01	.04	-.10	.01	-.06	.05	.10	.09	.01	.00	-.23	.11	.09

Note. Italics indicates small effect size, bold indicates medium effect size, and italic bold indicates large effect size.

Table 4-1. Zero Order Correlation Coefficients for All Variables (con't)

	41	42	43	44	45	46	4	48	49	50	51	52	53	54	55	56	57	58	5	60	61
41. Neighborhood quality^d	-																				
42. Parent-parent teacher organization^d	-.13	-																			
43. Parent-civic/social organization^d	-.14	.21	-																		
44. HIV/AIDS vulnerability^e	.07	-.02	-.05	-																	
45. Consequences of pregnancy^e	.08	-.04	-.05	.89	-																
46. Affect^f	-.07	.11	.07	-.01	-.01	-															
47. Self-esteem^f	.05	.08	.04	-.01	-.01	.45	-														
48. Health-risk behaviors^f	-.13	-.02	-.03	-.01	-.02	-.09	-.1	-													
49. Obstacles to birth control^f	.09	-.05	-.02	.14	.13	-.20	-.1	.03	-												
50. Pubertal development^f	-.08	.09	.04	.03	.02	-.02	.0	.09	-.06	-											
51. HIV/AIDS vulnerability^f	.06	.00	.00	.04	.03	-.05	.0	-.06	-.07	.01	-										
52. Consequences of pregnancy^f	.18	-.09	-.10	-.10	-.08	-.10	-.0	-.02	.09	-.08	-.08	-									
53. Perception of parent's sexual values^f	.08	-.09	-.04	-.12	-.12	.01	.0	.08	-.04	-.01	-.03	.28	-								
54. Parent/family connectedness^f	.02	.04	.03	.02	.03	.25	.3	-.12	-.04	.04	.05	-.04	.03	-							
55. Parent-adolescent activities^f	-.16	.19	.13	-.01	-.02	.12	.1	-.02	-.14	.09	.05	-.19	-.09	**.35**	-						
56. Parental presence^f	.00	.06	-.01	.07	-.05	.03	.0	.00	.01	.01	.04	-.09	-.04	.10	.12	-					
57. Friend's health-risk behaviors^f	-.11	-.05	-.04	.00	.00	-.13	-.1	.62	.09	.05	-.04	.08	.13	-.12	-.07	-.02	-				
58. School connectedness^f	-.07	.18	.10	.06	.01	.20	.2	-.12	-.13	.03	.07	-.22	-.13	.15	.28	.17	-.17	-			
59. Relationship with adults^f	-.03	.11	.05	-.01	.00	.23	.3	-.17	-.18	.07	.03	-.09	-.06	.25	.17	.05	-.16	.28	-		
60. Neighborhood quality^f	.96	-.13	-.13	.07	.09	-.07	.0	-.12	.07	-.08	.05	.18	.09	.03	-.17	.00	-.10	-.08	-.0	-	
61. Sexual competence^f	-.03	.08	-.02	.01	.02	.17	.1	-.27	-.27	-.06	.01	-.09	-.06	.12	.07	-.05	-.21	.14	.1	-.03	-

Note. Italics indicates small effect size, bold indicates medium effect size, and italic bold indicates large effect size.

a. Ethnic categories.
b. Community of residence categories.
c. Missing mechanism variables for Wave 1.
d. Wave 1 variables.
e. Missing mechanism variables for Wave 2.
f. Wave 2 variables.

Table 4-2. Percent Distribution of Sexual Behaviors by Gender and Ethnicity

Behavior	Total	Gender		Ethnicity					
		Female	Male	Asian	Black	Hispanic	Native	White	Other
Alcohol use w/sex									
Yes	12.7	10.3	15.3	13.4	9.4	13.6	14.4	13.7	#
No[a]	87.3	89.7	84.7	86.6	90.6	86.4	85.6	86.3	#
Drunk first and most recent sex									
Yes	.3	#	#	#	.1	.5	#	.4	#
No[a]	99.7	#	#	#	99.9	99.5	#	99.6	#
Drug use w/sex									
Yes	7.3	5.2	9.5	6.1	7.6	9.7	9.4	6.7	4.4
No[a]	92.7	94.8	90.5	93.9	92.4	90.3	90.6	93.3	95.6
Drug use first and most recent sex									
Yes	.4	#	#	#	#	.7	4.4	.3	#
No[a]	99.6	#	#	#	#	99.3	95.6	96.7	#
Contraceptive use all times									
Yes[a]	44.3	43.0	44.4	30.5	44.8	36.6	47.1	46.5	33.0
No	55.6	57.0	55.6	69.5	55.2	63.4	52.9	53.5	67.0
Casual sex									
Yes	35.8	29.4	42.6	18.3	48.9	32.6	52.2	32.7	17.8
No[a]	63.8	70.6	57.4	81.7	51.1	67.4	47.8	67.3	82.2
Anal sex									
Yes	14.1	15.3	12.8	16.6	11.5	13.8	19.4	14.5	28.4
No[a]	85.7	84.7	87.2	83.4	88.5	86.2	80.6	85.5	71.6
Sex for drugs/money									
Yes	3.3	2.6	4.0	1.2	3.3	4.7	#	3.2	#
No[a]	96.0	97.4	96.0	98.8	96.7	95.3	#	96.8	#

Note. # = In compliance with the Carolina Population Center data purchase and use agreement, data are not reported in these cells.
a. Denotes sexual competence.

Table 4-3. Percent Distribution of Sexual Competence Scores by Gender and Ethnicity

Sexual Competence[a]	Total	Gender		Ethnicity					
		Female	Male	Asian	Black	Hispanic	Native	White	Other
2	.2	.2	.2	.	.	.	.	.3	.
3	1.1	.3	1.9	.	1.9	1.5	4.4	.7	.
4	2.4	2.2	2.5	6.8	.9	3.5	2.8	2.4	.
5	8.9	6.9	10.9	8.0	10.0	7.5	14.2	8.6	17.8
6	24.0	22.4	25.6	16.8	26.5	28.0	27.0	22.6	12.1
7	39.4	43.4	35.3	40.4	40.4	39.2	23.1	39.5	55.2
8	24.1	24.6	23.6	28.0	20.4	20.3	28.5	25.9	14.9
Mean	6.70	6.80	6.60	6.75	6.64	6.61	6.47	6.75	6.67
Standard Deviation	1.08	1.00	1.16	1.15	1.06	1.09	1.34	1.08	.93
Standard Error	.03	.04	.05	.21	.05	.08	.30	.04	.29

a. Scores ranged from 2 to 8 out of a possible 0 to 8 range.

Table 4-4. Means, Standard Deviations, and Standard Errors for Independent Variables by Gender

System/level	Scale	Total			Female			Male		
		M	SD	SE	M	SD	SE	M	SD	SE
Microsystem										
Individual	Affect[a]	44.67	7.97	.27	43.20	8.68	.39	46.16	6.87	.30
	Affect[b]	44.88	7.96	.28	43.53	8.36	.37	46.26	7.27	.32
	Self-Esteem[a]	24.46	3.55	.13	23.82	3.63	.16	25.11	3.34	.13
	Self-Esteem[b]	24.77	3.46	.11	24.34	3.54	.11	25.20	3.33	.16
	Health-Risk Behaviors[a]	2.12	2.12	.06	2.00	1.70	.09	2.24	1.70	.07
	Health-Risk Behaviors[b]	2.13	2.13	.06	2.06	1.71	.08	2.20	1.72	.07
	Obstacles to Birth Control[a]	10.83	10.83	.13	10.03	3.58	.15	11.65	3.96	.19
	Obstacles to Birth Control[b]	10.78	10.78	.15	9.72	4.03	.17	11.86	4.48	.24
	Pubertal Development[a]	6.88	6.88	.04	7.02	1.39	.05	6.73	1.46	.06
	Pubertal Development[b]	6.88	6.88	.05	6.93	1.44	.06	6.84	1.48	.06
	HIV/AIDS Vulnerability[a]	3.40	3.40	.03	3.56	1.07	.04	3.24	1.15	.05
	HIV/AIDS Vulnerability[b]	3.14	3.14	.03	3.29	1.11	.04	2.98	1.18	.05
	Consequences of Pregnancy[a]	14.19	14.19	.18	14.07	4.45	.20	14.30	4.54	.23
	Consequences of Pregnancy[b]	14.68	14.68	.19	14.69	4.69	.20	14.66	4.63	.23
Family	Parental Sexual Values[a]	8.17	1.66	.06	8.33	1.61	.07	8.01	1.70	.08
	Perception of Parent's Sexual Values[a]	7.67	2.79	.11	7.15	2.79	.14	8.20	2.70	.13
	Perception of Parent's Sexual Values[b]	8.52	2.60	.10	8.20	2.73	.12	8.85	2.41	.11
	Parental Monitoring[a]	2.47	.78	.03	2.50	.74	.03	2.44	.82	.04
	Parent/Family Connectedness[a]	22.08	3.18	.11	21.74	3.48	.15	22.41	2.81	.11
	Parent/Family Connectedness[b]	21.78	3.00	.08	21.51	3.24	.12	22.06	2.71	.12
	Parent-Adolescent Activities[a]	4.59	2.87	.10	4.81	2.76	.11	4.35	2.97	.14
	Parent-Adolescent Activities[b]	4.51	2.85	.09	4.86	2.66	.11	4.16	2.99	.13
	Parental Presence[a]	2.22	.82	.03	2.23	.83	.03	2.21	.81	.03
	Parental Presence[b]	2.17	.91	.03	2.15	.95	.04	2.20	.87	.04
	Family Sexual Socialization[a]	9.26	2.57	.09	9.27	2.51	.13	9.26	2.62	.10

Table 4-4. Means, Standard Deviations, and Standard Errors for Independent Variables by Gender (con't)

System/level	Scale	Total			Female			Male		
		M	SD	SE	M	SD	SE	M	SD	SE
Microsystem										
Peer	Friend's Health-Risk Behaviors[a]	3.71	2.77	.10	3.55	2.71	.13	3.88	2.83	.13
	Friend's Health-Risk Behaviors[b]	4.12	2.81	.11	3.96	2.75	.14	4.29	2.85	.14
School	School Connectedness[a]	17.00	5.07	.17	16.83	5.15	.23	17.18	4.99	.20
	School Connectedness[b]	14.90	7.41	.27	14.85	7.18	.32	14.94	7.63	.36
Neighborhood/ Community	Relationship with Adults[a]	7.60	1.57	.05	7.71	1.58	.06	7.49	1.54	.07
	Relationship with Adults[b]	7.73	1.52	.05	7.94	1.47	.06	7.52	1.54	.07
	Neighborhood Quality[a]	11.71	2.55	.20	11.60	2.51	.21	11.81	2.60	.22
	Neighborhood Quality[b]	11.72	2.55	.20	11.61	2.50	.20	11.83	2.60	.22
Mesosystem										
Parent-School	Parent Membership Parent-Teacher Organization[a]	.23	.42	.02	.22	.42	.02	.24	.42	.02
Exosystem										
Parent-Community	Parent Membership Civic/Social Organization[a]	.10	.30	.01	.11	.31	.01	.01	.30	.01

a. Scale constructed from Wave 1 data.
b. Scale constructed from Wave 2 data.

Table 4-5. Means, Standard Deviations, and *Standard Errors* for Independent Variables by Ethnicity

System/level	Scale	Asian		Black		Hispanic		Native American		White		Other	
		M	SD/SE	M	SD/SE	M	SD/SE	M	SD/SE	M	SD/SE	M	SD/SE
Microsystem													
Individual	Affect[a]	42.43	7.05 / *1.17*	44.49	8.53 / *.46*	43.07	8.05 / *.58*	43.49	8.35 / *1.76*	45.17	7.72 / *.33*	48.21	6.47 / *1.63*
	Affect[b]	42.07	8.99 / *1.32*	44.76	7.40 / *.50*	42.38	8.32 / *.72*	46.92	7.89 / *1.29*	45.53	7.86 / *.35*	42.47	8.24 / *2.52*
	Self-Esteem[a]	23.44	3.38 / *.58*	25.49	3.22 / *.21*	24.13	3.99 / *.27*	24.27	3.99 / *.85*	24.23	3.48 / *.14*	25.26	2.59 / *.82*
	Self-Esteem[b]	23.15	3.48 / *.52*	25.83	3.01 / *.15*	24.28	3.77 / *.28*	24.53	3.38 / *.64*	24.58	3.46 / *.14*	26.96	2.54 / *.80*
	Health-Risk Behaviors[a]	2.38	1.67 / *.23*	1.36	1.49 / *.09*	2.12	1.70 / *.17*	2.53	1.77 / *.36*	2.35	1.70 / *.06*	1.48	1.25 / *.47*
	Health-Risk Behaviors[b]	2.05	1.50 / *.22*	1.40	1.59 / *.10*	2.14	1.74 / *.15*	1.91	1.56 / *.35*	2.39	1.69 / *.06*	1.39	1.70 / *.53*
	Obstacles to Birth Control[a]	12.17	3.47 / *.51*	10.97	3.84 / *.27*	12.25	3.95 / *.33*	11.72	4.08 / *.75*	10.39	3.73 / *.15*	10.68	4.90 / *1.47*
	Obstacles to Birth Control[b]	12.90	3.64 / *.51*	10.77	4.12 / *.26*	12.09	4.84 / *.34*	11.05	4.80 / *.75*	10.40	4.31 / *.17*	10.55	3.71 / *1.33*
	Pubertal Development[a]	6.45	1.30 / *.16*	6.54	1.51 / *.10*	6.69	1.59 / *.14*	6.83	1.66 / *.34*	7.04	1.34 / *.05*	7.25	.88 / *.27*
	Pubertal Development[b]	6.27	1.23 / *.20*	6.55	1.49 / *.11*	7.00	1.55 / *.12*	5.99	1.69 / *.33*	7.02	1.39 / *.05*	7.35	1.16 / *.33*
	HIV/AIDS Vulnerability[a]	3.45	1.20 / *.21*	3.57	1.10 / *.08*	3.49	1.04 / *.09*	3.27	1.40 / *.34*	3.33	1.12 / *.04*	3.47	.96 / *.26*
	HIV/AIDS Vulnerability[b]	3.14	1.22 / *.18*	3.45	1.09 / *.07*	3.25	1.24 / *.09*	2.72	1.29 / *.29*	3.03	1.12 / *.04*	2.79	1.39 / *.44*
	Consequences of Pregnancy[a]	12.89	4.36 / *.79*	15.99	4.58 / *.35*	14.78	4.69 / *.40*	14.32	4.11 / *.98*	13.50	4.26 / *.17*	14.54	3.32 / *.84*
	Consequences of Pregnancy[b]	11.73	3.81 / *.48*	16.35	4.64 / *.38*	15.22	4.68 / *.34*	14.38	4.56 / *.95*	14.15	4.52 / *.19*	13.18	4.14 / *1.24*

Table 4-5. Means, Standard Deviations, and *Standard Errors* for Independent Variables by Ethnicity (con't)

System/level	Scale	Asian		Black		Hispanic		Native American		White		Other	
		M	SD/SE	M	SD/SE	M	SD/SE	M	SD/SE	M	SD/SE	M	SD/SE
Family	Parental Sexual Values[a]	8.31	1.69 *.30*	8.08	1.54 *.12*	7.89	1.73 *.16*	8.09	1.77 *.36*	8.26	1.67 *.08*	8.46	1.98 *.61*
	Perception of Parent's Sexual Values[a]	6.60	2.55 *.47*	8.09	2.69 *.21*	7.60	3.07 *.28*	6.77	2.66 *.55*	7.63	2.74 *.13*	7.66	3.73 *1.04*
	Perception of Parent's Sexual Values[b]	7.30	2.90 *.52*	8.83	2.49 *.17*	8.40	2.72 *.24*	8.45	2.86 *.55*	8.53	2.56 *.10*	6.05	1.73 *.50*
	Parental Monitoring[a]	2.39	.78 *.11*	2.20	.88 *.07*	2.16	.92 *.06*	2.61	.66 *.13*	2.62	.66 *.03*	2.18	.60 *.19*
	Parent/Family Connectedness[a]	20.53	4.32 *.74*	22.27	3.36 *.22*	22.18	2.99 *.21*	21.87	2.34 *.54*	22.07	3.13 *.15*	21.37	2.19 *.69*
	Parent/Family Connectedness[b]	19.32	4.17 *.61*	21.97	2.90 *.14*	21.89	3.02 *.21*	23.02	1.73 *.33*	21.77	2.97 *.12*	20.69	2.40 *.80*
	Parent-Adolescent Activities[a]	4.61	2.63 *.40*	4.06	2.69 *.15*	3.95	2.70 *.21*	4.86	3.22 *.80*	4.88	2.91 *.14*	5.29	3.08 *1.00*
	Parent-Adolescent Activities[b]	4.07	2.84 *.51*	3.93	2.60 *.18*	3.89	2.51 *.18*	5.09	3.42 *.74*	4.83	2.92 *.11*	4.72	2.86 *.86*
	Parental Presence[a]	2.22	.83 *.11*	2.14	.87 *.05*	2.29	.82 *.06*	2.43	.75 *.15*	2.22	.80 *.03*	2.38	.95 *.25*
	Parental Presence[b]	2.28	.72 *.08*	2.11	.92 *.07*	2.22	.94 *.08*	2.56	.58 *.12*	2.17	.91 *.03*	1.87	1.15 *.38*
	Family Sexual Socialization[a]	7.98	2.86 *.47*	9.82	2.38 *.12*	8.87	2.56 *.27*	9.51	2.74 *.57*	9.21	2.57 *.11*	8.95	2.39 *.72*
Peer	Friend's Health-Risk Behaviors[a]	3.45	2.80 *.44*	2.62	2.60 *.13*	3.35	2.72 *.28*	4.27	2.45 *.48*	4.15	2.74 *.09*	2.99	2.11 *.74*
	Friend's Health-Risk Behaviors[b]	3.02	2.65 *.46*	2.95	2.61 *.16*	3.93	2.91 *.25*	4.32	2.47 *.55*	4.61	2.73 *.11*	2.12	2.23 *.69*
School	School Connectedness[a]	17.00	5.03 *.85*	17.15	5.02 *.33*	16.67	5.57 *.41*	14.84	6.22 *1.34*	17.10	4.91 *.21*	17.94	4.02 *1.39*
	School Connectedness[b]	16.00	6.77 *.91*	15.31	7.13 *.55*	14.25	7.68 *.64*	13.53	8.24 *1.76*	14.97	7.38 *.31*	9.75	8.33 *2.57*

Table 4-5. Means, Standard Deviations, and *Standard Errors* for Independent Variables by Ethnicity (con't)

System/level	Scale	Asian			Black			Hispanic			Native American			White			Other		
		M	SD/SE		M	SD/SE		M	SD/SE		M	SD/SE		M	SD/SE		M	SD/SE	
Neighborhood/ Community	Relationship with Adults[a]	7.68	1.36 *.23*		7.81	1.57 *.09*		7.53	1.61 *.12*		7.03	1.71 *.31*		7.55	1.55 *.06*		8.21	1.55 *.44*	
	Relationship with Adults[b]	7.73	1.23 *.14*		7.93	1.47 *.10*		7.53	1.74 *.16*		7.45	1.25 *.28*		7.73	1.50 *.07*		7.19	1.26 *.36*	
	Neighborhood Quality[a]	10.05	1.50 *.34*		13.14	2.43 *.22*		12.41	2.66 *.34*		12.14	2.66 *.62*		11.14	2.36 *.23*		10.50	1.71 *.48*	
	Neighborhood Quality[b]	10.12	1.51 *.33*		13.18	2.42 *.21*		12.36	2.62 *.32*		12.34	2.59 *.60*		11.15	2.36 *.23*		10.36	1.54 *.41*	
Mesosystem Parent- School	Parent Membership Parent-Teacher Organization[a]	.27	.44 *.06*		.25	.43 *.03*		.13	.33 *.03*		.32	.47 *.11*		.24	.43 *.02*		.13	.34 *.12*	
Exosystem Parent- Community	Parent Membership Civic/Social Organization[a]	.13	.34 *.06*		.12	.33 *.02*		.02	.15 *.01*		.09	.29 *.05*		.11	.32 *.01*		.00	.00 *.00*	

a. Scale constructed from Wave 1 data.
b. Scale constructed from Wave 2 data.

direction.

Fundamentally, construct validity, the most important form of validity (Schumm, 1990), is "concerned with the extent to which a particular measure relates to other measures consistent with theoretically derived hypotheses concerning the concepts (or constructs) that are being measured" (Carmines & Zeller, 1979). Thus, the theoretical propositions presented in the first two chapters provide a basis for establishing construct validity. Using Campbell and Fiske's (1959) multitrait-multimethod matrix to define construct validity, "a scale should correlate with closely related concepts (convergent validity) but not with unrelated concepts (discriminate validity)" (p. 29, Schumm, 1990). Examining the correlations for the independent variables and the sociodemographic variables produces evidence of both types of construct validity. For instance, looking at Wave 1 affect, it would be expected that other variables such as self-esteem would be closely related ($r = .46$) but not other variables such as perception of parent's sexual values (.03). Negative correlations also are an indication of closely related variables. Again, using Wave 1 affect, there is a negative correlation with health-risk behaviors ($r = -.18$). Theoretically, it is expected that these two variables be closely related and negatively related in this study.

Construct validity also is used to establish the validity of the Sexual Competence Scale. From Wave 1, variables that have at least a small effect size include: affect, self-esteem, health-risk behaviors, obstacles to birth control, consequences of pregnancy, parent/family connectedness, friends' health-risk behaviors, and school connectedness. And from Wave 2, variables that have at least a small effect size include: affect, self-esteem, health-risk behaviors, obstacles to birth control, parent/family connectedness,

friends' health-risk behaviors, school connectedness, and relationship with adults. These correlations provide evidence of convergent validity. In all instances, the direction of the relationship coincides with the hypothesized function of the variables either as a risk factor or as a protective factor. Because each of the independent variables was hypothesized to be related to sexual competence, interpretations for discriminate validity are not appropriate.

Table 4-2 presents the percent distribution of the sexual behaviors used to construct the Sexual Competence Scale by gender and ethnicity and Table 4-3 presents the percent distribution, means, and standard deviations for the Sexual Competence Scale by gender and ethnicity. Overall, a large majority of the adolescents in this study reported sexual behaviors that were categorized as sexual competent. Contraceptive use and casual sex had the largest percentages of sexual risk-taking behaviors, 55.6% and 35.8% respectively. Comparing females and males, females have higher rates of sexual competence on four of the six behaviors shown and on both of the behaviors that are not shown. The largest discrepancy is found on reports of casual sex, with approximately 13% more males reporting they had engaged in casual sex.

For most behaviors, the ethnic differences are only a percentage point or two. Contraceptive use, casual sex, and anal sex had the largest range. For those behaviors that have data reported on all five categories, those adolescents who reported "other" as their ethnic background had the highest rate of nondrug use and the lowest casual sex rate. Asian had the lowest rate of sex for money or drugs, Native Americans had the highest rate of contraceptive use at all times, and Black adolescents had the lowest rate of anal sex.

For the sexual competence scores, Table 4-3 shows that the mean for females was higher than that for males and that Asian and white adolescents had the highest mean. The theoretical range for the variable was 0 to 8; however, the actual range was 2 to 8 with the majority of adolescent's scoring between 4 and 8.

Table 4-4 presents the means, standard deviations, and standard errors for the independent variables by gender and Table 4-5 presents the same information by ethnicity.

Hierarchical Regression Analyses

Static Longitudinal Models: Wave 1 Predictors and Adolescent Sexual Competence

In the first set of analyses, individual level, familial level, and extrafamilial level Wave 1 variables were used to predict adolescent sexual competence (See Table 4-6). In addition, analyses were conducted to test for gender and ethnicity interaction effects. The standard for determining significant interactions is to interpret a significant F-change as significant slope differences between groups. In the current study, the large sample size (i.e., weighted sample) caused all changes in F to be significant. Therefore, the significance of the regression coefficients was used to determine the significance of the interactions. See Appendix A for R^2-change/F-change calculations.

In describing the results, *decreases* in sexual competence (i.e., increases in sexual risk-taking) are discussed in relation to variables that were hypothesized as risk factors and *increases* in sexual competence (i.e., decreases in sexual risk-taking) are discussed in relation to variables that were hypothesized as protective factors.

Table 4-6. Hierarchical Regression Analyses of Wave 1 Individual, Familial, and Extrafamilial Variables - Static Longitudinal Separate Model

	Controls Block 1		Individual Block 2		Familial Block 2		Extrafamilial Block 2	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Age	*-.06(.03)	-.08	*-.07(.03)	-.09	*-.06(.03)	-.08	-.05(.03)	-.0
Gender	**-.18(.07)	-.08	*-.16(.07)	-.07	**-.18(.07)	-.08	*-.16(.06)	-.07
Ethnicity								
Asian	-.06(.21)	-.01	.04(.19)	.01	-.01(.20)	.00	-.12(.20)	-.02
Black	-.09(.07)	-.03	**-.25(.08)	-.09	-.09(.07)	-.03	***-.27(.07)	-.10
Hispanic	-.15(.08)	-.05	-.12(.09)	-.04	-.13(.09)	-.04	*-.22(.20)	-.07
Native	-.29(.30)	-.04	-.20(.29)	-.03	-.30(.30)	-.04	-.26(.30)	-.04
Other	-.07(.32)	-.01	-.14(.30)	-.01	-.03(.32)	.00	-.17(.25)	-.01
Family Income	.00(.00)	.04	.00(.00)	.03	.00(.00)	.03	.00(.00)	.02
Parental Education	-.03(.02)	-.05	-.03(.02)	-.04	-.03(.02)	.05	*-.04(.02)	-.06
Parental Marital Status	.05(.07)	.02	.01(.06)	.01	.00(.07)	.00	-.03(.06)	-.01
Residence								
Urban residential	.11(.08)	.05	.12(.07)	.05	.10(.08)	.04	.10(.07)	.05
Suburban	.05(.08)	.02	.03(.07)	.01	.05(.08)	.02	.04(.08)	.02
Other	-.04(.15)	-.01	-.03(.14)	-.01	-.05(.08)	-.01	-.04(.14)	-.01
Missing mechanism variables								
Obstacles to birth control	*.23(.12)	.06	-.02(.12)	-.01	.18(.12)	.05	.08(.12)	.02
Consequences of pregnancy	**-.38(.12)	-.14	**-.34(.13)	-.12	**-.39(.13)	-.14	*-.32(.13)	-.12
Parental sexual values	**1.10(.36)	.33	***1.05(.31)	.32	**1.08(.36)	.33	**1.00(.33)	.30
Parental monitoring	-.17(.25)	-.05	-.05(.22)	-.02	-.12(.25)	-.04	-.07(.27)	-.02
Family sexual socialization	-.64(.33)	-.20	-.54(.30)	-.17	-.63(.34)	-.20	-.54(.30)	-.17
Parent membership parent-teacher	-.42(.40)	-.13	-.37(.38)	-.11	-.38(.38)	-.12	-.23(.36)	-.07
Parent membership civic/social	.16(.36)	.05	-.02(.36)	-.01	.11(.35)	.03	-.05(.33)	-.02

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.

Table 4-6. Hierarchical Regression Analyses of Wave 1 Individual, Familial, and Extrafamilial Variables - Static Longitudinal Separate Model (con't)

	Controls Block 1		Individual Block 2		Familial Block 2		Extrafamilial Block 2	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Individual level								
Affect			**.01(.00)	.10				
Self-esteem			.01(.01)	.03				
Health-risk behavior			***-.15(.02)	-.24				
Obstacles to birth control			**-.03(.01)	-.09				
Pubertal development			-.01(.02)	-.01				
HIV/AIDS vulnerability			-.01(.02)	-.01				
Consequences of pregnancy			-.01(.01)	-.04				
Familial level								
Parental sexual values					-.02(.02)	-.03		
Perception of parent sexual values					-.02(.01)	-.05		
Parental monitoring					.03(.04)	.02		
Parent/family connectedness					**.03(.01)	.10		
Parent-adolescent activities					.02(.01)	.04		
Parental presence					-.02(.04)	-.02		
Family sexual socialization					.00(.01)	.00		
Extrafamilial level								
Friend's health-risk behaviors							***-.09(.01)	-.23
School connectedness							*.01(.01)	.05
Relationship with adults							.01(.02)	.02
Neighborhood quality							-.01(.01)	-.02
Parent membership parent-teacher							**.22(.07)	.09
Parent membership civic/social							-.13(.11)	-.04
Total R^2	**.029		**.126		**.045		**.098	
R^2-change	**.029		**.097		**.016		**.069	

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.

Static Longitudinal Separate Model: Individual Level

After controlling for the sociodemographic variables, significant individual-level predictors included affect, health-risk behaviors, and perceptions of obstacles to birth control. As adolescent's affect became more negative sexual competence decreased. Likewise, a decrease in sexual competence was associated with increased health-risk behaviors and increased perceptions that there are obstacles to birth control. The unique variance explained by the Wave 1 individual-level variables was approximately 10% (See Appendix A for R^2-change/F-change calculations).

Gender Interactions. The association between consequences of pregnancy and sexual competence was not significant, but differed across gender ($t = -1.96$, $p = .05$). For males, an increase in the belief that pregnancy would have negative consequences was associated with an increase in sexual competence, but for females there was no association (female $b = -.01$; male $b = -.04$).

The associations between the remaining Wave 1 individual-level variables and sexual competence were similar for females and males.

Ethnic Interactions. The association between affect and sexual competence was significant (and positive) and differed for adolescents with different ethnic backgrounds ($t = 2.34$, $p < .05$). For Native American adolescents a decrease in affect was associated with a decrease in sexual competence, but for white adolescents there was no association (Native American $b = .06$; white $b = .02$). Approximately 5.3% of the variance in sexual competence was explained by the interaction terms (i.e., gender and race/ethnicity), 1% more than affect alone explained.

The association between HIV/AIDS vulnerability and sexual competence was not significant, but differed for adolescents with different ethnic backgrounds ($t = -2.21, p < .05$). For Asian adolescents, a decrease in the belief of HIV/AIDS vulnerability was associated with an increase in sexual competence, but for white adolescents there was no association (Asian $b = -.29$; white $b = .01$). Approximately 2.7% of the variance in sexual competence was explained by the interaction terms, .6% more than HIV/AIDS vulnerability alone explained.

The association between consequences of pregnancy and sexual competence was not significant, but differed for adolescents with different ethnic backgrounds ($t = -2.18, p < .05$). For Asian adolescents an increase in the belief that pregnancy would have negative consequences was associated with an increase in sexual competence, but for white adolescents there was no association (Asian $b = -.13$; white $b = -.01$). Approximately 3.7% of the variance in sexual competence was explained by the interaction terms, .9% more than consequences of pregnancy alone explained.

The associations between the remaining Wave 1 individual-level variables and sexual competence were similar for adolescent with different ethnic backgrounds.

Static Longitudinal Separate Model: Familial Level

Parent/family connectedness emerged as the only significant predictor at the familial level. As connectedness increased, adolescents' sexual competence increased. After controlling for the sociodemographic variables, Wave 1 familial-level variables accounted for approximately 2% of the variance in sexual competence.

Gender Interactions. The association between family sexual socialization and sexual competence is significant (and positive) and differed across gender ($t = -2.56, p < .05.$).

For female adolescents an increase in family sexual socialization was associated with an increase in sexual competence, but for male adolescents there was no association (female $b = .05$; male $b = -.01$). Approximately 2.5% of the variance in sexual competence was explained by the interaction terms (i.e., gender and race/ethnicity), 1% more than family sexual socialization alone explained.

The associations between the remaining Wave 1 familial-level variables and sexual competence were similar for females and males.

Ethnic Interactions. The association between parental presence and sexual competence is significant (and negative) and differed for adolescents with different ethnic backgrounds ($t = 6.70, p < .001$). The association was different for adolescents who indicated "other" as their ethnicity than it was for white adolescents ("other" $b = .56$; white $b = -.19$). For "other" adolescents a decrease in parental presence was associated with a decrease in sexual competence, but for white adolescents an increase in parental presence was associated with a decrease in sexual competence. Approximately 1.9% of the variance in sexual competence was explained by the interaction terms (i.e., gender and race/ethnicity), .4% more than parental presence alone explained.

The associations between the remaining Wave 1 familial-level variables and sexual competence were similar for adolescent with different ethnic backgrounds.

Static Longitudinal Separate Model: Extrafamilial Level

Friend's health-risk behaviors, school connectedness, and parent's membership in a parent-teacher organization were significant predictors at the extrafamilial level. As friend's health-risk behaviors increased, adolescent's sexual competence decreased. Increases in school connectedness were associated with increased sexual competence, as

was having parent's that were members of a parent-teacher organization. Wave 1 extrafamilial-level variables accounted for approximately 7% of the variance in sexual competence.

Gender Interactions. The association between neighborhood quality and sexual competence was not significant, but differed across gender ($B = -.06$, $t = -2.50$, $p < .05$). For male adolescents a decrease in neighborhood quality (higher scores indicate lower quality) was associated with and a decrease in sexual competence, but for females there was no association (female $b = 0$; male $b = -.06$).

The associations between the remaining Wave 1 extrafamilial-level variables and sexual competence were similar for females and males.

Ethnic Interactions. The association between neighborhood quality and sexual competence was not significant, but differed for adolescents with different ethnic backgrounds ($t = 2.65$, $p < .01$). For Black adolescents a decrease in neighborhood quality was associated with and a decrease in sexual competence, but for white adolescents there was no association (Black $b = .06$; white $b = 0$). Approximately 2.2% of the variance in sexual competence was explained by the interaction terms, .7% more than neighborhood quality alone explained.

The association between parent parent-teacher organization membership was not significant, but it differed for adolescents with different ethnic backgrounds ($t = 5.23$, $p < .001$). There was a stronger association for adolescents that indicated "other" for ethnicity than there was for white adolescents ("other" $b = 1.57$; white $b = .15$). For "other" adolescents the increase in parent parent-teacher organization membership associated with an increase in sexual competence was greater than the increase in sexual

competence for white adolescents. Approximately 2.6% of the variance in sexual competence was explained by the interaction terms, .4% more than parent parent-teacher organization membership alone explained.

The associations between the remaining Wave 1 extrafamilial-level variables and sexual competence were similar for adolescents with different ethnic backgrounds.

Static Longitudinal Additive Model

An additive model was tested using the significant predictors from the static longitudinal separate analyses, excluding interactions (See Table 4-7). After entering the control variables, the individual, familial, and then extrafamilial variables were entered. After the final block of variables was entered affect, health-risk behaviors, obstacles to birth control, friend's health-risk behaviors, and parent parent-teacher organization membership remained significant predictors of sexual competence. The parent/family connectedness and school connectedness variables were no longer significant predictors. The individual plus control variables accounted for 11% of the variance in sexual competence. The familial-level variable added .1% and the extrafamilial variables added 1.2% to the total 12.3% variance that was explained by the static longitudinal additive model.

Concurrent Models: Wave 2 Predictors and Adolescent Sexual Competence

In a second set of analyses, Wave 2 individual, familial, and extrafamilial level variables were used to predict adolescent sexual competence (See Table 4-8). In addition, analyses were conducted to test for gender and ethnicity interaction effects.

Table 4-7. Hierarchical Regression Analyses of Wave 1 Individual, Familial, and Extrafamilial Variables - Static Longitudinal Additive Model

	Controls Block 1		Individual Block 2		Familial Block 3		Extrafamilial Block 4	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Age	-.00(.02)	-.01	-.02(.02)	-.03	-.02(.02)	-.03	-.01(.02)	-.02
Gender	**-.18(.07)	-.08	*-.15(.06)	-.07	*-.16(.06)	-.07	*-.15(.06)	-.07
Ethnicity								
Asian	-.04(.21)	-.01	.07(.19)	.01	.09(.18)	.01	.04(.19)	.01
Black	-.10(.07)	-.04	***-.26(.08)	-.10	***-.27(.08)	-.10	***-.31(.08)	-.11
Hispanic	-.14(.09)	-.04	-.10(.09)	-.03	-.11(.09)	-.03	-.13(.09)	-.04
Native	-.27(.31)	-.04	-.19(.31)	-.03	-.19(.31)	-.03	-.21(.30)	-.03
Other	-.09(.32)	-.01	-.17(.31)	-.01	-.16(.31)	-.01	-.16(.29)	-.01
Family Income	.00(.00)	.03	.00(.00)	.02	.00(.00)	.02	.00(.00)	.01
Parental Education	-.02(.02)	-.03	-.02(.02)	-.03	-.02(.02)	-.03	*-.04(.02)	-.05
Parental Marital Status	.05(.07)	.02	.02(.06)	.01	.01(.06)	.00	-.03(.06)	-.01
Residence								
Urban residential	.11(.07)	.05	.12(.07)	.05	.11(.07)	.05	.10(.07)	.04
Suburban	.04(.08)	.02	.03(.07)	.01	.03(.07)	.01	.02(.07)	.01
Other	-.04(.15)	-.01	-.04(.14)	-.01	-.05(.14)	-.01	-.06(.14)	-.01
Missing mechanism variables								
Obstacles to birth control	.03(.11)	.01	*-.21(.11)	-.06	*-.21(.11)	-.06	*-.21(.10)	-.06
Parent membership parent-teacher	-.03(.10)	-.01	.00(.09)	.00	.01(.09)	.00	.06(.09)	.02

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4-7. Hierarchical Regression Analyses of Wave 1 Individual, Familial, and Extrafamilial Variables - Static Longitudinal Additive Model (con't)

	Controls Block 1		Individual Block 2		Familial Block 3		Extrafamilial Block 4	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Individual level								
Affect			**.01(.00)	.10	**.01(.00)	.10	*.01(.00)	.08
Health-risk behavior			***-.16(.02)	-.25	***-.16(.02)	-.25	***-.11(.03)	-.18
Obstacles to birth control			***-.03(.01)	-.10	**-.03(.01)	-.10	**-.03(.01)	-.09
Familial level								
Parent/family connectedness					.01(.01)	.04	.01(.01)	.04
Extrafamilial level								
Friend's health-risk behaviors							**-.04(.01)	-.11
School connectedness							.00(.01)	.01
Parent membership parent-teacher							**.19(.07)	.07
Total R^2	**.015		**.110		**.111		**.123	
R^2-change	**.015		**.095		**.001		**.012	

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4-8. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Concurrent Separate Model

	Controls Block 1		Individual Block 2		Familial Block 2		Extrafamilial Block 2	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Age	.00(.02)	-.01	-.02(.02)	-.02	-.01(.03)	-.01	.01(.03)	.02
Gender	*-.18(.07)	-.08	-.07(.07)	-.03	**-.19(.07)	-.09	*-.15(.06)	-.07
Ethnicity								
Asian	-.04(.21)	-.01	.04(.19)	.01	.07(.19)	.01	-.19(.21)	-.03
Black	-.10(.07	-.04	**-.24(.08)	-.09	-.11(.08)	-.04	**-.26(.08)	-.10
Hispanic	-.14(.09)	-.04	-.04(.09)	-.01	-.14(.09)	-.04	*-.20(.09)	-.06
Native	-.27(.31	-.04	-.40(.27)	-.05	-.30(.32)	-.04	-.26(.32)	-.04
Other	-.09(.34)	-.01	-.17(.39)	-.01	-.07(.38)	-.01	-.20(.30)	-.01
Family Income	.00(.00)	.03	.00(.00)	.01	.00(.00)	.03	.00(.00)	.02
Parental Education	-.02(.02)	-.03	-.02(.02)	-.02	-.03(.02)	-.04	-.03(.02)	-.04
Parental Marital Status	.05(.07)	.02	.07(.07)	.03	.03(.07)	.01	.02(.06)	.01
Residence								
Urban residential	.11(.07)	.05	**.18(.06)	.08	.10(.07)	.03	*.16(.07)	.07
Suburban	.05(.08)	.02	.10(.06)	.04	.05(.08)	-.04	.08(.07)	.03
Other	-.04(.15)	-.01	-.03(.13)	-.01	-.06(.14)	.01	.01(.14)	.00
Missing mechanism variables								
HIV/AIDS vulnerability	-.04(.20)	-.01	.02(.19)	.01	.07(.20)	.02	-.10(.21)	-.03
Consequences of pregnancy	.08(.15)	.02	.11(.14)	.03	-.07(.14)	-.02	.17(.16)	.05

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.

Table 4-8. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Concurrent Separate Model (con't)

	Controls Block 1		Individual Block 2		Familial Block 2		Extrafamilial Block 2	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Individual level								
Affect			**.01(.00)	.10				
Self-esteem			.00(.01)	.01				
Health-risk behavior			***-.17(.02)	-.27				
Obstacles to birth control			***-.06(.01)	-.24				
Pubertal development			*-.04(.02)	-.06				
HIV/AIDS vulnerability			-.02(.03)	-.02				
Consequences of pregnancy			*-.01(.01)	-.05				
Familial level								
Perception of parent sexual values					-.02(.01)	-.05		
Parent/family connectedness					***.05(.01)	.14		
Parent-adolescent activities					.00(.01)	.01		
Parental presence					*-.08(.04)	-.07		
Extrafamilial level								
Friend's health-risk behaviors							***-.08(.01)	-.20
School connectedness							**.02(.00)	.11
Relationship with adults							.02(.03)	.03
Neighborhood quality							-.00(.01)	-.01
Total R^2	**.015		**.174		**.039		**.077	
R^2-change	**.015		**.159		**.024		**.062	

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.

Concurrent Separate Model: Individual Level

After controlling for the sociodemographic variables, significant individual-level predictors included affect, health-risk behaviors, perceptions of obstacles to birth control, pubertal development, and consequences of pregnancy were associated with sexual competence. As adolescent's affect became more negative sexual competence decreased. Increases in health-risk behaviors, increases in the perception that there are obstacles to birth control and greater pubertal development were associated with decreased sexual competence. Furthermore, when adolescents reported that the potential consequences of pregnancy were more negative, sexual competence increased. The unique variance explained by the Wave 2 individual-level variables was approximately 16%.

Gender Interactions. There were no significant interactions for gender at the individual level. In other words, all of the associations between the Wave 2 individual-level variables and sexual competence were similar for females and males.

Ethnic Interactions. The association between pubertal development and sexual competence was not significant, but differed for adolescents with different ethnic backgrounds ($t = 2.48, p < .05$). For Asian adolescents a decrease in pubertal development was associated with an decrease in sexual competence, but for white adolescents there was no association (Asian $b = .22$; white $b = -.02$). Approximately 2.3% of the variance in sexual competence was explained by the interaction terms, .4% more than pubertal development alone explained.

The association between HIV/AIDS vulnerability and sexual competence was not significant, but differed for adolescents with different ethnic backgrounds ($B = -.58, t = -3.75, p < 001$). For Native American adolescents a decrease in HIV/AIDS vulnerability

was associated with an increase in sexual competence, but for white adolescents there was no association (Native American $b = -.59$; white $b = -.01$). Approximately 3.2% of the variance in sexual competence was explained by the interaction terms, 1.7% more than HIV/AIDS vulnerability alone explained.

The associations between the remaining Wave 2 individual-level variables and sexual competence were similar for adolescents with different ethnic backgrounds.

Concurrent Separate Model: Familial Level

Significant predictors at the familial level included parent/family connectedness and parental presence. As connectedness increased, adolescent's sexual competence increased. Increases in parental presence were associated with decreased sexual competence. After controlling for the sociodemographic variables, Wave 2 familial-level variables accounted for approximately 2% of the variance in sexual competence.

Gender Interactions. There were no significant interactions for gender at the familial level. Analogous to the individual-level variables, all of the associations between the Wave 2 familial-level variables and sexual competence were similar for females and males.

Ethnic Interactions. The association between parent/family connectedness and sexual competence is significant (and positive) and differed for adolescents with different ethnic backgrounds (Hispanic, $t = -3.06$, $p < .01$; "other", $t = -2.33$, $p < .05$) For white adolescents an increase in parent/family connectedness was associated with an increase in sexual competence and for "other" adolescents a decrease in parent/family connectedness was associated with an increase in sexual competence, but for Hispanic adolescents there was no association (Hispanic $b = -.03$; "other" $b = -.15$; white $b = .05$). Approximately

4.2% of the variance in sexual competence was explained by the interaction terms, .8% more than parent/family connectedness alone explained.

The associations between the remaining Wave 2 familial-level variables and sexual competence were similar for adolescents with different ethnic backgrounds.

Concurrent Separate Model: Extrafamilial Level

Friend's health-risk behaviors and school connectedness were significant predictors at the extrafamilial level. As friend's health-risk behaviors increased, adolescent's sexual competence decreased. Increases in school connectedness were associated with increased sexual competence. Wave 2 extrafamilial-level variables accounted for approximately 6% of the variance in sexual competence.

Gender Interactions. The association between neighborhood quality and sexual competence was not significant, but differed across gender ($t = -2.17, p < .05$). For male adolescents a decrease in neighborhood quality was associated with and a decrease in sexual competence, but for female adolescents neighborhood quality had no effect on sexual competence (female $b = 0$; male $b = -.05$). Approximately 2.2% of the variance in sexual competence was explained by the interaction terms, .7% more than neighborhood quality alone explained.

The associations between the remaining Wave 2 extrafamilial-level variables and sexual competence were similar for female and male adolescents.

Ethnic Interactions. The association between school connectedness and sexual competence is significant (and positive) and it differed for adolescents with different ethnic backgrounds ($B = .06, t = 2.40, p < .05$). There was a stronger association for white adolescents than there was for Asian adolescents (white $b = -.20$; Asian $b = -.14$). This

means that for white adolescents the increase in school connectedness that was associated with an increase in sexual competence was greater than the increase in sexual competence for Asian adolescents. Approximately 4.5% of the variance in sexual competence was explained by the interaction terms, .8% more than school connectedness alone explained.

The association between neighborhood quality and sexual competence is not significant, but differed for adolescents with different ethnic backgrounds ($t = 2.78, p <$ .01). For Black adolescents a decrease in neighborhood quality was associated with and a decrease in sexual competence, but for white adolescents neighborhood quality had no effect on sexual competence (Black $b = -.05$; white $b = 0$).

The associations between the remaining Wave 2 extrafamilial-level variables and sexual competence were similar for adolescents with different ethnic backgrounds.

Concurrent Additive Model

An additive model was tested using the significant predictors from this set of analyses, excluding interactions (See Table 4-9). After entering the control variables, the Wave 2 individual, familial, and then extrafamilial variables were entered. After the final block of variables were entered, affect, health-risk behaviors, obstacles to birth control, pubertal development, parent/family connectedness, parental presence, and school connectedness remained significant predictors of sexual competence. Consequences of pregnancy and friend's health-risk behaviors were no longer significant predictors. The individual plus control variables accounted for 15.9% of the variance in sexual competence. The familial level variable added .9% and the extrafamilial variables added .3% to the total 18.6% variance that was explained by the concurrent additive model.

Table 4-9. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Concurrent Additive Model

	Controls Block 1		Individual Block 2		Familial Block 3		Extrafamilial Block 4	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Age	-.00(.02)	.00	-.02(.02)	-.03	-.03(.02)	-.04	-.02(.02)	-.03
Gender	**-.18(.07)	-.08	-.07(.06)	-.03	-.07(.06)	-.03	-.07(.06)	-.03
Ethnicity								
Asian	-.04(.21)	-.01	.04(.19)	.01	.11(.18)	.02	.08(.17)	.01
Black	-.10(.07)	-.04	***-.25(.07)	-.09	-.25(.07)	-.09	***-.27(.07)	-.10
Hispanic	-.14(.09)	-.04	-.05(.09)	-.02	-.05(.09)	-.02	-.06(.09)	-.02
Native	-.27(.31)	-.04	-.40(.27)	-.05	-.40(.27)	-.05	-.37(.28)	-.05
Other	-.09(.33)	-.01	-.16(.39)	-.01	-.14(.42)	-.01	-.12(.41)	-.01
Family Income	.00(.00)	.03	.00(.00)	.01	.00(.00)	.01	.00(.00)	.01
Parental Education	-.02(.02)	-.03	-.02(.02)	-.02	-.02(.02)	-.02	-.02(.02)	-.03
Parental Marital Status	.05(.07)	.02	.07(.07)	.03	.08(.07)	.04	.07(.07)	.03
Residence								
Urban residential	.11(.07)	.05	**.18(.06)	.08	**.16(.06)	.07	**.17(.06)	.07
Suburban	.05(.08)	.02	.10(.06)	.05	.11(.06)	.05	.10(.06)	.05
Other	-.04(.15)	-.01	-.03(.13)	-.01	-.06(.13)	-.01	-.04(.13)	-.01
Missing mechanism variables								
Consequences of pregnancy	.06(.09)	.01	.12(.10)	.03	.07(.10)	.02	.09(.10)	.02

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4-9. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Concurrent Additive Model (con't)

	Controls Block 1		Individual Block 2		Familial Block 3		Extrafamilial Block 4	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Individual level								
Affect			** .01(.00)	.10	* .01(.00)	.09	* .01(.00)	.08
Health-risk behavior			***-.17(.02)	-.27	***-.16(.02)	-.26	***-.15(.02)	-.24
Obstacles to birth control			***-.06(.01)	-.24	***-.06(.01)	-.24	***-.06(.01)	-.23
Pubertal development			*-.04(.02)	-.06	*-.05(.02)	-.06	*-.05(.02)	-.06
Consequences of pregnancy			-.01(.01)	-.05	-.01(.01)	-.05	-.01(.01)	-.04
Familial level								
Parent/family connectedness					* .03(.01)	.08	* .02(.01)	.07
Parental presence					*-.09(.04)	-.07	*-.09(.04)	-.08
Extrafamilial level								
Friend's health-risk behaviors							-.01(.01)	-.02
School connectedness							* .01(.00)	.06
Total R²	**.015		**.174		**.183		**.186	
R²-change	**.015		**.159		**.009		**.003	

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Autoregressive Longitudinal Model: Wave 2 Predictors,

Controlling for Wave 1 Predictors

Using the significant predictors from the concurrent set of analyses, an

autoregressive model was tested (See Table 4-10). After entering the sociodemographic

variables as controls, Wave 1 variables were entered as a second set of covariates. Then

the Wave 2 individual, familial, and then extrafamilial variables were entered. Wave 2

(controlling for Wave 1) health-risk behaviors, obstacles to birth control, pubertal

development, and parental presence remained significant predictors of sexual

competence. Affect, consequences of pregnancy, parent/family connectedness, friend's

health-risk behaviors, and school connectedness were no longer significant predictors.

Wave 1 predictors plus control variables accounted for 12.6% of the variance in sexual

competence. Individual Wave 2 variables accounted for an additional 7% of the variance.

The familial-level variable added .6% and the extrafamilial variables added .1% to the

total 20.3% variance that was explained by the autoregressive longitudinal model.

Results for Each Hypothesis

Hypothesis 1

Hypothesis 1 proposed that 11 of the variables would function as risk factors for

sexual risk-taking (i.e., reduce sexual competence). The variables must be significant in

the right direction to support the hypothesis. Table 4-11 summarizes the results for each

hypothesis. The Affect Scale was used to test Hypothesis 1(a), that a general sense of

hopelessness about life would be a risk factor for sexual risk-taking. In the static and

concurrent separate and additive models there was a positive association with sexual

competence, supporting Hypothesis 1(a). Indications were that adolescents with greater

Table 4-10. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Autoregressive Longitudinal Model

	Controls Block 1		Wave 1 Predictors Block 2		Individual Block 3		Familial Block 4		Extrafamilial Block 5	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Age	-.05(.03)	-.07	-.05(.03)	-.07	-.05(.03)	-.07	*-.06(.03)	-.08	-.05(.03)	-.07
Gender	**-.18(.07)	-.08	*-.15(.06)	-.07	-.06(.07)	-.03	-.06(.07)	-.03	-.06(.07)	-.03
Ethnicity										
Asian	-.04(.21)	-.01	.05(.18)	.01	.09(.18)	.01	.13(.17)	.02	.13(.17)	.02
Black	-.09(.07)	-.03	***-.27(.08)	-.10	***-.31(.08)	-.11	***-.31(.08)	-.11	***-.31(.08)	-.11
Hispanic	-.13(.09)	-.04	-.12(.09)	-.04	-.06(.09)	-.02	-.06(.09)	-.02	-.06(.09)	-.02
Native	-.30(.31)	-.04	-.20(.30)	-.03	-.35(.27)	-.05	-.35(.27)	-.05	-.34(.27)	-.05
Other	-.09(.33)	-.01	-.17(.32)	-.01	-.16(.38)	-.01	-.16(.40)	-.01	-.12(.40)	-.01
Family Income	.00(.00)	.03	.00(.00)	.02	.00(.00)	.01	.00(.00)	.01	.00(.00)	.01
Parental Education	-.03(.02)	-.04	-.03(.02)	-.04	-.02(.02)	-.02	-.02(.02)	-.02	-.02(.02)	-.03
Parental Marital Status	.05(.07)	.02	.00(.06)	.00	.04(.06)	.02	.05(.06)	.02	.05(.06)	.02
Residence										
Urban residential	.12(.08)	.05	.12(.07)	.05	*.15(.07)	.07	*.15(.06)	.06	*.15(.06)	.07
Suburban	.05(.08)	.02	.03(.07)	.01	.08(.06)	.03	.08(.06)	.04	.08(.06)	.04
Other	-.04(.15)	-.01	-.05(.13)	-.01	-.05(.12)	-.01	-.06(.13)	-.01	-.06(.13)	-.01
Missing mechanism variables										
Obstacles to birth control	.21(.12)	.06	-.05(.12)	-.01	-.10(.13)	-.03	-.09(.13)	-.02	-.10(.13)	-.03
Consequences of pregnancy[a]	**-.39(.13)	-.14	*-.35(.13)	-.13	-.19(.13)	-.07	-.19(.14)	-.07	-.18(.14)	-.07
Consequences of pregnancy[b]	.12(.09)	.03	.13(.09)	.04	*.19(.10)	.05	.15(.10)	.04	.16(.10)	.04

Note. B(SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.

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Table 4-10. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Autoregressive Longitudinal Model (con't)

	Controls Block 1		Wave 1 Predictors Block 2		Individual Block 3		Familial Block 4		Extrafamilial Block 5	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Individual level										
Affect[a]			*.01(.00)	.08	.00(.00)	.02	.00(.00)	.02	.00(.00)	.02
Health-risk behavior[a]			***-.11(.03)	-.18	*-.06(.03)	-.09	*-.06(.03)	-.09	*-.05(.03)	-.09
Obstacles to birth control[a]			**-.03(.01)	-.09	-.00(.01)	-.01	-.00(.01)	-.01	-.00(.01)	-.01
Pubertal development[a]			-.00(.02)	.00	.01(.02)	.02	.01(.02)	.02	.02(.02)	.02
Consequences of pregnancy[a]			-.01(.01)	-.04	-.01(.01)	-.03	-.01(.01)	-.03	-.01(.01)	-.03
Familial level										
Parent/family connectedness[a]			.02(.01)	.05	.01(.01)	.04	.01(.01)	.02	.00(.01)	.01
Parental presence[a]			-.05(.04)	-.04	-.06(.04)	-.05	-.03(.03)	-.02	-.03(.03)	-.02
Extrafamilial level										
Friend's health-risk behaviors[a]			**-.04(.01)	-.10	*-.03(.01)	-.08	*-.03(.01)	-.08	*-.03(.02)	-.08
School connectedness[a]			.00(.01)	.01	.00(.01)	.00	.00(.01)	.00	-.00(.01)	.00

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.

Table 4-10. Hierarchical Regression Analyses of Wave 2 Individual, Familial, and Extrafamilial Variables - Autoregressive Longitudinal Model (con't)

	Controls Block 1		Wave 1 Predictors Block 2		Individual Block 3		Familial Block 4		Extrafamilial Block 5	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Individual level										
Affect[b]					*.01(.00)	.08	.01(.00)	.07	.01(.00)	.07
Health-risk behavior[b]					***-.11(.02)	-.18	***-.11(.02)	-.18	***-.12(.02)	-.18
Obstacles to birth control[b]					***-.06(.01)	-.22	***-.06(.01)	-.22	***-.06(.01)	-.22
Pubertal development[b]					*-.05(.02)	-.07	*-.05(.02)	-.07	*-.05(.02)	-.07
Consequences of pregnancy[b]					-.00(.01)	-.02	-.00(.01)	-.02	-.00(.01)	-.02
Familial level										
Parent/family connectedness[b]							.02(.01)	.06	.02(.01)	.06
Parental presence[b]							*-.08(.04)	-.07	*-.09(.04)	-.07
Extrafamilial level										
Friend's health-risk behaviors[b]									.01(.01)	.02
School connectedness[b]									.01(.00)	.04
Total R^2	**.022		**.126		**.196		**.202		**.203	
R^2-change	**.022		**.104		**.070		**.006		**.001	

Note. B (SE) and Total R^2 from SUDAAN analyses. β from weighted SPSS analyses.
*p < .05. **p < .01. ***p < .001.
a. Wave 1 variable.
b. Wave 2 variable.

Table 4-11. Results for Each Hypothesis

	Static separate model	Static additive model	Concurrent separate model	Concurrent additive model	Autoregressive model
Risk hypotheses					
1a. Negative affect	X	X	X	X	
3. Gender interaction		-	-	-	-
4. Ethnicity interactions	X[d]	-	-	-	-
1b. Low Self-esteem					
3. Gender interaction		-	-	-	-
4. Ethnicity interactions		-	-	-	-
1c. High health risk-behaviors	X	X	X	X	X
3. Gender interaction		-	-		-
4. Ethnicity interactions		-	-	-	-
1d. Obstacles to birth control	X	X	X	X	X
3. Gender interaction		-	-	-	-
4. Ethnicity interactions		-	-	-	-
1e. Early pubertal development		-	X	X	X
3. Gender interaction		-	-	-	-
4. Ethnicity interactions		-	X[a]	-	-
1f. Parents have traditional sexual values					
3. Gender interaction		-	-	-	-
4. Ethnicity interactions		-	-	-	-
1g. Parents w/traditional sexual values					
3. Gender interaction		-	-	-	-
4. Ethnicity interactions		-	-	-	-

Note. Interactions for gender and ethnicity were not tested for additive and autoregressive models.

Table 4-11. Results for each of the Hypotheses (con't)

	Static separate model	Static additive model	Concurrent separate model	Concurrent additive model	Autoregressive model
1h. Low parental monitoring					
3. Gender interaction	-	-		-	-
4. Ethnicity interactions	-	-		-	-
1i. Low parental presence			X	X	X
3. Gender interaction	X[e]	-		-	-
4. Ethnicity interactions	-	-		-	-
1j. Friends w/health-risk behaviors	X	X	X	-	-
3. Gender interaction	-	-		-	-
4. Ethnicity interactions	-	-		-	-
1k. Low quality neighborhoods	X	-	X	-	-
3. Gender interaction	X[b]	-	X[b]	-	-
4. Ethnicity interactions	-	-		-	-
Protective hypotheses					
2a. Not discounting risk of HIV/AIDS					
3. Gender interaction	X[a]	-	X[d]	-	-
4. Ethnicity interactions	-	-	X	-	-
2b. Negative consequences of pregnancy	X	-		-	-
3. Gender interaction	X[a]	-		-	-
4. Ethnicity interactions	-	-		-	-
2c. High parent/family connectedness	X	-	X	X	-
3. Gender interaction	-		-	-	-
4. Ethnicity interactions		-	X[ce]	-	-

Note. Interactions for gender and ethnicity were not tested for additive and autoregressive models.

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Table 4-11. Results for each of the Hypotheses (con't)

	Static separate model	Static additive model	Concurrent separate model	Concurrent additive model	Autoregressive model
2d. High parent-adolescent activities		-		-	-
3. Gender interaction		-		-	-
4. Ethnicity interactions		-		-	-
2e. High family sexual socialization					
3. Gender interaction	X	-		-	-
4. Ethnicity interactions		-		-	-
2f. Friends w/out health-risk behaviors	X	X	X	-	-
3. Gender interaction		-		-	-
4. Ethnicity interactions		-		-	-
2g. High school-connectedness	X		X	X	-
3. Gender interaction		-		-	-
4. Ethnicity interactions		-	X^a	-	-
2h. Positive relationships w/adults					
3. Gender interaction		-		-	-
4. Ethnicity interactions		-		-	-
2i. Parents PTA member	X	X		-	-
3. Gender interaction		-		-	-
4. Ethnicity interactions	X^e	-		-	-
2j. Parents civic/social member		-		-	-
3. Gender interaction					-
4. Ethnicity interactions		-		-	-

Note. Interactions for gender and ethnicity were not tested for additive and autoregressive models. Findings for parental presence were significant but in the opposite direction.

a. Ethnicity interaction for Asian.
b. Ethnicity interaction for Black.
c. Ethnicity interaction for Hispanic.
d. Ethnicity interaction for Native.
e. Ethnicity interaction for "other".

negative affect (i.e., a sense of hopelessness) were at greater risk for sexual risk-taking. The Self-Esteem Scale was used to test Hypothesis 1b, that low self-esteem would be a risk factor for sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 1(b) was not supported.

The Health-Risk Behaviors Scale was used to test Hypothesis 1(c), that engaging in other health-risk behaviors would be a risk factor for sexual risk-taking. In all of the tested models, there was a negative association with sexual competence, supporting Hypothesis 1(c). Indications were that adolescents that engaged in other health-risk behaviors were at greater risk for sexual risk-taking.

The Obstacles to Birth Control Scale was used to test Hypothesis 1(d), that a perception that there are obstacles to contraceptive use would be a risk factor for sexual risk-taking. In all of the models tested, results indicated that there was a negative association with sexual competence, supporting Hypothesis 1(d). Indications were that adolescents who perceived that there were obstacles to birth control were at greater risk for sexual risk-taking.

The Pubertal Development Scale was used to test Hypothesis 1(e), that early pubertal development would be a risk factor for sexual risk-taking. In the concurrent and autoregressive models, there was a negative association with sexual competence. Thus, Hypothesis 1(e) was not supported. Indications were that less physically developed adolescents were at greater risk for sexual risk-taking.

The Perception of Parent's Sexual Values Scale was used to test Hypothesis 1(f), that a perception that parents who have traditional sexual values would be a risk factor for

sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 1(f) was not supported.

The Parental Sexual Values Scale was used to test Hypothesis 1(g), that having parents with traditional sexual values would be a risk factor for sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 1(g) was not supported.

The Parental Monitoring Scale was used to test Hypothesis 1(h), that low parental monitoring of adolescents would be a risk factor for sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 1(h) was not supported.

The Parental Presence Scale was used to test Hypothesis 1(i), that low parental presence would be a risk factor for sexual risk-taking. In the concurrent separate models, concurrent additive, and autoregressive models, there was a negative association with sexual competence, thus, Hypothesis 1(i) was not supported. Adolescents with higher parental presence were at greater risk for sexual risk-taking. This relationship did not hold in the static separate and static additive models.

The Friend's Health-Risk Behaviors Scale was used to test Hypothesis 1(j), that having friends who engage in other health-risk behaviors would be a risk factor for sexual risk-taking. In the static separate, static additive, and concurrent separate models, there was a negative association with sexual competence, supporting Hypothesis 1(j). Adolescents with friends who engaged in health-risk behaviors were at greater risk for sexual risk-taking. However, this relationship did not hold in the concurrent additive and autoregressive models.

The Neighborhood Quality Scale was used to test Hypothesis 1(k), that residing in neighborhoods that are characterized as low quality would be a risk factor for sexual risk-

taking. There was no association with sexual competence. Thus, Hypothesis 1(k) was not supported.

Hypothesis 2

The second set of hypotheses proposed that 10 of the variables would function as protective factors for sexual risk-taking (i.e., increase sexual competence). The variables must be significant in the right direction to support the hypothesis. The HIV/AIDS Vulnerability Scale was used to test Hypothesis 2(a), that not holding attitudes that discount the risk of HIV/AIDS would protect adolescents from sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 2(a) was not supported.

The Consequences of Pregnancy Scale was used to test Hypothesis 2(b), that perceiving that there are negative consequences of becoming pregnant would protect adolescents from sexual risk-taking. In the concurrent separate model, there was a negative association with sexual competence, supporting Hypothesis 2(b). Adolescents with negative perceptions of pregnancy were more likely to be sexually competent. However, this relationship did not hold in the static separate, concurrent additive, and autoregressive models.

The Parent/Family Connectedness Scale was used to test Hypothesis 2(c), that having high levels of parent-family connectedness would protect adolescents from sexual risk-taking. In the static separate, concurrent separate, and concurrent additive models, there was a positive association with sexual competence, supporting Hypothesis 2(c). Adolescents with higher parent/family connectedness were more likely to be sexually competent. However, this relationship did not hold in the static additive and autoregressive models.

The Parent-Adolescent Activities Scale was used to test Hypothesis 2(d), that participating in activities with parents would protect adolescents from sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 2(d) was not supported.

The Family Sexual Socialization Scale was used to test Hypothesis 2(e), that having a higher level of family sexual socialization would protect adolescents from sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 2(e) was not supported.

The Friend's Health-Risk Behaviors Scale was used to test Hypothesis 2(f), that having friends who do not engage in other health-risk behaviors would protect adolescents from sexual risk-taking. In the static separate, static additive, and concurrent separate models, results indicated that there was a negative association with sexual competence, supporting Hypothesis 2(f). Adolescents with friends who did not engage in health-risk behaviors were more likely to be sexually competent. However, this relationship did not hold in the concurrent additive and autoregressive models.

The School Connectedness Scale was used to test Hypothesis 2(g), that feeling connected to school would protect adolescents from sexual risk-taking. In the static separate, concurrent separate and concurrent additive models, there was a positive association with sexual competence, supporting Hypothesis 2(g). Adolescents with higher school connectedness were more likely to be sexually competent. However, this relationship did not hold in the static additive and autoregressive models.

The Relationship with Adults Scale was used to test Hypothesis 2(h), that having positive relationships with adults would protect adolescents from sexual risk-taking.

There was no association with sexual competence. Thus, Hypothesis 2(h) was not supported.

The Parent Membership Parent-Teacher Organization Scale was used to test Hypothesis 2(i), that parent's involvement in school-related organizations would protect adolescents from sexual risk-taking. In the models that tested this variable, there was a positive association with sexual competence, supporting Hypothesis 2(i). Adolescents with parents involved in a parent-teacher organization were more likely to be sexually competent.

The Parent Membership Civic/Social Organization Scale was used to test Hypothesis 2(j), that parent's involvement in civic or social organizations would protect adolescents from sexual risk-taking. There was no association with sexual competence. Thus, Hypothesis 2(j) was not supported.

<center>Hypothesis 3</center>

The third hypothesis that was tested in this study was that there are gender differences in the effects that risk factors and protective factors have on sexual risk-taking behaviors. Regression analyses that included interaction terms for gender were used to test this hypothesis. Results indicated that there was a gender interaction with the Wave 1 consequences of pregnancy variable, the family sexual socialization variable, and Wave 1 and Wave 2 neighborhood quality variables. Indications were that for males, there was an increase in sexual competence associated with decreasingly negative beliefs about the consequences of pregnancy, but there was no association for females. For females, higher levels of family sexual socialization were associated with increased sexual competence, but for males there was no association with sexual competence.

Lower neighborhood quality was associated with lower levels of sexual competence for males, with no effect being indicated for females.

There were no gender interactions for affect, self-esteem, health-risk behaviors, obstacles to birth control, pubertal development, parent's sexual values, perceptions of parents sexual values, parental monitoring, parental presence, friend's health-risk behaviors, HIV/AIDS vulnerability, parent/family connectedness, parent-adolescent activities, school connectedness, relationships with adults, parent parent-teacher organization membership, or parent civic/social organization.

<div align="center">Hypothesis 4</div>

The fourth hypothesis that was tested in this study was that there are ethnic differences in the effects that risk factors and protective factors have on sexual risk-taking behaviors. Regression analyses that included interaction terms for ethnicity were used to test this hypothesis. White was the referent ethnic group, therefore, significant interactions indicated differences between the group named in the variable and white adolescents. Significant interactions were found for Wave 1 affect, HIV/AIDS vulnerability, consequences of pregnancy, parental presence, neighborhood quality, and parent parent-teacher organization membership variables. Wave 2 variables with significant interactions included pubertal development, HIV/AIDS vulnerability, parent/family connectedness, school connectedness, and neighborhood quality.

For Asian adolescents, an increase in the belief of HIV/AIDS vulnerability (Wave 1) was associated with a decrease in sexual competence, but for white adolescents there was no association with sexual competence. There was a negative association between consequences of pregnancy and sexual competence for Asian adolescents. That is to say,

fewer negative consequences of pregnancy was associated with a decrease in sexual competence. For white adolescents there was no effect for consequences of pregnancy. For Asian adolescents, higher pubertal development was associated with increased sexual competence, but for white adolescents there was no association with sexual competence. Both Asian adolescents and white adolescents had a positive association between school connectedness and sexual competence, but it is stronger for white adolescents.

For Black adolescents a decrease in neighborhood quality (Wave 1 and 2) was associated with an increase in sexual competence, but for white adolescents neighborhood quality had no effect on sexual competence.

For Hispanic adolescents there was no association between parent/family connectedness and sexual competence, but there was a positive association for white adolescents.

For both Native American there was an association between affect and sexual competence, but it there was no association for white adolescents. For Native American adolescents an increase in HIV/AIDS vulnerability (Wave 2) was associated with a decrease in sexual competence, but for white adolescents there was no effect.

There was a positive association between parental presence and sexual competence for "other" adolescents, but for white adolescents this association was negative. For both "other" adolescents and white adolescents, there was a positive association for parent parent-teacher organization membership, but it was stronger for "other" adolescents. For "other" adolescents there was a negative association between parent/family connectedness and sexual competence, but the relationship was positive for white adolescents.

Overall, results support the hypothesis that there are risk (Hypothesis 1) and protective (Hypothesis 2) factors associated with sexual competence. However, there are few gender (Hypothesis 3) and ethnic (Hypothesis 4) differences in the affect that risk and protective factors have on sexual competence.

CHAPTER V

DISCUSSION AND CONCLUSIONS

This study investigated the risk and protective factors associated with adolescent

sexual behaviors and introduced the concept of sexual competence to measure sexual

adjustment (i.e., sexual health). Thus, instead of using the more traditional approach of

examining what factors increase or decrease the chances that adolescents will engage in

sexual risk-taking behaviors, this study focused on the factors that promote or inhibit

sexual competence.

Five models were tested using 35 factors constructed from the Add Health study data

(i.e., 20 from Wave 1 and 15 from Wave 2), plus gender and ethnicity variables, to

represent each system of the ecological paradigm. The findings support the proposition

that within an adolescent's sphere of influence there are specific factors that promote the

development of sexual competence as well as factors that inhibit the development of

sexual competence. In addition, these findings indicate that the affect of these factors is

fairly consistent across gender and ethnicity.

The full models of risk and protective predictor variables (i.e., with all

sociodemographic variables and eliminating nonsignificant factors) account for 12%

(static longitudinal model), 19% (concurrent model), and 20% (autoregressive

longitudinal model) of the variance in adolescent sexual competence. Comparing this to

other risk and protective model studies, Jessor et al. (1995) accounted for 48% of the

variance in adolescent problem behaviors using the Multiple Problem Behavior Index to

assess problem behaviors. This index included alcohol use, delinquent-type behavior,

marijuana use, and sexual intercourse.

In their studies of adolescent problem behaviors, Jessor et al. and Stoiber and

Good (1998) accounted for 12% and 31% of the variance in sexual behaviors,

respectively. In both of these studies, sexual behavior was simply a dichotomized

measure of sexual intercourse (i.e., have you had sex, yes or no). Thus, there was less

variation in the measure when compared to the current study. In addition, the Jessor et al.

study included a total of 13 risk and protective predictor variables and the Stoiber and

Good study had a total of 12 risk and protective predictor variables in their models.

Comparatively, this study included a total of six statistically significant risk and

protective predictor variables in the static model and nine risk and protective predictor

variables in the concurrent model. Therefore, the variance accounted for in this study is

based on fewer significant predictors.

Explaining the variance between adolescents who have had intercourse and those

who have not is analogous to comparing apples to oranges. It is much easier to describe

the differences between two groups that are so obviously different than it is to describe

the differences within a group with the same experience (i.e., sexual intercourse).

Accordingly, the first conclusion is that the models tested in this study make a new

contribution to adolescent sexuality research.

Which model is best or what are the significance of the similarities and differences

between the three types of models? According to Davies et al. (1999):

> [r]esearch designs that restrict the assessment of each construct to a single point in
> time are referred to as static because they fail to capture the stability and variability
> of each key construct over time....[and]....[e]ven longitudinal designs with static
> measures of each construct fail to control appropriately the effect that prior values of
> a variable can have on itself (p. 241).

Thus, the static longitudinal model tested in this study does not consider changes that may occur in any particular variable and how those changes affect sexual competence. In reference to the concurrent model, "[a]t the most fundamental level, cross-sectional designs violate the principle stipulating that a variable can only be caused by values of a preceding variable" (p. 241, Davies et al., 1999). Consequently, the autoregressive model would appear to be the better model because it captures the stability and variability of the constructs over time. However, it is also possible that each of these models tell us something different about sexual development. The conclusion then is that, from a strictly causal perspective, the autoregressive model has better explanatory ability. However, the static longitudinal and concurrent models also tell us something about the nature of sexual development.

Though individual-level variables account for a larger portion of the variance and tend to have stronger associations with sexual competence, families, peers, and schools also contribute to the total variance explained and have a direct effect on adolescents' sexual competence. These findings support those of other studies that have used predictor variables from multiple contexts to examine adolescent sexual behaviors, sexual risk-taking, and problem behaviors (Jessor et al., 1995; Luster & Small, 1994; Resnick et al., 1997). From an ecological perspective, these findings support the premise that environmental determinants affect individual behaviors and that the individual is not completely responsible for behaviors that put them at risk for disease or ill health.

Looking at the results from the different analytic models, a pattern emerges for peer and parental influence. Friends health-risk behaviors is significantly associated with sexual competence in the static separate and static additive models and in the concurrent

separate model. However, in the concurrent additive and autoregressive models the association is no longer significant. Conversely, parental presence is not significantly associated with sexual competence in the static separate and static additive models, but there is a significant association for the concurrent separate and additive models and autoregressive model (See Table 4-10). In addition, parent/family connectedness maintains a significant association with sexual competence in the concurrent additive model that was not maintained in the static additive model. This suggests that the early influence of peers might be diminished later by parental influence.

With nearly 71% of the sample between the ages of 16 and 18 at Wave 2, the majority of these adolescents are in the later stages of middle adolescence and the initial stages of late adolescence. On the other hand, at Wave 1 most of these youth would have been at the late stages of early adolescence and the initial stages of middle adolescence. Along with the difference in timing of peer and parental influences, it appears that as youth transition from early adolescence to middle adolescence, peers provide the strongest influence on sexual competence, whereas, the transition from middle adolescence to late adolescence sees a resurgence of parental influences. In addition, results from the autoregressive model suggest that changes in parental influences have a stronger impact on adolescent sexual competence than changes in peer influences.

As noted by Pipher (1994) and Kindlon and Thompson (1999), for both females and males, early adolescence is often characterized by youth exploring and asserting their independence, and in our culture this often is demonstrated by distancing oneself from parent's and by minimizing the perception (by peers) of parental influences. Conversely, this is a time when the peer group becomes the prime developmental influence. It also is

a time when parents, unsure of how to handle or react to the changes that are occurring for the early adolescent, might become less involved in the adolescent's life. In either case, early adolescence is a time often characterized by increased parent-child conflict and as such parent's influence on adolescent behaviors diminishes. However, as both the adolescent and their parent(s) become accustomed to these changes, the parent-child relationship becomes less conflictual and once again parents become a major influence in their child's development.

As an indication of parents' importance in the development of adolescent's sexual competence, this study shows that parent's membership in a parent-teacher organization is associated with increased sexual competence. Recall that Garbarino (1990) proposed that risk and opportunity at the mesosystem involve the quantity and quality of linkages between microsystems. In this study the existence of a linkage between family and school was assessed and it was hypothesized that when this linkage was present it serves as a protective factor because it provides greater opportunities for positive developmental outcomes.

Mesosystems are established when a child first enters a new setting (Garbarino & Abramowitz, 1992), what Bronfenbrenner referred to as an ecological transition. If the transition is positive, it provides opportunities for the child. In this instance, the child is transitioning to adolescence and in most cases a new school (i.e., middle school or junior high school). Parental presence in the new setting, represented here by membership in the parent-teacher organization, at the time of an ecological transition increases the chances that the transition will be a positive one. This, in combination with parents modeling a

commitment to conventional institutions, creates a strong mesosystem that provides a

positive developmental influence that is associated with sexual competence.

The associations, or lack of associations, between the predictor variables and sexual

competence are fairly consistent across gender and ethnicity, the two macrosystems

examined in this study. Gender differences are found for only four of the thirty-five

predictors, approximately 11%. Ethnic differences are more prevalent with eleven of the

thirty-five predictors, approximately 31%, having different associations for particular

ethnic groups. All but one of these had just one ethnic group with an interaction. These

findings suggests that the societal blue print for sexual competence is similar for males

and females and across ethnic groups. However, it would be inappropriate to completely

disregard those instances where gender and ethnic differences do occur. In these

instances, the previous research and the theoretical frameworks discussed in the first two

chapters provide some insights concerning these differences.

Two methodological issues that may account for why these findings are in contrast to

the reviewed literature that has generally found gender or ethnic differences in sexual

behaviors. One reason for the discrepancies is attributed to the earlier discussion of the

differences between previous research that has focused on adolescents having or not

having intercourse and the current study's examination of the sexual competence of

sexually active adolescents. A second reason for the discrepancies is that previous works

that have found differences examined only mean differences, whereas, the present study

compared slopes. Developmentally, it is more appropriate to discuss slope differences

because they actually describe how factors influence a developmental outcome. In this

study, differences were examined in terms of risk and protective influences on sexual

competence, not just on differences in sexual behaviors. Hence, the difference between slope and mean comparisons.

Though the findings of this study oppose the prevalent notion of gender and ethnic differences in sexual behavior, these findings are similar to more recent studies of adolescent health related behaviors (Jessor et al., 1995; Luster & Small, 1994; Perkins et al., 1998; Small & Luster, 1994; Stoiber & Good, 1998). Of course, these researchers did find some differences just as there are in the current study. Yet overall, they found that gender and ethnicity were not primary contributors in explaining the variations in the outcomes that were examined. For instance, Jessor et al.'s (1995) study of adolescent problem behavior showed that the variance explained by their Problem Behavior Theory was similar across gender and ethnic groups.

Similar to the present study, these studies used a multicontextual approach to examine adolescent health behaviors. As part of this approach, demographic background variables are often controlled for and then interactions or separate models for gender and ethnicity are analyzed. Using this method controls for the variables (e.g., age, SES) that are often responsible for the differences in gender and ethnicity that are found in less complex analyses. Thus, the effect of gender and ethnicity are greatly reduced.

As previously mentioned, gender and ethnic differences are often discussed within the context of sexual activeness. If indeed these difference truly exist, in may be a result of the different subcultures (i.e., macrosystems) that influence an adolescent. However, once an adolescent has become sexually active and is influenced more by the broader social context, differences in sexual behaviors become less pronounced. Similarly, it may be that once an adolescent becomes sexually active they look to the broader social

context for the sexual development "blue print" because it either does not exist in the previous subculture or it does not fit well with the new belief system.

The conclusion regarding the macrosystems examined in this study is that in general, sexual health develops universally. This means that although the timing of intercourse may differ by gender or ethnicity or sexual intercourse may occur within a different context, whether or not adolescents become sexually competent is based on similar factors. These findings provide a more objective view of adolescent sexuality when compared to the value-based distinction between having or not having intercourse or at what age intercourse is first experienced within the context of gender or ethnic differences. Simply stated, these findings suggest that the effects of risk and protective factors on sexual competence is fairly homogeneous.

Overall, risk factors seem to be stronger predictors of adolescent sexual competence than the protective factors examined in this study. When the significant predictors from the separate models were tested in the additive models, the majority of the risk factors were associated with sexual competence whereas only a few of the protective factors maintained an association with sexual competence. Furthermore, only changes in risk factors were associated with sexual competence in the autoregressive model. These findings are similar to the findings of other multicontextual risk and protective models of adolescent problem behaviors (Jessor et al., 1995; Stoiber & Good, 1998).

This suggests that when both risk and protective factors are present, the direct influence of risk factors is stronger than the direct influence of protective factors. In other words, for an adolescent to become sexually competent when risk factors are present, there must be enough protective factors present to compensate for the negative effects of

the risk factors. However, this only shows how adolescents are more or less sexually competent. Protective factors also can be manifested as buffering effects (Scaramella et al., 1999). This means that instead of having a direct effect on sexual competence, protective factors can moderate the relationship between risk factors and sexual competence. These potential moderating effects were not examined in the present study.

Two risk factors, engaging in other health-risk behaviors and perceiving that there are obstacles to contraceptive use, emerged as strong indicators of sexual competence. In each model, both of these factors were associated with sexual competence and the standardized coefficients were generally larger than the other predictors that were associated with sexual competence. It was hypothesized that because problem behaviors tend to occur as clusters, engaging in other health-risk behaviors would be related to sexual risk-taking and as a result inhibit sexual competence. Indeed, other researchers also have found an association between adolescent sexual risk-taking and other problem behaviors (Luster & Small, 1994). Not only do these behaviors demonstrate a negative health orientation, alcohol and marijuana use can affect the decision-making process involved in whether or not to engage in sexual intercourse and if a contraceptive is used. Perceiving that there are obstacles to contraceptive use was thought to represent risk because it provides adolescents with a justification for not using a contraceptive. Together, these behaviors and those used in the measure of sexual competence embody the status of an adolescent's health. Consequently, these findings point to the importance of using a holistic approach when examining adolescent sexual health.

Limitations of the Study

The findings of this study are limited by measurement issues of sexual competence. First, because of the complexity of the Add Health study it was difficult to determine the number of sexual intercourse partners that adolescents had had and therefore this was not included in the measure. Second, the overall mean was 6.70 out of a possible range of 0 to 8 and the range of scores was limited, with approximately 99% of the sexual competence scores between 4 and 8. Third, there were a small number of cases in several of the cells for the individual behaviors that were used to create sexual competence. These findings suggest that further consideration needs to be given to the measure of sexual competence.

Another limitation of this study is that only the direct effects on sexual competence were tested for the variables from the different microsystems. As a whole, individual level variables had considerably more explanatory power than the ecological systems had. But what is not apparent is how these other systems may influence the characteristics of an adolescent that are associated with sexual health. As noted by Bronfenbrenner (1979), "in ecological research, the principle main effects are likely to be interactions" (p. 38).

A final concern is that only compensatory effects of protective factors were tested. This may have resulted in an over estimation of the effect that risk factors have on sexual competence or an underestimation of the role of protective factors in the development of sexual competence. Jessor et al. (1995) found that in addition to compensatory effects, protective factors also had a buffering effect on problem behaviors. In this study only the

direct effects of protective factors on sexual competence was examined. Thus, the full potential of protective factors to decrease sexual risk-taking was not investigated.

Implications for Practice

In practice, the findings of this study suggest that to increase sexual competence, those who are involved in health promotion programs need to effect change within the different ecological systems. Stoiber and Good (1998) recommended that "the complex nature of linkages between risk and resilience [i.e., protection]....support the need for expanded, multifocused prevention and intervention efforts rather than those emphasizing micro-skills or narrow knowledge content alone" (p. 395). Thus, to increase sexual competence and promote sexual health, comprehensive sexuality education needs to be an integral part of general health promotion and that health promotion needs to occur within the different contexts of a person's life.

At the macro-level, the findings of this study suggest that programs or program components intended to promote sexual health can be inclusive of both females and males and across ethnic groups. Where the findings of this study and others have indicated that there are gender or ethnic differences, health promotion programs can be enhanced to reflect these differences. At the meso-level, parents need to be encouraged to be involved in their adolescent's schools so as to provide greater opportunities for positive developmental outcomes.

Higher levels of school connectedness and parent/family connectedness are both microsystem influences that were shown to increase sexual competence. To help promote sexual health schools need to provide opportunities for all students to be involved with the school. With the family system, parents need to be told that they do make a difference

in their adolescent's life and that they can be a positive influence on their sexual development. However, it is not enough for them to simply monitor or to be present, they need to connect with their adolescent in a positive manner. This includes a warm and loving relationship characterized by good communication.

In general, there is a need to decrease the number of risk factors associated with sexual risk-taking and increase the number protective factors. Decreasing negative affect, other health-risk behaviors, and obstacles to birth control are changes that could be implemented at any level and that would serve adolescents well in becoming sexually healthy adults.

Implications for Research

By focusing on risk and protective factors, the current study is what Bronfenbrenner (1987) referred to as process-person-context model. Bronfenbrenner distinguished between class-theoretical and field-theoretical models to describe two types of research. Class-theoretical includes social-address models, personal-attribute models, and person-context models. Basically, these three types of models describe a person and their environment. Social address models are those models that describe people's "membership" in groups (e.g., social economic status, family structure), whereas, personal attribute models describe the individual (e.g., I.Q. or temperament). Person-context models are a combination of social address and personal attribute models. The person-context produces what Bronfenbrenner referred to as "ecological niches." He defines these as "regions in the environment that are especially favorable or unfavorable to the development of individuals with particular personal characteristics" (p. 194).

Typically, a new field of study begins with class-theoretical models. However, these models do not "reveal the mechanisms that account for observed relationships" (Bronfenbrenner, 1987, p. 192). Field-theoretical models include the mechanisms or processes that explain relationship. Bronfenbrenner referred to this as a process-person-context model. This model adds the process dimension to the person-context model. In other words, what is it that causes one group or individual to be different from other groups or individuals. The focus of this study on the process of how sexual competence is developed supports a continuing trend of adolescent sexuality research that goes beyond describing the social address of adolescents who experience sexually intercourse to how and why their experiences are different.

Another research implication from this study is whether or not to weight the sexual competence measure by the birth control item, including condom use. In the end, this is the behavior that is most likely to increase an adolescent's risk for HIV infection, other STDs, and unintended pregnancy. Using a contraceptive is the only behavior in the measure of sexual competence that directly relates to reducing this risk. The remaining behaviors are related to the decision-making process to engage in sexual intercourse and/or to use a contraceptive. Therefore, it may be that contraceptive use is a stronger indication of sexual competence than other behaviors and so it should be weighted accordingly.

As noted in the introduction to this study, the adolescent sexual research literature has traditionally characterized adolescent sexual behavior as a problem behavior and as such, researchers often make comparisons between sexually abstinent adolescents and sexually active adolescents. For example, in a recent study that examined the family's

role in ethnic minority adolescents' sexual behaviors, the researches found that parental monitoring "consistently predicted less sexual activity" (p. 95, Miller, Forehand, & Kotchick, 1999). In light of this finding, the authors concluded that "[c]onsiderable importance has been ascribed to [parental] monitoring in the management of adolescent sexual behavior and in the prevention of other problem behaviors during adolescence that have been found to relate to increased sexual risk-taking" (p. 95). Not only does this statement perpetuate the idea that adolescent sexuality is inherently problematic, it also suggests that the only "management" of adolescent sexual behavior is prevention. Does this mean that the adolescent has developed sexually? What good is parental monitoring when the adolescent leaves the home? As demonstrated in the present study, parental monitoring does not differentiate between sexually competent adolescents and adolescents who engage in sexual risk-taking behaviors.

As a culture, part of the "wisdom" we impart onto adolescents when they experience "adolescent" problems, is that this (adolescence) is only a short period of their lives and that it does not last forever. However, when it comes to their sexuality, we act as though this period of their lives does last forever. We seem more concerned with managing their sexual behaviors than we are with helping them to develop into sexually healthy adults. By using a problematic approach to study adolescent sexuality, researchers are only contributing to the problems that are related to sexual risk-taking in adolescence *and* adulthood.

Fortunately, there is a growing movement for a new approach to studying adolescent sexual behaviors. Indeed, Udry and Bearman (1998) begin their discussion of how the Add Health study can provide new methods for new research on adolescent sexual

behavior with the statement that "[s]exual behavior is always included in the list of 'problem behaviors' and 'risk behaviors' of adolescence, although it is considered a normal and acceptable behavior among adults" (p. 241). The current study provides a new concept with which to examine adolescent sexual behaviors that focuses on the development of sexual health.

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APPENDIX

Calculations of R^2-change/F-change

	R^2 - 1	R^2 - 2	R^2-change	N = (# Cases)	p = (Total # IV)	q = (# IV Enter)	F-change
Static Separate							
Controls	0.000	0.029	0.029	6139016	20	20	9167.40
Controls - Individual	0.029	0.126	0.097	6139016	27	7	97332.76
Controls - Familial	0.029	0.045	0.016	6139016	27	7	14693.16
Controls - Extrafamilial	0.029	0.098	0.069	6139016	26	6	78268.71
Concurrent Separate							
Controls	0.000	0.015	0.015	6139016	15	15	6232.49
Controls - Individual	0.015	0.174	0.159	6139016	22	7	168817.00
Controls - Familial	0.015	0.039	0.024	6139016	19	4	38328.80
Controls - Extrafamilial	0.015	0.077	0.062	6139016	19	4	103092.57
Static Additive							
Controls	0.000	0.015	0.015	6139016	15	15	6232.49
Controls & Ind	0.015	0.110	0.095	6139016	18	3	218428.73
Controls, Ind, & Fam	0.110	0.111	0.001	6139016	19	1	6905.51
Controls, Ind, Fam, & Ext	0.111	0.123	0.012	6139016	22	3	27999.97
Concurrent Additive							
Controls	0.000	0.015	0.015	6139016	14	14	6677.67
Controls & Ind	0.015	0.174	0.159	6139016	19	5	236343.91
Controls, Ind, & Fam	0.174	0.183	0.009	6139016	21	2	33813.31
Controls, Ind, Fam, & Ext	0.183	0.186	0.003	6139016	23	2	11312.64
Autoregressive							
Controls	0.000	0.022	0.022	6139016	16	16	8631.01
Controls & Wave1	0.022	0.126	0.104	6139016	25	9	81166.41
Controls, Wave 1, & Ind	0.126	0.196	0.070	6139016	30	5	106897.75
Controls, Wave 1, Ind, & Fam	0.196	0.202	0.006	6139016	32	2	23078.88
Controls, Wave 1, Ind, Fam, & Ext	0.202	0.203	0.001	6139016	34	2	3851.31

Calculations of R^2-change/F-change

	R^2-1	R^2-2	R^2-change	N = (# Cases)	p = (Total # IV)	q = (# IV Enter)	F-change
Interactions Wave 1							
Feeling	0.043	0.053	0.010	6139016	20	6	10804.29
HIV/AIDS vulnerability	0.021	0.027	0.006	6139016	21	6	6309.35
Consequences of pregnancy	0.028	0.037	0.009	6139016	21	6	9562.30
Parental presence	0.015	0.019	0.004	6139016	20	6	4171.93
Family sexual socialization	0.015	0.025	0.010	6139016	21	6	10494.01
Neighborhood quality	0.015	0.022	0.007	6139016	20	6	7323.273
Parent PTA membership	0.022	0.026	0.004	6139016	21	6	4201.912
Interactions Wave 1							
Pubertal development	0.019	0.023	0.004	6139016	20	6	4189.011
HIV/AIDS vulnerability	0.015	0.032	0.017	6139016	21	6	17968.819
Family connectedness	0.032	0.042	0.010	6139016	20	6	10680.228
School connectedness	0.037	0.045	0.008	6139016	20	6	8571.023
Neighborhood quality	0.015	0.022	0.007	6139016	20	6	7323.273

VITA

Kevin originated from Flushing, Michigan and after serving in the military, he obtained his Bachelor of Science Degree from Central Michigan University with a psychology major and sociology minor. In 1993, he began his graduate program in Child and Family Studies at The University of Tennessee, Knoxville and in 1996 he received his Masters of Science Degree. He recently received the Child and Family Studies departmental award for outstanding research as a graduate student. His dissertation study of adolescent sexual competence was supervised by his major professor Dr. Cheryl Buehler. In the summer immediately following graduation, he is relocating to Eastern North Carolina where his partner Dr. Sharon M. Ballard has accepted a position as assistant professor at East Carolina University. Kevin plans to pursue his interest in social science research and adolescent sexuality.