

AN ABSTRACT OF THE DISSERTATION OF

Elizabeth L. Rink for the degree of Doctor of Philosophy in Public Health presented on May 16, 2006.  
Title: An Ecological Analysis of Adolescent Females' Perceptions of Sex: Implications for Onset of Sexual Intercourse.

Abstract approved: \_\_\_\_\_

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Raymond Thicker

This study explores the intrapersonal and interpersonal ecological factors that influence adolescent females' perceptions of sex and the extent to which their perceptions of sex impact onset of sexual intercourse as they mature. Particular attention is given to how depression influences individual, personal and social factors in an adolescent female's life, to shape her attitudes towards sex, and determine her engagement in sex as she reaches young adulthood. Ecological Systems Theory is used to examine the extent to which individual, family, and social factors impact adolescent females' perceptions of sex and onset of sexual intercourse.

Data are from the National Longitudinal Study of Adolescent Health. Multinomial logistic regression reveals that the factors associated with less positive perceptions of sex are age, self-esteem, sexual intercourse, religiosity and connection to mother and peers, as well as, depression in combination with religiosity and connection to one's peers. More positive perceptions of sex are linked with depression, connection to one's school, as well as, depression in conjunction with aging and sexual intercourse. Results from the logistic regression analysis determines that less positive perceptions of sex delay onset of sexual intercourse among adolescent females; however, adolescent females' attitudes towards sex vary greatly in determining onset of sexual intercourse as they mature. Furthermore, there is no association between depression and adolescent females' perceptions of sex in predicting onset of sexual intercourse as they progress into young adulthood.

The findings from this study suggest that programs focused on shaping attitudes toward sex should assist young women in forming a definite opinion about their decision to have sexual intercourse or abstain from engagement in sexual intercourse. A female's age, sense of self-worth, emotional state, and religiosity as well as the strength of her relationships with parents, peers and school must be considered when addressing her sexual health. This investigation supports the use of Ecological

Systems Theory as a useful theoretical framework for examining the factors that influence adolescent females' perceptions of sex and engagement in sexual intercourse. A more cognitive investigation of the relationship between depression and the factors in an adolescent female's life that influence her attitudes towards sex and how depression affects an adolescent female's perception of sex and her decision to engage in sexual intercourse is warranted as this study finds only minor support for the use of Ecological Systems Theory when exploring the association between depression and adolescent female sexual health.

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**An Ecological Analysis of Adolescent Females' Perceptions of Sex: Implications for Onset of Sexual Intercourse**

by

**Elizabeth L. Rink**

**A DISSERTATION**

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APPROVED:

Redacted for Privacy

Major Professor, representing Public Health

Redacted for Privacy

Chair of the Department of Public Health

Redacted for Privacy

Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Elizabeth L. Rink, Author

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### A DEDICATION

In memory of my grandmother, Isabel Charlotte Talbot Rink (September 4, 1908 – March 6, 2004) for the abundance of love she surrounded me with throughout my life and her words of wisdom on the subject.

“Honey, all you ever need to know about sex is that it’s terrible, absolutely terrible.”

Niagara Falls, New York  
Summer 1977

# An Ecological Analysis of Adolescent Females' Perceptions of Sex: Implications for Onset of Sexual Intercourse

## Chapter 1: Introduction

### Statement of the Problem

Approximately 47% of high school students in the 9<sup>th</sup> to 12<sup>th</sup> grade report engagement in sexual intercourse (CDC, 2003). Adolescent females 13 to 19 years old who engage in sexual activity have an increased possibility of becoming pregnant, having an abortion and contracting sexually transmitted infections, as well as engaging in high-risk behaviors such as delinquency and substance abuse (CDC, 2000; CDC, 2003; Mosher, J. et. al., 2005). In addition, sexually active adolescent females may suffer from psychological problems including depression and stress (Kirby, 1999; Corcoran, 2000; Hallfors, et. al., 2005). These public health concerns heighten the need for continued research to identify factors that lead to sexual activity among adolescent females. Females who engage earlier in sexual intercourse during adolescence are exposed over a longer period of time to the potential negative health outcomes associated with sexual activity (Alan Guttmacher Institute, 2002). In a review of 250 studies on adolescent sexual behavior, Kirby (2002) identifies more than 100 individual and environmental factors that lead to sexual initiation among adolescent females, with adolescent females' attitudes towards sex being one of the strongest predictors of their decision to engage in sexual activity.

### Justification for the Study

Previous research on adolescent females' attitudes towards sex reveals that adolescent females' sexual activity is consistent with their sexual perceptions. Gillmore et. al. (2002) provide evidence that adolescent females who anticipate a detrimental outcome as a result of having sex are more likely to delay sexual intercourse than those females who believe there will be a personal or social gain to having sex. Rostosky et. al. (2003) report that adolescent females have premature sexual intercourse if they perceive engagement in sexual intercourse as pleasurable and as a means to enhance their social status. Levinson et. al. (1995) report that adolescent females who equate having sex with emotional closeness

are more likely to have sexual intercourse. Cornell and Halpern-Felsher (2005) suggest that adolescent females who report that engagement in sexual intercourse will result in social problems, such as damaging their reputations or making their parents upset, are likely to abstain from sexual intercourse.

These previous efforts to study adolescent female sexual health tend to have a narrow focus and do not take into consideration the multiple individual and environmental circumstances in which an adolescent female develops her perceptions of sex. Furthermore, these studies do not consider the extent to which an adolescent female's perceptions of sex influence her decisions to become sexually active as she transitions through adolescence into young adulthood (Kirby, 2002). In particular, these studies do not acknowledge the adolescent female's emotional mindset and its impact on her ability to make rational decisions about whether or not to engage in sexual intercourse. Longmore et. al. (2004) suggest that an adolescent female's affective state must be examined in order to understand how it may delay or accelerate onset of sexual intercourse. For example, depression is an emotional state that results in feelings of emptiness, isolation, loneliness and causes difficulty with concentration. These symptoms may influence an adolescent female's ability to make wise decisions about whether or not to engage in sexual intercourse. While studies have found that depressive symptoms increase the probability that an adolescent female will experience early sexual intercourse, few studies have explored the influence that depression has on adolescent females' perceptions of sex or the extent to which the interaction between depression and sexual attitudes determines onset of sexual intercourse among adolescent females (Whitbeck et. al., 1993; Harris et. al., 2002; Longmore et. al., 2004).

### **Purpose of the Study**

The purpose of this study is: 1) To determine the extent to which individual characteristics, personal attributes and social relationships within the adolescent female's environment influence her attitudes towards sex; 2) To determine the extent to which perceptions of sex influence onset of sexual intercourse as adolescent females mature; and 3) To determine the extent that depression affects individual, personal and social factors which influence an adolescent female's attitudes towards sex and her decision to engage in sexual intercourse as she transitions through adolescence into young adulthood. The specific variables examined in this study include age, race, depression, self-esteem,

sexual intercourse, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness. Data from the National Longitudinal Study of Adolescent Health are used to examine the context in which adolescent females' perceptions of sex are shaped and how perceptions of sex determine onset of sexual intercourse during the transition from adolescence into young adulthood.

### **Research Questions**

The research questions for this study are organized into three sections: 1) intrapersonal ecological factors that influence perceptions of sex; 2) interpersonal ecological factors that influence perceptions of sex; and 3) perceptions of sex influence on onset of sexual intercourse. The research questions for this study are the following:

#### **Intrapersonal Ecological Factors**

1. To what extent do age, race, self-esteem, sexual intercourse, religiosity, alcohol use and perceptions of sex differ between depressed and non-depressed adolescent females?
2. To what extent do age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use influence adolescent females' perceptions of sex?
3. To what extent does depression interact with age, race, self-esteem, sexual intercourse, religiosity, and alcohol use, to influence adolescent females' perception of sex?

#### **Interpersonal Ecological Factors**

4. To what extent do mother connectedness, father connectedness, peer connectedness and school connectedness differ between depressed and non-depressed adolescent females?
5. To what extent do mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex?
6. To what extent does depression interact with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perception of sex?

#### **Perceptions of Sex Influence On Onset of Sexual Intercourse**

7. To what extent do perceptions of sex influence onset of sexual intercourse for adolescent females as they transition from adolescence into young adulthood?

8. To what extent does depression interact with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood?

### **Hypotheses**

The following hypotheses are examined in this study:

#### **Intrapersonal Ecological Factors**

**Ho1:** There is no significant difference between depressed and non-depressed adolescent females in relation to age, race, self-esteem, sexual intercourse, religiosity, alcohol use and perceptions of sex.

**Ha1:** There is a significant difference between depressed and non-depressed adolescent females in relation to age, race, self-esteem, sexual intercourse, religiosity, alcohol use and perceptions of sex.

**Ho2:** The extent to which age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use influence adolescent females' perceptions of sex is not significant.

**Ha2:** The extent to which age, race, depression, self-esteem, sexual intercourse, religiosity and alcohol use influence adolescent females' perceptions of sex is significant.

**Ho3:** The extent to which depression interacts with age, race, self-esteem, sexual intercourse, religiosity, and alcohol use to influence adolescent females' perceptions of sex is not significant.

**Ha3:** The extent to which depression interacts with age, race, self-esteem, sexual intercourse, religiosity, and alcohol use to influence adolescent females' perceptions of sex is significant.

#### **Interpersonal Ecological Factors**

**Ho4:** There is no significant difference between depressed and non-depressed adolescent females in relation to mother connectedness, father connectedness, peer connectedness and school connectedness.

**Ha4:** There is a significant difference between depressed and non-depressed adolescent females in relation to mother connectedness, father connectedness, peer connectedness and school connectedness.

**Ho5:** The extent to which mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex is not significant.

**Ha5:** The extent to which mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex is significant.

**Ho6:** The extent to which depression interacts with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perceptions of sex is not significant.

**Ha6:** The extent to which depression interacts with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perceptions of sex is significant.

#### **Intrapersonal Ecological Factors that Influence Onset of Sexual Intercourse**

**Ho7:** The extent to which perceptions of sex influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is not significant.

**Ha7:** The extent to which perceptions of sex influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is significant.

**Ho8:** The extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is not significant.

**Ha8:** The extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is significant.

#### **Significance of the Study**

This study expands upon previous research on adolescent females' perceptions of sex and onset of sexual intercourse with a more in-depth examination of the individual, emotional, and social factors that affect an adolescent female's sexual perceptions and how her sexual perceptions influence her decision to engage in sexual intercourse as she matures (Gillmore et. al., 2002; Rostosky et. al. 2003; Cornell & Halpern-Felsher 2005; Levinson et. al., 1995). Kirby (2002) suggests that adolescent females' attitudes towards sex develop within an individual and social context that must be examined in order to design public health strategies that can delay onset of sexual intercourse as adolescent females transition into young adulthood. Therefore, further investigation is warranted to unravel the interwoven relationship between an adolescent female's individual and social environment, her perceptions of sex and her sexual behavior.

This study provides a detailed analysis of the extent to which depression affects individual, personal and social factors of an adolescent female's life, to influence her attitudes towards sex, and her decision to engage in sexual intercourse as she transitions through adolescence into young adulthood. According to Whitbeck et. al. (1993) adolescent females with depression have permissive attitudes towards sex which may account for their early engagement in sexual behavior. Ramrakha et. al, (2000) and Reinherz et. al.(1993) suggest that premature onset of sexual intercourse among adolescent females with depression leads to high rates of pregnancy, abortion and sexually transmitted infections. Studies have not examined how depression in combination with individual, personal and social factors affects an adolescent female's sexual perceptions and influences her engagement in sexual intercourse (Longmore et. al., 2004). One aim of the present study is to determine the extent to which an adolescent female's perceptions of sex is influenced by the interaction between depression and other individual, personal and social factors present in her social ecology. A second aim of this study is to assess the extent to which depression alone influences perceptions of sex to determine onset of sexual intercourse among adolescent females as they mature.

### **Limitations**

The limitations of this study include the following:

1. The information used in this study is based on data derived from adolescent self-reports.
2. The data from the Add Health Study is gathered from high school adolescents. The findings may not be generalized to dropouts, youth who were absent, homeless youth who are not in school, youth who were home schooled or youth who participate in alternative education.
3. Results from this study are not generalizable to adolescents with clinical depression. The Center for Epidemiologic Studies-Depression Scale (CES-D) is not an adequate diagnostic tool to assess clinical depression in adolescents because it does not fully assess the criteria for adolescent depression as outlined in the DSM-IV.
4. Three variables in this study, alcohol use, religiosity, and father connectedness, are measured using a single item due to lack of suitable questions in the Add Health In-Home Questionnaire.

These items may not adequately reflect an adolescent female's history with alcohol use, sense of spirituality or devotion to a God, or the nature of her relationship with her father.

### **Delimitations**

The delimitations in this study include the following:

1. The Add Health Study is a nationally representative sample of adolescents who were attending high school in the United States.
2. This study focuses on the influence of intrapersonal and interpersonal ecological factors on adolescent females' perceptions of sex.
3. This study examines how perceptions of sex influence onset of sexual intercourse among adolescent females as they transition from adolescence into young adulthood.

### **Definition of Terms**

The following terms are used in this study.

**Females** - females are 13 to 19 years of age, not married during Wave I of the Add Health Study, and participated in Wave II and Wave III of the Add Health Study.

**Race** – pertains to whether a female is white or non-white.

**Depression** – the degree to which an adolescent female reports feeling sad, lonely, fearful, hopeless, unmotivated, tired, unliked, worthless, unhappy, bothered by things, and having a poor appetite during the past seven days.

**Alcohol Use** – how much alcohol an adolescent female has consumed over the course of 12 months (5 or more in a row).

**Religiosity** – how important the concept of a god or a higher power is to an adolescent female.

**Perceptions of Sex** – refers to the adolescent female's perception of the costs and the benefits of engagement in sexual activity. Adolescent females who disagree that there are benefits to engagement in sexual intercourse have negative perceptions of sex. Adolescent females who have neutral perceptions of the benefits of sexual activity, meaning that they neither agree nor disagree, have

ambivalent perceptions of engagement in sexual intercourse. Adolescent females who agree that there are benefits to sexual intercourse have positive perceptions of sex.

**Sexual Intercourse** – whether or not an adolescent female has or has not engaged in sexual intercourse.

**Self-Esteem** – the extent to which an adolescent female feels good about her personal qualities, has a lot to be proud of, likes herself, feels loved and thinks of herself as good in relation to other people.

**Parent-Family Connectedness** - the degree to which an adolescent female feels close to her mother and father, perceives her mother or father as caring, feels satisfied with her relationship with her parents and feels loved and wanted by her parents.

**School Connectedness** – the extent to which an adolescent female feels teachers treat students fairly at school, feels close to people at school and feels a part of school.

**Peer Connectedness** – the extent to which an adolescent female feels cared for and close to her peers.

## CHAPTER II: LITERATURE REVIEW

Chapter II presents an overview of the intrapersonal and interpersonal ecological factors and theoretical model explored in this study. The intrapersonal ecological factors examined in this study are: age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use. The interpersonal ecological factors presented in this study include: mother connectedness; father connectedness; peer connectedness; and school connectedness. The extent to which these ecological factors influence adolescent females' attitudes towards sex and their engagement in sexual intercourse as they mature is examined using Ecological Systems Theory (Bronfenbrenner, 1979).

### **Intrapersonal Ecological Factors**

**Age.** According to Corcoran (2000), Watts & Nagy (2000), Santelli et. al. (2000) Murry (1992), and Small & Kerns (1993), sex becomes an increasingly normative behavior as adolescents age. For example, adolescent females 16 to 18 years of age are more likely to engage in sexual intercourse than younger adolescent females ages 13 to 15 years of age (CDC, 2003). Research has confirmed that sexual behaviors are hormonally and physiologically driven and part of the adolescent developmental process (Halpern & Urdy, 1999). While the likelihood of adolescent female sexual intercourse may increase with age, it is not clear how age affects adolescent females' perceptions of sex to influence the onset of sexual intercourse (Levinson et. al., 1995). The paucity of research in this area is in contrast to the extensive amount of research that has been conducted on the relationship between race, adolescent females' perceptions of sex and engagement in sexual intercourse.

**Race.** Prior research has established that attitudes towards sex and sexual behavior differ by race. Black and Hispanic adolescent females are likely to engage in sexual intercourse earlier than White adolescent females (CDC, 2003). Adolescent females from non-Caucasian racial groups are also more likely than Caucasian females to perceive engagement in sexual intercourse as a beneficial experience based on their cultural and social beliefs about sex (Dorius et. al., 1993; Lauritsen 1994; Blum et. al. 2000). These variations in sexual attitudes and behavior by race highlight the need to include race as a factor when examining perceptions of sex and subsequent onset of engagement in sex among adolescent females. In addition, adolescent females from non-White racial groups tend to exhibit

higher rates of depression than white adolescent females, which may affect their perceptions of sex and their sexual behavior (Rushton et. al., 2002; Schraedley et. al., 1999).

**Depression.** Depression is the most common mental health problem among adolescent females (Ramrakha et al., 2000; Reinherz et al., 1993; Rushton et al., 2002). Approximately 29% of adolescent females report feeling sad and hopeless over a two week period to the point that they stop participating in daily activities (CDC, 2003). Previous research suggests that the lifetime prevalence of depression during adolescence is as high as 20% (Costello, et. al., 1996; Fleming & Oxford, 1990; Lewinsohn et. al., 1998; Whitaker et. al., 2000). Other studies suggest that approximately 40% of adolescent females experience depressive symptoms during their adolescence with the possibility of a depressive state lasting up to three years (Gil-Rivas et. al., 2003). Depression is a combination of symptoms, which include feeling blue, difficulties with concentration and task completion, irritability, loneliness, and emptiness. Depression may make it difficult for an adolescent female to think clearly and make appropriate decisions about her feelings and actions. An adolescent female suffering from depression may have a tendency to make decisions about engaging in sexual intercourse that are based exclusively on her need to relieve her feelings of loneliness and emptiness.

The research on adolescent females' sexual activity and depression demonstrates that adolescent females with depression have sex earlier and more frequently than other adolescent females (Lewinsohn et al., 1995; Harris et. al, 2002). Although previous research proposes that depressed adolescent females have permissive attitudes towards sex, which leads them into earlier sexual activity, research has not extensively explored the extent to which depression interacts with the multiple personal and environmental factors that influence her perceptions of sex and sexual behavior (Whitbeck et. al., 1992; Whitbeck et. al., 1993). For example, a recent study by Longmore et. al. (2004) suggests that the association between depression and self-esteem should be examined to assess their influence on an adolescent female's decision to engage in sexual intercourse.

**Self-Esteem.** The relationship between self-esteem and sexual health has received much attention in the research literature on adolescent health. Self-esteem refers to the regard with which an adolescent female views herself (Rosenberg, 1989). Self-esteem can motivate an adolescent female to engage or not to engage in a particular behavior such as sexual intercourse. However, several studies

indicate that there is no relationship between self-esteem and engagement in sexual intercourse among adolescent females (Stratton & Spitzer, 1967; Perlman, 1974; Jessor & Jessor, 1977; MacCorquodale & DeLamater, 1979). These studies state that sexual behavior is influenced by societal norms, cultural beliefs and practices, not self-esteem. In contrast, other studies propose that adolescent females with low levels of self-esteem will engage in sexual activity to boost their self worth (Lindeman, 1974; Orr et al., 1989; Spencer et al., 2002). Gecas and Longmore (2003) suggest that self-esteem must be examined in combination with other factors present in an adolescent female's life in order to assess its influence on her decision to engage in sexual intercourse as she matures.

**Sexual Intercourse.** The research interest in adolescent females' engagement in sexual intercourse is driven by its potentially negative social, emotional and health consequences. The individual and environmental factors associated with engagement in sexual intercourse among adolescent females include: sociodemographic characteristics (e.g., age, gender, race and socioeconomic status); individual characteristics (e.g., emotional well being, sexual beliefs and attitudes, and alcohol use) (Perkins et al., 1998; Small & Kerns, 1993; Singh & Darroch, 1999; Santelli et al., 2000; Kirby, 2002; Kirby, 1999); family characteristics (e.g., family size, parent education level and closeness to parents); and community characteristics (e.g., attachment to social institutions, school and peers). Most studies that examine the association between individual factors and adolescent female sexual behavior do not examine the extent to which an adolescent female's emotional mindset in combination with her sexual attitudes influences the onset of sexual intercourse as she progresses through adolescence into young adulthood (Longmore et. al., 2004). This lack of clarity is found also in the research on the association between alcohol use, sexual perceptions and adolescent female engagement in sexual intercourse.

**Alcohol Use.** While it is well established in the adolescent sexual health literature that alcohol use and engagement in sexual intercourse are associated, the interrelatedness between alcohol use, sexual perceptions and sexual behavior among adolescent females has not been clearly examined (Scales & Leffert, 1999; Jessor et. al., 1995). In a critical review of studies on alcohol use and sexual behavior, Weinhardt et. al. (2000) establish that alcohol use may increase positive attitudes towards sex and may reduce cognitive ability to make decisions about engagement in sexual intercourse. However,

Weinhardt et. al. (2000) conclude that it is misleading to continue to promote the belief that alcohol use increases engagement in sexual intercourse because not everyone who drinks alcohol decides to have sex. Their review of the literature suggests that studies that examine the relationship between alcohol use and sexual intercourse are limited because they do not gather specific information on alcohol use before or during sexual events, nor do studies examine the amount of alcohol intake before, during, or after sexual intercourse; therefore detailed information on the extent to which alcohol use influences perceptions of sex and decisions to engage in sexual intercourse has not been fully examined in the adolescent female population.

**Religiosity.** The association between religion and adolescent females' sexual health is also unclear (Kirby, 2002). Miller and Gur (2002) state that religiosity, or the importance of a God in an adolescent female's life, is not associated with her decision to engage in sexual intercourse. In contrast, Resnick et. al. (1997), Vesley et. al. (2004), and Jones et. al. (2005) propose that increased religiosity deters engagement in sexual intercourse among adolescent females. A study by Rostosky et. al. (2003) is one of the few studies examining the association between religiosity and adolescent females' perceptions of sex, and it suggests that adolescent females with stronger religious beliefs have negative perceptions of sex.

**Perceptions of Sex.** Prior research on adolescent females' perceptions of sex has established that adolescent females' ability to weigh the costs and benefits of participation in sexual intercourse does influence their sexual behavior (Levinson et. al., 1995). Adolescent females who perceive greater personal cost to having sex, e.g. that they will feel guilty if they have sex or that having sex will upset their parents, are more likely to remain sexually abstinent. Adolescent females who perceive greater personal benefit to having sex, e.g. that they will be popular with their peers if they have sex or that they will feel better about themselves if they have sex, are more likely to be sexually active. Individual and environmental factors that affect adolescent females' sexual perceptions or how their perceptions of sex predict onset of sexual intercourse as they age have not been thoroughly examined (Kirby, 2002; Longmore et. al., 2004; Carvajal et. al., 1999).

In addition, prior research on adolescent females' attitudes towards sex has categorized sexual perceptions into two distinct categories, positive and negative. Positive sexual attitudes indicate a more

favorable perception of sex and negative sexual attitudes suggest a more disapproving view of sex (Levinson et. al., 1995; Rostosky et. al., 2003; Gillmore et. al., 2002; Cornell and Halpern-Felsher, 2005). It may be argued that adolescent females' perceptions of sex are not as obvious as either positive or negative. Adolescent females' may be unclear about their perceptions of sex because of the many contradictory messages they receive from their parents, teachers, friends and the media about sex, which may make it challenging to form a viewpoint on the positive and negative aspects of being sexually active (Gillmore et. al., 2002). Adolescent females who lack a clear opinion about sex may be in jeopardy of engaging in sexual intercourse prematurely; similarly, adolescent females who have ambivalent attitudes towards pregnancy may be at an increased risk for childbearing (Bruckner et. al., 2004). However, the extent to which adolescent females' ambivalent attitudes towards sex influence their decision to engage in sexual intercourse has not been assessed.

### **Interpersonal Ecological Factors**

**Parent Connectedness.** The family environment influences adolescent females' sexual knowledge, attitudes, beliefs and behaviors. Recent research has studied the relationship between adolescent female sexual health and parent connectedness (Resnick et al., 1997; Miller, 2002; Jaccard & Dittus, 2000; White & DeBlasse, 1992). Parent connectedness is characterized as parental warmth, support, and parent child closeness (Miller, 2002; Resnick et al., 1997). Adolescent females who perceive that they have a close relationship with their parents in which they can communicate with them and feel supported by their mother and father are less likely to engage in sex (Resnick et al., 1997; Jaccard & Dittus, 2000). This evidence emphasizes the importance of closeness between adolescents and their parents during the adolescent years as a factor that influences adolescent females' sexual behavior. However, studies have not examined the influence of the parent-child connectedness on sexual attitudes. In fact, studies on adolescents' perceptions of sex have found that peer relationships overshadow parental bonds when it comes to understanding adolescent females' attitudes toward sex and their sexual behavior (Rice, 1999; Corcoran, 2000; Whitaker et. al., 2000)

**Peer Connectedness.** Many studies examine the influence of peer connectedness on adolescent female sexual activity. Bishop and Inderbitzen (1995) state that peer characteristics are directly related to an adolescent's social behavior and psychosocial well being. Billy et al., (1984)

suggest that adolescent females' peer selection and the decision to engage in sexual activity are impacted by their friends' sexual behavior. Similarly, Perkins et al., (1998) proposes that there is an association between adolescent female sexual activity and peer pressure to engage in high-risk behaviors. Whitaker et al., (2000) also conclude that adolescent females who are sexually active or anticipating being sexually active are involved in a sexually active peer group. In addition, it is also important to study the environment in which the majority of peer relationships develop, the school.

**School Connectedness.** The importance of an adolescent female feeling positively involved with her school environment as a factor associated with onset of sexual intercourse is inconclusive. Resnick et. al., (1997) concludes that higher overall school attendance, feeling treated fairly by teachers and feeling close to teachers delays sexual activity. Tubman et al., (1996) reports a correlation between adolescent females with higher grade point averages and later onset of sexual activity. Educational aspirations beyond high school delay onset of sexual activity among adolescent females (Harvey & Spigner, 1995). In contrast, Perkins et. al., (1998) suggest that school climate is not a significant predictor of engagement in sexual activity for adolescent females. Mott et al., (1996) states that a positive connection to school does not prohibit adolescent sexual activity. Corcoran (2000) reports that a positive connection to the school environment is more likely among adolescents who are already sexually active. Furthermore, the extent to which the connection to one's school environment influences an adolescent female's perception of sex has not been examined.

### **Theoretical Framework**

In this study, the Ecological Systems Theory is applied to assess the extent to which intrapersonal and interpersonal ecological factors influence adolescent females' perceptions of sex and how adolescent females' perception of sex influence onset of sexual intercourse as they mature. Central to the Ecological Systems Theory is an emphasis on the interaction of intrapersonal and interpersonal ecological factors in promoting the positive development of adolescents as they progress into young adulthood (Rew, 2005). Within the Ecological Systems Theory framework it can be maintained that as a female develops she becomes increasingly affected by the environmental factors around her. An adolescent female is motivated to engage in a particular health behavior as a way to maintain or

restructure her environment as she matures. Ecological Systems Theory can be used to illustrate that an adolescent female's behavior is not the sole result of maturation but is the outcome of simultaneous interactions between multiple intrapersonal and interpersonal ecological factors present within the adolescent female's environment that affect her perceptions of a particular behavior and her subsequent decision to engage in that behavior (Bronfenbrenner, 1979).

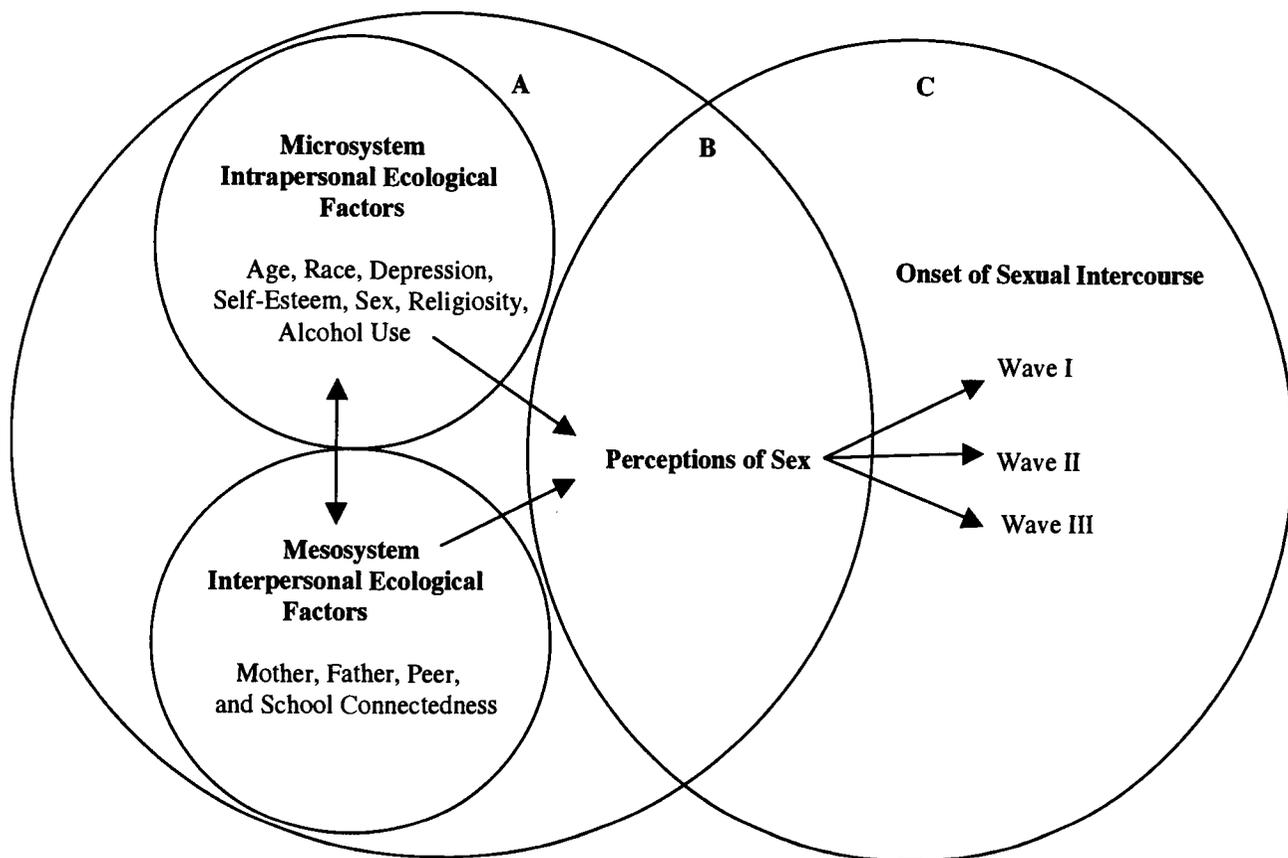
Ecological Systems Theory outlines four levels of intrapersonal and interpersonal influence that affect an adolescent female's attitudes and behaviors. These include the microsystem (e.g. unique physical and personal characteristics, experiences and roles), mesosystem (e.g. interactions with family, peers and the school environment), exosystem (e.g. larger organizations that the adolescent female does not directly interact with but which affect her such as government institutions) and macrosystem (e.g. the media, policies, culture) (Bronfenbrenner, 1979). According to Kirby (2002) the intrapersonal and interpersonal ecological factors that have the strongest affect on an adolescent female's perceptions of sex and sexual behavior are those factors in her immediate social environment, such as her personal characteristics, personal beliefs and experiences, emotional well-being, connection to her parents, peers and school. Thus, personal, family and social factors may provide some insight into an adolescent female's perception of sex and her onset of sexual intercourse. Ecological Systems Theory suggests that a female's perception of sex is formed during adolescence by the interconnectedness of these intrapersonal and interpersonal factors; and she is motivated by her perceptions of sex to engage or not to engage in sexual intercourse as a means of adapting to her environment as she matures.

Figure 1 depicts an ecological systems view of the intrapersonal and interpersonal factors that influence females' perceptions of sex during adolescence and how perceptions of sex established during adolescence influence onset of sexual intercourse as females transition into young adulthood. Within the microsystem, age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use function as individual level factors that influence perceptions of sex. Few studies have yet to integrate these multiple intrapersonal ecological factors in a unified approach to understand their impact on adolescent females' attitudes towards sex. Within the mesosystem an adolescent female's connection to her parents, peers and school environment operate as familial and social factors that influence her perceptions of sex. This approach is adapted from the resiliency field, which suggests that bonding to

individuals and social settings has a direct effect on adolescents' attitudes and behaviors (Bernard, B., 1991; Werner, E., 1993; Flay & Petraitis, 1994). In addition, Ecological Systems Theory is applied in this study to examine how perceptions of sex formed during adolescence, motivate adolescent females' sexual behavior. The interaction between depression and other intrapersonal and interpersonal ecological factors in an adolescent female's social environment is given specific attention because it will contribute a perception of adolescent female sexual attitudes that will add new insights into the extent to which an adolescent female's affective state in combination with micro and meso level factors influence her perceptions of sex and sexual behavior.

Figure 1 marshals together the two primary paths of inquiry in this study. Circle A represents the intrapersonal and interpersonal ecological factors that influence adolescent females perceptions of sex (Circle B). They include personal, familial and social factors that may directly account for an adolescent female's attitude towards sex. Circle B illustrates the extent to which an adolescent female's perceptions of sex may predict onset of sexual intercourse at Wave I, Wave II, and Wave III of the Add Health Study (Circle C) because of the direct effect attitudes towards sex have on adolescent females' decision to engage in sexual intercourse.

**Figure 1: The Influence of Ecological Factors on Adolescent Females' Perceptions of Sex and Onset of Sexual Intercourse**



### CHAPTER III: RESEARCH DESIGN AND METHODS

In this study the Add Health Study is used to examine the extent to which age, race, depression, self-esteem, sexual intercourse, religiosity, alcohol use, mother connectedness, father connectedness, peer connectedness, and school connectedness influence perceptions of sex among a nationally representative sample of adolescent females. This study also addresses the extent to which an adolescent female's perceptions of sex influence onset of sexual intercourse as she transition from adolescence into young adulthood.

#### **The Add Health Study**

The Add Health Study is a longitudinal study examining adolescents' health behaviors, their environments, and transition into young adulthood (Bearman et. al., 1997). The Add Health Study focuses on factors that influence adolescents' health behaviors such as individual attributes, family characteristics, peer connectedness, romantic relationships, the school environment, neighborhoods and communities. Unlike other national surveys conducted on adolescent health, such as the Center for Disease Control and Prevention's Youth Risk Behavior Survey (YRBS), the Add Health Study explores the individual characteristics of adolescents, their perceptions, knowledge, attitudes, and beliefs about health issues in relationship to the role of connectedness to families, peers, school and communities in promoting positive health behaviors as adolescents transition into young adulthood.

The Add Health dataset is appropriate for use in this study for the following reasons: 1) it includes measures of ecological factors that are not found in other national surveys on adolescent health, making it possible to examine the emotional and social context that shapes an adolescent female's perceptions of sex at a specific point in time; and 2) the longitudinal design of the Add Health Study allows for the examination of the degree to which sexual perceptions predict onset of sexual intercourse as adolescent females transition from adolescence to young adulthood.

### **The Add Health Sampling Design**

The Add Health Study utilizes a multistage clustering design to provide a representative sample of adolescents attending school in the United States. The Qualified Educational District (QED) database, which lists all the high schools in the United States, was used to select a sample of high schools with probability proportional to enrollment size. This meant that schools with more students had a greater chance of being selected from the QED list. For the purpose of drawing the Add Health sample, the QED high schools were sorted by the size of the student body, school type, region of the country, location, and percentage of white students. Approximately eighty high schools were selected systematically with probability proportional to enrollment size using with replacement sampling, meaning that once the high schools were selected from the sample they were placed back on the sorted list of high schools. A post stratification adjustment was then made with the eighty selected high schools using the different regions of the country so that the sum of the school weights would equal the total number of schools in the original sampling. The eighty high schools selected for participation in the Add Health Study were then asked to give the names of the feeder schools or middle schools that provided the students to their entering class. Fifty-two schools that were contributing students to the eighty high schools were selected with probability proportional to the percentage of the high school's entering class coming from the feeder high or middle school. In total, one hundred and thirty-two schools and the students attending those schools made up the adolescent sample for the Add Health Study (Chantala & Tabor, 1999; Tourangeau & Shin, 1999; Chantala, 2001; Bearman et. al., 1997)<sup>1</sup>.

### **Design Characteristics**

The Add Health design characteristics include clustering, stratification and weighting. The primary sampling unit of the Add Health Study is the school. The Add Health sample is stratified into four regions of the country, Northeast, Midwest, South, and West. All of the Add Health participants have sampling weights. An Add Health sampling weight represents the inverse of the probability that an

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<sup>1</sup> For a detailed description of the Add Health sampling and weighting procedures, please see Tourangeau, R. & Shin, H. (1999). *National Longitudinal Study of Adolescent Health: Grand Sample Weight*. Carolina Population Center: University of North Carolina, Chapel Hill.

adolescent's participation in the Add Health Study is due to the study's sampling design. The Add Health sampling weights were calculated based on: 1) which phase of the initial data collection process the adolescent participated in, such as the In-School Questionnaire, the In-Home Questionnaire or both; 2) which school they attended, high school or feeder/middle school; and 3) which wave of the Add Health Study they participated in. The Add Health weights were summed across the various samples that the adolescent was selected from and then divided by the number of samples from which the adolescent was eligible. Nonresponse adjustments were made to the sampling weights for schools and students who refused to participate in the Add Health study. The Add Health sampling weights were then trimmed because of excessively large weights assigned to some adolescents. Post-stratification adjustments were made on the Add Health sampling weights based on the adolescent population in the United States in 1995 in order to reduce any errors in estimates due to the Add Health sampling design (Chantala & Tabor, 1999; Tourangeau & Shin, 1999; Chantala, 2001; Bearman et. al., 1997)).

The combined effect of the clustering, stratification and weighting in the Add Health Study is that standard errors may be larger or smaller than those that are calculated in a simple random sample (Chantala & Tabor, 1999). In addition, the point estimates that are calculated using the Add Health Study data set may be biased as a result of the weighting in the Add Health Study design (Chantala & Tabor, 1999). The difference in the precision of the standard errors and point estimates that are produced by a complex survey design such as the Add Health Study in relationship to a simple random sample is called a design effect (Hosmer & Lemeshow, 2000). A design effect reflects the inflation in variance that may occur when responses to an item on a survey are similar because the participants who are surveyed are from the same cluster, or primary sampling unit, and are anticipated to have comparable characteristics (Hosmer & Lemeshow, 2000). With respect to the Add Health Study, adolescent females from the same school are expected to be alike in their responses. This creates a bias in the results of any analysis using the Add Health Study. In order to correctly compute variances and point estimates in this study, the design effects inherent in the Add Health sampling design must be taken into consideration. This is accomplished by conducting the analysis in this study using a cluster variable, stratification variable, and sampling weight variable (Chantala & Tabor, 1999; Tourangeau & Shin, 1999; Chantala, 2001; Bearman et. al., 1997).

## **Data Collection**

Adolescents attending the 132 schools in the Add Health Study were eligible for participation in four surveys: the In-School Questionnaire (1994-1995), the Wave I In-Home Questionnaire (1995), the Wave II In-Home Questionnaire (1996), and the Wave III In-Home Questionnaire (2002) (Chantala & Tabor, 1999). Approximately 83,135 adolescents participated in the In-School Questionnaire (Chantala & Tabor, 1999). Adolescents who participated in the In-School Questionnaire were then selected from school rosters to participate in the In-Home data collection phase of the Add Health Study (Chantala & Tabor, 1999). Approximately 18,924 adolescents participated in the Wave I In-Home Questionnaire in 1995, 13,570 adolescents participated in the Wave II In-Home Questionnaire in 1996, and 15,197 of the original respondents from Wave I participated in the Wave III In-Home Questionnaire from August 2001 to April 2002 (Chantala & Tabor, 1999; Bearman et al., 1997).

The Wave I, Wave II and Wave III In-Home interviews took approximately two hours and were conducted by a trained interviewer. All data were recorded on laptop computers using an audio computer-assisted self-interviewing technique (Bearman, et al., 1997). Prior to the administration of the In-Home Questionnaire each adolescent was given the Peabody Picture and Vocabulary Test in order to ensure comprehension of the questionnaire. The interviewer read questions aloud for less sensitive topics. For more sensitive topics the adolescent listened to pre-recorded questions through the use of earphones (Bearman et al., 1997).

### **Wave I, Wave II, and Wave III In-Home Questionnaire**

The components of the Wave I and Wave II In-Home Questionnaire are: 1) adolescents' health and risk behaviors, 2) individual psychosocial and genetic characteristics, 3) social cognitive development variables, 4) school characteristics, and 5) family factors (Resnick et al., 1997; Bearman et al., 1997). The Wave I and Wave II In-Home Questionnaires include individual measurement items and scales based on standard and validated instruments (Resnick et al., 1997; Bearman et al., 1997; Sieving et al., 2000) as well as measurement instruments used in other national and state surveys of adolescents such as the YRBS (Bearman et al., 1997). For example the CES-D depression scale and Rosenberg's self-esteem scale used in this study are well-established measurements for depression and self-esteem

(Radloff, 1997; Rosenberg, 1965). The connectedness measures in this study are based on resiliency research (Resnick et al., 1997; Bearman et al., 1997; Sieving et al., 2000). Other measures such as questions related to alcohol use and onset of sexual intercourse are standard behavior questions used in other national surveys such as the Youth Risk Behavior Survey (YRBS) (Bearman et al., 1997).

The Wave III In-Home Questionnaire is designed differently from the Wave I and Wave II In-Home Questionnaires in order to obtain data on adolescents as they transition into young adulthood. The Wave III In-Home Questionnaire includes data on health status, disease processes, marital relationships, childbearing, education and work force events. The measurement in this study from the Wave III In-Home Questionnaire is a question regarding engagement in sexual intercourse used in national surveys such as the YRBS and the National Survey of Family Growth (NSFG) (Bearman et al., 1997).

## **Measures**

The dependent and independent variables in this study are outlined below.

### **Dependent Variables**

**Perceptions of Sex.** Perceptions of sex are measured using a 5-point Likert scale from strongly agree to strongly disagree (Resnick et al., 1997). The scale has a reported Cronbach's alpha of .70, indicating internal consistency (Resnick et al., 1997). The seven items on the scale include questions on the following topics: 1) having sexual intercourse would make me more attractive to others; 2) having sexual intercourse would make me feel less lonely; 3) having sexual intercourse would make me feel guilty; 4) having sexual intercourse would upset my mother; 5) having sexual intercourse would cause my partner to lose respect for me; 6) having sexual intercourse would give me physical pleasure; and 7) having sexual intercourse would gain me more respect among my peers (Resnick et al., 1997; Bearman et al., 1997).

In order to use the perceptions of sex scale in this analysis, the 7 item scale is reverse-coded from 1=strongly agree to 5=strongly disagree to 1=strongly disagree to 5=strongly agree so that higher scores on the perceptions of sex scale relate to high levels of perceived benefits to engagement in sexual intercourse. Responses to the 7 item scale are averaged into a single index and then collapsed into one

unit categories from 1 = strongly disagree to 5 = strongly agree<sup>2</sup>. Because of thin cell counts in the strongly disagree and strongly agree categories the responses are collapsed into three categories: 1=disagree, 2=neutral and 3=agree (Tabachnick & Fidell, 1996; DeMaris & Rao, 1993; Agresti & Finlay, 1997).

The perceptions of sex response categories of disagree, neutral and agree are classified into three categories of sexual perception (Bruckner et. al., 2004; Rotosky, et. al., 2003). Adolescent females who disagree that there are benefits to engagement in sexual intercourse are classified as having negative perceptions of sex (negative). Adolescent females who have neutral perceptions of the benefits of sexual activity, meaning that they neither agree nor disagree, are classified as having ambivalent perceptions of engagement in sexual intercourse (ambivalent). Adolescent females who agree that there are benefits to sexual intercourse are classified as having positive perceptions of sex (positive). The perception of sex scale is used as a dependent variable in order to examine the factors that influence adolescent females' perceptions of sex among the Wave I and Wave II sample and as an independent variable to examine onset of sexual intercourse at Wave I, Wave II and Wave III.

**Engagement in Sexual Activity.** For Wave I and Wave II, engagement in sexual activity is measured using the following item: Have you ever had sexual intercourse? For Wave III engagement in sexual activity is measured using the following items: 1) Have you ever had vaginal intercourse? The engagement in sexual activity item is used as an independent variable in the Wave I and Wave II analysis in order to determine how an adolescent female's experience of sexual intercourse influences her perceptions of sex and as a dependent variable in order to determine onset of sexual intercourse at Waves I, II, and III (Bearman et. al., 1997).

### **Independent Variables**

**Age.** Age is determined by date of birth.

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<sup>2</sup> All of the scales used in this study with the expectation of the CES-D scale are organized in a similar manner. The scales are reverse coded so that higher scores on the scales represent higher levels of agreement ( 1 = strongly disagree, 2 = disagree, 3= neutral, 4 = agree, 5 = strongly agree). The scales are then averaged into a continuous single index such as 1.1, 1.2, 1.3 etc. and collapsed into one unit categories such as 1.0, 2.0, 3.0 etc. The scales are then further collapsed due to thin cell counts in the strongly disagree and strongly agree categories for a final measurement of 1= disagree, 2=neutral, and 3=agree.

**Race.** The Add Health principal investigators did not originally clarify the Wave I race variables (Personal communication with Joyce Tabor, Add Health Data Manager, 2/04). Respondents are not asked questions related to race in Wave II, and in Wave III the race categories are different from those asked in Wave I. Therefore race is coded 1= Non-White, 0 = White for use in this analysis.

**Depression.** Depression in the Add Health Study is measured using the Center for Epidemiologic Studies-Depression Scale (CES-D) (Resnick et al., 1997; Bearman et al., 1997). The CES-D is a 20 item scale developed to measure depressive symptomatology in the general population (Radloff, 1997). A 19 item modified scale of the CES-D is used in the Add Health study with a reported Cronbach's alpha of .87, indicating high internal consistency in the CES-D (Resnick et al., 1997; Goodman & Capitman, 2000). The total CES-D scores represent a summation of the 19 items with a range of 0 (no depressive symptoms) to 60 (most frequent/severe depressive symptoms) (Rushton, 2002). A cut off score of 24 is used to determine depression in the adolescent females participating in Wave I and Wave II of the Add Health Study<sup>3</sup> (Roberts et al., 1991; Rushton et al., 2002; Goodman & Capitman, 2000; Resnick et al., 1997; Bearman et al., 1997). In the present study, a new variable is made with a cut off score of 24 to determine depression in adolescent females. The new depression variable is coded 0= not depressed, 1= depressed.

**Self-Esteem.** The 10 items in the self-esteem scale are: 1) You are well coordinated; 2) You have a lot of good qualities; 3) You are physically fit; 4) You have a lot to be proud of; 5) You like yourself just the way you are; 6) You feel like you are doing everything just right; 7) You feel socially accepted; 8) You feel loved and wanted; 9) You seldom get sick; and 10) You have a lot of energy (Rosenberg, 1989). The items in the scale are based on a 5-point Likert scale from strongly disagree to strongly agree. The scale has reported Cronbach's alpha of .86 indicating strong internal consistency (Resnick et al, 1997). For the purposes of this analysis the items in the scale are recoded so that higher scores on the self-esteem scale correlated to higher levels of self-esteem. The self-esteem scale is averaged into a single index and collapsed into one unit categories from 1 = strongly disagree to 5 =

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<sup>3</sup> Roberts et al., (1991) conduct receiver operating characteristics analysis as well as internal consistency-reliability and sensitivity and specificity testing on the CES-D to make comparisons between detecting major depression in adults and adolescents. Their research identifies the need to set different case criteria for detecting depression in adolescent males and females as well as for adults when using the CES-D.

strongly agree. The scale is then collapsed into three categories (1=disagree, 2=neutral, and 3=agree) because of low cell counts in the strongly disagree and strongly agree categories (Tabachnick & Fidell, 1996; Hosmer & Lemeshow, 2000; Agresti & Finlay, 1997). The disagree category corresponds to adolescent females who perceive they have low esteem. The neutral category corresponds to adolescent females who perceive they have medium level of self-esteem. The agree category corresponds to adolescent females who perceive that they have a high level of self-esteem (Rosenberg, 1989; Young et al., 1999; Spencer et. al., 2002; Longmore, et. al. 2004;).

**Religiosity.** Religiosity is measured using a single item: "How important is religion to you?". The religion item is measured on a 4 point Likert scale from 1=very important to 4= not important at all. The religiosity item is reverse-coded so a higher score reflect greater religiosity. The religiosity scale is collapsed into three categories (1=not very important, 2= fairly unimportant and 3= important) because of thin cells in the very important and fairly important categories (Tabachnick & Fidell, 1996; Hosmer & Lemeshow, 2000).

**Alcohol Use.** Alcohol use is measured using one item, " Over the past 12 months how many days did you drink five or more drinks in a row?" Responses range from 1=every day to 7=never. These responses are reverse coded (1=never to 7=everyday) so that higher scores on the alcohol use item reflect higher levels of alcohol consumption.

**Mother Connectedness.** The mother connectedness scale is a 5 point Likert scale from 1= strongly agree to 5= strongly disagree and includes 5 questions: 1) Your mother is warm and loving towards you; 2) Your mother encourages your independence; 3) Your mother discusses ethics with you; 4) You and your mother have good communication; and 5) You and your mother have a good relationship. The Cronbach's alpha for the mother connectedness scale is .98 indicating that the scale is a reliable measure of mother connectedness. Multicollienarity was found between the questions related to good communication and having a good relationship with your mother ( $r = .9132$ ). However this item is retained in the analysis because prior research using the Add Health mother connectedness scale includes these items, and in order to build on existing research this item is included in the analysis. In addition, it cannot be assumed that having good communication with one's mother indicates that an adolescent has an overall good relationship with her mother (Resnick et al., 1997; Dittus & Jaccard,

2000; Sieving et al., 2001; Huebner & Howell, 2003). For the purposes of this analysis the items in the scale are recoded so that higher scores on the mother connectedness scale correlated to higher levels of mother connectedness. The mother connectedness scale is averaged into a single index and collapsed into the one-unit categories from 1 = strongly disagree to 5 = strongly agree. The mother connectedness scale is then collapsed into three categories (1=disagree, 2=neutral, and 3=agree) because of thin cells in the strongly disagree and strongly agree categories (Tabachnick & Fidell, 1996; DeMaris & Rao, 1993; Agresti & Finlay, 1997).

**Father Connectedness.** The father connectedness scale is measured using a 5 point Likert scale from 1 = strongly agree to 5 = strongly disagree and includes 3 questions: 1) Your father is warm and loving to you; 2) You and your father have good communication; and 3) You and your father have a good relationship. The Cronbach's alpha for the father connectedness scale is .99 indicating high internal consistency. However, multicollinearity was found in the three items in the scale with correlations among the items being .9552, .9648 and .9774, respectively. This demonstrates that the scale is highly redundant. For the purpose of this analysis two of the items in the father connectedness scale are dropped and only one item (You and your father have a good relationship) measures connectedness to father in this study. This item is selected because it is an overall measure of the adolescent female's connectedness to her father, and is based on research conducted on adolescent females' perceptions of their relationships with their fathers (Whitbeck et. al. 1992; Whitbeck et. al, 1993; Whitbeck et. al., 1999). For the purposes of this analysis the father connectedness variable is recoded so that higher scores correlated to higher levels of father connectedness. The father connectedness item is collapsed into three categories (1=disagree, 2=neutral, and 3=agree) because of thin cells in the strongly disagree and strongly agree categories (Tabachnick & Fidell, 1996; DeMaris & Rao, 1993; Agresti & Finlay, 1997).

**Peer Connectedness.** Peer connectedness is measured using a single item: "Do your friends care about you?" The item is coded 1= not at all to 5= very important. The peer scale is collapsed into three categories (1=very little, 2= somewhat and 3= quite a bit) because of low cell counts in the very much and not at all categories (Tabachnick & Fidell, 1996; Hosmer & Lemeshow, 2000; Agresti & Finlay, 1997).

**School Connectedness.** School connectedness is measured using a 6-item scale and has a reported Cronbach's alpha of .79 indicating high internal consistency in the school connectedness scale (Resnick et al., 1997). The questions in the school connectedness scale are: 1) I feel close to the people at school; 2) I feel a part of school; 3) Students at my school are prejudiced; 4) I am happy at school; 5) Teachers treat students fairly at school; and 6) I feel safe at school. The scale is reverse coded so a higher score reflects greater connectedness to school (1 = strongly disagree to 5 = strongly agree). Responses to the school connectedness scale are averaged into a single index and collapsed into one unit categories from 1=strongly disagree to 5=strongly agree. Because of low cell counts in the strongly agree and strongly disagree categories, the scale is collapsed to 1= disagree, 2= neutral and 3= agree (Tabachnick & Fidell, 1996; DeMaris & Rao, 1993; McNeely et al., 2001; Agresti & Finlay, 1997).

### **Data Management**

The variables of interest from the Wave I, Wave II, and Wave III Add Health data sets are merged using an identifier variable for each respondent in this study with a weight data set that includes a region variable, primary sampling unit variable, and weight variable in order to create a panel data set that is used in this analysis (Chantala & Tabor, 1999). A subpopulation of adolescent females who answered questions related to their perceptions of sex is used to correctly compute the point estimates and variances in this analysis. (Chantala & Tabor, 1999; Personal Communication - Kim Chantala, 6/04). Refusal and "don't know" answers consist of less than 2.0% of the data used in this analysis. Legitimate skips range from 0.0% to 50.0% depending on the variable. Missing data is minimal (0.39%) and dropped from the analysis.

### **Statistical Analysis**

Univariate and multivariate statistical techniques are used in this analysis. Chi-square tests are conducted on the nominal and ordinal variables in this study to assess differences between depressed and non-depressed adolescent females. Multinomial logistic regression is used to examine adolescent females' positive, ambivalent and negative perceptions of sex. In the multinomial regression models, the base category is set as negative in order to make comparisons with prior research, which indicates

that adolescent females' perceptions of sex are, predominately, negative (Gillmore et. al., 2002; Cornell & Halpern-Fischer, 2005; Rostosky et. al, 2003). Since engagement in sexual intercourse is a dichotomous variable, logistic regression is used to examine the extent that perceptions of sexual activity influence engagement in sexual intercourse among adolescent females as they transition from adolescence into young adulthood. Interaction effects are presented in the logistic regression models to assess the extent to which the independent variables influence adolescent females' perception of sex and onset of sexual intercourse as a result of depression. Post estimation analyses are conducted on all the models in this study. Categorical variables and interaction effects examined in the regression models are coded into a series of dummy variables with the lowest unit of analysis as the reference category. Significance levels are set at  $p < 0.05$ ,  $p < 0.01$  and  $p < 0.001$ . Stata Version 8.2 is used to perform the analyses.

### **Interpretation of Results**

In this study odds ratios and interaction effects are reported. Odds are the ratio of the probability that an event will occur to the probability that it will not occur. An odds ratio is the ratio of two odds. An odds ratio measures the change in odds that an event will occur for every unit change in a given variable. The interpretation of an odds ratio is: 1) An odds ratio greater than one indicates that for every one unit increase in the independent variable, the dependent variable is more likely to occur than if the independent variable remained unchanged, holding all other variables in the model constant; and 2) An odds ratio less than one indicates that for every one unit increase in the independent variable, the dependent variable is less likely to occur than if the independent variable remained unchanged, holding all other variables in the model constant (Hosmer & Lemeshow, 2001; Tabachnick & Fidell, 1996). An interaction effect is the influence of an independent variable on the dependent variable as a result of third variable (Jaccard, 2001). In this study the third variable is depression. Depression is examined to determine the extent to which it influences intrapersonal and interpersonal ecological factors to impact an adolescent female's perception of sex and her engagement in sexual intercourse.

### **Sample Size and Power**

Data in this study are drawn from Wave I (1995), Wave II (1996) and Wave III (2002) of the Add Health data set. The response rates for the three waves of the Add Study are: Wave I – 78.9%, Wave II – 88.2%, and Wave III – 77.4%. In total, 5,736 adolescent females participated in the three waves of the Add Health Study.

The adolescent females who are asked questions related to perceptions of sex vary at each wave of the Add Health Study depending on age and marital status. For example, at Wave I adolescent females who are 15 years and older and not married are asked questions related to their perception of sex and engagement in sexual intercourse. At Wave II all the adolescent females, except those that are married, are asked questions related to their sexual perceptions and engagement in sexual intercourse. At Wave III perceptions of sex questions are not included in the Add Health Survey, but questions related to sexual intercourse are asked of the Wave III females.

For this reason, two samples are examined in this study. The first sample includes 3,644 adolescent females who are asked questions related to their perceptions of sex at Wave I and onset of sexual intercourse at Wave I, Wave II and Wave III of the Add Health Study. In the Wave I sample, approximately 10.7% (390) report being depressed. The second sample consists of 5,531 adolescent females who are asked questions related to their perceptions of sex at Wave II and onset of sexual intercourse at Wave II and Wave III. Approximately 10.0% (551) report being depressed at Wave II. The estimated power for the two-sample comparison between depressed and non-depressed adolescent females for both the Wave I and Wave II samples is 1.00 with the alpha level set at 0.05. This indicates a high probability that reliable differences among the Wave I and Wave II adolescent females are detectable when differences truly exist.

## CHAPTER IV: RESULTS

### Introduction

The results of this analysis are presented in two sections. Section I presents the results for the Wave I sample. Section II presents the results for the Wave II sample. The sections in this chapter are organized as follows: 1) A brief overview of the sample; 2) Research hypotheses 1 and 4 examine the differences in intrapersonal and interpersonal ecological factors between depressed and non-depressed adolescent females; 3) Research hypotheses 2 and 3, and 5 and 6 examine the extent to which intrapersonal and interpersonal ecological factors influence perceptions of sex; 3) Post estimation analysis of the multinomial logistic regression models examined in this study; 4) Research hypotheses 7 and 8 examine the extent to which perceptions of sex predict onset of sexual intercourse; and 5) Post estimation analysis of the logistic regression models examined in this study.

### *Section I*

#### **Overview – Wave I**

The Wave I sample consists of 3,644 adolescent females who are asked questions related to their perceptions of sex. The Wave I adolescent females are 15 to 19 years old. Ten percent of the females report being depressed and 90.0% of the females report being non-depressed. Approximately 72.4% of the sample is white and 26.6% of the sample is non-white. In addition, 44.8% of the sample has had sexual intercourse and 55.2% of the sample that has not previously had sexual intercourse.

#### **Research Hypothesis #1 – Wave I**

**Ho1: There is no significant difference between depressed and non-depressed adolescent females in relation to age, race, self-esteem, sexual intercourse, religiosity, alcohol use, and perceptions of sex.**

**Ha1: There is a significant difference between depressed and non-depressed adolescent females in relation to age, race, self-esteem, sexual intercourse, religiosity, alcohol use, and perceptions of sex.**

**Age.** There is no statistically significant difference in age between depressed and non-depressed adolescent females (Table 1). The majority (65.0%) of the Wave I adolescent females who answer questions related to perceptions of sex are 16 to 17 years old.

**Race.** There is a statistically significant difference in race between depressed and non-depressed adolescent females (Table 1). Thirty-three percent of the depressed adolescent females are non-white in comparison to 27.0% of the non-depressed adolescent females. These results suggest that a greater percentage of depressed adolescent females are from non-White racial groups than non-depressed adolescent females.

**Self-Esteem.** There is a statistically significant difference in self-esteem between depressed and non-depressed adolescent females (Table 1). Approximately 20.1% of the depressed adolescent females report low levels of self-esteem in comparison to 4.4% of the non-depressed adolescent females. These results indicate that depressed adolescent females have lower levels of self-esteem than non-depressed adolescent females. What is interesting to note here, however, is that 49.8% of the sample report a medium level of self-esteem, indicating that regardless of whether or not an adolescent female is depressed the majority of adolescent females are uncertain about their self-worth.

**Sexual Intercourse.** There is a statistically significant difference in sexual intercourse between depressed and non-depressed adolescent females (Table 1). Approximately 59.0% of the depressed adolescent females have engaged in sexual intercourse in comparison to 43.1% of the non-depressed adolescent females. These results suggest that depressed adolescent females ages 15 to 19 transition into sexual intercourse earlier than 15 to 19 year old non-depressed adolescent females.

**Religiosity.** There is no statistically significant difference in religiosity between depressed and non-depressed adolescent females (Table 1). Fifty-three percent of the depressed adolescent females and 49.0% non-depressed adolescent females agree that their concept of a God is very important to them, indicating similar levels of the religiosity in the lives of depressed and non-depressed adolescent females.

**Alcohol Use.** There is a statistically significant difference in alcohol use between depressed and non-depressed adolescent females (Table 1). Sixty-four percent of the depressed adolescent females report drinking alcohol in comparison to 53.0% of the non-depressed adolescent females. The largest

difference is seen between the depressed and non-depressed adolescent females' alcohol use in the daily use category with 4.5% of the depressed adolescent females reporting drinking every day in comparison to less than 1.0% (0.83%) of the non-depressed adolescent females. These results suggest that depressed adolescent females drink alcohol more frequently than non-depressed adolescent females. However, it should be noted that overall 45.7% of the total sample have no experience with alcohol use, indicating that alcohol use is not necessarily a common behavior among 15 to 19 year old adolescent females.

**Perceptions of Sex.** There are statistically significant differences in perceptions of sex between depressed and non-depressed adolescent females (Table 1). Approximately 57.1% of the depressed adolescent females and 57.0% non-depressed adolescent females have negative perceptions of sex. Thirty-nine percent of the depressed adolescent females and 41.3% of the non-depressed adolescent females have ambivalent perceptions of sex. Four percent of the depressed adolescent females have positive perceptions of sex in contrast to only 1.6% of the non-depressed adolescent females. These results indicate that the majority of the adolescent females who are 15 to 19 years old have negative or ambivalent perceptions of sex.

**Table 1. Wave I – Chi Square Test Results for Intrapersonal Ecological Factors**

Independent Variable	Adolescent Females	Depressed	Non-depressed	$\chi^2(df)^4$
Age				
15	522(16.4%)	56(18.7%)	466(16.2%)	36.8(4)
16	1,194(33.7%)	109(26.7%)	1,085(34.6%)	
17	1,235(31.6%)	134(32.5%)	1,101(31.5%)	
18	563(14.3%)	69(18.3%)	494(14.4%)	
19	130(4.0%)	22(3.8%)	108(3.3%)	
N	3,644(100%)	390(100%)	3,254(100%)	
Race				
Non-White	1,445(26.6%)	188(33.4%)	1,257(26.9%)	21.7(1)*
White	2,195(72.4%)	201(66.6%)	1,994(73.1%)	
N	3,640(100%)	389(100%)	3,251(100%)	
Self-Esteem				
Low	199(6.1%)	68(20.1%)	131(4.4%)	556.7(2)***
Medium	1,810(49.8%)	225(57.0%)	1,585(48.9%)	
High	1,634(44.1%)	97(22.9%)	1,537(46.7%)	
N	3,643(100%)	390(100%)	3,253(100%)	
Ever Sex				
Yes	1,590(44.8%)	240(59.1%)	1,350(43.1%)	104.7(2)***
No	2,045(55.2%)	149(40.9%)	1,896(56.9%)	
N	3,635(100%)	389(100%)	3,246(100%)	
Religiosity				
Not Important	292(10.8%)	29(11.0%)	263(10.7%)	8.4(2)
Fairly Unimportant	1,271(39.9%)	124(35.6%)	1,147(40.3%)	
Important	1,638(49.3%)	181(53.4%)	1,457(49.0%)	
N	3,201(100%)	334(100%)	2,867(100%)	
Alcohol Use				
Never	939(45.7%)	93(35.5%)	846(47.2%)	91.0(6)**
1-2 days	392(22.4%)	56(23.0%)	336(22.3%)	
Once a month	243(13.6%)	38(16.9%)	205(13.2%)	
2-3 days a month	165(8.9%)	25(8.1%)	140(9.0%)	
1-2 days a week	99(5.5%)	22(8.9%)	77(5.1%)	
3-5 days a week	40(2.5%)	8(3.0%)	32(2.5%)	
Everyday	20(1.3%)	7(4.5%)	13(0.83%)	
N	1,898(100%)	249(100%)	1,649(100%)	
Perceptions of Sex				
Negative	2,040(57.0%)	221(57.0%)	1,819(57.1%)	26.3(2)*
Ambivalent	1,526(41.1%)	154(39.0%)	1,372(41.3%)	
Positive	78(1.9%)	15(4.0%)	63(1.6%)	
N	3,644(100%)	390(100%)	3,254(100%)	

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ 

<sup>4</sup> The chi-square statistic and degrees of freedom are presented for the depressed and non-depressed adolescent females.

#### **Research Hypothesis #4 – Wave I**

**Ho4:** There is no significant difference between depressed and non-depressed adolescent females in relation to mother connectedness, father connectedness, peer connectedness and school connectedness.

**Ha4:** There is a significant difference between depressed and non-depressed adolescent females in relation to mother connectedness, father connectedness, peer connectedness and school connectedness.

**Mother Connectedness.** There is a statistically significant difference in mother connectedness between depressed and non-depressed adolescent females (Table 2). Eighteen percent of the depressed adolescent females report that they do not feel a connection to their mothers in contrast to 8.0% of the non-depressed adolescent females. In addition, 55.3% of the depressed adolescent females report that they are connected to their mothers in comparison to almost 71.3% of the non-depressed adolescent females. While these results indicate that depressed adolescent females feel less of a connection to their mothers in comparison to non-depressed adolescent females, overall the majority of the adolescent females perceive that they have a strong connection to their mothers.

**Father Connectedness.** There is a statistically significant difference in father connectedness between depressed and non-depressed adolescent females (Table 2). Approximately 25.4% of the depressed adolescent females report that they do not feel connected to their fathers in comparison to 12.7% of the non-depressed adolescent females. Almost 63.0% of the depressed adolescent females report that they have a connection to their father in comparison to almost 76.9% of the non-depressed adolescent females who report that they feel a connection to their father. While these results indicate that depressed adolescent females feel less of a connection to their fathers in comparison to non-depressed adolescent females, overall the majority of the depressed and non-depressed adolescent females have a strong connection to their fathers.

**Peer Connectedness.** There is a statistically significant difference in peer connectedness between depressed and non-depressed adolescent females (Table 2). Approximately 4.5% of the depressed adolescent females report that they do not feel connected to their peers in comparison to 1.8% of the non-depressed adolescent females. While overall, depressed adolescent females feel they are less

connected to their peers than the non-depressed adolescent females, almost 84.0% of the depressed females agree that they have a strong connection with their peers compared to 90.0% of the non-depressed adolescent females.

**School Connectedness.** There is a statistically significant difference in school connectedness between depressed and non-depressed adolescent females. Thirty-three percent of the depressed adolescent females report that they do not feel connected to their school in contrast to 13.5% of the non-depressed adolescent females. Only 18.6% of the depressed adolescent females report that they have a connection to school in comparison to almost 31.0% of the non-depressed adolescent females. While these results indicate that depressed adolescent females feel less connected to their school environment in comparison to the non-depressed adolescent females, the majority of the adolescent females have neutral feelings regarding their connection to their school environment.

**Table 2: Chi-Square Test Results for Intrapersonal Ecological Factors**

Independent Variables	Adolescent Females	Depressed	Non-Depressed	$\chi^2(df)$
<b>Mother Connectedness</b>				
Disagree	299 (9.0%)	76(18.2%)	223(8.0%)	156.9(2)***
Neutral	762(21.3%)	97(26.5%)	665(20.7%)	
Agree	2,403(69.7%)	188 55.3%)	2,215(71.3%)	
N	3,464(100%)	361(100%)	3,103(100%)	
<b>Father Connectedness</b>				
Disagree	387(13.9%)	67(25.4%)	320(12.7%)	93.7(2)***
Neutral	303(10.5%)	43(11.9%)	260(10.4%)	
Agree	1,909(75.6%)	131(62.6%)	1,778(76.9%)	
N	2,599(100%)	241(100%)	2,358(100%)	
<b>Peer Connectedness</b>				
Disagree	83(2.1%)	18(4.5%)	65(1.8%)	44.3(2)*
Neutral	377(9.3%)	59(11.6%)	318(9.0%)	
Agree	3,172(88.6%)	310(83.9%)	2,862(89.2%)	
N	3,632(100%)	387(100%)	3,245(100%)	
<b>School Connectedness</b>				
Disagree	508(15.5%)	108(32.5%)	400(13.5%)	283.4(2)***
Neutral	2,044(55.1%)	197(48.8%)	1,847(55.8%)	
Agree	1,007(29.4%)	64(18.6%)	943(30.6%)	
N	3,559(100%)	369(100%)	3,109(100%)	

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### **Multinomial Logistic Regression – Wave I**

Multinomial logistic regression is used to examine the extent to which intrapersonal and interpersonal ecological factors influence adolescent females' sexual perceptions. Negative perceptions of sex is set as the base category in the multinomial logistic regression models to make comparisons with previously established research studies which demonstrate that the adolescent females have negative attitudes towards sex (Gillmore et. al., 2002; Cornell & Halpern-Fischer, 2005; Rostosky et. al, 2003). Model One makes comparisons between negative perceptions of sex and ambivalent perceptions of sex (negative verses ambivalent). Model Two makes comparisons between negative perceptions of sex and positive perceptions of sex (negative verses positive). Interaction effects are presented in the multinomial logistic regression models to assess the extent to which depression impacts that influence of the independent variables on adolescent females' perception of sex. The interaction effects are: 1) depression x age; 2) depression x race; 3) depression x self-esteem; 4) depression x sex; 5) depression x religiosity; 6) depression x alcohol use; 7) depression x mother connectedness; 8) depression x father connectedness; 9) depression x peer connectedness; and 10) depression x school connectedness.

**Table 3: Multinomial Logistic Regression Analysis with Interaction Effects Associated with Perceptions of Sex – Wave I**

Independent Variables	Model One (Negative vs. Ambivalent)	Model Two (Negative vs. Positive)
	OR (95% CI)	OR(95% CI)
Age	.89(.80-.98)*	.92(.10-.1.2)
Race	1.1(.73-1.2)	1.8(.29-1.9)
Depression	1.2(.22-6.5)	.66(.01-54.0)
Self-Esteem		
Low (Reference)	1.0	1.0
Medium	.58(.32-.99)*	.38(.10-1.4)
High	.43(.25-.75)**	.17(.05-.60)**
Ever Sex	.63(.49-.80)	.40(.19-.97)*
Religiosity		
Unimportant (Reference)	1.0	1.0
Fairly Unimportant	.61(.41-.90)*	.48(.06-3.4)
Important	1.7(1.3-1.5)***	2.4(.97-6.3)
Alcohol Use	1.0(.99-1.0)	1.0(.99-1.0)
Mother Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.86(.60-1.2)	1.4(.29-6.7)
Agree	.99(.66-1.5)	.92(.25-3.3)
Father Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.3(.77-2.2)	1.0(.18-5.8)
Agree	1.3(.85-1.9)	1.0(.24-4.3)
Peer Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.49(.24-1.0)	.09(.01-.75)*
Agree	.50(.25-1.0)	.32(.07-1.4)
School Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.3(.97-1.7)	.70(.30-1.5)
Agree	1.2(.86-1.7)	.40(.14-1.2)
Depression x Age	1.4(1.1-1.9)*	2.4(1.3-4.5)**
Depression x Race	1.0(.56-1.8)	3.3(.56-19.7)
Depression x Self-Esteem		
Low (Reference)	1.0	1.0
Medium	1.1(.46-2.4)	.84(.08-8.7)
High	1.3(.44-4.0)	2.4(.34-17.4)
Depression x Sex	.69(.36-1.4)	.98(.22-4.3)
Depression x Religiosity		
Important (Reference)	1.0	--
Fairly Unimportant	.53(.21-1.3)	--
Important	.22(.07-.64)**	--
Depression x Alcohol	1.0(.99-1.0)	1.0(.99-1.0)
Depression x Mother Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.6(.59-4.6)	2.2(.07-72.5)
Agree	.86(.34-2.2)	1.5(.06-37.2)
Depression x Father Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.95(.29-3.2)	.07(.003-1.6)
Agree	.60(.22-.1.6)	.39(.05-2.7)
Depression x Peer Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	3.9(.51-29.9)	8.9(.15-533.9)
Agree	2.4(.40-14.6)	.82(.01-71.5)
Depression x School Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.1(.52-2.2)	.18(.02-1.6)
Agree	.59(.23-1.5)	1.6(.23-11.8)

Legend: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; --"N" to small for regression analysis

### **Research Hypothesis #2 – Wave I**

**Ho2: The extent to which age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use influence adolescent females' perceptions of sex is significant.**

**Ha2: The extent to which age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use influence adolescent females' perceptions of sex is not significant.**

#### **Model One (Negative vs. Ambivalent)**

This analysis reveals that there is a statistically significant relationship between age, self-esteem, sexual intercourse, religiosity and ambivalent attitudes towards sex (Model One) (Table 3). As age increases, adolescent females are less likely than at their current age to have ambivalent perceptions of sex. In addition, as self-esteem increases adolescent females are less likely than when their self-esteem is low to have ambivalent sexual perceptions. With respect to sexual intercourse, adolescent females are less likely to have ambivalent feelings about sex if they have had sexual intercourse than if they have not had sexual intercourse. As religiosity increases adolescent females are more likely to have ambivalent perceptions of sex than when religiosity is low. Race, depression, and alcohol use are not statistically significant in Model One.

#### **Model Two (Negative vs. Positive)**

In Model Two there is a statistically significant relationship between sexual intercourse, self-esteem and positive perceptions of sex (Table 3). As self-esteem increases adolescent females are less likely to have positive perceptions of sex than when self-esteem is low. Adolescent females who report having sexual intercourse are less likely to have positive perceptions of sex than those adolescent females who have not had sexual intercourse. Age, race, depression, religiosity and alcohol use are not statistically significant in Model Two.

The results from both Model One and Model Two suggest that age, self-esteem, religiosity and sexual intercourse are the most influential intrapersonal ecological factors in predicting adolescent females' perceptions of sex. In Model One as age and self-esteem increase adolescent females are less likely to have ambivalent perceptions of sex. Increased religiosity also results in more ambivalent attitudes towards sex. The experience of sexual intercourse, however, remains constant in Model One

and Model Two. This demonstrates that adolescent females consistently have a less approving attitude toward sex if they have had sexual intercourse. Furthermore, the confidence interval for sexual intercourse in Model One and Model Two suggests that the extent to which having sex influences perceptions of sex varies widely depending on the adolescent female.

### **Research Hypothesis #3 – Wave I**

**Ho3: The extent to which depression interacts with age, race, self-esteem, sexual intercourse, religiosity, and alcohol use to influence adolescent females' perceptions of sex is not significant.**

**Ha3: The extent to which depression interacts with age, race, self-esteem, sexual intercourse, religiosity, and alcohol use to influence adolescent females' perceptions of sex is significant.**

### **Model One (Negative verses Ambivalent)**

The Model One analysis reveals a statistically significant relationship in the extent to which depression interacts with age and religiosity to influence ambivalent attitudes towards sex (Table 3). As adolescent females with depression age, they are more likely than at their current age to have ambivalent perceptions of sex. In addition as religiosity increases adolescent females with depression are less likely to have ambivalent perceptions of sex than when religiosity is low. All other interaction terms for the intrapersonal ecological factors examined in Model One are not statistically significant.

### **Model Two (Negative verses Positive)**

In Model Two the interaction between depression and age is statistically significant, showing a continued influence from Model One between the effects of depression on the adolescent female's aging process and positive perceptions of sex (Table 3). As adolescent females mature they are more likely than at their current age to have positive perceptions of sex. No other interaction terms among the intrapersonal ecological factors demonstrate statistical significance in Model Two.

Based on the results from Model One and Model Two, depression in combination with maturation results in more positive perceptions of sex among adolescent females. In contrast depression in combination with increased religiosity results in less ambivalent perceptions of sex.

#### **Research Hypothesis #5 – Wave I**

**Ho5: The extent to which mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex is not significant.**

**Ha5: The extent to which mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex is significant.**

#### **Model One (Negative verses Ambivalent)**

The analysis of Model One indicates that there is no statistically significant relationship between mother connectedness, father connectedness, peer connectedness, and school connectedness and adolescent females' ambivalent perceptions of sex.

#### **Model Two (Negative verses Positive)**

The analysis of Model Two shows a statistically significant relationship between peer connectedness and adolescent females' positive perceptions of sex (Table 3). Adolescent females with stronger connections to their peers are less likely to be positive in their perceptions of sex than adolescent females with weaker connections to their peers. Also similar to Model One, in Model Two there is no statistically significant relationship in the extent to which mother connectedness, father connectedness and school connectedness influence sexual attitudes.

The results of Model One and Model Two indicate that within the adolescent female's social ecology it is a connection to one's peers that influences her less positive perceptions of sex in comparison to other interpersonal ecological factors, such as connection to one's mother, father or school environment.

### **Research Hypothesis #6 – Wave I**

**Ho6: The extent to which depression interacts with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perceptions of sex is not significant.**

**Ha6: There is a statistically significant relationship in the extent to which depression interacts with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perceptions of sex is significant.**

#### **Model One (Negative verses Ambivalent)**

The Model One analysis reveals that there is no statistically significant in the extent to which depression interacts with the interpersonal ecological factors in an adolescent female's life.

#### **Model Two (Negative verses Positive)**

In Model Two there is no statistically significant relationship in the extent to which depression interacts with the interpersonal ecological factors present in an adolescent female's life.

The results for Model One and Model Two demonstrate that adolescent female's perceptions of sex are not influenced by her social relationships if the adolescent female reports having depression.

### **Post-Estimation Analysis – Wave I Multinomial Logistic Regression**

Post-estimation analyses are conducted for the multinomial logistic regression model in this study in order to determine the extent to which the independent variables examined in the multinomial logistic regression models predict perceptions of sex. Coefficient estimates are assessed using the Wald test, a test of the hypothesis that all of the independent variables in the multinomial logistic regression model are simultaneously equal to zero. McFadden's  $R^2$  and Bayesian information criterion (BIC) are measures of fit tests used to determine the goodness of fit for the multinomial logistic regression model. Comparisons are made between a full model, which includes the interaction effects and a constraint model, which does not include the interaction effects. In addition the Test of Independent Irrelevant Alternatives is used to examine the extent to which inclusion or exclusion of the perceptions of sex categories determines which category is selected (Long & Freese, 2003). The base category in the multinomial logistic regression models is set at negative for all post estimation analysis.

## Wald Test

Table 4 presents the Wald test results for the full and constraint models. The Wald tests of the full models with the interaction effects for the negative vs. ambivalent model and the negative vs. agree model are statistically significant. The Wald tests of the constraint models without interaction effects for the negative vs. ambivalent model and the negative vs. agree model are also statistically significant. These results indicate that the independent variables in the full models and the constraint models reliably predict adolescent females' perceptions of sex.

**Table 4: Wald Test – Wave I Multinomial Logistic Regression**

Wald Test	$\chi^2(df)$
Full Model	
Negative vs. Ambivalent	133.6(21)***
Negative vs. Positive	143.3(21)***
Constraint Model	
Negative vs. Ambivalent	80.7(11)***
Negative vs. Positive	71.0(11)***

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

## Measures of Fit

Table 5 presents the results for McFadden's  $R^2$  and Bayesian information criterion (BIC). The results of McFadden's  $R^2$  test indicate that the independent variables in full model and the constraint model are reliable predictors of perceptions of sex among adolescent females. However, the more negative BIC in the constraint model indicates that the model without interaction effects is a better fit than the model that includes the interaction effects (Long & Freese, 2003). Thus, while the results of the Wald tests for the full and constraint models indicate that the independent variables in the multinomial logistic regression models can predict perceptions of sex, the results from the measure of fit tests suggest that the constraint models without inclusion of the interaction terms provide a better fit to the data than the fully interactive models. These findings are consistent with the results of the multinomial logistic regression analysis in which the independent variables without interactions with depression provide more insight into the intrapersonal and interpersonal ecological factors that influence adolescent females' perceptions of sex than the independent variables with depression interactions.

**Table 5: Measures of Fit – Wave I Multinomial Logistic Regression Model**

Multinomial Logistic Regression Model	$\chi^2(df)$	McFadden's R <sup>2</sup>	BIC
Full Model	394.5(42)	0.042*	110.9
Constraint Model	154.2(22)	0.035*	-12.9

Legend: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

### **Test of Independence of Irrelevant Alternatives**

The test of independence of irrelevant alternatives (IIA) for the Wave I multinomial logistic regression model reveals inconsistent results. The test of IIA, developed by McFadden (1974), is used to determine whether or not the inclusion or exclusion of the negative, ambivalent and positive categories in the perceptions of sex scale affect the relevance of which of the outcome categories are selected. The assumption of the IIA is that the likelihood of selecting an outcome category does not depend on the other outcome categories that are available as alternative selections in the model. For example, the possibility of an adolescent female preferring the ambivalent perception of sex category instead of the negative perception of sex category does not depend on her having the positive perception of sex category as an option.

Table 6 presents the results of the multinomial logistic regression model testing using two tests of IIA, Hausman test of IIA (1984) and Small and Hsiao test of IIA (1985). The Hausman test of IIA indicates that the inclusion or exclusion of the ambivalent and negative perceptions of sex categories does not affect an adolescent female's chances of selecting either of these sexual perception categories when the base category is set at negative in the model. The Small and Hsiao test of IIA shows slightly different results, demonstrating that when the base category is set at negative it is relevant that there is an ambivalent perception of sex category available in the model as an alternative choice for adolescent females. This implies that sexual ambivalence is a meaningfully distinct category to consider when examining adolescent females' perceptions of sex.

Previous research indicates that tests of IIA are most useful when the outcome categories are clearly different from each other; otherwise they generate inconsistent results and do not assist in interpreting the relevance of multinomial logistic regression models (Agresti, 2002; Long & Freese, 2003). Among the Wave I sample the perceptions of sex categories are: 57.0% negative, 41.1% ambivalent, and 1.9% positive. When comparing the perception of sex categories using the Small and

Hsiao test the similar frequencies in the negative and ambivalent perceptions of sex categories may make it difficult to statistically compute differences between the two categories; thereby confirming the view that tests of IIA are not effective when categories appear similar to each other (Long & Freese, 2003).

**Table 6: Test of Independence of Irrelevant Alternatives**

Test of IIA	$\chi^2(df)$	Evidence
Hausman Test of IIA		
Ambivalent	-8.7(23)	For Ho
Positive	1.5(22)	For Ho
Negative	-6.7(22)	For Ho
Small and Hsiao Test of IIA		
Ambivalent	39.7(23)*	Against Ho
Positive	13.8(23)	For Ho

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### Logistic Regression Models – Wave I

Waves I, II and III of the Add Health Study are used to determine the extent to which perceptions of sex predict onset of sexual intercourse among the Wave I adolescent females as they transition through adolescence into young adulthood. The dependent variable is engagement in sexual intercourse. The primary independent variable of interest is adolescent females' perceptions of sex. Other independent variables included in the analysis are age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness. The interaction effects included in the analysis are: 1) depression x age, 2) depression x race, 3) depression x self-esteem, 4) depression x religiosity, 5) depression x alcohol use, 6) depression x the perceptions of sex, 7) depression x mother connectedness, 8) depression x father connectedness, 9) depression x peer connectedness, and 10) depression x school connectedness. Logistic regression is used in this analysis to determine the extent to which females' perceptions of sex predict onset of sexual intercourse as they transition from adolescence into young adulthood. Table 7 presents the three logistic regression models used in the analysis of the Wave I adolescent females. The logistic regression models are described below.

**Model Three.** Model Three includes the influence of age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness in predicting engagement in sexual intercourse measured at Wave I.

**Model Four.** Model Four includes the influence of age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness, measured at Wave I to predict onset of sexual intercourse by Wave II.

**Model Five.** Model Five includes the influence of age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness, measured at Wave I to predict onset of sexual intercourse by Wave III.

Table 7: Logistic Regression Analysis with Interaction Effects – Wave I

Independent Variables	Model Three	Model Four	Model Five
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age	1.6(1.4-1.7)***	1.2(1.1-1.4)**	.76(.67-.95)**
Race	1.3(.97-1.8)	.96(.66-1.4)	1.2(.81-1.8)
Depression	2.3(.41-12.5)	.20(.01-6.0)	1.0(.96-1.1)
Self-Esteem			
Low (Reference)	1.0	1.0	1.0
Medium	.76(.49-1.2)	1.3(.63-2.8)	1.1(.51-2.5)
High	.58(.36-.91)*	1.0(.46-2.2)	1.2(.52-3.0)
Religiosity			
Unimportant (Reference)	1.0	1.0	1.0
Fairly Unimportant	1.1(.72-1.6)	1.2(.67-2.0)	1.3(.64-2.5)
Important	.74(.50-1.1)	.79(.42-1.5)	.93(.45-1.9)
Alcohol Use	1.2(1.1-1.3)***	.99(.98-.99)***	.99(.98-.99)**
Perceptions of Sex			
Negative (Reference)	1.0	1.0	1.0
Ambivalent	.60(.46-.78)***	.72(.52-.99)*	.66(.45-.97)*
Positive	.41(.19-.88)*	.51(.26-1.2)	.92(.30-2.8)
Mother Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	1.2(.77-1.9)	1.1(.55-2.2)	.66(.29-1.5)
Agree	.93(.59-1.5)	1.4(.70-2.7)	.58(.27-1.3)
Father Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	.64(.37-1.1)	1.6(.65-3.2)	.97(.42-2.2)
Agree	.50(.35-.75)***	1.1(.63-2.1)	.95(.45-2.0)
Peer Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	1.0(.51-2.1)	.27(.12-.61)**	.35(.06-2.1)
Agree	.78(.38-1.6)	.26(.12-.59)***	.27(.06-1.2)
School Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	.56(.39-.79)***	.49(.32-.76)***	.46(.15-1.4)
Agree	.43(.28-.68)***	.35(.21-.59)***	.56(.17-1.8)
Depression x Age	1.1(.83-1.5)	1.4(.86-2.2)	.68(.28-1.6)
Depression x Race	1.0(.53-2.0)	.97(.36-2.6)	.64(.09-4.3)
Depression x Self-Esteem			
Low (Reference)	1.0	1.0	1.0
Medium	.94(.34-2.6)	1.3(.56-17.4)	.02(.00-.51)
High	1.2(.44-3.4)	3.1(.59-1.1)	.01(.00-.02)
Depression x Religiosity			
Unimportant (Reference)	1.0	1.0	--
Fairly Unimportant	1.2(.30-4.5)	3.6(.42-29.7)	--
Important	1.0(.33-3.2)	.47(.06-3.5)	--
Depression x Alcohol	.99(.98-1.0)	.99(.98-1.0)	.97(.94-.99)*
Perceptions of Sex			
Negative (Reference)	1.0	1.0	1.0
Ambivalent	.74(.40-1.4)	1.2(.47-3.2)	1.8(.27-12.2)
Positive	1.2(.23-5.7)	16.8(.58-487.9)	.03(.00-1.4)
Depression x Mother Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	.26(.10-.66)**	.47(.10-2.3)	2.2(.02-278.4)
Agree	.29(.12-.74)**	.92(.19-4.4)	1.3(.02-100.0)
Depression x Father Connectedness			
Disagree (Reference)	1.0	1.0	--
Neutral	1.4(.39-5.4)	.16(.02-1.6)	--
Agree	2.8(1.01-7.8)*	.21(.05-1.0)	--
Depression x Peer Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	7.9(1.4-43.8)*	.31(.03-3.4)	.04(.01-1.5)
Agree	7.4(1.4-37.8)*	.40(.05-3.2)	.17(.01-2.7)
Depression x School Connectedness			
Disagree (Reference)	1.0	1.0	1.0
Neutral	.73(.29-1.8)	8.4(1.9-36.9)**	4.2(.34-51.3)
Agree	.88(.36-2.1)	10.0(2.1-47.4)**	1.8(.10-41.1)

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; --"N" to small for regression analysis

### **Research Hypothesis #7 – Wave I**

**Ho7: The extent to which perceptions of sex influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is not significant.**

**Ha7: The extent to which perceptions of sex influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is significant.**

#### **Model Three (Engagement in Sex at Wave I)**

There is a statistically significant relationship between perceptions of sex and the onset of sexual intercourse at Wave I (Table 7). The results indicate that adolescent females are less likely to have sexual intercourse when their perceptions of sex change from negative to positive. These results reveal that adolescent females' less positive perceptions of sex are consistent with their decision to delay onset of sexual intercourse at Wave I.

#### **Model Four (Engagement in Sexual Intercourse between Wave I and Wave II)**

There is a statistically significant relationship between perceptions of sex established at Wave I and the onset of sexual intercourse by Wave II (Table 7). The results demonstrate that adolescent females are less likely to have sexual intercourse between Wave I and Wave II when their perceptions of sex change from negative to positive. While these results are consistent with the Model Three findings, suggesting that less positive perceptions of sex established during adolescence will delay onset of sexual intercourse as adolescent females mature, the width of the confidence interval suggests that the influence of perceptions of sex in predicting engagement in sexual intercourse may vary widely depending on the adolescent female. In addition the extent to which attitudes towards sex predict onset of sexual intercourse may diminish with time.

#### **Model Five (Engagement in Sexual Intercourse between Wave I and Wave III)**

There is a statistically significant relationship between perceptions of sex and the onset of sexual intercourse between Wave I and Wave III (Table 7). As adolescent females' perceptions of sex change from negative to ambivalent they are less likely to have sexual intercourse between Wave I and Wave III. These results are consistent with those in Model Three and Model Four in that less positive perceptions of sex established during adolescence will deter onset of sexual intercourse as an adolescent female progress into young adulthood. However, based on the width of the confidence intervals in the

logistic regression models, females' attitudes towards sex that are formed during adolescence vary greatly in predicting onset of sexual intercourse as they mature. This indicates that perceptions of sex formed during adolescence may not be a primary determinant to predicting females' decision to engage in sexual intercourse as they approach young adulthood.

#### **Research Hypothesis #8 – Wave I**

**Ho8: The extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is not significant.**

**Ha8: The extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is significant.**

There is no statistically significant relationship regarding the extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among the Wave I adolescent females as they transition from adolescence into young adulthood (Table 7). The interaction between depression and perceptions of sex is not significantly associated with onset of sexual intercourse among the Wave I females in any of the logistic regression models examined in this study. Based on these results depression does not have an influence on adolescent females' attitudes towards sex to predict their engagement in sexual intercourse.

#### **Other Variables - Wave I**

While not specifically addressed in the research questions and hypothesis in this study, several of the other independent variables in the logistic regression models are statistically significant. These variables are discussed below and are organized into intrapersonal ecological factors and interpersonal ecological factors.

#### **Intrapersonal Ecological Factors – Wave I**

**Age.** In this analysis there is a statistically significant relationship between age and the onset of sexual intercourse among adolescent females (Table 7). Age is statistically significant in Model

Three and Model Four. These results indicate that as adolescent females age they are more likely, than at their current age, to engage in sexual intercourse as they transition through adolescent into young adulthood, holding all other variables in the models constant. These findings suggest that engagement in sexual intercourse is a normal and natural behavior among adolescent females as they mature. In Model Five as adolescent females age they are less likely to engage in sexual intercourse than at their current age, holding all other variables constant. This suggests that, even though engagement in sex may be viewed as a normal development process for adolescents, there may reach a point in time as adolescent females mature when age is less important in their decision to engage in sex. In addition, the association between aging and increased likelihood of engagement in sexual intercourse corresponds with less positive perceptions of sex. These findings suggest that less positive perceptions of sex formed in adolescence will delay onset of sexual intercourse in spite of the aging process.

**Race.** There is no statistically significant relationship between race and the onset of sexual intercourse among the Wave I adolescent females in the logistic regression models examined in this study (Table 7).

**Depression.** There is no statistically significant relationship between depression and the onset of sexual intercourse among the Wave I adolescent females (Table 7).

**Self-Esteem.** In Model Three there is a statistically significant relationship in the extent to which self-esteem influences onset of sexual intercourse (Table 7). As self-esteem increases among the Wave I adolescent females they are less likely to engage in sexual intercourse than when their self-esteem is low. These results suggest that adolescent females with higher levels of self-esteem may be more likely to delay onset of sexual intercourse than adolescent females with lower levels of self-esteem.

**Religiosity.** There is no statistically significant relationship in the extent to which the religiosity influences onset of sexual intercourse among the Wave I adolescent female sample (Table 7).

**Alcohol Use.** This analysis reveals that there is a statistically significant relationship in the extent to which alcohol use influences onset of sexual intercourse among adolescent females. Alcohol use is statistically significant in Model Three, Model Four, and Model Five (Table 7). In the logistic

regression models as alcohol use increases the adolescent females are less likely to engage in sexual intercourse as they transition through adolescence into young adulthood.

In Model Five there is also a statistically significant relationship in the extent to which depression interacts with alcohol to influence onset of sexual intercourse between Wave I and Wave III (Table 7). As alcohol use increases at Wave I, adolescent females with depressive symptoms are less likely to have had sexual intercourse by Wave III, holding all other variables constant. Based on these results, depression in combination with increased alcohol use among adolescent females may delay engagement in sexual intercourse as they mature.

### **Interpersonal Ecological Factors**

**Mother Connectedness.** There is no statistically significant relationship in the extent to which mother connectedness influences onset of sexual intercourse among the Wave I adolescent females (Table 7).

In Model Three there is a statistically significant relationship in the extent to which depression interacts with mother connectedness to influence onset of sexual intercourse (Table 7). In Model Three the combination of depression and a stronger connection to one's mother decreases the likelihood that an adolescent female will engage in sexual intercourse at Wave I. Based on these results, the combination of depression and increased connection to one's mother appears to delay onset of sexual intercourse among adolescent females when they are younger; on the other hand, over the life course of adolescence into young adulthood the interaction between depression and increased levels of mother connectedness actually may not influence the likelihood of engagement in sexual intercourse.

**Father Connectedness.** In Model Three there is a statistically significant relationship in the extent to which father connectedness influences onset of sexual intercourse (Table 7). As connection to one's father becomes stronger adolescent females are less likely to have engaged in sexual intercourse at Wave I than adolescent females with weaker connections to their fathers. In addition as adolescent females with depression connection to their fathers becomes stronger they are more likely to engage in sexual intercourse at Wave I. Age is also statistically significant in Model Three. These results suggest that growing older and having a strong connection to one's father may have a different affect on an

adolescent female's decision to engage in sexual intercourse depending on whether or not she reports having depression.

**Peer Connectedness.** In Model Four there is a statistically significant relationship in the extent to which peer connectedness influences onset of sexual intercourse (Table 7). Increased connection to one's peers at Wave I decreases the likelihood that an adolescent female will engage in sexual intercourse by Wave II. Furthermore in Model Three (Table 7) as an adolescent female's connection to her peer group increases she is more likely to engage in sexual intercourse at Wave I. However, peer connectedness does not significantly influence onset of sexual intercourse in any of the other logistic regression models. These results suggest that relationships with peers may have be a protective factor in delaying onset of sexual intercourse for adolescent females, but viewed as a risk factor for adolescent females with depression.

**School Connectedness.** In Model Three and Model Four (Table 7) there is a statistically significant relationship in the extent to which school connectedness influences onset of sexual intercourse. As connection to one's school environment increases adolescent females are less likely to engage in sexual intercourse. In contrast, in Model Four (Table 7), as connection to school increases adolescent females are more likely to engage in sexual intercourse if they report having depression. These results indicate that the strength of connection to one's school environment is an important predictor of whether or not an adolescent female will engage in sexual intercourse as she matures, particularly if the adolescent female has depression.

#### **Post Estimation Analysis – Wave I Logistic Regression Models**

Post-estimation analyses are conducted for the logistic regression model in this study in order to determine the extent to which the independent variables examined in the logistic regression models predict onset of sexual intercourse. Coefficient estimates are assessed using the Likelihood ratio test, a test of the hypothesis that compares the log likelihood from the full model to the log likelihood of the constraint model to determine if the coefficients in the logistic regression models are simultaneously equal to zero. McFadden's  $R^2$  and Bayesian information criterion (BIC) are measures of fit tests used to determine the goodness of fit for the logistic regression model. Comparisons are made between a full

model, which includes the interaction effects and a constraint model, which does not include the interaction effects (Long & Freese, 2003).

### Likelihood Ratio Test

Table 8 presents the results for the Likelihood ratio tests for Wave I logistic regression models. The Likelihood ratio test for the Model Three full model against the Model Three constraint model is statistically significant indicating that the full model with inclusion of the interaction terms is a more reliable predictor of engagement in sexual intercourse among adolescent females than the constraint model without inclusion of the interaction terms. The Likelihood ratio test for the Model Four full model against the Model Four constraint model is not statistically significant. This indicates that the full model with inclusion of the interaction terms is just as reliable a predictor of engagement in sexual intercourse among adolescent females as the constraint model without inclusion of the interaction terms. Statistically, there is no advantage to including the interaction terms in Model Four. The Likelihood ratio test for the Model Five full model against the Model Five constraint model is not statistically significant. This demonstrates that the full model with inclusion of the interaction terms is just as reliable a predictor of engagement in sexual intercourse among adolescent females as the constraint model without inclusion of the interaction terms. Statistically, there is no advantage to including the interaction terms in Model Five.

**Table 8: Likelihood Ratio Tests for Logistic Regression Models – Wave I**

Logistic Regression Models	$\chi^2(df)$
Model Three (Engagement in Sexual Intercourse at Wave I)	
Full Model	1707.6(21) ***
Constraint Model	1683.9(11)***
Likelihood Ratio Test	23.7(10)**
Model Four (Engagement in Sexual Intercourse between Wave I and Wave II)	
Full Model	1179.4(21)***
Constraint Model	1162.7(11)***
Likelihood Ratio Test	16.6(10)
Model Five (Engagement in Sexual Intercourse between Wave I and Wave II)	
Full Model	419.5(21)***
Constraint Model	402.5(11)***
Likelihood Ratio Test	17.0(10)

Legend: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

### Measures of Fit

Table 9 presents the results for McFadden's  $R^2$  and Bayesian information criterion (BIC). The results of McFadden's  $R^2$  test for Model Three indicate that the independent variables in full model and the constraint model are reliable predictors of engagement in sexual intercourse at Wave I. However, the more negative BIC in the constraint model indicates that Model Three without interaction effects is a better fit than Model Three that includes the interaction effects (Long & Freese, 2003). The results of McFadden's  $R^2$  test for Model Four indicate that the independent variables in full model and the constraint model are reliable predictors of engagement in sexual intercourse between Wave I and Wave II. However, the more negative BIC in the constraint model indicates that Model Four without interaction effects is a better fit than the Model Four that includes the interaction effects. The results of McFadden's  $R^2$  test for Model Five indicate that the independent variables in full model and the constraint model are reliable predictors of engagement in sexual intercourse between Wave I and Wave III. However, the more negative BIC in the constraint model indicates that Model Five without interaction effects is a better fit than the Model Five that includes the interaction effects. These findings are consistent with the results from the Wave I logistic regression analysis in this study which indicate that the independent variables that do not include an interaction with depression are more reliable predictors of adolescent females' onset of sexual intercourse than the independent variables that do include an interaction with depression.

**Table 9: Measures of Fit – Wave I Logistic Regression Models**

Logistic Regression Models	$\chi^2(df)$	McFadden's $R^2$	BIC
Model Three (Engagement in Sexual Intercourse at Wave I)			
Full Model	476.9(21)***	0.144	-550.6
Constraint Model	369.2(11)***	0.138	-604.6
Model Four (Engagement in Sexual Intercourse between Wave I and Wave II)			
Full Model	552.4(21)***	0.134	-498.4
Constraint Model	408.0(11)***	0.127	-545.6
Model Five (Engagement in Sexual Intercourse between Wave I and Wave III)			
Full Model	286.3(21)***	0.096	-23.5
Constraint Model	104.8(11)***	0.076	-83.2

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

*Section II***Overview – Wave II**

At Wave II 5,531 unmarried females ages 13 to 20 are asked questions related to their perceptions of sex. Approximately 551 females report being depressed and 4,980 report being non-depressed. The sample is 74.2% white and 25.8% non-white. In addition, 58.4% of the Wave II sample has had sexual intercourse in comparison to 41.6% of the sample that has not previously had sexual intercourse.

**Research Hypothesis #1 – Wave II**

**Ho1: There is no significant difference between depressed and non-depressed adolescent females in relation to age, race, self-esteem, sexual intercourse, religiosity, alcohol use, and perceptions of sex.**

**Ha1: There is a significant difference between depressed and non-depressed adolescent females in relation to age, race, self-esteem, sexual intercourse, religiosity, alcohol use, and perceptions of sex.**

**Age.** Among the Wave II sample there is a statistically significant difference in age between depressed and non-depressed adolescent females (Table 10). Starting at age 15 the depressed adolescent females are older than the non-depressed adolescent females. For example, 18.0% of the depressed adolescent females are 18 years of age in comparison to 12.6% of the non-depressed adolescent females. This indicates that depression is more common among older adolescent females.

**Race.** There is a statistically significant difference in race between the depressed and non-depressed adolescent females among the Wave II sample (Table 10). Thirty-four percent of the depressed adolescent females are non-white in comparison to 25.0% of the non-depressed adolescent females. These results suggest that depression is found more in adolescents from non-White racial groups than in white adolescent females.

**Self-Esteem.** There is a statistically significant difference in self-esteem between depressed and non-depressed adolescent females among the Wave II sample (Table 10). The depressed adolescent females have lower levels of self-esteem than the non-depressed adolescent females. Only 31.5% of the

depressed adolescent females agree that they have high self-esteem in comparison to 40.7% of the non-depressed adolescent females. However, 58.7% of the Wave III adolescent females report a medium level of self-esteem. These results indicate that, while depressed adolescent females have lower levels of self-esteem than non-depressed adolescent females, the majority of the Wave II adolescent females are vague or undecided about their perceptions regarding their self-worth.

**Sexual Intercourse.** There is a statistically significant difference in engagement in sexual intercourse between depressed and non-depressed adolescent females (Table 10). At Wave II the depressed adolescent females have had sexual intercourse more than the non-depressed adolescent females. Approximately 63.6% of the depressed adolescent females have engaged in sexual intercourse in comparison to 40.0% of the non-depressed adolescent females. These results indicate that depressed adolescent females have sex earlier than non-depressed adolescent females.

**Religiosity.** There is no statistically significant difference in religiosity between depressed and non-depressed adolescent females among the Wave II sample (Table 10). Fifty-two percent of the depressed adolescent females and 49.3% non-depressed adolescent females agree that a concept of a God is very important to them, indicating similar levels of the religiosity in the lives of depressed and non-depressed adolescent females. These results demonstrate that religiosity is important to adolescent females, regardless of whether or not they report having depression.

**Alcohol Use.** There is a statistically significant difference in alcohol use between depressed and non-depressed adolescent females among the Wave II sample (Table 10). Almost 96.0% of the depressed adolescent females have experience with alcohol use in comparison to 92.0% of the non-depressed adolescent females. Alcohol use in the daily use category is reported by 3.2% of the depressed adolescent females in comparison to 1.3% of the non-depressed adolescent females. While these results suggest that depressed adolescent females drink alcohol more frequently than non-depressed adolescent females, in general about 93% of the Wave II adolescent females have had experience with alcohol use.

**Perceptions of Sex.** There is no statistically significant difference in perceptions of sex between depressed and non-depressed adolescent females among the Wave II sample (Table 10). Only 2.3% of the depressed and non-depressed adolescent females have positive perceptions of sex. The

majority (97.0%) of the adolescent females have negative or ambivalent in their perceptions of sex.

These findings suggest that adolescent females primarily have negative and ambivalent perceptions of sex, regardless of depression status.

**Table 10. Wave II Chi Square Test Results for the Intrapersonal Ecological Factors**

Independent Variable	Adolescent Females	Depressed	Non-Depressed	$\chi^2$ (df)
Age				
13	267(6.0%)	15(2.2%)	252(6.0%)	73.2(7)**
14	759(17.0%)	44(11.2%)	715(17.6%)	
15	965(20.3%)	100(21.0%)	865(20.2%)	
16	1,174(20.4%)	113(22.5%)	1,061(20.2%)	
17	1,204(18.0%)	134(19.1%)	1,070(18.8%)	
18	861(13.6%)	106(18.0%)	755(12.6%)	
19	267(4.0%)	33(5.0%)	234(4.0%)	
20	34(0.70%)	6(1.0%)	28(0.60%)	
N	5,531(100%)	551(100%)	4,980(100%)	
Race				
Non-White	2,042(25.8%)	253(34.7%)	1,789(25.0%)	48.6(1)***
White	3,481(74.2%)	296(65.3%)	3,185(75.0%)	
N	5,523(100%)	549(100%)	4,974(100%)	
Self-Esteem				
Disagree	72(1.3%)	26(5.0%)	46(1.0%)	132.9(2)***
Neutral	3,215(58.7%)	351(63.5%)	2,864(58.3%)	
Agree	2,242(40.0%)	173(31.5%)	2,069(40.7%)	
N	5,529(100%)	550(100%)	4,979(100%)	
Ever Sex				
Yes	2,371(41.6%)	350(63.6%)	2,021(40.0%)	62.2(1)***
No	3,137(58.4%)	197(36.4%)	2,940(60.0%)	
N	5,508(100%)	547(100%)	4,961(100%)	
Religiosity				
Not Important	506(11.6%)	44(9.5%)	462(11.8%)	5.1(2)
Fairly Unimportant	1,793(38.8%)	173(38.2%)	1,620(38.9%)	
Important	2,502(49.6%)	248(52.3%)	2,254(49.3%)	
N	4,801(100%)	465(100%)	4,336(100%)	
Alcohol Use				
Never	189(7.1%)	18(4.3%)	171(7.5%)	49.4(6)*
1-2 days	861(30.8%)	111(36.4%)	750(30.1%)	
Once a month	737(29.2%)	67(23.7%)	670(30.0%)	
2-3 days a month	418(15.8%)	50(12.5%)	368(16.3%)	
1-2 days a week	297(11.1%)	50(14.4%)	247(10.7%)	
3-5 days a week	98(4.3%)	19(5.5%)	79(4.1%)	
Everyday	40(1.5%)	10(3.2%)	30(1.3%)	
N	2,640(100%)	325(100%)	2,315(100%)	
Perceptions of Sex				
Negative	3,348(60.4%)	316(57.2%)	3,032(60.7%)	0.92(2)
Ambivalent	2,061(37.3%)	221(40.5%)	1,840(37.0%)	
Positive	122(2.3%)	14(2.3%)	108(2.3%)	
N	5,531(100%)	551(100%)	4,980(100%)	

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Research Hypothesis # 4 – Wave II**

**Ho4: There is no significant difference between depressed and non-depressed adolescent females in relation to mother connectedness, father connectedness, peer connectedness and school connectedness.**

**Ha4: There is a significant difference between depressed and non-depressed adolescent females in relation to mother connectedness, father connectedness, peer connectedness and school connectedness.**

**Mother Connectedness.** There is a statistically significant difference in mother connectedness between depressed and non-depressed adolescent females (Table 11). Among the Wave II sample slightly more than 18.0% of the depressed adolescent females do not feel they have a connection to the mothers in contrast to 6.3% of the non-depressed adolescent females. In addition, 54.2% of the depressed adolescent females feel that they are connected to their mothers in contrast to almost 72.5% of the non-depressed adolescent females. While these results indicate that depressed adolescent females feel less of a connection to their mothers in comparison to non-depressed adolescent females, overall the majority of the depressed and non-depressed adolescent females perceive that they have a strong connection to their mothers.

**Father Connectedness.** There is a statistically significant difference in father connectedness between the Wave II depressed and non-depressed adolescent females (Table 11). Approximately 25.2% of the depressed adolescent females report that they are not connected to their fathers in contrast to 11.1% of the non-depressed adolescent females. Almost 60.0% of the depressed adolescent females feel that they have a connection to their father. In contrast, 78.7% of the non-depressed adolescent females feel that they have a connection to their father. While these results indicate that depressed adolescent females feel less connected to their fathers compared to non-depressed adolescent females, overall, the majority of the depressed and non-depressed adolescent females have a strong connection to their fathers.

**Peer Connectedness.** There is a statistically significant difference in peer connectedness between depressed and non-depressed adolescent females (Table 11). Among the Wave II sample

approximately 6.8% of the depressed adolescent females report that they do not feel connected to their peers, in contrast to 1.9% of the non-depressed adolescent females. While overall, depressed adolescent females are less connected to their peers than the non-depressed adolescent females, almost 82.0% of the depressed females feel that they have a connection with their peers and 90.0% of the non-depressed adolescent females. These findings indicate a high prevalence of close peer relationships during adolescence for both depressed and non-depressed adolescent females.

**School Connectedness.** There is a statistically significant difference in school connectedness between depressed and non-depressed adolescent (Table 11). Among the Wave II sample twenty-six percent of the depressed adolescent females report that they do not feel connected to their school environment in contrast to 8.1% of the non-depressed adolescent females. Only 27.4% of the depressed adolescent females report that they have a connection to school in comparison to 44.2% of the non-depressed adolescent females. These results indicate that for the most part depressed adolescent females feel less connected to their school environment than the non-depressed adolescent females. However, the majority of adolescent females (47.6%) have either neutral or positive feelings regarding their connection to their school environment.

**Table 11: Wave II Chi-Square Test Results for the Interpersonal Ecological Factors**

Independent Variables	Adolescent Females	Depressed	Non-Depressed	$\chi^2(df)$
<b>Mother Connectedness</b>				
Disagree	387(7.5%)	92(18.5%)	295(6.3%)	222.4(2)***
Neutral	1,162(21.8%)	144(27.3%)	1,018(21.2%)	
Agree	3,678(70.7%)	262(54.2%)	3,416(72.5%)	
N	5,227(100%)	498(100%)	4,729(100%)	
<b>Father Connectedness</b>				
Disagree	526(12.2%)	96(25.2%)	430(11.1%)	131.8(2)***
Neutral	458(10.6%)	49(15.1%)	409(10.2%)	
Agree	2,999(77.2%)	185(59.7%)	2,814(78.7%)	
N	3,983(100%)	330(100%)	3,653(100%)	
<b>Peer Connectedness</b>				
Disagree	145(2.4%)	40(6.8%)	105(1.9%)	113.2(2)***
Neutral	494(8.4%)	71(11.3%)	423(8.0%)	
Agree	4,875(89.0%)	437(81.8%)	4,438(90.1%)	
N	5,514(100%)	548(100%)	4,966(100%)	
<b>School Connectedness</b>				
Disagree	497(9.7%)	113(25.6%)	384(8.1%)	303.1(2)***
Neutral	2,528(47.6%)	239(47.0%)	2,289(47.6%)	
Agree	2,089(42.7%)	123(27.4%)	1,966(44.2%)	
N	5,114(100%)	475(100%)	4,639(100%)	

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

## **Multinomial Logistic Regression Models – Wave II**

Multinomial logistic regression is used to examine the extent to which intrapersonal and interpersonal ecological factors influence adolescent females' sexual perceptions. Negative perception of sex is set as the base category in the multinomial logistic regression models to make comparisons with previously established research studies which demonstrate that the adolescent females have negative attitudes towards sex (Gillmore et. al., 2002; Cornell & Halpern-Fischer, 2005; Rostosky et. al, 2003). Model Six makes comparisons between negative perceptions of sex and ambivalent perceptions of sex (negative verses ambivalent). Model Seven makes comparisons between negative perceptions of sex and positive perceptions of sex (negative verses positive). Interaction effects are presented in the multinomial logistic regression models to assess the extent to which the independent variables influence adolescent females' perception of sex as a result of depression. The interaction effects are: 1) depression x age; 2) depression x race; 3) depression x self-esteem; 4) depression x sex; 5) depression x religiosity; 6) depression x alcohol use; 7) depression x mother connectedness; 8) depression x father connectedness; 9) depression x peer connectedness; and 10) depression x school connectedness.

**Table 12: Multinomial Logistic Regression Analysis with Interaction Effects Associated with Perceptions of Sex – Wave II**

Independent Variables	Model Six (Negative vs. Ambivalent)	Model Seven (Negative vs. Positive)
	OR (95% CI)	OR (95% CI)
Age	.97(.91-1.0)	.70(.57-.86)***
Race	1.1(.95-1.4)	1.2(.64-2.3)
Depression	1.03(1.02-1.1)***	1.1(1.02-1.1)**
Self-Esteem		
Low (Reference)	1.0	1.0
Medium	.90(.34-2.3)	.22(.03-1.6)
High	.78(.30-2.0)	.35(.05-2.5)
Ever Sex	.77(.60-.98)*	.61(.31-1.2)
Religiosity		
Unimportant (Reference)	1.0	1.0
Fairly Unimportant	1.3(.99-1.8)	2.5(.75-8.2)
Important	1.5(1.12-2.0)**	2.9(.88-9.6)
Alcohol Use	1.0(.99-1.0)	1.0(.83-1.2)
Mother Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.2(.83-1.7)	.39(.11-1.5)
Agree	.93(.65-1.4)*	.48(.17-1.4)
Father Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.1(.77-1.7)	1.8(.36-9.4)
Agree	1.0(.74-1.4)	1.0(.29-3.4)
Peer Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	2.1(.90-1.1)**	2.0(.45-8.9)
Agree	1.2(.76-1.9)	.83(.20-3.4)
School Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.1(.73-1.5)	8.0(1.9-34.2)**
Agree	.93(.65-1.3)	5.6(1.3-26.3)*
Depression x Age	1.0(.99-1.0)	1.0(.83-1.3)
Depression x Race	1.1(.61-1.9)	.37(.10-1.5)
Depression x Self-Esteem		
Low (Reference)	1.0	1.0
Medium	1.1(.28-4.5)	1.4(.06-32.3)
High	.92(.24-3.6)	.19(.01-5.7)
Depression x Sex	1.0(.89-1.1)	3.0(1.3-6.7)**
Depression x Religiosity		
Unimportant (Reference)	1.0	1.0
Fairly Unimportant	.56(.22-1.5)	9.1(.73-112.0)
Important	.46(.19-1.1)	4.5(.48-42.4)
Depression x Alcohol	1.0(.67-1.5)	1.0(.99-1.0)
Depression x Mother Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.49(.19-1.3)	3.7(.07-207.9)
Agree	.82(.36-1.9)	4.2(.12-141.8)
Depression x Father Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.3(.36-4.9)	--
Agree	1.5(.54-4.2)	7.0(.21-226.4)
Depression x Peer Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.23(.05-1.1)*	--
Agree	.60(.18-2.0)	1.2(.10-12.9)
Depression x School Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.9(.75-4.9)	.16(.10-3.2)
Agree	1.8(.77-4.5)	.13(.01-2.7)

Legend: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; --"N" to small for regression analysis

**Research Hypothesis #2 – Wave II**

**Ho2: The extent to which age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use influence adolescent females' perceptions of sex is not significant.**

**Ha2: The extent to which age, race, depression, self-esteem, sexual intercourse, religiosity, and alcohol use influence adolescent females' perceptions of sex is significant.**

**Model Six (Negative vs. Ambivalent)**

In Model Six there is a statistically significant relationship between depression, sexual intercourse, religiosity and ambivalent perceptions of sex (Table 12). Adolescent females with depression are more likely to report ambivalent attitudes towards sex than adolescent females without depression, holding all other variables constant. Adolescent females who report higher levels of religiosity are more likely than adolescent females with lower levels of self-esteem to be ambivalent in their perceptions of sex. In addition adolescent females who have had sexual intercourse are less likely to be ambivalent in their perceptions of sex than adolescent females who have not had sexual intercourse. No other intrapersonal ecological factors are statistically significant in Model Six.

**Model Seven (Negative verses Positive)**

In Model Seven there is a statistically significant relationship between age and depression and positive perceptions of sex (Table 12). As adolescent females become older they are less likely to have positive perceptions of sex than at their current age, holding all other variables constant. Adolescent females with depression are more likely to report positive attitudes towards sex than adolescent females without depression, holding all other variables constant. No other intrapersonal ecological factors are statistically significant in Model Seven.

The results of Model Six and Model Seven indicate that becoming older and having sex are associated with less positive perceptions of sex among adolescent females. In comparison, increased religiosity results in ambivalent perceptions of sex.

**Research Hypothesis #3 – Wave II**

**Ho3: The extent to which depression interacts with age, race, self-esteem, sexual intercourse, alcohol use, and religiosity to influence adolescent females' perceptions of sex is not significant.**

**Ha3: The extent to which depression interacts with age, race, self-esteem, sexual intercourse, alcohol use, and religiosity to influence adolescent females' perceptions of sex is significant.**

**Model Six (Negative verses Ambivalent)**

In Model Six there is no statistically significant relationship in the extent to which depression interacts with the intrapersonal ecological factors to influence adolescent females' perceptions of sex (Table 12).

**Model Seven (Negative verses Positive)**

In Model Seven there is a statistically significant relationship in the extent to which the interaction between depression and sexual intercourse influence adolescent females' perceptions of sex (Table 12). The influence of depression in combination with having sex results in adolescent females being more likely to have positive attitudes towards sex than adolescent females with depressive symptoms who have not had sexual intercourse, holding all other variables constant. Depression has no statistically significant relationship with any of the other intrapersonal ecological factors in Model Seven.

**Research Hypothesis #5 – Wave II**

**Ho5: The extent to which mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex is significant.**

**Ha5: The extent to which mother connectedness, father connectedness, peer connectedness and school connectedness influence adolescent females' perceptions of sex is not significant.**

**Model Six (Negative verses Ambivalent)**

In Model Six there is a statistically significant relationship in the extent to which peer connectedness influence ambivalent perceptions of sex (Table 12). As connection to one's peer group strengthens, adolescent females are more likely to have ambivalent sexual attitudes than adolescent females with weaker ties to their peers. Mother connectedness, father connectedness and school connectedness are not statistically significant in Model Six.

**Model Seven (Negative verses Positive)**

In Model Seven there is a statistically significant relationship in the extent to which school connectedness influences adolescent females' positive perceptions of sex (Table 12). As connection to one's school increases adolescent females are more likely to have positive perceptions of sex. No other interpersonal ecological factors are statistically significant in Model Seven.

**Research Hypothesis #6 – Wave II**

**Ho6: The extent to which depression interacts with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perceptions of sex is not significant.**

**Ha6: The extent to which depression interacts with mother connectedness, father connectedness, peer connectedness and school connectedness to influence adolescent females' perceptions of sex is significant.**

**Model Six (Negative verses Ambivalent)**

In Model Six there is a statistically significant relationship in the extent to which depression interacts peer connectedness to influence adolescent females' ambivalent perceptions of sex (Table 12). Adolescent females with depression who report a neutral connection to their peer group have less ambivalent attitudes towards sex than adolescent females with depression who do not perceive a connection to their peers. The interactions between depression and mother connectedness, father connectedness and school connectedness are not statistically significant in Model Six.

**Model Seven (Negative verses Positive)**

In Model Seven there is no statistically significant relationship in the extent to which depression interacts with mother connectedness, father connectedness, peer connectedness, and school connectedness to influence adolescent females' positive perceptions of sex (Table 12).

**Post-Estimation Analysis – Wave II Multinomial Logistic Regression**

Post-estimation analyses are conducted for the Wave II multinomial logistic regression model in this study in order to determine the degree to which the independent variables examined in the analysis can reliable predictors of the perception of sex categories. Coefficient estimates are assessed using the Wald test, a test of the hypothesis that all of the independent variables in the multinomial logistic regression model are simultaneously equal to zero. McFadden's  $R^2$  and Bayesian information criterion (BIC) are measures of fit tests used to determine the goodness of fit for the multinomial logistic regression model. Comparisons are made between a full model, which includes the interaction effects and a constraint model, which does not include the interaction effects. In addition the Test of Independent Irrelevant Alternatives is used to examine the extent to which inclusion or exclusion of the perceptions of sex categories determines which category is selected (Long & Freese, 2003). The base category is set at negative for all post estimation analysis.

**Wald Test**

Table 13 presents the Wald test results for the full and constraint models with the base category set at negative. The Wald tests of the full models with the interaction effects for the negative vs. ambivalent model and the negative vs. agree model are statistically significant. The Wald tests of the constraint models without interaction effects for the negative vs. ambivalent model and the negative vs. agree model are also statistically significant. These results indicate that the independent variables in the full models and the constraint models reliably predict adolescent females' perceptions of sex.

**Table 13: Wald Test – Wave II Multinomial Logistic Regression**

Wald Test	$\chi^2(df)$
Full Model	
Negative vs. Ambivalent	92.2(21)***
Negative vs. Positive	83.9(21)***
Constraint Model	
Negative vs. Ambivalent	67.7(11)***
Negative vs. Positive	64.3(11)***

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### Measures of Fit

Table 14 presents the results for McFadden's  $R^2$  and Bayesian information criterion (BIC). The results of McFadden's  $R^2$  test indicate that the independent variables in full model and the constraint model are reliable predictors of perceptions of sex among adolescent females. However, the more negative BIC in the constraint model indicates that the model without interaction effects is a better fit than the model that includes the interaction effects. These findings suggest that the constraint models provide a better fit to the data than the fully interactive models. These results are consistent with the findings from the multinomial logistic regression analysis in which the independent variables without the depression interactions provided more insight into the factors that influence adolescent females' perceptions of sex than the independent variables with depression interactions.

**Table 14: Measures of Fit – Wave II Multinomial Logistic Regression Model**

Multinomial Logistic Regression Model	$\chi^2(df)$	McFadden's $R^2$	BIC
Full Model	183.8(42)***	0.030	114.5
Constraint Model	116.0(22)***	0.026	-24.9

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### Test of Independence of Irrelevant Alternatives

Table 15 presents the results for the test of IIA with the base category set at negative. The test of independence of irrelevant alternatives (IIA) results for the Wave II multinomial logistic regression model are inconsistent. The Hausman Test of IIA indicates that the inclusion or exclusion of the ambivalent and positive categories in the perceptions of sex scale does not affect the chances of an adolescent female selecting either of these perceptions of sex categories when the base category is set at negative in the model. The Small and Hsiao Test of IIA demonstrates slightly different results, indicating that when the base category is set at negative it is relevant that there is a positive perception of sex category available in

the model as an alternative option. These results suggest that tests of IIA work best when the outcome categories are distinct and independent from one another as is the case among the Wave II sample in which 60.4% report a negative perception of sex, 37.3% report an ambivalent perception of sex, and 2.3% report a positive perception of sex (Long & Freese, 2003).

**Table 15: Test of Independence of Irrelevant Alternatives – Wave II**

Test of IIA	$\chi^2(df)$	Evidence
Hausman Test of IIA		
Ambivalent	-12.6(22)	For Ho
Positive	-0.4(22)	For Ho
Negative	0.6(22)	For Ho
Small and Hsiao Test of IIA		
Ambivalent	11.2(22)	For Ho
Positive	43.4(22)*	Against Ho

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### Logistic Regression – Wave II

Waves II and III of the Add Health Study are used to determine the extent to which perceptions of sex predict onset of sexual intercourse among adolescent females as they transition from adolescence into young adulthood. The dependent variable is engagement in sexual intercourse. The primary independent variable of interest is adolescent females' perceptions of sex. Other independent variables included in the analysis are age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness. The interaction effects included in the analysis are: 1) depression x age, 2) depression x race, 3) depression x self-esteem, 4) depression x religiosity, 5) depression x alcohol use, 6) depression x the perceptions of sex, 7) depression x mother connectedness, 8) depression x father connectedness, 9) depression x peer connectedness, and 10) depression x school connectedness. Logistic regression is used for this analysis to determine the extent to which females' perceptions of sex predict onset of sexual intercourse as they transition from adolescence into young adulthood (Table 16). The two logistic regression models used in this analysis are described below.

**Model Eight.** Model Eight includes the influence of age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer

connectedness, and school connectedness, measured at Wave II to predict engagement in sexual intercourse at Wave II.

**Model Nine.** Model Nine includes the influence of age, race, depression, self-esteem, religiosity, alcohol use, perceptions of sex, mother connectedness, father connectedness, peer connectedness, and school connectedness, measured at Wave II to predict engagement in sexual intercourse by Wave III.

Table 16: Logistic Regression Analysis with Interaction Effects – Wave II

Independent Variables	Model Eight	Model Nine
	OR (95% CI)	OR (95% CI)
Age	1.7(1.5-1.8)***	.97(.89-1.1)
Race	1.2(.94-1.6)	1.2(.88-1.6)
Depression	1.03(1.01-1.1)**	1.0(.96-1.1)
Self-Esteem		
Low (Reference)	1.0	1.0
Medium	.46(.16-1.4)	.97(.26-3.7)
High	.42(.14-1.3)	1.2(.31-4.7)
Religiosity		
Unimportant (Reference)	1.0	1.0
Fairly Unimportant	.96(.70-1.3)	.70(.41-1.2)
Important	.55(.39-.76)***	.40(.22-.72)**
Alcohol Use	.99(.98-.99)***	.99(.98-.99)***
Perceptions of Sex		
Negative (Reference)	1.0	1.0
Ambivalent	.61(.51-.73)***	.86(.66-1.1)
Positive	.50(.27-.93)*	1.1(.51-2.2)
Mother Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.1(.73-1.5)	.77(.39-1.5)
Agree	.84(.60-1.2)	.72(.38-1.4)
Father Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.61(.38-1.0)	1.5(.68-3.1)
Agree	.51(.36-.73)***	.68(.41-1.1)
Peer Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	1.6(.81-3.2)	.86(.32-2.3)
Agree	1.0(.56-1.9)	.92(.39-2.2)
School Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.75(.57-1.0)	.71(.39-1.3)
Agree	.46(.33-.63)	.73(.38-1.4)
Depression x Age	.93(.84-1.0)	1.0(.87-1.2)
Depression x Race	1.2(.70-2.2)	.72(.31-1.7)
Depression x Self-Esteem		
Low (Reference)	1.0	1.0
Medium	1.5(.32-7.3)	5.1(.49-52.2)
High	2.3(.47-11.8)	1.4(.14-14.0)
Depression x Religiosity		
Unimportant (Reference)	1.0	1.0
Fairly Unimportant	.47(.14-1.6)	6.8(.74-62.5)
Important	.91(.27-3.1)	17.7(1.6-195.0)*
Depression x Alcohol	1.0(.98-1.2)	.99(.98-1.0)
Perceptions of Sex		
Negative (Reference)	1.0	1.0
Ambivalent	.89(.52-1.5)	1.2(.42-3.6)
Positive	.97(.13-6.9)	1.2(.07-18.4)
Depression x Mother Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.90(.36-2.3)	.27(.02-2.8)
Agree	2.1(.78-5.7)	.19(.02-2.0)
Depression x Father Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	2.9(.86-10.1)	1.3(.13-12.2)
Agree	3.0(1.3-7.2)**	.63(.14-2.8)
Depression x Peer Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.45(.12-1.7)	14.0(.75-262.7)
Agree	.36(.10-1.3)	21.9(.17-273.9)
Depression x School Connectedness		
Disagree (Reference)	1.0	1.0
Neutral	.97(.41-2.3)	.38(.07-2.0)
Agree	.80(.32-2.0)	.47(.09-2.6)

Legend: \*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001

**Research Hypothesis #7 – Wave II**

**Ho7: The extent to which perceptions of sex influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is not significant.**

**Ha7: The extent to which perceptions of sex influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is significant.**

**Model Eight (Engagement in Sexual Intercourse at Wave II)**

There is a statistically significant relationship between perceptions of sex and the onset of sexual intercourse among adolescent females (Table 16). The results indicate that adolescent females are less likely to have sexual intercourse when their perceptions of sex change from negative to positive. These findings support the belief that adolescent females' who perceive there to be more costs than benefits to engagement in sexual activity will delay onset of sexual intercourse.

**Model Nine (Engagement in Sexual Intercourse between Wave II and Wave III)**

There is no statistically significant relationship between perceptions of sex and the onset of sexual intercourse between Wave II and Wave III (Table 16).

Overall, these findings suggest that an adolescent female's less positive attitude towards sex will delay her onset of sexual intercourse. However, as an adolescent female matures her attitudes towards sex may not be a primary indicator of whether or not she will engage in sexual intercourse.

**Research Hypothesis #8 – Wave II**

**Ho8: The extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is not significant.**

**Ha8: The extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among females as they transition from adolescence into young adulthood is significant.**

There is no statistically significant relationship regarding the extent to which depression interacts with perceptions of sex to influence onset of sexual intercourse among adolescent females as they transition from adolescent into young adulthood (Table 16). The interaction between depression

and perceptions of sex is not significantly associated with onset of sexual intercourse in the two logistic regression models examined in this study. These results suggest that there is no association between the influence of depression on an adolescent female's attitude towards sex and her decision to engage in sexual intercourse.

### **Other Variables – Wave II**

While not specifically addressed in the research questions and hypothesis in this study, several of the other independent variables in the logistic regression models are statistically significant. These variables are discussed below and are organized into intrapersonal ecological factors and interpersonal ecological factors.

#### **Intrapersonal Ecological Factors**

**Age.** In this analysis there is a statistically significant relationship in the extent to which age influences onset of sexual intercourse among adolescent females in Model Eight but not in Model Nine (Table 16). These results indicate that as the adolescent females age they are more likely to engage in sexual intercourse than at their current age. However, over the life course of adolescence age may be less of a factor in whether or not an adolescent female will engage in sexual intercourse.

**Race.** There is no statistically significant relationship in the degree to which race influences onset of sexual intercourse among the Wave II adolescent females (Table 16).

**Depression.** In Model Eight there is a statistically significant between depression and the onset of sexual intercourse among the Wave II adolescent females (Table 16). Adolescent females who report having depression are more likely to engage in sexual intercourse than adolescent females who report no depression. These results are not seen in Model Nine (Table 21) indicating that there is no relationship between depression and the onset of sexual intercourse between Wave II and Wave III.

**Self-Esteem.** There is no statistically significant relationship between self-esteem and the onset of sexual intercourse in Model Eight and Model Nine (Table 16).

**Religiosity.** Model Eight and Model Nine reveal that there is a statistically significant relationship between religiosity and the onset of sexual intercourse (Table 16). Adolescent females with higher levels of religiosity are less likely to engage in sexual intercourse than adolescent females with

lower levels of religiosity. The interaction between depression and religiosity is statistically significant in Model Nine (Table 16). These results suggest that a strong sense of religiosity increases the likelihood that an adolescent female will engage in sexual intercourse between Wave I and Wave III if she reports having depression.

**Alcohol Use.** This analysis reveals that there is a statistically significant relationship between alcohol use and the onset of sexual intercourse among adolescent females (Table 16). Alcohol use is statistically significant in Model Eight and Model Nine. These results indicate that as alcohol use increases among the Wave II adolescent females they are less likely to engage in sexual intercourse. Based on these results, increased alcohol use may deter onset of sexual intercourse as adolescent females mature.

### **Interpersonal Ecological Factors**

**Mother Connectedness.** In Model Eight and Model Nine there is no statistically significant relationship between mother connectedness and the onset of sexual intercourse among adolescent females (Table 16).

**Father Connectedness.** In Model Eight there is a statistically significant relationship between father connectedness and the onset of sexual intercourse (Table 16). In Model Eight as an adolescent female's connection to her father strengthens she is less likely to engage in sexual intercourse than an adolescent female's with a weaker connections to her father's. In addition as connection to one's father increases adolescent females are more likely to engage in sexual intercourse if they report having depression. Age is also statistically significant in Model Eight. These results suggest that growing older in addition to an increase in one's connection to one's father may deter the onset of sexual intercourse among adolescent females. However if the adolescent female is depressed her relationship with her father may be a risk factor for onset of sexual intercourse.

**Peer Connectedness.** There is no statistically significant difference in the degree to which peer connectedness influences onset of sexual intercourse among the Wave II adolescent females (Table 16). These findings indicate that relationships with peers are not as influential as other interpersonal ecological factors, such as father connectedness, in influencing onset of sexual intercourse among adolescent females.

**School Connectedness.** There is no statistically significant difference in the degree to which school connectedness influences engagement in sexual intercourse among the Wave II adolescent female sample (Table 16).

#### **Post Estimation Analysis – Wave II Logistic Regression Models**

Post-estimation analyses are conducted for the Wave II logistic regression model in this study in order to determine the extent to which the independent variables examined in the logistic regression models predict onset of sexual intercourse. Coefficient estimates are assessed using the Likelihood ratio test, a test of the hypothesis that compares the log likelihood of the full model to the log likelihood of the constraint model to determine if the coefficients in the logistic regression models are simultaneously equal to zero. McFadden's  $R^2$  and Bayesian information criterion (BIC) are measures of fit tests used to determine the goodness of fit for the logistic regression model. Comparisons are made between a full model, which includes the interaction effects and a constraint model, which does not include the interaction effects (Long & Freese, 2003).

#### **Likelihood Ratio Test**

Table 17 presents the results for the Likelihood ratio tests for Wave II logistic regression models. The Likelihood ratio test for the Model Eight full model against the Model Eight constraint model is not statistically significant indicating that the full model with inclusion of the interaction terms is just as reliable a predictor of engagement in sexual intercourse among adolescent females as the constraint model without inclusion of the interaction terms. Statistically, there is no advantage to including the interaction terms in Model Eight. The Likelihood ratio test for the Model Nine full model against the Model Nine constraint model is not statistically significant indicating that the full model with inclusion of the interaction terms is just as reliable a predictor of engagement in sexual intercourse among adolescent females as the constraint model without inclusion of the interaction terms. Statistically, there is no advantage to including the interaction terms in Model Nine.

**Table 17: Likelihood Ratio Tests for Logistic Regression Models – Wave II**

Logistic Regression Models	$\chi^2(df)$
Model Eight (Engagement in Sexual Intercourse at Wave II)	
Full Model	2372.3(21)***
Constraint Model	2356.1(11)***
Likelihood Ratio Test	16.2(10)
Model Nine (Engagement in Sexual Intercourse between Wave II and Wave III)	
Full Model	475.9(21)***
Constraint Model	469.8(11)***
Likelihood Ratio Test	6.1(10)

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### Measures of Fit

Table 18 presents the results for McFadden's  $R^2$  and Bayesian information criterion (BIC). The results of McFadden's  $R^2$  test for Model Eight indicate that the independent variables in full model and the constraint model are reliable predictors of engagement in sexual intercourse at Wave II. However, the more negative BIC in the constraint model indicates that Model Eight without interaction effects is a better fit than Model Eight with inclusion of the interaction effects. The results of McFadden's  $R^2$  test for Model Nine indicate that the independent variables in full and the constraint model are reliable predictors of engagement in sexual intercourse between Wave II and Wave III. However, the more negative BIC in the constraint model indicates that Model Nine without interaction effects is a better fit than the Model Nine with inclusion of the interaction effects. These findings are consistent with the Wave II logistic regression analysis, which demonstrate that the intrapersonal and interpersonal ecological factors that do not include depression interactions are more reliable predictors of adolescent females' onset of sexual intercourse than the intrapersonal and interpersonal ecological factors that do include an interaction with depression.

**Table 18: Measures of Fit – Wave II Logistic Regression**

Logistic Regression Models	$\chi^2(df)$	McFadden's $R^2$	BIC
Model Eight (Engagement in Sexual Intercourse at Wave II)			
Full Model	660.2(21)***	0.189	-1236.4
Constraint Model	613.7(11)***	0.185	-1291.3
Model Nine (Engagement in Sexual Intercourse between Wave II and Wave III)			
Full Model	175.4(21)***	0.076	-121.2
Constraint Model	152.9(11)***	0.071	-200.9

Legend: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

## Chapter V: Discussion

Chapter V provides a discussion of the results of this analysis with respect to the research questions examined in this study. The discussion is organized into four sections: 1) Section I: Intrapersonal and Interpersonal Ecological Factors of Depressed and Non-Depressed Adolescent Females; 2) Section II: Intrapersonal and Interpersonal Ecological Factors as Predictors of Adolescent Females' Perceptions of Sex; 3) Section III: Perceptions of Sex and Implications for Onset of Sexual Intercourse; and 4) Section IV: Theoretical Application of Ecological Systems Theory. Each section describes the intrapersonal and interpersonal ecological factors examined in this study in relation to their influence on adolescent females' perceptions of sex and onset of sexual intercourse.

### **Section I: Intrapersonal and Interpersonal Ecological Factors of Depressed and Non-Depressed Adolescent Females**

Research questions 1 and 4 explore the intrapersonal and interpersonal ecological factors of depressed and non-depressed adolescent females. The results of research questions 1 and 4 are discussed below.

#### **Intrapersonal Ecological Factors**

**Age.** The results from this study suggest that adolescent females are increasingly susceptible to depression as they mature. Depression is reported more among the older adolescent females than the younger adolescent females at Wave I and Wave II of the Add Health Study. These findings are consistent with previous research studies and indicate that depression becomes more prevalent among adolescent females as they mature (Lewinsohn et. al., 1995; Lewinsohn et. al., 2000). These results suggest that females should be screened for depression during adolescence as part of routine health examinations in medical and school settings, particularly since depression during adolescence may lead to other psychological problems during adulthood (Gil-Rivas et. al., 2003).

**Race.** In this study the majority of the adolescent females who report being depressed are white. However, among the smaller number of non-white adolescent females there is a higher percentage of depressed adolescent females than non-depressed adolescent females. These results are consistent with previous research on adolescent depression which has shown that adolescents from non-

white racial groups tend to exhibit signs of depression more than Caucasian adolescents (Rushton et. al., 2002; Schraedley et al., 1999; Culp & Clyman 1995 ).The differences in the percentage of white and non-white depressed adolescent females may reflect differences in the sample selection and inclusion characteristics, as the majority of the Add Health sample is Caucasian and special samples are taken of different racial groups with higher SES that are not included in this study. Furthermore, the research that has been conducted to determine the predictive validity of the CES-D scale for identifying depressive symptoms in adolescent females among racially diverse populations is inconclusive (Prescott et. al., 1998). This may effect the ability to identify depression in racially diverse groups of adolescent females because the CES-D cut-off score of 24 is based on the extensive amount of research conducted on primarily Caucasian adolescent females (Lewinsohn et. al., 2000; Lewinsohn et. al., 1994; Roberts et. al., 1991; Roberts et. al., 1995). These issues support the importance of examining race in studies conducted on depression in adolescents.

**Self-Esteem.** In this study the majority of the adolescent females report moderate levels of self-esteem. These results are consistent with research on adolescent development, which proposes that adolescence is a transitional time during the life course in which feelings of uncertainty and insecurity may result in decreased levels of self-esteem (Rice, 1999). In addition, this study indicates that depressed adolescent females have moderate levels of self-esteem. This challenges previously held beliefs regarding low levels of self-esteem in adolescent females with depression (Williams & Currie, 2000). The present findings imply that feelings of uncertainty about one's self-worth may be a normal developmental condition for females during adolescence.

**Sexual Intercourse.** In this study depressed adolescent females engage in sexual intercourse earlier than the non-depressed adolescent females, indicating that depression is a risk factor for onset of sexual intercourse. These findings confirm that adolescent females with depression are sexually active earlier than non-depressed adolescent females (Miller, 2002; Reinherz et. al., 1993; Whitbeck et. al., 1999; Longmore et.al., 2004). Given the present results, adolescent females who have depression should be counseled about their sexual activity in order to address related negative health outcomes, such as risk for pregnancy and sexually transmitted infections. Adolescent females should also routinely

be screened for depression by schools and health care providers in order to not only treat the depressive symptoms, but also to address possible engagement in sexual intercourse.

**Religiosity.** The results from this study suggest that personal devotion, or an adolescent female's perception of her connection with a God, is similarly important to both depressed and non-depressed adolescent females. These results parallel previous research showing that personal devotion to one's concept of a God has a potential protective quality against negative health behaviors for depressed and non-depressed adolescent females (Rostosky et. al., 2003; Miller & Gur, 2002). Future research should examine how religiosity can be incorporated into programs that address adolescent female sexual health.

**Alcohol Use.** Previous examination of alcohol use among adolescent females demonstrates that depression is a risk factor for alcohol use (Kandel & Davies, 1982; Ramrakha et. al., 2000; Resnick et. al., 1997). The findings from this study indicate that alcohol use is more prevalent among the depressed adolescent females than the non-depressed adolescent females. However, the results also demonstrate that adolescent females in this study, whether they are depressed or not, engage in some experimentation with alcohol use during adolescence. These findings are consistent with the substantial amount of research that has been conducted on occurrence of alcohol use in the general adolescent female population; and suggest that experimentation with alcohol is a common health behavior among adolescent females (Scales & Leffert, 1999).

**Perceptions of Sex.** The results from this analysis indicate that most adolescent females have negative and ambivalent perceptions of sex. More specifically, the data demonstrate that depressed adolescent females have predominately negative and ambivalent perceptions of sex. These findings challenge previously held beliefs that depressed adolescent females have permissive attitudes towards sex (Whitbeck et. al, 1992; Whitbeck et. al., 1993). Furthermore, previous examination of adolescent females' perceptions of sex organizes attitudes towards sex into two categories, positive and negative. The findings in this study suggest that adolescent females with ambivalent perceptions of sex are also a meaningfully distinct group. The definition of ambivalent perceptions of sex in this study is intended to capture the perceptions of adolescent females who are uncertain about the positive and negative aspects of engagement in sexual intercourse. Adolescent females who are indecisive about whether or not to

engage in sexual intercourse may be at risk to engage in sexual intercourse because they may be easily swayed into spontaneous or reckless sexually active. In contrast, adolescent females with a clear concept of their motivation to be sexually active may be more likely to delay onset of sexual intercourse and may be psychologically and emotionally prepared for engagement in sexual intercourse once they do decide to become sexually active. Therefore, adolescent sexual health programs aimed at shaping perceptions of sex may need to address adolescent females' uncertain attitudes towards sex in order to assist them in forming a decisive opinion about the costs and benefits to engagement in sexual intercourse.

### **Interpersonal Ecological Factors**

**Parent Family Connectedness.** In this study adolescent females report strong connections to their mothers and their fathers. This finding suggests that the degree of closeness an adolescent female feels toward her parents is important to her. This is interesting to note as previous research suggests that an adolescent female's closeness to her parents plays a less central role in her life as she progresses through adolescence into young adulthood (Rice, 1999; Scales & Leffert, 1999). Also interesting to note is that within the subpopulation of depressed adolescent females, the majority perceive a strong connection to their mother and father. This is contrary to prior research that indicates that depressed adolescent females lack strong attachments to their parents (Rushton et. al., 2002; Hops et. al., 1990; Sanford et.al., 1995; Garnefski, 2000; Reinherz et. al., 1993; Kandel & Davies, 1982). Overall, these results indicate that adolescent females are strongly connected to their parents, whether they have depression or not, and highlight the importance of including the parent-daughter relationship when designing programs for adolescent females that address their sexual attitudes and sexual behavior.

**Peer Connectedness.** In this study the majority of adolescent females report a strong connection to their peers. Studies that examine peer support and depression in adolescents reveal that negative perceptions of peer support, low attachment to a peer group, and isolation from peers are correlated with depressive symptoms in adolescent females (Garnefski, 2000; Hops et. al., 1990; Kandel & Davies, 1982; Schraedley et al., 1999; Milne & Lancaster, 2001). While the purpose of this study is not to examine a possible correlation between peer connectedness and depression, the importance of peer connectedness reported by both the depressed and non-depressed adolescent females in this study

emphasizes the potential role that peer relationships have in influencing perceptions of sex and sexual behavior, by either protecting adolescent females from engaging in high risk sexual behavior, or conversely, putting adolescent females at risk for engagement in risky sexual behavior. This may be particularly important to examine among depressed adolescent females who may be highly susceptible to peer influences to engage in sexual activity in order to reduce feelings of social isolation and emptiness.

**School Connectedness.** In this study the difference between the depressed and non-depressed adolescent females' connection to their school environments is relatively small, with the majority of the Wave I and Wave II samples reporting a neutral connection to their school environment. Prior research has found a correlation between school environment and adolescent females' depression (Reinherz et. al., 1993; Garnefski, 2000; Rushston et.al., 2002; Quatman et. al., 2001). In addition, previous research supports adolescent females' neutral connection to their school environment and suggests that as adolescent females mature, attachment to their school environment diminishes in importance (McNeely et. al., 2002; Wong & Wiest, 1999; Cheng & Kaplan, 2003). This finding implies that adolescent females' attachment to their school environment may not be a protective factor that buffers them from engagement in sexual intercourse, particularly as adolescent females mature or if they have depression. Because of adolescent females' lack of attachment to their school environment, sexual health programs focused on shaping adolescent females' perceptions of sex and delaying onset of sexual intercourse may be more effective if delivered in venues other than, or in addition to, the school setting.

## **Section II: Intrapersonal and Interpersonal Ecological Factors as Predictors of Adolescent Females' Perceptions of Sex**

Research questions 2, 3, 5, and 6 address the extent to which intrapersonal and interpersonal ecological factors influence adolescent females' perceptions of sex. Particular attention is given to examining the extent to which depression in combination with other ecological factors influences adolescent females' perceptions of sex. The results of research questions 2, 3, 5 and 6 are discussed below.

### **Intrapersonal Ecological Factors**

**Age.** The findings in this study suggest that age influences an adolescent female's perceptions of sex differently depending on whether or not she is suffering from depression. As an adolescent female matures she is consistently less likely to have positive perceptions of sex. In contrast, an adolescent female with depression is more likely to have favorable attitudes towards sex as she matures. Because adolescent females' sexual activity is associated with their sexual perceptions, adolescent females with less positive perceptions of sex may be more likely to delay onset of sexual intercourse as they mature. The present findings also imply that adolescent females with depression may be more at risk for engagement in sexual intercourse as they mature because of their more favorable attitudes towards sex. Sexual health programs aimed at shaping attitudes towards sex and delaying onset of sexual intercourse should consider how aging in addition to an adolescent female's emotional state of mind influences her perceptions of sex.

**Race.** In this study race does not influence an adolescent female's perception of sex. These findings are not consistent with studies examining the relationship between race and sexual beliefs. Previous research suggests that adolescents from diverse racial groups have different perceptions of sex that are influenced by cultural norms regarding sex (Flores, et. al., 2002; Lauritsen, 1994; Perkins, et. al., 1998). In particular, Blum et. al. (2000) suggest that Hispanic adolescent females perceive more benefits to engagement in sexual activity than costs. In contrast, Billy et. al. (1988) report only slight variations in perceptions of sex among White and Black adolescent females based on their social environments, with the majority of the White and Black adolescent females having positive attitudes towards sex. The interpretation of the results in this study must be made cautiously. In-depth comparisons of the variables in this study are not conducted by race, making it difficult to determine the extent to which race impacts perceptions of sex among adolescent females. Future research should examine attitudes towards sex among adolescent females for culturally diverse racial groups in order to specifically tailor culturally appropriate sexual health messages.

**Depression.** In the Wave II adolescent female sample, depression is associated with positive perceptions of sex. These findings suggest that depressed adolescent females have more favorable attitudes towards sex than non-depressed adolescent females. However, depression as an independent

factor is not statistically significant in any of the other multinomial logistic regression models examined in this study. In comparison, the interaction between depression and other intrapersonal and intrapersonal ecological factors in the multinomial logistic regression models are statistically significant. The present findings imply that depression alone is not a primary determinant of adolescent females' perceptions of sex. The results in this study demonstrate that depression in combination with an adolescent female's age, experiences with sexual intercourse, and connection to her mother provide more insights into the factors present in her social ecology that shape her perception of sex than merely considering her affective state in isolation.

**Self-Esteem.** Data from this study indicate that higher levels of self-esteem among adolescent females result in disapproval of sexual activity. Since self-esteem refers to the regard in which an adolescent female holds herself, the findings from this study imply that an adolescent female who views herself in high regard perceives sex as a behavior that will decrease her sense of self worth. These results support prior research on adolescent sexual health and self-esteem, which has demonstrated that an increased level of self-esteem is a protective factor that aids adolescent females' ability to filter through the costs and the benefits to engagement in sexual activity (Longmore et. al., 2004). In addition, the majority of adolescent females have neutral perceptions of their self-esteem. It is important, when designing sexual health programs focused on shaping attitudes towards sex, to incorporate activities aimed at increasing adolescent females' self-esteem.

**Sexual Intercourse.** In this study engagement in sexual intercourse influences adolescent females' attitudes towards sex differently depending on whether or not they report having depression. Adolescent females have less favorable perceptions of sex if they have had sexual intercourse. In contrast, the joint occurrence of depression and experiencing sexual intercourse results in positive perceptions of sex among adolescent females. Given that adolescence is a time in the developmental life course when beliefs and patterns of behaviors are established, it becomes particularly important to consider how adolescent females' are affected by their sexual experiences (Association of Maternal and Child Programs, 2002). The findings in this study suggest that adolescent females may be engaging in sexual intercourse without a clear understanding of its physical, emotional, or social effects. As a result, their engagement in sexual intercourse leaves them with negative feelings and, perhaps, regret. Females

who perceive their experience with sexual intercourse as negative may be at risk for psychological and emotional problems as they mature. In addition, negative attitudes towards sex as a result of their sexual experiences may deter adolescent females from developing sexually healthy relationships as they mature.

With respect to furthering understanding of depression's influence on adolescent females' perceptions of sex, prior research proposes that adolescent females are likely to have positive attitudes towards sex due to a need to decrease emptiness and increase social acceptance. Thus, adolescent females with depression are more vulnerable to engagement in sexual intercourse as a means to alleviate their feelings of loneliness. The findings from this study suggest that an adolescent female with depression perceives the experience of sexual intercourse as beneficial. The concern then becomes that an adolescent female with depression will seek external validation to bolster her sense of self-worth by continuing to engage in sexual intercourse, whether it is in her best interest or not. Clinical interventions for adolescent females with depression need to address their attitudes towards sex in order fully examine their motivations to engage in sex.

**Religiosity.** In this study religiosity does influence adolescent female's perceptions of sex. A study on the role of religiosity and sexual attitudes in determining onset of sexual intercourse by Rostosky et. al. (2003) using the Wave I Add Health sample found results indicating that there is a weak correlation between adolescent females with higher levels of religiosity and attitudes towards sex. The evidence supporting the concept that an adolescent female's attachment to a God does influence her perceptions of sex seems likely. Teens who describe themselves as connected to a Higher Power may be affected by the beliefs regarding sex of the religious institutions that support their concept of a God. Adolescent females who are connected to a God may be more likely to model attitudes towards sex that are supported by their faith community. Given the increased emphasis by federal organizations in recent years to incorporate faith based organizations into programs that address adolescent sexual health, future research should continue to examine the extent to which religiosity affects adolescent females' perceptions of sex in order to identify useful strategies to include appropriate sexual health messages in religious institutions that choose to address adolescent sexual health.

**Alcohol use.** There is no evidence in this study that alcohol use influences adolescent females' perceptions of sex. These findings are difficult to decipher given the co-occurrence of alcohol and sexual behavior among adolescent females, as well as the high prevalence of the co-occurrence of alcohol use and depression in adolescent females. Moreover alcohol use impairs decision-making as well as one's ability to accurately recall a given situation or experience. In addition, alcohol use diminishes an individual's inhibitions making it easier for an adolescent female to engage in sex. A perceived level of less stress or less anxiety about having sex may impact an adolescent female's attitudes towards sex. Therefore it seems likely that alcohol use will influence one's perception of sex, particularly if an adolescent female has been drinking and having sex. Researchers interested in adolescent female alcohol use and sexual intercourse may benefit from investigating not just the co-occurrence of drinking and having sex but also how alcohol use impairs adolescent females' perceptions of sex as well as examining the awards and consequences for adolescent females' to drink and have sex.

#### **Interpersonal Ecological Factors**

**Mother Connectedness.** In this study mother connectedness influences perceptions of sex among adolescent females. Among the Wave II sample, adolescent females are less likely to have favorable attitudes towards sex as their connection to their mothers becomes stronger. This finding is juxtaposed the experience of sexual intercourse, which has a negative influence on adolescent females' attitudes towards sex, and suggests that the strength of connection that an adolescent female has with her mother could impact an adolescent female's perceptions of sex.

These findings are, in general, consistent with previous research studies, which have demonstrated the vital role that the maternal relationship plays in impacting adolescent females' beliefs about sex (Miller, 2002; Hutchinson, 2002; Calhoun, 2001; Dittus & Jaccard, 2000; Huebner & Howell, 2003). However, contrary to a study by Dittus et. al.(1999), who suggest that the degree of satisfaction with the maternal relationship does not influence the adolescent females' perceptions of sex as much as parental communication about sex, this study demonstrates that an adolescent female's overall satisfaction with her maternal relationship does influence beliefs about sex. Furthermore, because adolescent females are attitudes towards sex are influenced by their maternal relationships, the potential

for the mother-daughter relationship to promote healthy sexual development and sexual behavior among adolescent females must be considered. Strengthening mother daughter relationships as a means to promote sexually healthy young women is particularly important to consider given that in this study the aging process, fluctuations in self-esteem and sexual experiences may result in negative attitudes towards sex.

These findings support research from the National Campaign to Prevent Teen Pregnancy (2004), which reports that adolescent females prefer receiving sexual health information from their parents more than from any other source. Maternal involvement in influencing adolescent females' perceptions of the consequences and advantages to engagement in sexual activity also reinforces current federal policies to promote parental involvement in adolescent sexual health, such as Title X Family Planning policies which require family planning providers to encourage parental participation in sexual health services. Furthermore the Center for Disease Control and Prevention's *Ten Essential Public Health Services to Promote Adolescent Health* emphasizes the importance of parental involvement in raising sexually healthy adolescents (Association of Maternal and Child Health Programs, 2002)

**Father Connectedness.** The lack of association between father connectedness and perceptions of sex for adolescent females in this study should not go unnoticed. At present very little is known about the potential influence that fathers have on adolescent females' attitudes towards sex and their sexual behavior. A small number of previous studies have found that the father-daughter relationship has a positive influence on adolescent females' perceptions of sex (Dittus et. al., 1999; Hutchinson & Cooney, 1998; Hutchinson, 2002). It is quite likely that fathers may have a unique influence on adolescent females' perceptions of sex that, to date, has not been adequately, examined.

**Peer Connectedness.** In this study there is evidence that peer connectedness influences adolescent females' perceptions of sex. Among the Wave I sample adolescent females are less likely to have ambivalent perceptions of sex the closer they are to their peers. Furthermore, among the Wave II sample, adolescent females have more ambivalent perceptions of sex the closer they are to their peers. Also among the Wave II sample adolescent females with depression are less likely to have ambivalent attitudes towards sex the closer they are to their peers. While these findings support prior studies that demonstrate an association between peer relationships and adolescents' attitudes towards sex, there is

no consistent trend seen in the data among the Wave I and Wave II adolescent females (Harris, 1995; Cooper et. al., 1998; Billy et. al., 1984; Levinson et. al., 1995; Parsons et. al., 1997; Corcoran, 2000). In addition other variables in the multinomial logistic regression models such as age, self-esteem, religiosity, experiencing sexual intercourse and mother connectedness have a stronger influence on the adolescent females' perceptions of sex. These findings suggest that peer influences may have a minor role in forming females' sexual perceptions during adolescence.

**School Connectedness.** There is no evidence in this study that school connectedness influences perceptions of sex among adolescent females. These results are consistent with research conducted by Perkins et. al. (1999) which found no association between adolescent females' connection to their school environment and their sexual perceptions. Yet these results are contrary to other research demonstrating the importance of involvement in school in effecting adolescent females' attitudes towards sex and sexual behavior (Bernard, 1991; Small & Luster, 1994; Werner & Smith, 1993). The lack of clarity regarding the influence of school connectedness on perceptions of sex among adolescent females may relate to the measures used in this study, which include items like feeling close to teachers at school, feeling safe at school, and feeling happy while at school. These items do not directly address issues related to the school environment and sex such as whether or not comprehensive sexual health education is being offered in the school, the teachers' attitudes towards sex and competency in teaching sexual health, and whether or not the adolescent has received sexual health education (Yarber & McCabe, 1984).

### **Section III: Perceptions of Sex and Implications for Onset of Sexual Intercourse**

Research questions 7 and 8 explored the extent to which perceptions of sex influence onset of sexual intercourse for adolescent females as they transition from adolescence into young adulthood with particular attention given to examining the interaction between depression and perceptions of sex in determining engagement in sexual intercourse. The results of research questions 7 and 8 are discussed below. In addition, although not related to the research questions in this study, other intrapersonal and

interpersonal variables examined in this study such as age, race, depression, self-esteem, religiosity, alcohol use, parent connectedness, peer connectedness, and school connectedness are also discussed.

**Perceptions of Sex.** The data from this study suggest that an adolescent female's engagement in sexual intercourse is associated with her perceptions of sex. As perceptions of sex change from negative to positive among the Wave I adolescent females they are less likely to engage in sexual intercourse as they mature. These findings are consistent with the Wave II adolescent females who are also less likely to engage in sexual intercourse as their attitudes towards sex change from negative to positive. These data suggest that an adolescent female's decision to delay engagement in sexual intercourse is influenced by her ability to decipher the costs and the benefits of engagement in sexual intercourse. Adolescent females who perceive more costs than benefits to engagement in sexual intercourse are more likely to remain abstinent longer as they transition from adolescence into young adulthood. These results indicate that perceptions of sex formed in adolescence do influence an adolescent female's decision to have sex as she matures.

While these findings confirm prior research on the association between sexual attitudes and sexual behavior, it is important to note that the degree to which the Wave I and Wave II females' attitudes towards sex influence onset of sexual intercourse becomes weaker as they mature. In addition, the degree to which perceptions of sex influence onset of sexual intercourse in this study varies widely as the adolescent females mature. Furthermore, an increase in age is associated with onset of sexual intercourse in each of the logistic regression models examined in this study. These results suggest that a female's sexual perceptions formed during adolescence may have the most effective impression on her decision to delay engagement in sexual intercourse when she is younger. Perceptions of sex may also fluctuate among adolescent females as they mature, making it difficult to predict their intention to engage in sexual intercourse. It may be that adolescent females do not so much intentionally decide not to have sex as they mature, but are indecisive about engaging in sexual intercourse as they age. Gillmore et. al., (2002) suggest that adolescent females may not deliberately avoid engagement in sexual intercourse, but rather may not have clear opinions about engaging in sexual intercourse. Thus, if provided with the opportunity adolescent females may be more likely to engage in sexual intercourse.

Furthermore, the interaction between depression and perceptions of sex is not statistically significant in any of the logistic regression models examined in this study. These findings suggest that an adolescent female who is exhibiting depressive symptoms may be disconnected from her ability to reason through the costs and the benefits to engagement in sexual intercourse. These results indicate that the emotional disposition of an adolescent female with depression may create a barrier in her ability to make decisions regarding her sexual behavior. Finally, these findings challenge previously held beliefs that adolescent females with depression have permissive attitudes towards sex and are, therefore, more inclined to engage in sexual intercourse (Whitbeck et. al., 1992; Whitbeck et. al., 1993).

### **Intrapersonal Ecological Factors**

**Age.** Age is statistically significant in all but one of the logistic regression models examined in this study. These findings indicate that age is a significant predictor of engagement in sexual intercourse. These data support other research findings and suggest that, across the adolescent life course, sexual intimacy becomes increasingly normative; and unlike other adolescent health behaviors, such as alcohol use, it can be developmentally appropriate (Velsey, et. al., 2004; Gillmore, et. el., 2002; Longmore et. al., 2004; Kirby, 2003). The implications of these findings demonstrate that established models for preventing negative adolescent health behaviors, such as limiting alcohol use, may not be effective interventions for delaying onset of sexual intercourse among adolescent females. Future research efforts should examine new models for addressing adolescent female sexual health, which presents engagement in sexual behavior as a normal health behavior.

**Depression.** Among the Wave I adolescent females there is no evidence that depression predicts onset of sexual intercourse. Among the Wave II adolescent females there is some evidence that depression slightly increases the likelihood that an adolescent female will engage in sexual intercourse as she matures. However, there is no consistent trend seen regarding the extent to which depression predicts onset of sexual intercourse among adolescent females in the logistic regression models examined in this study. These findings are not consistent with previous research examining the role of depression in predicting onset of sexual intercourse (Resnick et. al. 1997; Rushton et. al., 2002; Schraedley et. al. 1999). In these studies depression is examined as an isolated variable and is associated with early onset of sexual intercourse among adolescent females. In addition the temporal

ordering of depression leading to onset of sexual intercourse is not closely examined in these studies. A recent study investigating which behavior comes first in adolescence, sexual intercourse and substance use or depression, suggests that it is the combination of sexual intercourse and substance use that contributes to depression, not the other way around; and depression actually decreases the likelihood that adolescent females will engage in sexual intercourse (Hallfors, et. al., 2005). Thus, it may be that depression in and of itself is not a reliable predictor of onset of sexual intercourse among adolescent females and may be better examined in combination with other factors present in an adolescent female's life.

**Self-Esteem.** In this study there is minor evidence supporting a relationship between self-esteem and onset of sexual intercourse. Among the Wave I adolescent females higher levels of self-esteem are associated with delaying onset of sexual intercourse. However this trend does not continue over time, suggesting that a higher level of self-esteem is not a reliable factor in deterring onset of sexual intercourse among adolescent females as they mature. These findings are consistent with previous studies, which found inconclusive results in the relationship between self-esteem and onset of sexual behavior (Stratton & Spitzer, 1967; Perlman, 1974; Jessor & Jessor, 1975; MacCorquodale & DeLamater, 1979; White & DeBlassie, 1992). Given the present findings more research is needed to examine the ways in which intervention programs designed to delay onset of sexual intercourse among adolescent females can incorporate concepts of self-esteem as a protective factor.

**Religiosity.** There is a statistically significant association between religiosity and delayed onset of sexual intercourse among the Wave II sample. These findings suggest a positive relationship between an increase in the religiosity and postponing onset of sexual intercourse among adolescent females. These findings support prior research on the connection between religiosity and deterring adolescent female sexual behavior (Resnick et. al., 1997; Vesley et. al., 2004). However this research is in contrast to other studies related to religiosity and adolescent female sexual health. For example, Miller & Gur (2002) indicate a positive association between sexual maturity and the religiosity, or personal devotion to a God, which may hint at the hypothesis that sexually mature adolescent females with strong religious beliefs are more likely to engage in sexual intercourse because of their sexual maturity and spirituality. More recent research by Jones et. al. (2005) proposes that religiosity has little

impact among older adolescent females. Furthermore, the interaction between depression and increased religiosity suggest that over the life course of adolescents increased spirituality may be a risk factor for onset of sexual intercourse if an adolescent female reports having depression. The present findings imply that more research is needed to examine the extent to which differences in age and personal connection to a God influence adolescent females' onset of sexual intercourse.

**Alcohol Use.** Increased alcohol use has a minimal effect on an adolescent female's decision to delay onset of sexual intercourse in each of the logistic regression models examined in this study. In addition the depression by alcohol interaction shows similar results in Model Three of the Wave I sample. Furthermore, other intrapersonal and interpersonal ecological factors examined in this study, such as age, religiosity, father connectedness, peer connectedness, school connectedness and perceptions of sex, appear to influence onset of sexual intercourse more than alcohol use. These findings are contrary to previous research, which has established that increased alcohol use is associated with sexual intercourse among adolescent females (Scales & Leffert, 1999). In this study alcohol use is measured using a single item that indicates an adolescent female's frequency of alcohol use over the course of a 12-month period. It does not measure alcohol abuse or dependence. In addition, the analysis in this study is not conducted to determine whether or not the female participants used alcohol before, during or after they engaged in sexual intercourse. Hallfors, et. al. (2005) suggest future longitudinal research is needed to examine the cause and effect relationship over time between alcohol use, engagement in sexual activity, and depression, in order to gain a greater understanding of the co-occurrence of these risk behaviors among adolescents.

### **Interpersonal Ecological Factors**

**Mother Connectedness.** In this study there is no association between mother connectedness and onset of sexual intercourse among adolescent females in this study. However among the Wave I sample, the interaction between depression and mother connectedness decreases the likelihood of engagement in sexual activity for depressed adolescent females. This indicates that the mother-daughter relationship has a protective quality that delays engagement in sexual intercourse among adolescent females with depression.

The data from this study are varied with respect to furthering our understanding of the influence of mothers on their daughters sexual behavior. Evidence for the effects of family processes on engagement in sexual intercourse are complex and inclusive. Although there is evidence that a warm, supportive and close relationship with one's mother delays onset of sexual intercourse, there is also evidence that the nature of the mother-daughter relationship has no effect on engagement in sexual intercourse (Billy, et. al, 1988; Vesely, et. al., 2004). Whitbeck, et. al. (1999) propose that the magnitude of the effect of mother connectedness in preventing the onset of sexual intercourse diminishes as adolescent females become older. Kirby (2002) suggests that it is difficult to decipher how mother-daughter relationship effects onset of sexual intercourse among adolescent females due to the complexity of interwoven issues, such as parents' sexual values, the characteristics of the parent-child communication process and adolescent female maturation. Furthermore, much less is known about the extent to which the mother-daughter relationship influences engagement in sexual intercourse when the daughter is depressed (Whitbeck et. al., 1992; Whitbeck, et. al., 1993). Future research would be useful to better clarify the causal impact of the mother-daughter relationships on adolescent females' engagement in sexual intercourse with particular consideration of the adolescent female's affective state.

**Father Connectedness.** There is an association between father connectedness and onset of sexual intercourse among the Wave I and Wave II adolescent females. These findings suggest that adolescent females are less likely to engage in sexual intercourse as they mature the closer they are to their fathers. However, if an adolescent female reports depression she is more likely to engage in sexual intercourse as she matures the closer she is to her father. These results warrant further investigation as research on the influence of the father-daughter dyad on engagement in sexual intercourse is scant and has primarily focused on the ramifications of the absence of a father figure in an adolescent's life (Coley, 2003).

**Peer Connectedness.** There is evidence in this study that peer connectedness influences onset of sexual intercourse. Among the Wave I sample, adolescent females with strong connections to their peers are less likely to engage in sexual intercourse. In contrast adolescent females with depression are more likely to engage in sexual intercourse the closer they are to their peers. These findings are

consistent with previous research studies and suggest that close peer relationships are related to onset of sexual intercourse among adolescent females (Billy et. al., 1984; Resnick et. al., 1997; Blum et al., 2000; Corcoran, 2000). These data suggest that close relationships formed with peers during adolescence influence an adolescent female's decision to engage in sexual intercourse as she matures, particularly if the adolescent female reports depression. In this study peer connectedness does not have a consistent influence in predicting onset of sexual intercourse among adolescent females in the other logistic regression models examined in this study. The present findings imply that, while peer relationships may be a predictor in determining adolescent female sexual behavior, the extent to which peers' perceptions of sex or peer group sexual norms interact with an adolescent female's emotional state of mind to influence her onset of sexual intercourse warrants further investigation.

**School Connectedness.** Among the Wave I adolescent females there is an association between increased connectedness to school and delaying onset of sexual intercourse. However, for adolescent females with depression increased connectedness to school increases the likelihood of onset of sexual intercourse. While these findings are consistent with studies which demonstrate that the more connected an adolescent female is to her school environment the less likely she is to engage in health risk behaviors such as sexual activity, the association between school connectedness and depression in predicting onset of sexual intercourse among adolescent females may indicate that for who have depression, the school environment provides an opportunity for social interactions more conducive to engagement in sexual intercourse. Thus, while for many adolescent females, school connectedness is viewed as a protective factor against engagement in sexual intercourse, for adolescent females with depression connection to the school environment may be a risk factor for onset of sexual intercourse.

#### **Section IV: Theoretical Application of Ecological Systems Theory**

The assessment of intrapersonal and interpersonal ecological factors from Ecological Systems Theory is a useful framework for studying perceptions of sex and onset of sexual intercourse among adolescent females. The application of Ecological Systems Theory in this study involves the integration of multiple individual, family, and social factors with an emphasis on the examination of the affective state of depression as a means to examine their influence on adolescent females' perceptions of sex and

onset of sexual intercourse. The results of the Ecological Systems analysis are in agreement with Kirby's suggestion that the strongest influences on an adolescent female's perception of sex and her subsequent decision to engage in sexual intercourse are those ecological factors in her immediate environment (Table 19). For example, an adolescent female's perceptions of sex are influenced by her age, whether or not she reports depression, her perceived level of self-esteem, whether or not she has had sexual intercourse, her sense of spirituality and her strength of connection to her friends and her mother. The factors associated with onset of sexual intercourse among adolescent females are age, depression, self-esteem, religiosity, alcohol use, perceptions of sex and connection to their parents, peers and school.

Thus, examining intrapersonal and interpersonal ecological factors in the context of Ecological Systems Theory provides insight into adolescent females' perceptions of sex and their engagement in sexual intercourse. Indeed, until further evidence is available to describe more macrosystem influences on adolescent females' perceptions of sex, such as poverty and the media, intrapersonal and interpersonal ecological factors may be the most promising to address. In practice, knowing the intrapersonal and interpersonal factors present in an adolescent female's social ecology may provide a context for understanding the formation of her sexual perceptions and how her attitudes towards sex influence her engagement in sexual intercourse as she matures.

Further research focusing on the extent to which depression impacts the influence of the intrapersonal and interpersonal ecological factors on perceptions of sex and onset of sexual intercourse is warranted as this study provides limited insight into such issues with the use of Ecological Systems Theory. In this study there is evidence to suggest that depression impacts age, sexual intercourse, religiosity and connection to one's peers to influence perceptions of sex. Depression also impacts an adolescent female's alcohol use, connection to her parents, peers and her school environment to influence her decision to engage in sexual intercourse. However, these results are not consistently seen in the analysis examined in this study suggesting that an adolescent female's emotional state may have an erratic affect on the individual, family, and social factors in her life that shape her sexual health. Furthermore, depression does not impact an adolescent female's perceptions of sex to affect her engagement in sexual intercourse. The lack of evidence gained from the results of this investigation that

are derived from Ecological Systems Theory suggests that cognitive models such as Cognitive Appraisal Theory or the Theory of Reasoned Action, which emphasize how an individual attaches meaning to an event or situation to impact both their emotional and behavioral responses, may be more useful when examining the impact of depression in shaping an adolescent female's attitudes toward sex and influencing her engagement in sexual intercourse (Rew, 2005).

**Table 19: The Influence of Intrapersonal and Interpersonal Ecological Factors on Perceptions of Sex and Onset of Sexual Intercourse**

Independent Variables	Perceptions of Sex	Onset of Sexual Intercourse
<b>Intrapersonal Ecological Factors</b>		
Age	Less Positive	Increases Onset of Sex
Depression	More Positive	Increases Onset of Sex
Self-Esteem	Less Positive	Decreases Onset of Sex
Ever Sex	Less Positive	
Religiosity	Less Positive	Decreases Onset of Sex
Alcohol Use		Decreases Onset of Sex
Perceptions of Sex		Decreases Onset of Sex
<b>Interpersonal Ecological Factors</b>		
Mother Connectedness	Less Positive	
Father Connectedness		Decreases Onset of Sex
Peer Connectedness	Less Positive	Decreases Onset of Sex
School Connectedness	More Positive	Decreases Onset of Sex
<b>Interaction Effects</b>		
Depression x Age	More Positive	
Depression x Sex	More Positive	
Depression x Religiosity	Less Positive	Increases Onset
Depression x Alcohol Use		Decreases Onset of Sex
Depression x Mother Connectedness	Less Positive	Decreases Onset of Sex
Depression x Father Connectedness		Increases Onset of Sex
Depression x Peer Connectedness	Less Positive	Increases Onset of Sex
Depression x School Connectedness		Increases Onset of Sex

## CHAPTER VI: Conclusions and Recommendations

The findings in this study indicate differences in the intrapersonal and interpersonal ecological factors that influence adolescent females' perceptions of sex and onset of sexual intercourse. The findings in this study also demonstrate variations in the degree to which depression in combination with intrapersonal and interpersonal factors present in an adolescent female's social ecology influence her perceptions of sex and onset of sexual intercourse. The conclusions and recommendations from this study are presented below.

A major finding from the present study is the number of adolescent females, both depressed and non-depressed, reporting ambivalent perceptions of sex. These findings imply that sexual health programs focused on attitudes towards sex can make a difference in assisting adolescent females who are ambivalent about sex to form an explicit opinion about sex, whether it is positive or negative. Adolescent females with an opinion about the advantages and disadvantages to engagement in sexual activity may be more likely to delay onset of sexual intercourse than adolescent females who are ambivalent about sex, because the former have clear expectations regarding the extent to which sexual activity will affect their emotional and physical health. In addition, adolescent females with strong attitudes towards sex may be more prepared to engage in sexual intercourse, such as considering contraceptive use prior to having sex, which is an important step in preventing pregnancy and sexually transmitted infections. More specifically, designing clinical interventions to assist depressed adolescent females to develop a palpable position on their attitudes towards sex may delay their onset of sexual intercourse or prevent them from engaging in high-risk sexual behavior.

The findings in this study have several important implications for furthering our understanding of the factors that influence adolescent females' perceptions of sex. Although we know that it is the immediate intrapersonal and interpersonal ecological factors within an adolescent female's social ecology that have a direct effect on her perceptions of sex, we know little about the process through which these influences occur, particularly if an adolescent female reports depression. The results from this study indicate that intrapersonal ecological factors with a direct effect on an adolescent female's perceptions of sex are her age, perceived level of self-esteem, whether or not she has had sexual

intercourse and her strength of spirituality. In this study as adolescent females mature and their self-esteem increases they have less favorable perceptions of sex. Of particular concern is the finding that sexually experienced adolescent females report less favorable attitudes towards sex. These findings propose that as adolescent females mature and their self-esteem increases their decision to engage in sexual intercourse results in negative sexual perceptions. These findings suggest that adolescent females are engaging in sexual intercourse without the necessary intimacy skills or emotional maturity to have positive sexual experiences.

Negative sexual experiences during adolescence pose risks for possible future difficulties with intimate relationships in young adulthood, as well as psychological and emotional problems (Rice, 1999). Historically, in the United States policymakers have promoted sexual health programs that focus on abstinence-until-marriage education, fear based messages about the consequences of sexual activity, false facts and information on reproductive health and refusal skills to avoid engagement in sexual intercourse (Dailard, 2001; U.S. House of Representatives, 2004). This risk-focused approach does not adequately prepare adolescent females for sexual intimacy, provide them with the skills necessary to be sexually healthy, or equip them with the ability to develop sexually healthy relationships as they mature. Future research should examine how health education methods can prepare adolescent females for fulfilling sexual relationships once they decide to become sexually active, particularly since the results from this study indicate that engagement in sex is a developmentally normal behavior. Furthermore, policymakers must rectify the federal government's primary focus and fiscal support for abstinence-only education programs that either have not been rigorously evaluated for effectiveness or have shown no effect in deterring premarital sex among adolescent females (U.S. House of Representatives, 2004; Kirby, 2002). The inability of federally funded abstinence-only education programs to promote a comprehensive approach to educating young people about sexual health may actually increase young women's risk for negative health outcomes associated with sexual intercourse, such as sexually transmitted infections (Bearman & Bruckner, 2004).

In this study mother connectedness affects adolescent females' perceptions of sex. As connection to one's mother becomes stronger, an adolescent female's perception of sex tends to be ambivalent. This finding is in contrast to the commonly held belief that parents have little or no

influence on their adolescent females' sexual attitudes (Gillmore, et. al., 2002). While this study demonstrates some evidence that closeness to one's peers has a positive influence on adolescent females' perceptions of sex, this finding is not consistently seen in the results of this analysis. Other studies demonstrate similar findings and suggest that the degree of closeness between a mother and her daughter is an essential component, more so than peer relationships, to raising sexually healthy females (Scales & Leffert, 1999; Dittus et. al., 1999; Dittus & Jaccard, 2000). It may be that the strength of the mother-daughter relationship can help to counterbalance the negative effect of engagement in sexual intercourse on an adolescent female's perceptions of sex.

Current national health education standards and federal family planning policies encourage parental involvement in schools and clinical settings to assist adolescent females in sexual decision-making (Department of Health and Human Services, 2005; National Health Education Standards, 2004). The results of several studies indicate that parents want to be involved in their teenage daughter's sexual health and that teenager's want to be able to discuss sex with their parents (Dailard, 2001; Kirby, 2002; Eastman, et. al., 2005). However, there continues to be a need for health educators and clinicians to implement effective strategies and clinical techniques for counseling adolescent females on their sexual wellbeing, that includes parents as partners in their adolescent daughter's sexual health (Sonenstein et. al., 2004). Future research should examine how parents can be incorporated into sexual health programs and family planning visits as a beneficial influence to their daughters' sexual attitudes.

With respect to furthering our understanding of the extent to which the affective state of depression influences adolescent females' perceptions of sex, this study demonstrates that depression, in and of itself, does not have a substantial influence on an adolescent female's attitudes towards sex. Rather it is depression in combination with the intrapersonal ecological factors, age and the experience of sexual intercourse, that have the most impact on an adolescent female's perceptions of sex. In this study as adolescent females mature their perceptions of sex are positive if they report having depression. This finding suggests that as adolescent females with depression become older they may be motivated to engage in sexual intercourse due to their positive attitudes towards sex. Furthermore, adolescent females with depression who have experienced sexual intercourse report favorable attitudes

towards sex. This finding suggests that depressed adolescent females do perceive there to be some kind of personal or social benefit to having sex that may support engagement in high-risk sexual behavior. These findings highlight the need for health care providers to address depressed adolescent females' perceptions of sex in order to design clinical interventions that may deter them from engagement in sexual intercourse.

Moreover, this study provides insights into the relationship between adolescent females' perceptions of sex and their onset of sexual intercourse. The present study demonstrates that less favorable perceptions of sex established during adolescence do consistently influence an adolescent female's decision to delay onset of sexual intercourse as she matures. However, the degree to which less favorable attitudes towards sex deter an adolescent female from engaging in sexual intercourse varies considerably as an adolescent female matures, from having a substantial affect on her decision to delay onset of sexual intercourse to having only a minor influence on her decision to remain abstinent.

Efforts to delay onset of sexual intercourse among adolescent females tend to give precedence to adolescent females' perceptions of sex (Dittus & Jaccard, 2000; Kirby, 2002). The findings from this study imply that prevention efforts aimed at shaping attitudes towards sex in an attempt to delay onset of sexual intercourse among adolescent females may be better focused during the pre-teen years and early adolescence before females become sexually active. Sexual health education strategies for females in middle and late adolescence would be better suited to prepare females for sexually healthy relationships by teaching them communication and decision making skills, contraception use and components to a healthy relationship as opposed to a perpetual focus on abstinence-only messages.

In addition the findings from this study indicate that a programmatic focus concerned with shaping adolescent females' perceptions of sex as a means to delay onset of sexual intercourse may be more affective if combined with parental involvement, peer involvement, school activities, and spiritual beliefs. The present study demonstrates that adolescent females' relationships with their mothers and fathers are important to them and have the potential to influence their decisions to engage or not to engage in sexual intercourse. Therefore, mothers and fathers must be included in any school, community, or clinically based intervention aimed at adolescent females' sexual health. Similarly, in this study religiosity is important to adolescent females. There is some evidence that as adolescent

females mature and their personal devotion to a God strengthens, they are less likely to engage in sexual intercourse. This finding suggests that faith based organizations may be a useful partner for schools, community based organizations and family planning services to collaborate with to address adolescent females' sexual health. In this study close peer relationships are associated with delaying onset of sexual intercourse among adolescent females. In addition, adolescent females do report that they are close to their friends. This finding highlights the need to incorporate peer relationships into adolescent female sexual health programs. These recommendations are in keeping with the National Initiative to Improve Adolescent Health by the Year 2010 and the 2001 Surgeon General Call to Action which recommend focusing on the strengths in an adolescent female's life as a means to promote positive messages about sex and healthy sexual development (Association of Maternal and Child Health Programs, 2002; Surgeon General Call to Action, 2001).

In this study depressed adolescent females engage in sexual intercourse earlier than non-depressed adolescent females. Depressed adolescent females are also increasingly initiated into sexual intercourse as they mature. In addition, adolescent females with depression tend to have more positive perceptions of sex than adolescent females who report no depression. However, in this study depressed adolescent females' onset of sexual intercourse is not influenced by their perceptions of sex. These results imply that there is a disconnect between an adolescent female's ability to decipher the advantages and disadvantages to engagement in sexual intercourse and her decision to become sexually active if she has depression. This finding is contrary to previously established beliefs regarding depressed adolescent females' promiscuous attitudes towards sex as a motivator to engage in sexual intercourse in order to alleviate feelings of emptiness and sadness and increase social acceptance (Whitbeck, et. al., 1992; Whitbeck, et. al., 1993; Levinson, et. al., 1995).

Furthermore, this study provided only minor insight into the intrapersonal and interpersonal ecological factors that predict depressed adolescent females' onset of sexual intercourse. In this study the closer a depressed adolescent female is to her mother the less likely she is to engage in sexual intercourse as she matures. This finding suggests that the strength of the mother-daughter relationship has a protective influence on a depressed adolescent female's sexual activity that should be capitalized on in therapeutic settings when counseling depressed adolescent females on their sexual behavior. In

contrast, increased connection to one's father, peer group and school environment appears to be a risk factor for onset of sexual intercourse if an adolescent female reports depression. Future research is needed to unravel the factors that motivate depressed adolescent females to engage in sexual intercourse, in order to design therapeutic interventions that can address sexual behavior among this high-risk population.

In conclusion, the results of this study demonstrate that an Ecological Systems approach can be applied to furthering our understanding of the factors that influence an adolescent female's sexual health. Within an adolescent female's social ecology multiple intrapersonal and interpersonal factors do influence her perceptions of sex and onset of sexual intercourse. Prevention efforts to address adolescent females' sexual health must go beyond a categorical focus on shaping attitudes towards sex to addressing the myriad of factors that affect their sexual attitudes, such as maturation, emotional mindset, self-esteem, sense of spirituality and relationships with parents, peers, and their school environment. A comprehensive, integrated, and holistic approach that involves family, peers, and the community to addressing adolescent females' sexual health is needed because a sole focus on adolescent females' perceptions of sex as a primary deterrent to postponing sexual intercourse may not be an effective prevention strategy as adolescent females mature. Sexual intercourse takes place within the context of a relationship. Promoting the elements of a healthy partnership and how romantic relationships may influence sexual decision making, in addition to addressing abstaining from sexual intercourse, communication skills and contraceptive methods, may be a worthwhile prevention strategy to incorporate into sexual health programs and family planning interventions aimed at adolescent females (Gottman & Silver, 2000; Department of Health and Human Services, 2005). It is the hope that by developing innovative methods to influencing adolescent females' perceptions of sex, their sexual attitudes can be redirected into a focus on the emotional, relational and physical benefits of sex, which will have a positive impact on their sexual development and their decisions to delay onset of sexual intercourse.

In addition, therapeutic interventions designed for depressed adolescent females must explore the lack of congruency between their perceptions of sex and their sexual activity, in order to improve depressed adolescent females' sexual development. With the apparent co-occurrence of depression and

sexual activity among adolescent females public health practitioners and researchers will face new challenges in promoting sexual health in the adolescent female population. The results of this study suggest that an ecological approach to examining sexual health among adolescent females with depression provides limited insight. Therefore, cognitive theoretical models may need to be applied and integrated into population based approaches to advance the capacity of public health programs to address the prevalence of depression and sexual behavior among adolescent females.

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**APPENDIX A: Add Health Measurement Tools**

Appendix A presents the scales used in this study.

**Perceptions of Sex.** Perceptions of sex is measured using a 7 item, 5-point Likert scale from strongly agree to strongly disagree. The scale is reversed coded to 5=strongly agree to 1= strongly disagree so that higher scores related to higher levels of perceived benefits of sex. Responses to the 7 item scale are averaged into one unit categories from 5 – strongly agree to 1- strongly disagree. Because of think cell counts in the strongly agree and strongly disagree categories the responses are collapsed into three categories: 1 = negative, 2 = ambivalent and 3 = positive.

**Table 1A: Perceptions of Sex**

Perceptions of Sex Items				
<i>1. If you had sexual intercourse, your friends would respect you more.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>2. If you had sexual intercourse, your partner would lose respect for you.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>3. If you had sexual intercourse, afterward, you would feel guilty.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>4. If you had sexual intercourse, it would upset your mother.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>5. If you had sexual intercourse, it would give you a great deal of pleasure.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>6. If you had sexual intercourse, it would make you more attractive to men.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>7. If you had sexual intercourse, you would feel less lonely.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	

**Depression.** Depression is measured using the Center for Epidemiologic Studies-Depression Scale (CES-D). A modified 19 item scale of the CES-D is used in this study in the Wave I and Wave II In-Home Questionnaire (Table 2A). The 19 items are coded 0 = never or rarely to 3 = most of the time or all of the time. The total CES-D scores represented a summation of the 19 items with a range of 0 (no depressive symptoms) to 60 (most frequent/severe depressive symptoms). A cut off score of 24 is used to determine depression in the adolescent females. Respondents' scores for the CES-D are totaled and a new variable was created using the cut off score of 24 to determine depression in adolescent females. The new depression variable is coded 0 = not depressed, 1 = depressed.

**Table 2A: Center for Epidemiologic Studies – Depression Scale.**

<b>Center for Epidemiologic Studies – Depression Scale</b>			
How often was each of the following things true during the past week?			
<i>1. You were bothered by things that usually don't bother you.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>2. You didn't feel like eating, your appetite was poor.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>3. You felt that you could not shake off the blues, even with help from your family and your friends.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>4. You felt that you were just as good as other people.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>5. You had trouble keeping your mind on what you were doing.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>6. You felt depressed.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>7. You felt that you were too tired to do things.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>8. You felt hopeful about the future.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>9. You thought your life had been a failure.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>10. You felt fearful.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>11. You were happy.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>12. You talked less than usual.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>13. You felt lonely.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>14. People were unfriendly to you.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>15. You enjoyed life.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>16. You felt sad.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>17. You felt that people disliked you.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>18. It was hard to get started doing things.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)
<i>19. You felt life was not worth living.</i>			
Never or Rarely (0)	Sometimes (1)	A Lot of the Time (2)	All of the Time (3)

**Alcohol Use.** Alcohol use is measured using one item. Responses ranged from 1 = every day to 7 = never. These responses are reverse coded (1= never to 7=everyday) so that higher scores on the alcohol use item reflected higher levels of alcohol consumption.

**Table 3A: Alcohol Use.**

<i>1. During the past 12 months, on how many days did you drink alcohol (5 or more drinks in a row)?</i>						
Never (1)	1 or 2 Days in 12 Months (2)	Once a Month (3)	2 or 3 Days a Month (4)	1 or 2 Days a Week (5)	3 to 5 Days a Week (6)	Every Day or Almost Every Day (7)

**Religion.** Religion is measured using a single item. The religion item is measured on a 4-point Likert scale from 1 = very important to 4 = not important at all. The religion scale is reverse coded so a higher score reflected greater religiosity. The religion scale is collapsed into three categories (1 = not very important, 2= fairly unimportant, and 3 = important) because of thin cells in the very important and fairly important category.

**Table 4A. Religion.**

<i>1. How important is religion to you?</i>			
Very Important (4)	Fairly Important (3)	Fairly Unimportant (2)	Not Important At All (1)
Important (3)		Fairly Unimportant (2)	Not Very Important (1)

**School Connectedness.** School Connectedness is measured using a 6 item scale. Responses to the school connectedness scale are averaged into one unit categories from 1 = strongly agree to 5 = strongly disagree. The scale is reverse coded so a higher score reflected greater connectedness to school (1 = strongly disagree to 5 = strongly agree). Because of low cell counts in the strongly agree and strongly disagree categories, the scale is collapsed to 1 = disagree, 2 = neutral and 3 = agree.

**Table 5A: School Connectedness.**

School Connectedness Items				
<i>How much do you agree or disagree with the following statements.</i>				
<i>1. You feel close to people at your school.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>2. You feel like you are part of your school.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>3. Students at your school are prejudice.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>4. You are happy to be at your school.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>5. The teachers at your school treat students fairly.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>6. You feel safe in your school.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	

**Parent Connectedness.** Parent connectedness is measured using two separate measurements, one for mother connectedness and another for father connectedness.

Mother connectedness is measured with a 5-point Likert scale that included 5 questions. The scale was coded 1 = strongly agree to 5 = strongly disagree. For the purposes of this analysis the mother connectedness items were recoded so that higher scores on the mother connectedness scale correlated to higher levels of mother connectedness. The mother connectedness is average and collapsed into on-unit categories from 1 = strongly disagree to 5 = strongly agree. The mother connectedness scale is then collapsed into three categories (1= disagree, 2 = neutral, and 3 = agree) because of thin cells in the strongly disagree and strongly agree categories.

Father connectedness is measured using a single item that was coded 1 = strongly agree to 5 = strongly disagree. Similar to the mother connectedness scale the father connectedness variable is recoded so that higher scores correlated to higher levels of father connectedness. The father connectedness item is then collapsed into three categories (1= disagree, 2 = neutral, and 3 = agree) because of thin cells in the strongly disagree and strongly agree categories.

**Table 6A: Mother Connectedness.**

<b>Mother Connectedness Items</b>				
<i>1. Most of the time, your mother is warm and loving toward you.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>2. Your mother encourages you to be independent.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>3. When you do something wrong that is important, your mother talks about it with you and helps you understand why it is wrong.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>4. You are satisfied with the way your mother and you communicate with each other.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>5. Overall, you are satisfied with your relationship with your mother.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	

**Table 7A: Father Connectedness.**

<b>Father Connectedness Item</b>				
<i>1. Overall, you are satisfied with your relationship with your father.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	

**Self-Esteem.** The self-esteem scale is a 10 item, 5 – point Likert scale from strongly disagree to strongly agree. The items in the scale are recoded so that higher scores on the self-esteem scale correlated to higher levels of self-esteem. The scale is averaged and collapsed into one unit categories from 1 = strongly disagree to 5 = strongly agree. The scale is then collapsed into three categories (1=disagree, 2=neutral, and 3=agree) because of low cell counts in the strongly disagree and strongly agree categories.

**Table 8A: Self-Esteem**

<i>1. You have a lot of energy.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>2. You seldom get sick.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>3. When you do get sick, you get better quickly.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>4. You are well coordinated.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>5. You have a lot of good qualities.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>6. You are physically fit.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>7. You have a lot to be proud of.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>8. You like yourself just the way you are.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>9. You feel socially accepted.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	
<i>10. You feel loved and wanted.</i>				
Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
Agree (3)		Neutral (2)	Disagree (1)	

**Peer Connectedness.** Peer connectedness is measured using a single item that is coded from 1 = not at all to 5 = very much. The peer item is collapsed into three categories (1=very little, 2=somewhat and 3 = quite a bit) because of low cell counts in the not at all and very much categories.

**Table 9A. Peer Connectedness.**

<i>How much do you feel that your friends care about you?</i>				
Very Much (5)	Quite a Bit (4)	Somewhat (3)	Very Little (2)	Not at All (1)
Quite a Bit (3)		Somewhat (2)	Not at All (1)	

**APPENDIX B: Data Screening**

Appendix B presents the data screening for the Wave I and Wave II samples. The tables are organized by full data sets for each of the variables.

### Wave I – Data Screening

**Table 10A: Data screening for Wave I Full Data Set**

Variables	Full Data Set	Missing	Legitimate Skips	Don't Knows	Refused	Total
Age	3,644 (100%)	0	0	0	0	3,644 (100%)
Depression	3,644 (100%)	0	0	0	0	3,644 (100%)
Race	3,640 (99.9%)	0	0	2 (0.50%)	2 (0.50%)	3,644 (100%)
Self-Esteem	3,643 (99.7%)	0	0	1 (0.30%)	0	3,644 (100%)
Ever Sex	3,635 (99.8%)	0	0	5 (0.11%)	4 (0.09%)	3,644 (100%)
Religion	3,201 (87.0%)	0	3 (1.0%)	0	440 (12.0%)	3,644 (100%)
Alcohol Use	1,898 (54.0%)	0	1,740 (46.0%)	3 (0.06%)	3 (0.07%)	3,644 (100%)
Mother Connectedness	3,464 (95.0%)	0	0	179 (5.0%)	1 (0.01%)	3,644 (100%)
Father Connectedness	2,599 (71.7%)	0	1,044 (28.2%)	0	1 (0.10%)	3,644 (100%)
Peer Connectedness	3,632 (99.7%)	0	2 (0.09%)	7 (0.10%)	3 (0.11%)	3,644 (100%)
School Connectedness	3,559 (96.8%)	0	85 (3.2%)	0	0	3,644 (100%)
Perceptions of Sex	3,644 (100.0%)	0	0	0	0	3,644 (100%)

### Wave II – Data Screening

**Table 11A: Data Screening for Wave II Full Data Set**

Variables	Full Data Set	Missing	Legitimate Skips	Don't Knows	Refused	Total
Age	5,531 (100%)	0	0	0	0	5,531 (100%)
Depression	5,531 (100%)	0	0	0	0	5,531 (100%)
Race	5,523 (99.8%)	0	0	3 (0.01%)	5 (0.20%)	5,531 (100%)
Self-Esteem	5,529 (99.9%)	0	0	1 (0.05%)	1 (0.05%)	5,531 (100%)
Ever Sex	5,508 (99.7%)	0	0	17 (0.28%)	6 (0.07%)	5,531 (100%)
Religion	4,801 (85.9%)	0	723 (14.0%)	4 (0.05%)	3 (0.05%)	5,531 (100%)
Alcohol Use	2,640 (43.7%)	0	2,884 (56.2%)	6 (0.10%)	1 (0.02%)	5,531 (100%)
Mother Connectedness	5,227 (94.8%)	0	303 (5.2%)	1 (0.02%)	0	5,531 (100%)
Father Connectedness	3,983 (73.9%)	0	1,547 (26.1%)	1 (0.03%)	0	5,531 (100%)
Peer Connectedness	5,514 (99.7%)	0	2 (0.08%)	14 (0.18%)	1 (0.03%)	5,531 (100%)
School Connectedness	5,114 (92.3%)	0	414 (7.7%)	1 (0.02%)	1 (0.03%)	5,531 (100%)
Perceptions of Sex	5,531 (100%)	0	0	0	0	5,531 (100%)