Indiana University of Pennsylvania
Knowledge Repository @ IUP

Theses and Dissertations (All)

8-2010

Psychological Outcomes of Adolescent Females' Early Sexual Initiation: An Analysis Using Wave 1 and 2 From The National Longitudinal Study of Adolescent Health

Shelley Nicole Vukman
Indiana University of Pennsylvania

Follow this and additional works at: http://knowledge.library.iup.edu/etd

Recommended Citation
Vukman, Shelley Nicole, "Psychological Outcomes of Adolescent Females' Early Sexual Initiation: An Analysis Using Wave 1 and 2 From The National Longitudinal Study of Adolescent Health" (2010). *Theses and Dissertations (All)*. 1015.
http://knowledge.library.iup.edu/etd/1015

This Thesis is brought to you for free and open access by Knowledge Repository @ IUP. It has been accepted for inclusion in Theses and Dissertations (All) by an authorized administrator of Knowledge Repository @ IUP. For more information, please contact cclouser@iup.edu, sara.parme@iup.edu.

PSYCHOLOGICAL OUTCOMES OF ADOLESCENT FEMALES' EARLY SEXUAL INITIATION: AN ANALYSIS USING WAVE 1 AND 2 FROM THE NATIONAL LONGITUDINAL STUDY OF ADOLESCENT HEALTH

A Thesis

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Master of Arts

Shelley Nicole Vukman

Indiana University of Pennsylvania

August 2010

Indiana University of Pennsylvania

The School of Graduate Studies and Research

Department of Sociology

We hereby approve the thesis of

Shelley N. Vukman

Candidate for the degree of Master of Arts

_____ _____

Kay Snyder, Ph.D.
Professor of Sociology, Advisor

_____ _____

Alex Heckert, Ph.D.
Professor of Sociology

_____ _____

Diane Shinberg, Ph.D.
Assistant Professor of Sociology

ACCEPTED

_____ _____

Timothy P. Mack, Ph.D.
Dean
The School of Graduate Studies and Research

Title: Psychological Outcomes of Adolescent Females' Early Sexual Initiation: An Analysis Using Wave 1 and 2 From The National Longitudinal Study of Adolescent Health

Author: Shelley N. Vukman

Thesis Chair: Dr. Kay Snyder

Thesis Committee Members: Dr. Alex Heckert
Dr. Diane Shinberg

This study used longitudinal analysis of the National Longitudinal Study of Adolescent Health to examine the effects of early sexual initiation and time since sexual initiation among female adolescents on levels of depressive symptomatology, self-esteem, body image, and disordered eating behaviors. The sample included all females interviewed at both wave 1 (1994-95) and wave 2 (1996) from the public-use dataset, resulting in a nationally representative sample of 2,385 female adolescents in grades 7-12. Scales for depressive symptomatology, levels of self-esteem, and distorted body image used previously validated measures, whereas the disordered eating behavior scale was created for this study.

Analyses involving ordinary least squares and logistic regression used wave 1 and wave 2 to measure change in psychological outcomes over time. Controlling for wave 1 measures ultimately provided a more conservative test of the associations between early sexual initiation and psychological outcomes. As hypothesized, the study found a significant causal relationship between adolescent females initiating sex early and higher levels of depressive symptomatology. Females who initiated sex early and had higher levels of depressive symptomatology at wave 1 were likely to exacerbate their depressive symptoms after sexual intercourse. Still, female's level of depressive symptomatology decreased as the time since first sexual initiation increased. Early sexual initiation did

not significantly impact levels of self-esteem, distorted body image, or disordered eating behaviors as hypothesized. In fact, adolescent females who initiated sex early had lower levels of disordered eating behaviors and a more positive body image, suggesting that adolescent females who had initiated sex were more satisfied with their bodies compared to peers who had not yet initiated sex.

This study provided support for previous studies demonstrating that females who perceived themselves as maturing early experienced more negative psychological outcomes: higher levels of depressive symptomatology, more disordered eating behaviors, and greater odds of having a distorted body image. This study also confirmed the previous finding that the younger age at sexual initiation, the greater likelihood of sex being involuntary. Overall, this study underscores the importance of using longitudinal research to better understand the impact and implications of early sexual initiation among adolescent females.

ACKNOWLEDGEMENTS

First and foremost I would like to thank my committee members. This thesis would not have been possible without their guidance. I would like to thank Dr. Diane Shinberg for offering her methodological expertise, especially in using longitudinal data. Dr. Shinberg offered much advice for data analysis and research insight and made great efforts to explain things clearly. Her enthusiasm for research motivated and encouraged me to complete this study.

It was a pleasure to work with Dr. Alex Heckert. He made available his support in a number of ways, including his boundless patience in sharing his methodological knowledge. He challenged my thinking, and his enthusiasm not only helped me throughout the learning process but made it enjoyable. I am grateful for his generous support and for answering my never-ending questions.

I owe my deepest gratitude to Dr. Kay Snyder, my committee chair and greatest mentor. She guided me through my time as a graduate student at Indiana University of Pennsylvania and has given me the encouragement to continue on to a doctoral program. Without her unconditional support and patience, I would have never made it this far. She gave me a sense of direction in pursuing my graduate studies and has played a significant role in my life. I cannot thank her enough.

Finally, I would like to thank my friends and family for their encouragement and support throughout my graduate studies, and for dealing with me in times of stress. I dedicate this thesis to them.

TABLE OF CONTENTS

CHAPTER

I. INTRODUCTION 1

II. REVIEW OF LITERATURE 8

Sexual Attitudes in the United States 10
Girlhood Perspectives 11
Female Adolescent Development 13
Research on Early Sexual Initiation 16
Psychological Well-Being of Female Adolescents 19
Depression 19
Self-Esteem 23
Body Image 24
Disordered Eating Behaviors 26
Hypotheses 28

III. METHODS 31

Research Design 31
Public-Use Data 34
Measures 36
Psychological Measures 36
Sexual Initiation Variables 42
Control Variables 45
Reliability and Validity 51
Procedures 53

IV. FINDINGS 56

Univariate Analyses 56
Psychological Measures 56
Sexual Initiation Variables 59
Control Variables 60
Regression Results 64
Depressive Symptomatology 64
Self-Esteem 68
Body Image 71
Disordered Eating Behaviors 74
Summary 77

V. DISCUSSION 80

Previous Research 80

Implications....84
Limitations....87
Directions for Future Research....89
Conclusion....92

RESEARCH ACKNOWLEDGEMENTS....94

REFERENCES....95

LIST OF TABLES

Table Page

1 Descriptive Statistics for Analytic Variables, Add Health Waves 1-2. 57

2 Linear Regression Results for Depressive Symptomatology Scores, Add Health Waves 1-2.....65

3 Linear Regression Results for Self-Esteem Scores, Add Health Waves 1-2.....69

4 Logistic Regression Results for Distorted Body Image, Add Health Waves 1-2.....72

5 Linear Regression Results for Disordered Eating Behaviors, Add Health Waves 1-2 75

LIST OF FIGURES

Figures Page

1 Organizational chart showing sequential order of the blocked regression models.....55

CHAPTER I: INTRODUCTION

Adolescence is a critical stage for emotional and physical development. It can be a challenging time for individuals as they become more independent and are given more freedom from parents to make their own decisions. Adolescence may also be the first time individuals explore romantic relationships and their sexuality. While the negative consequences of sexual activity among adolescents are often discussed in the United States, typically the focus is on the physical consequences of early sexual initiation, such as a greater number of sexual partners, increased risk of sexually transmitted infections, and unintended pregnancy (Albert, Brown, & Flanigan, 2003). Less studied are the possible emotional outcomes of early sexual initiation. Of particular importance to this study was examining if a younger age at sexual initiation increased negative psychological outcomes among adolescent females.

Previous studies have indicated that emotional distress was more common in adolescent females than males (Whitehead & Ooms, 1999). Females experienced higher rates of depression (Berk, 2004), and studies have suggested that females' self esteem and body image declined in adolescence (Ridolfo & Milkie, 2008). Whitehead and Ooms (1999) argued that in the 1990s, young females in the United States were growing up in the midst of a culture that glorified sex and "sexiness." More recently the overexposure of exploitative sexual messages has become even more prevalent, which may play a role in the age at which adolescent females initiate sex. Furthermore, young females today are maturing earlier biologically, while their social and cognitive development has not kept pace.

Young females are sent contradictory messages regarding their sexuality. Although youth and adults in the United States tend to view sex with a more tolerant attitude than they have in the past, communication and education about sex for young people remains relatively restrictive (Berk, 2004). Typically, adolescents learn about sex primarily from peers and also from the media, which glorifies sex yet only rarely shows protected sex or the negative consequences of sex. Young females may be experiencing more social pressure to initiate sex at younger ages, and earlier sexual activity can interfere with healthy psychological development (Whitehead & Ooms, 1999). This thesis is important due to the lack of research on the topic.

Previous studies have indicated a link between higher rates of depression and sexually active teenage males and females (Johnson, Noyes, & Rector, 2003). Studies have reported conflicting results, however, in regards to the direction of causality between depression and sexual activity. Furthermore, the implications of age at sexual initiation have been less studied. Since Johnson, Noyes, and Rector found a relationship between depression and sexual activity, other psychological outcomes of early sexual initiation should also be examined. In this study, I investigate whether the age of sexual initiation resulted in various negative psychological outcomes.

In Chapter II I review the literature related to sexual activity in adolescence. This chapter explores current sexual attitudes in the United States in terms of how these might affect young females. I discuss the "girlhood crisis," which states that the patriarchal and sexist society in the United States is harmful to female adolescents (Ridolfo & Milkie, 2008). I contrast this movement with the "girl power" movement, which views female adolescents as having a stronger sense of self in part because they are more

knowledgeable about sex today and can take more responsibility over their sexual health (Ridolfo, 2007). This chapter examines the physical, cognitive, and emotional development of female adolescents to determine how these factors might contribute to an adolescent's decision to initiate sex early. This chapter also reviews the available literature on early sexual initiation to determine predictor variables. Lastly, I discuss four psychological outcomes: depression, self-esteem, distorted body image, and disordered eating behaviors.

Chapter III describes the methodology of this study. I conducted secondary data analysis using the public-use dataset of the National Longitudinal Study of Adolescent Health. This study's sample included females who were interviewed at wave 1 and wave 2, resulting in a total of 2,385 female adolescents. The independent variables were respondents' time since sexual initiation and age at sexual initiation. Control variables included socio-demographic variables as well as sexual context variables, such as whether or not the female had involuntary sexual activity, dating status, and perceived physical maturity. I examined how the age at sexual initiation and time since sexual initiation affected four psychological outcome variables—depressive symptomatology, self-esteem, body image, and disordered eating behaviors.

The depressive symptomatology outcome variable was computed using an adapted 11-item scale that was validated in previous studies. The scale was a continuous variable to measure levels of depressive symptomatology. The second outcome variable, self-esteem, used 6 items that form a continuous scale that have been validated in previous studies. Distorted body image was a dichotomous variable computed by measuring perceived distortion of being overweight. This variable was adapted from a

previous study. I also created a disordered eating behaviors scale unique to this study, a continuous variable with 6 items. All four outcome variables were measured at wave 1 and wave 2 so change in psychological outcomes could be observed for respondents.

The main research question of the study is: Does an early age at first intercourse increase the likelihood of negative psychological effects on adolescent females? This study tested various hypotheses to answer this research question. The first hypothesis is: Female adolescents who initiate sexual intercourse early will have higher levels of depressive symptomatology, lower self-esteem, more distorted body image, and greater levels of disordered eating behaviors at wave 2 on average than late initiators or non-initiators. The rationale for this hypothesis stemmed from a review of previous studies and the psychological literature. The adolescent development literature was also considered in terms of its implications for early sexual initiation, since younger adolescents lack formal operational reasoning skills that are not developed until late adolescence. Females who initiated sex early may be more preoccupied with their body, and may be more susceptible to societal messages portraying beauty as thin. These young females may be more vulnerable to unhealthy messages, and not able to filter them out as much as older females. Females who initiated sex late are further developed emotionally and cognitively, and may not feel as much pressure in regards to their bodies.

The next hypothesis is: As the time since first sexual intercourse increases for female adolescents, negative psychological outcomes will decrease. I expected to find less negative psychological outcomes as more time passed since first sexual intercourse. This hypothesis was based on the psychological literature regarding adolescent development. The available literature has found that self-esteem and body image

increased throughout adolescence as the adolescent ages, while levels of depression decreased as the adolescent ages (Berk, 2004). An aging effect occurs, in which adolescents grow out of a negative self-perception of themselves as they enter young adulthood. The negative psychological outcomes predicted from early sexual initiation were expected to lessen as females age.

The last hypothesis is: As the age of sexual initiation increases, negative psychological outcomes will decrease. This hypothesis once again was based on the adolescent development literature. In late adolescence, reasoning skills are further developed (Berk, 2004), and adolescents might feel more control over their first sexual intercourse. For females, sexual initiation occurring later in adolescence is less likely to involve forced sex (Abma, Martinex, Mosher, & Dawson, 2004). Older females may be in a better position in all sorts of ways to negotiate sexuality, rather than being coerced.

The data were analyzed by using ordinary least squares regression and logistic regression; two regressions were run per outcome variable. The outcome variables were first regressed with a categorical variable specifying those who had sex early, those who initiated sex late, those who never initiated sex by wave 2, and those who initiated sex but at an unknown age. The outcome variables were then regressed on continuous independent variables measuring time since first sexual initiation and age at initiation. To ensure a more precise calculation, the unit of measurement was months rather than years. Variables were entered into the model in a hierarchical fashion. Ordinary least squares regression was used to analyze depressive symptomatology, self-esteem, and disordered eating behaviors. Logistic regression was used to analyze distorted body image.

Chapter IV discusses the findings from this study. The data analysis did not support most of my hypotheses. Early sexual initiation did not significantly impact levels of self-esteem, distorted body image, or disordered eating behaviors as predicted. In fact, adolescent females who initiated sex early had lower levels of disordered eating behaviors and a more positive body image. Other findings, however, indicated negative consequences of early sexual initiation. Adolescent females who initiated sex early were more likely to report that it was involuntary. Early sexual initiation predicted higher depressive symptomatology scores, demonstrating a causal relationship between the variables, a significant contribution to literature on this topic. An additional contribution of this research was examining a previously unstudied variable — disordered eating behavior.

In Chapter V, I discuss the implications of the present study, limitations of the study, and suggestions for future research. This study found that early sexual initiation among adolescent females did not affect levels of self-esteem, body image, and eating behaviors in a negative way. Some adolescents fared better than others on these self-reported measures, however, the incidence of higher levels of depressive symptomatology after early sexual initiation is important to recognize. Limitations of this study included self-report bias, which is common when measuring a sensitive topic such as sexual behavior among a young population. Other limitations included the way in which sexual initiation was measured in the study design, as well as how height and weight were measured at wave 1.

Future research using the complete, restricted contractual dataset should be completed examining age at initiation on depressive symptomatology. If future studies

show similar findings, perhaps not only the physical consequences of sex should be discussed with adolescent females, but emotional implications regarding depressive symptoms should be communicated as well. Future longitudinal research is warranted to examine self-esteem, disordered eating behaviors, and distorted body image to confirm that no relationship exists with early sexual initiation. Future research should be conducted using the most recent waves of data from the National Longitudinal Study of Adolescent Health. Wave 3 (2001-02) and wave 4 (2007-08) could be used to examine if early sexual initiation has any long-term implications on the mental and sexual health of females. Overall, the nationally representative dataset and longitudinal design of this study provided a valuable resource for examining implications of early sexual initiation. The next section is an overview of the literature pertaining to sexual activity among adolescents and the psychological well-being of young females in the United States.

CHAPTER II: REVIEW OF LITERATURE

Sexual activity among adolescents, and how to appropriately address its potential negative consequences, is a hotly contested issue in the United States. Politicians debate reproductive rights; school administrators and parents argue about whether to promote abstinence-only or comprehensive sex education programs; and, many worry that teens are continually bombarded by so many sex-related messages in the media. In spite of the various concerns about the consequences of early sexual activity among adolescents, there actually is little published information on the topic (Albert, Brown, & Flanigan, 2003). Much of the literature has focused on the *negative physical consequences* of early sexual initiation, such as a greater number of sexual partners over time, and an increased risk of teen pregnancy and sexually transmitted diseases (Johnson, Noyes, & Rector, 2003). These outcomes affect both male and female adolescents, but may be more detrimental to female adolescents. Female adolescents in the United States bear the most responsibility if they become pregnant and are faced with the double standard of a bad reputation for being sexually active, while their male counterparts are looked at more positively.

Furthermore, early sexual initiation may also have a greater effect on females than on males in terms of emotional outcomes. Forming first romantic relationships and first sexual intercourse is a rite-of-passage for many American adolescents presently. In a report for the National Campaign to Prevent Teen Pregnancy, Whitehead and Ooms (1999) described young women's sexual initiation as having emotional and symbolic significance for females based on commitment and love. The same report examined research studies and personal accounts that consistently found that young females wanted

their first sexual intercourse to "mean" something (Whitehead & Ooms). In their report, Whitehead and Ooms also cited numerous books published in the 1990s that included personal interviews with young females, in which adolescent females described feelings of loss, emptiness, and resentment after their first sexual intercourse. Because emotions appear to accompany female adolescents' early sexual experiences, I would expect that early sexual initiation among female adolescents would result in negative psychological outcomes.

The way in which teen sexual activity has been evaluated is problematic with regards to literature on this topic. Many of the studies are cross-sectional in nature, and thus do not give an accurate reflection of changes in emotions across time after sexual initiation. Albert, Brown, and Flanigan (2003) pointed out that a widely cited survey used to measure adolescent sexual behavior is the Youth Risk Behavior Survey; however, this survey only collects data on high-school students. The majority of high school students are at least 15 years old. Albert et al. found that nearly one in five adolescents (male and female) had initiated sex before their 15th birthday. Much of the literature is not only cross-sectional, but has excluded adolescents younger than 15 who have initiated sex. The less frequently studied younger population, particularly of females, could be more vulnerable to negative psychological outcomes. As will be discussed in Chapter III, the current study includes a wider age range and is longitudinal. After first examining the current literature on sexual behaviors and the psychological well-being of adolescent females, I consider research on current sexual attitudes in the United States and how these attitudes affect young females. I then discuss the available literature on female adolescent development, as well as some of the most common psychological struggles

that plague young women—depression, low self-esteem, poor body image, and disordered eating behaviors.

Sexual Attitudes in the United States

Sexual attitudes in the United States have become more liberal in the past 30 years among youth and adults (Berk, 2004). By the 1990s, many adults and young people in the United States believed that it was socially acceptable for two people to have sex before marriage if they were emotionally committed to each other (Michael, Gagnon, Laumann, & Kolata, 1994). The liberal shift in sexual values could contribute to adolescents initiating sex at earlier ages. Although youth and adults in the United States tend to have a more tolerant attitude towards sex than in the past, education and communication have lagged behind. Berk argued the United States has painted an image of a "sexually free modern adolescent," while sexual attitudes have remained relatively restrictive (p. 354). Since parents often give their children limited information on sex, Berk indicated that adolescents are left to learn from their school, friends, magazines, the internet, television, and other media.

Laumann, Gagnon, Michael, and Michaels (1994) noted the large role played by mass media and the extensive growth of technology in the transition of sexual values in the United States since the 1960s. Cell phones, computers, video games, and especially the internet expose young people in the United States to an uncensored world around the clock. Unfortunately, this has given various types of popular media the power to influence social norms. Sex, drugs, and alcohol use are glorified through much of the media. This contrasts considerably with the 1950s, when a husband and wife were not even pictured on television sleeping in the same bed.

Brown (2002) found that adolescents watched American prime-time television the most, where two-thirds of programs contained sexually explicit content. Programs displayed promiscuous characters, with young women dressed provocatively and only recognized for their attractiveness and sexuality. Brown also found that programs rarely displayed characters taking precautions against pregnancy and sexually transmitted infections. According to Berk (2004), adolescents received contradictory messages from various sources. Societal messages romanticize sex and show how exciting sex is, while adults and schools emphasize how sex in young adolescence is wrong. As adolescents are forming their identities and transitioning into adulthood, they may find these contradictory messages confusing.

Girlhood Perspectives

The idea of a "girlhood crisis" became popular in the 1990s as psychologists, such as Mary Pipher and others, published their works on how the patriarchal and sexist society in the United States could be harmful to female adolescents (Ridolfo & Milkie, 2008). Pipher (1994) argued that a desensitization of sex in the United States created a poisonous culture for female adolescents. Pipher also argued that overexposure to sexualized messages gave females unrealistic standards to strive for regarding sexuality. An over-sexualized society may communicate to young females that their value is based on attractiveness and sex appeal. One implication of Pipher's argument might be that older female adolescents who are further developed cognitively and emotionally may be able to filter out these harmful messages, whereas younger females are not yet able to do so.

Ridolfo and Milkie (2008) explained how supporters of the "girlhood crisis" believed that adolescent females are unable to maintain a strong self-concept in a society where women are devalued. The available literature has provided evidence for this; however, there are opponents to this theory. Some challenged the "girlhood crisis" because many of the studies were done on middle class whites, ignoring other adolescent females from different racial and economic backgrounds. In order to understand female adolescents' transitions into adulthood, other socio-demographic characteristics must be examined (Ridolfo & Milkie). Those who have disagreed with this perspective have typically shown support for a girl empowerment movement. Aaopola, Gonick, and Harris (as cited in Ridolfo, 2007) termed this the "girl power" movement, which viewed young female adolescents as having a strong sense of self, rather than being passive and vulnerable.

Other researchers have recognized that young females may experience a combination of these two perspectives. Brumberg (1998) studied the history of American girls and the changed meanings toward a girls' sexual coming of age. She argued that a shift had occurred in the locus of authority from the family, educators, and clergy to adolescent girls themselves, health professionals, and the law. Whitehead and Ooms (1999) referred to this shift as a move from social-protection to self-protection, a cultural change that they argued had both positive and negative consequences for young females. When compared to earlier generations, they found that female adolescents in the late 1990s were less naïve when it came to sexual matters and pregnancy. They were more knowledgeable about contraception and sexual health, and more open in talking about sexuality. Alternatively, Brumberg contended that adolescent females were also less

likely to get the guidance and support needed from adult women. Social institutions no longer protected and sheltered young women regarding sexuality, leaving young women to navigate through this sensitive time themselves.

Female Adolescent Development

Adolescence is a time of dramatic physical and cognitive changes (Berk, 2004). Whitehead and Ooms (1999) described adolescence as a vulnerable time emotionally for females, as well as a critical stage in life for healthy development into the transition to adulthood. Young women's bodies mature much faster than their minds and hearts. While some 13 year-olds might look like fully grown women, they still have skills to develop before they are ready to assume adult roles, such as engaging in sexual intercourse (Whitehead & Ooms). In a report for the National Campaign to Prevent Teen Pregnancy, Albert, Brown, and Flanigan (2003) used estimates from three nationally representative datasets from 1994 to 1997 to gain a national picture of the sexual behavior of young adolescents. They found that 18-19% of youth reported having had sexual intercourse at age 14 or younger. The percentage of adolescents who reported having had sex increased with age. At age 12, only 4-5% of adolescents reported having had sex; at age 13, 10% reported having had sex; by age 14, the percentage had increased to 18-19%. Female adolescents were less likely to report having had sex at an early age than males, but a substantial percentage still reported being sexually experienced. At the age of 12, Albert, Brown, and Flanigan found that 2-4% of female adolescents reported being sexually experienced. By the age of 14, 14-20% of female adolescents reported being sexually experienced.

Importantly, a consistent finding in previous studies is that male adolescents have reported higher rates of sexual activity compared to female adolescents. Zenilman (2005) concluded that this discrepancy could be due to males over-reporting and females under-reporting their sexual experiences. Albert, Brown, and Flanigan (2003) found that three nationally representative datasets all suggested that approximately one in five youth had sex prior to the age of 15. Whitehead and Ooms (1999) suggested that young females who initiated sex early and were a part of this statistic may not have been emotionally or cognitively ready to fully engage in consent, contraception, or choice when it came to first sexual intercourse. What might be considered normative for a 17 year-old is developmentally inappropriate for a 13 year-old.

Berk (2004) described how formal operational reasoning takes until late adolescence to be fully developed, at which point adolescents become better at planning and decision making. Reasoning skills can be very important for a young woman when making decisions about contraception, especially when first sexual intercourse might not be a planned event. Albert, Brown, and Flanigan (2003) found that contraceptive use among young adolescents was relatively low. This could be due to first sexual intercourse being a spontaneous event where adolescents often do not plan in advance to bring condoms or other contraception. Females are subjected to the sexual double standard and may be particularly unlikely to acknowledge planned first intercourse by using contraceptives.

Furthermore, with reasoning skills remaining undeveloped, adolescents may not think of the consequences of having unprotected sex. Using the National Longitudinal Study of Adolescent Health, Albert, Brown, and Flanigan (2003) found that the

likelihood of contraception use at first sex increased dramatically as the age at first sex increased. As reasoning skills developed further, individuals realized the consequences of unprotected sex, and more adolescents were prepared with contraception. Consistent with these findings, Albert et al. were not surprised to find that approximately one in seven sexually experienced 14 year-old female adolescents reported having been pregnant. For young adolescent females, fear over the possibility of becoming pregnant after unprotected sex, or the reality of actually becoming pregnant, could contribute to stress and negative emotions after first intercourse.

Young females may feel pressure to have sex. Using data from the National Survey of Family Growth, Albert, Brown, and Flanigan (2003) reported that more than one in ten adolescent females who had sex prior to age 15 described it as non-voluntary. Additionally, many more of these females classified their first sex as relatively unwanted. When compared to females who initiated sex later in adolescence, female adolescents who initiated sex prior to age 15 and classified it as voluntary were more likely to say that their first sexual intercourse was relatively unwanted. Other studies have had similar findings. Abma, Martinez, Mosher, and Dawson (2004) found that the younger the age at first sexual intercourse, the higher the proportion of adolescents who reported sex as being involuntary.

These statistics are cause for concern. If many young female adolescents are being forced or pressured into having sex, they may experience feelings of resentment or other negative emotions after first sex. Older female adolescents may feel more control over their first sexual intercourse, and not give in to pressure as much as younger adolescents. As Berk (2004) has noted, from a psychological perspective, older

adolescents were more likely to have a conventional moral orientation so the importance of peer pressure and gender-stereotyped attitudes and behaviors declined. Younger females may have felt negative emotions after their first sexual intercourse because it was a relatively unwanted experience. Young female adolescents could also develop a negative self concept if they blame themselves and feel guilt after the experience.

Research on Early Sexual Initiation

Previous studies have uncovered a broad range of predictors of early sexual initiation for males and females. Berk (2004) found a link between early sexual activity and personal, peer, family, and educational characteristics. One of the strongest predictors of early sexual activity was race, with African American and Hispanic youth at a greater risk of early sexual initiation. Using data from the Youth Risk Behavior Survey of 2003, Grunbaum et al. (2004) found that 19% of African American youth and 8% of Hispanic youth initiated sex prior to the age of 13, compared to 4% of White youth. Pubertal maturation was also linked to early sexual activity, with females who matured early having an increased risk of initiating sex earlier than their peers (Berk). Dating status was another important variable to examine because adolescents who dated were exposed to more potential sex partners and more opportunities to initiate sex than non-daters. Albert, Brown, and Flanigan (2003) found that female adolescents who dated someone older were significantly more at risk of earlier sexual initiation.

Parents' involvement in their children's lives has shifted in recent decades due to changing family dynamics and societal norms. Single-parent families and two parents working outside of the home are more prevalent today. Parents typically have less time to spend with their children, and adolescents tend to have more freedom to make their

own choices. Adolescence is also a time when individuals often distance themselves from adults and depend more on their peer group. Previous studies have found that peers' sexual norms and attitudes influence adolescents' sexual behavior (Bachanas et al., 2002; Maxwell, 2002; Romer et al., 1994; Whitaker & Miller, 2000).

Studies have found that family structure is a significant variable, with the likelihood of early sex increasing for youth living in non-intact families. Berk (2004) defined a non-intact family structure as including parental divorce, single-parent families, and step-parent families. Kotchick, Shaffer, Forehand, and Miller (2001) suggested that single-parent homes may offer less parental supervision and fewer resources to adolescents for educational attainment. They also found that having a large family, poor school performance, and low educational aspirations were related to early sexual initiation. If adolescents associated with friends who were sexually active or had older siblings who were sexually active, this decreased their age at sexual initiation (Kotchick et al.). Since many of these factors are associated with lower socioeconomic status, adolescents growing up in economically disadvantaged families not surprisingly were more likely to initiate sex earlier (Berk). Berk also discussed a link between early sexual activity and other norm-violating behaviors. Albert, Brown, and Flanigan (2003) found that reported prior use of cigarettes, alcohol, marijuana, and other illicit drugs increased the risk of early sexual initiation.

Protective factors help discourage adolescents from having sex too early. These protective factors include attachment to school and other conventional values, such as higher religiosity. Rosenbaum and Kandel (1990) discussed various studies that found

that adolescents who demonstrated higher academic achievements, educational aspirations, and a higher level of conventionality tended to initiate sex at a later age.

The average age of sexual initiation is important to consider in this study as a point of reference. The lack of updated, relevant statistics makes it difficult to determine the current average age of sexual initiation. Whitehead and Ooms (1999) found that the modal age of sexual onset in the mid 1990s was 17, gradually declining to this age over thirty years. The Alan Guttmacher Institute (2010) published the most recent report with relevant statistics in January 2010. The report examined American teen sexual and reproductive health, finding that by age 15, only 13% of teens who were never-married had initiated sex. By the age of 19, this statistic increased dramatically to 70% of never-married teens having engaged in sexual intercourse. The increase in sexual initiation among older adolescents could be due to having more freedom and independence. For younger female adolescents still living at home, it can be more difficult to obtain birth control or other forms of contraception without their parents' help.

Young women need more assistance from adults when it comes to taking preventive measures from unintended pregnancy and sexually transmitted diseases in young adolescence. It can be stressful for female adolescents to navigate through this time in an environment that is unsupportive toward having sex. If they do choose to have sex, many of these adolescents must sneak around, considering that the majority are living with other family members. Such circumstances may also contribute to more sexual intercourse being unplanned. The additional obstacles younger females have to overcome might cause more stress and negative emotions involving their first sexual intercourse.

Older female adolescents may be more likely to avoid these negative emotions because they have more resources available to them. Older female adolescents may be more comfortable seeking out forms of contraception, and at the age of 17 they are also able to obtain emergency contraception over the counter without an adult's signature. Older adolescents may experience more freedom from their parents because they have their driver's license, and many will eventually be living away from their parents when they go to college. In addition to having more independence, older adolescents are typically further developed cognitively and better prepared emotionally for their first sexual intercourse.

Psychological Well-Being of Female Adolescents

Depression

Previous research has indicated that depression is an important issue for female adolescents. In her review of literature, Berk (2004) discussed Nolen-Hoeksema's research, which found that depression occurred twice as often in adolescent females as in adolescent males, a gender disparity that continued into adulthood. Weissman et al. (1999) found that depression in adolescence can disrupt identity development and prevent young women from mastering critical developmental tasks. Cicchetti and Toth (1998) found a combination of biological and environmental factors led to depression. Genetics plays a role, and depression can occur with a chemical imbalance in the region in the brain involved in inhibiting negative emotions. Cicchetti and Toth also found depression can occur as a hormonal response to stress. Furthermore, negative experiences can induce depression by promoting the onset of the biological functions just described.

Events such as divorce, the end of a friendship or romantic relationship, or troubles at school could all contribute to depression in a vulnerable adolescent (Berk).

Previous research has examined why adolescent females are more prone to depression compared to adolescent males. Nolen-Hoeksema (as cited in Berk, 2004) discussed how depressive symptoms increased around the time of puberty. Interestingly, biological changes were not completely responsible for the greater levels of depression among adolescent females as compared to males, however, since this gender disparity was only found in industrialized nations. In developing countries, Culbertson (1997) found that depression rates were similar among young males and females. Berk (2004) suggested that gender-typed coping styles and stressful events seemed responsible for female adolescent depression.

Females who mature early can be especially predisposed to depression. Wichstrom (1999) discussed how the increase of gender socialization during adolescence can increase females' passivity and dependency, which are maladaptive approaches for females to use in completing tasks. Additionally, Wichstrom found that adolescents who strongly identify with feminine traits were more depressed, regardless of their gender. Depression may develop due to stressful experiences that young female's face and their maladaptive coping strategies to deal with the stress (Berk, 2004).

Previous research has examined a possible link between depression and early sexual initiation in females. Results are conflicting, however, in terms of the direction of causality between the two variables. Some studies have found that depressed female adolescents were more likely to initiate sex early. Other studies, discussed below, found females who initiate sex early may develop depression. However, many of these

previous studies did not use a longitudinal data set in their analyses, such as that used in the present study. Furthermore, most of the past research has used depressive symptoms as an independent variable, rather than as the dependent variable as is the case in the present study.

In their cross-sectional research, Whitbeck, Hoyt, Miller and Kao (1992) found that depressive symptomatology directly and indirectly increased the probability of sexual activity among adolescent females. The findings of Whitbeck et al. suggested that females who showed higher levels of depressive symptomatology may initiate sex at an earlier age. Harris, Duncan, and Boisjoly (2002) used longitudinal data from the National Longitudinal Study of Adolescent Health and found that a "nothing to lose" attitude and negative normative climate increased the risk of females' early sexual onset. Longmore, Manning, Giordano, and Rudolph (2004) used wave 1 and wave 2 of Add Health data to examine whether depressive symptoms affected an adolescent's sexual initiation when normative timing and background variables were controlled. They found that the frequency of depressive symptoms was a statistically significant predictor of sexual onset for 13 year-old females, but not for females 15 or 17 years of age. They suggested that depressive symptoms were a risk factor for an adolescent female's early sexual onset; depressive symptoms were a more significant predictor for White females than for African American females.

The findings discussed above suggest the opposite direction of causality than that examined in the present study. Hallfors, Waller, Bauer, Ford, and Halpern (2005) used wave 1 and wave 2 of Add Health data to examine the direction of causality between risk behaviors and depression in adolescence. In their analysis they found strong evidence

that adolescent sex and drug behaviors had a causal or mediating relationship for the development of depressive symptoms. Particularly for females, modest involvement with sex and drug behavior increased the risk for depression. Hallfors et al.'s findings support the perspective that adolescents may self-medicate depression with drugs and sex. The direction of causality in Hallfors et al.'s study is consistent with the present study; however, the present study uses a different independent variable.

Johnson, Noyes, and Rector (2003) used wave 2 of Add Health data to conduct a cross-sectional analysis on sexual activity and depression. They found that 25.3% of sexually active teenage females reported feeling depressed all, most, or a lot of the time. By contrast, only 7.7% of teenage females who were not sexually active reported being depressed all, most, or a lot of the time. Johnson et al. concluded that sexually active teenage females were more than three times more likely to be depressed than teenage females who were not sexually active. The present study will take these findings a step further by exploring the effects of age on sexual initiation as an indicator of depression.

Depression in female adolescents can be accompanied by other forms of emotional distress. Whitehead and Ooms (1999) argued that a disturbing number of teenage females struggled with depression, eating disorders, anxiety about their bodies, and drug and alcohol abuse. In fact, Whitehead and Ooms found that adolescent females with depressive symptoms were twice as likely as other adolescent females to engage in substance abuse and three times as likely to develop eating disorders. If there is a link between sexual activity and depression, then it is also important to examine other psychological factors related to depression, such as low self-esteem, poor body-image, and eating disorders.

Self-Esteem

According to Berk (2004), self-esteem is the evaluative side of self-concept and can fluctuate during adolescence. Previous studies have indicated that for most young people, self-esteem is high and continues to rise through the teen years (Berk; Zimmerman, Copeland, Shope, & Dielman, 1997). Self-esteem is influenced by an adolescent's larger social environment. Research has shown that African American adolescents have higher self-esteem than White adolescents. The disparity could occur because African Americans are more likely to have a strong sense of ethnic pride and a close, extended family (Gray-Little & Hafdahl, 2000). Gray-Little and Carels (1997) suggested that teenagers have higher self-esteem if they live in neighborhoods where their socioeconomic status or ethnic group is well represented. Most young people whose self-esteem drops in adolescence were females (Berk). Berk suggested that this is because adolescent females worry more than adolescent males about their physical appearance and feel more insecure in their abilities. Longmore, Manning, Giordano, and Rudolph (2004) studied the impact of self-esteem on adolescents' sexual initiation, arguing that high self-esteem could serve as a protective factor in delaying first sexual intercourse. However, the researchers acknowledged that self-esteem by itself did not protect against all risky behaviors, but could be a buffer against risky behaviors when combined with other positive attributes.

High self-esteem in female adolescents may help them deal with stressful life events. In their longitudinal analysis, Longmore, Manning, Giordano, and Rudolph (2004) examined how depression and self-esteem predicted age of sexual onset. They

found depressive symptoms, a risk factor, exerted a greater effect on sexual initiation compared to self esteem, a protective factor.

Body Image

Berk (2004) described body image as the attitude toward, and the conception of physical appearance. Ridolfo and Milkie (2008) discussed the two ways that body image is typically measured: cognitive-evaluation dissatisfaction or perceptual body size distortion. Cash and Deagle (1997) defined cognitive-evaluation dissatisfaction as an attitudinal measure of one's body in which individuals evaluate their satisfaction or dissatisfaction with their body size and shape. Cash and Deagle defined perceptual body size distortion as occurring when an individual demonstrates difficulty in accurately assessing their own body size.

Since adolescence is a time when physical attractiveness is highly salient (Halpern, Udry, Campbell, & Suchindran, 1999), females' preoccupation with their bodies is anticipated. Past studies have found that adolescent females' body image is influenced by the "appearance culture" and "appearance conversations" they have with their peers and friends (Halpern, King, Oslak, & Udry, 2005, p. 537). Halpern et al. found that adolescents with greater body fat have a lower likelihood of dating. Additionally, they found that female adolescents with below-average levels of fat had a significant advantage in the likelihood of dating. They concluded that with findings such as these, the prevalence of dieting and preoccupation with weight among pubertal and post-pubertal females was not surprising.

Halpern, King, Oslak, and Udry (2005) examined the effects of romantic relationships on adolescent females' body image, expecting significant findings

considering the normal anxieties that arise with adolescent romantic relationships and sexuality, and also with the sexual objectification of women's bodies in the United States. Using waves 1 and 2 of the National Longitudinal Study of Adolescent Health, they studied White, African American, and Hispanic female adolescents between the ages of 12-17. They found that the probability of having a sexual romantic relationship decreased by 6% with every one point increase in body mass-index (BMI). Moreover, they found a significant increase in the likelihood of dieting among adolescent females in nonsexual romantic relationships. This finding did not vary by age, race, or socioeconomic status. Halpern et al. concluded that females in a relationship and not having sex may diet in order to remain attractive to their partner, while females having sex in a relationship may have a higher self perception of their attractiveness and not feel pressure to diet. They also considered the possibility that sexually active females might have greater self assurance and body image, so they feel more comfortable initiating sex and have less concern with losing weight. Their findings suggest a relationship between weight and romantic relationships; the researchers suggest further consideration into the psychological implications of these findings.

Research has consistently found that early maturing females have reported poorer body image. Usmiani and Daniluk (1997) pointed out that an adolescent's body image strongly affected their self-esteem and psychological well-being. Adolescents felt more comfortable with peers who were at the same pubertal status, which could have negative implications for females who associated with older males. Early matured females sought older companions, which could lead to early sexual activity, substance use, and other delinquent acts (Caspi et al., 1993; Stattin & Magnusson, 1990).

Race was an additional determinant of poor body image. Previous studies have reported significant differences in the body image of White females and African American females. African American females were not as preoccupied with their weight as were White females (Ridolfo & Milkie, 2008). On average, adolescent African American females tended to be heavier than White adolescent females. White adolescent females were more likely to report themselves as being overweight, however, while African American females were more likely to report their weight as normal (Paxton, Valois, & Drane, 2004). In their review of previous studies, Ridolfo and Milkie discussed Ge, Elder, Regnerus, and Cox's research, which found that perceptions of being overweight had greater negative effects on the emotional health of White adolescent females than on African American or Hispanic adolescents. Kemper, Sargent, Drane, Valois, and Hussey (1994) found that larger body size was more accepted in African American culture. Ridolfo and Milkie (2008) used Rosenberg's contextual theory and Black Feminist theory to conclude that the unique socialization of African American female adolescents by their mothers explained why these adolescents had a higher self concept. As reported by their adolescents, they found that African American mothers were more supportive, encouraging of their child's independence, and had higher educational aspirations for their daughters. Adolescent females' perceived body image was influenced not only by societal messages, but also by messages from significant others.

Disordered Eating Behaviors

Adolescent females with poorer body image may be more likely to excessively diet and exhibit disordered eating behaviors. Disordered eating can include a number of

behaviors, including the use of laxatives, diet pills, extreme exercise or dieting, and vomiting. In their discussion of previous studies, Mueller, Pearson, Muller, Frank, and Turner (2010) commented on the significance of this issue in the United States, where "anti-fat" attitudes are encouraged and sometimes rewarded. Littleton and Ollendick (2003) warned that adolescent females can give into this pressure with unhealthy dieting and equate being thin with being beautiful. Halpern, King, Oslak, and Udry (2005) argued that dieting in adolescence could have both positive and negative implications for females. Those who dieted in a healthy and nutritionally sound way could avoid the prevalent problem of adolescent obesity, but those who excessively dieted could demonstrate disordered eating behaviors.

Cauffman and Steinberg (1996) conducted a modest cross-sectional study on White upper-middle-class adolescent females to examine the effects of dating and sexual activity on dieting. They found that dating and physical involvement with boyfriends was significantly linked to dieting and disordered eating behaviors. Conversely, Halpern, Udry, Campbell, & Suchindran (1999) conducted a longitudinal analysis on 200 White and African American female adolescents and did not find a significant relationship between dieting and sexual experience. They found that the amount of body fat was a better determinant of dieting, regardless of dating status.

Previous studies have indicated that eating disorders such as anorexia nervosa and bulimia nervosa mainly plagued White upper-class female adolescents (Lee & Lee, 1996). At the same time, eating disorders among other ethnic populations have been on the rise. Kuba and Harris (2001) suggested this was an effect of acculturation, with other ethnic populations being influenced by the dominant cultural values in Western societies.

Granillo, Jones-Rodrigues, and Carvajal (2005) conducted a cross-sectional analysis using wave 1 data from the National Longitudinal Study of Adolescent Health to examine eating disorder prevalence among Latina adolescents. They found that the parental level of education of Latina adolescents was significantly associated with developing eating disorders. Latinas whose parents had some level of college education had a lower BMI compared to those whose parents had no college education. This finding is consistent with literature that found a higher prevalence of eating disorders among adolescents who had higher socioeconomic status. Granillo et al. also found that eating disorder symptoms in Latinas were associated with body dissatisfaction, negative affectivity, low self-esteem, and substance use. Less studied is the association between sexual activity and eating disorders. This study will add to the literature specifically by researching a previously unstudied variable with early sexual initiation—disordered eating behaviors.

Hypotheses

The purpose of this study was to examine the possible negative emotional outcomes of early sexual initiation for female adolescents. Sexual activity and the emotional struggles of adolescent females have been widely researched, but more attention needs to be given to the implications of having sex early. Being cognitively, emotionally, and mentally underdeveloped at the time of first sexual initiation, combined with less mentorship and negative messages from the media, may have a negative impact on girls psychologically.

Conducting longitudinal analysis allowed me to examine changes in emotions after sexual initiation. The National Longitudinal Study of Adolescent Health (Add Health), which will be discussed further in Chapter III, allows researchers to study how

social environments and behaviors occurring in adolescence may be linked to health and other outcomes through early adulthood (Harris & Udry, 2008). For this research I used wave 1 (1994-95) and wave 2 (1996) of the public-use Add Health data (Harris & Udry). The main research question for this study is: Does an early age at first intercourse result in an increase in negative psychological effects among adolescent females?

I propose the following hypotheses:

Hypothesis 1a: Female adolescents who initiate sexual intercourse early will have higher levels of depressive symptomatology at wave 2 on average than late initiators.

Hypothesis 1b: Female adolescents who initiate sexual intercourse early will have higher levels of depressive symptomatology at wave 2 on average than non-initiators.

Hypothesis 2a: Female adolescents who initiate sexual intercourse early will have lower levels of self-esteem at wave 2 on average than late initiators.

Hypothesis 2b: Female adolescents who initiate sexual intercourse early will have lower levels of self-esteem at wave 2 on average than non-initiators.

Hypothesis 3a: Female adolescents who initiate sexual intercourse early will be more likely to have distorted body image at wave 2 on average than late initiators.

Hypothesis 3b: Female adolescents who initiate sexual intercourse early will be more likely to have distorted body image at wave 2 on average than non-initiators.

Hypothesis 4a: Female adolescents who initiate sexual intercourse early will have a greater number of disordered eating behaviors at wave 2 on average than late initiators.

Hypothesis 4b: Female adolescents who initiate sexual intercourse early will have a greater number of disordered eating behaviors at wave 2 on average than non-initiators.

Hypothesis 5: As the time since first sexual intercourse increases for female adolescents, negative psychological outcomes will decrease.

Hypothesis 6: As the age of sexual initiation increases, negative psychological outcomes will decrease.

Based on the literature review, I expected support for all of these hypotheses. The following chapter discusses the research design of the National Longitudinal Study of Adolescent Health in depth, as well as this study's measures and procedures.

CHAPTER III: METHODS

This study used The National Longitudinal Study of Adolescent Health to test the hypotheses stated in Chapter II. Due to the complexity of the dataset, this chapter begins with an in-depth discussion of the research design and an explanation of the public-use data. Construction of all independent variables, control variables, and four dependent variables are then examined thoroughly. Finally, the chapter reviews the reliability and validity of the variables, as well as the procedures used for data analysis.

Research Design

The National Longitudinal Survey of Adolescent Health was mandated by Congress to collect data on adolescent health in the United States. The study's purpose was to measure the impact of the social environment on adolescents' health and well-being. The National Longitudinal Study of Adolescent Health (Add Health) is a nationally representative sample of adolescents in the United States, who were in grades 7-12 during the 1994-95 school years. The Institutional Review Board for the Protection of Human Subjects in the School of Public Health at the University of North Carolina at Chapel Hill reviewed and approved all Add Health protocols. Add Health used a clustered, school-based, sampling design. According to Kelly and Preston (1997), the school-based design was the best way to screen for respondents and to access the respondents' peers, which was a fundamental aspect of the study.

The original sample consisted of 80 high schools and 52 middle schools in the United States, which were selected with unequal probability of selection. Using systematic sampling methods and implicit stratification ensured that the schools selected were representative of United States schools in terms of ethnicity, urbanicity, region of

the country, school size, and school type. In order to be eligible, the high school had to include an 11th grade and enroll at least 30 students. Of the originally selected high schools, 70% participated; the schools that declined were replaced by a school within the stratum. The participating high schools assisted in finding feeder schools. Feeder schools had to include a 7th grade and send at least five graduates to the participating high school. Of the feeder schools, one was selected with probability proportional to the number of students it sent to the high school. The sample consisted of a pair of schools in 80 communities (if a high school spanned grades 7-12, then a separate feeder school was not recruited). The core study included 132 total schools (Harris et al., 2009).

An in-school questionnaire, a self-administered instrument, was given to students in grades 7-12 from September 1994 through April 1995. The questionnaire included demographic and social characteristics, parent education and occupation, risky behaviors, self-esteem, health, household structure, friendships, and extracurricular activities. More than 90,000 adolescents completed the in-school questionnaire (Kelly & Preston, 1997). Students who completed the in-school questionnaire, as well as those who did not but were listed on a school roster, were eligible for the core in-home sample. The main (core) sample was a nationally representative sample of adolescents in grades 7-12 in the United States. Students were stratified by grade level and gender; approximately 17 were chosen from each strata, for a total of approximately 200 adolescents from each of the 80 pairs of schools. Over-sampling was done on African American adolescents who had one parent with a college degree. Over-sampling was also done on Chinese, Cuban, and Puerto Rican adolescents. The main sample also consisted of a significant number of Mexican-Americans, Nicaraguans, Japanese, South Koreans, Filipinos, and Vietnamese.

The in-home interview was conducted between April and December 1995, with the majority being administered in the adolescents' homes. To maintain data security and to minimize interviewer or parental influence, interviewers used lap-top computers to record answers. For sensitive questions, respondents listened to questions through earphones and entered answers directly into the computer through computer-assisted self interviewing (CASI). The interviews covered a wide range of topics, including sexual partnerships, romantic partnerships, substance use, educational aspirations, family dynamics, nutrition, decision-making processes, and health status. Respondents were also given a vocabulary test at the in-home interview, which was an abridged version of the Peabody Picture Vocabulary Test-Revised (Kelly & Preston, 1997). A total of 12,105 adolescents were interviewed for this core sample (Harris et al, 2009).

Data were also collected from school administrators and parents during the first wave. School administrators were given self-administered questionnaires to answer questions regarding school policies and procedures, student body characteristics, teacher characteristics, and health services. Of those adolescents who were a part of the in-home interview, a parent, preferably the resident mother, was interviewed. The parent answered questions on health conditions, marriage and relationships, education, employment, household income, neighborhood characteristics, and the parent-child relationship (Harris et al., 2009).

The second wave of data included follow-up in-home interviews with adolescents from April through August 1996. The sample consisted of respondents from the wave 1 in-home interview, with some exceptions: any respondent who was in the 12th grade at wave 1 and who was not in a special "genetic" sample; wave 1 respondents who were

only selected into a disability sample were not interviewed at wave 2 (Kelly & Preston, 1997). The wave 2 interview was similar to the first interview, with added questions on sun exposure and nutrition, as well as physical measures such as weight (Kelly & Preston). Approximately 15,000 adolescents were re-interviewed for the second wave. School administrators were also re-interviewed (Harris et al., 2009).

In-home interviews were conducted with original respondents for wave 3 in 2001 and 2002. Interviews covered information on respondents' relationships, marriage, child-bearing, cohabitation, and health behaviors. The most recent follow-up with original respondents was done in 2007 and 2008 for wave 4 data, in which respondents were asked about their social, psychological, health, and economic circumstances (Harris et al., 2009). This study did not include wave 3 or wave 4 data in analysis.

Public-Use Data

Add Health data can be obtained in two forms—a public-use dataset or a restricted-use contractual dataset. The restricted-use data is extensive, and only available by contractual agreement from the Inter-University Consortium for Political and Social Research. To obtain a contract, the researcher must have an IRB-approved security plan for storing and handling the data and sign a data-use contract in agreement to keep the data confidential. If a researcher purchases restricted-use data, they have access to all of the variables and respondents. For a master's thesis and the scope of this study, the restricted-use dataset was unwarranted. Alternatively, this study used wave 1 and wave 2 of the public-use dataset.

Wave 1 and wave 2 of the public-use dataset contain information collected from 1994-1996 of Add Health's nationally representative sample of adolescents.

Respondents in these waves consisted of one-half the core sample, randomly chosen, and one-half of the over-sampled African American adolescents. The content of the public-use dataset for wave 1 and wave 2 included the following: in-school questionnaire, wave 1 in-home interview, Add Health picture vocabulary test, wave 1 parent questionnaire, wave 2 in-home interview, contextual data, and in-school network data. Public-use data can be downloaded from the Inter-University Consortium for Public and Social Research or purchased from Sociometrics. Sociometrics indexes or categorizes variables by topic and type, and provides files for multiple statistical analysis programs. This study used the Sociometrics public-use data for wave 1 and wave 2 (Harris et al, 2009). The dataset distributed by Sociometrics contains 5,800 variables and 6,504 cases (Kelly & Preston, 1997).

The research question of the present study is: Does an early age at first intercourse result in an increase in negative psychological effects among adolescent females? In an attempt to answer this research question, only females interviewed both at wave 1 and wave 2 were included in the sample. The original dataset (6,504 cases) consisted of 3,356 females at wave 1 and 2,519 females at wave 2. Females who were interviewed at both wave 1 and wave 2 made up the final analytic sample, for a total of 2,385 adolescents. The next section describes the psychological measures, sexual initiation variables, and control variables for this study, as well as a description of how the data were analyzed.

Measures

Psychological Measures

This study measured four different behavioral outcomes. The dependent variables were evaluated using separate scales for psychological outcomes, including depressive symptomatology, self-esteem, body image, and disordered eating behaviors. Scales were constructed for each of these variables at wave 1 and wave 2, as the wave 1 outcomes were controlled.

The CES-D scale from the Center for Epidemiologic Studies is a self-report depression scale that can be used when researching the general population. The CES-D is a short scale that uses symptoms of depression that have been used in longer, validated studies (Radloff, 1977). The CES-D scale is typically measured using 20 items. Questions covering a modified version of all 20 items of the CES-D scale were asked in the adolescent in-home interviews at wave 1 and wave 2. Hallfors, Waller, Bauer, Ford, and Halpern (2005) identified these modifications as two items measured in the past year rather than the past week, and two other items that used adapted wording from the CES-D. Several studies using Add Health data to examine adolescent depression used an 11-item scale, rather than the original 20-item scale (Longmore, Manning, Giordano, & Rudolph, 2004). Exploratory factor analyses were performed on the 20 items and 11 items using principal axis factoring and varimax rotation. Four factors were extracted from the 20 items (alpha = .69). One factor was extracted from the 11 items (alpha = .84).

The one factor solution with a higher alpha reliability was used. The 11 items are summarized here. Respondents were asked how often each statement was true during the

past seven days: 1) “You were bothered by things that usually don’t bother you;” 2) “You didn’t feel like eating, or your appetite was poor;” 3) “You felt that you could not shake off the blues, even with help from your family and your friends;” 4) “You had trouble keeping your mind on what you were doing;” 5) “You felt depressed;” 6) “You felt you were too tired to do things;” 7) “You felt fearful;” 8) “You talked less than usual;” 9) “You felt lonely;” 10) “You felt sad;” and 11) “It was hard to get started doing things.” Responses were coded 0 for “never or rarely,” 1 for “sometimes,” 2 for “a lot of the time,” and 3 for “most of the time or all of the time.” The respondent could also report that they didn’t know or refuse to answer. A *depressive symptomatology score* was constructed for every respondent who reported valid responses to at least 6 of the 11 items. The score was calculated by taking the mean of the items, and multiplying by 11. Scores ranged from 0 to 31.

Diagnostic statistics were used to explore the variable. The residuals-versus-predicted values plot (not shown) displayed heteroscedasticity. Power transformations were explored to determine if the depressive symptomatology scale could be transformed to better approximate a normal distribution. I computed the natural log and square root of the variable. The transformations did not improve the non-normal distribution and the regression results remained the same; therefore, the original variable was retained for analysis.

Dichotomizing the variable was an alternative considered to measure adolescents with higher depressive symptomatology versus those with low depressive symptomatology. Since a goal of the study was to measure change in psychological outcomes over time, however, this effect would be lost if the level of measurement was

altered. This variable was kept interval-level to avoid losing effects and because clear cut-points and quantiles were not evident. This study's large sample size could improve the effects of the variable's heteroscedasticity. The data analysis used weighting variables and survey data analysis, which could also correct the heteroscedasticity and nonlinearity. In addition, previous literature using the abbreviated CES-D scale and Add Health data was referred to and indicated the use of the skewed distribution.

Previous studies using Add Health data have examined self-esteem levels of adolescents by using 6 items asked at wave 1 and wave 2 of the adolescent in-home interview (Ridolfo & Milkie, 2008; Longmore, Manning, Giordano, & Rudolph, 2004). Self-esteem was measured by constructing a scale based on respondents' answers to 6 items: "You have a lot of good qualities;" "You have a lot to be proud of;" "You like yourself just the way you are;" "You feel like you are doing everything just about right;" "You feel socially accepted;" and "You feel loved and wanted." Respondents' ratings of agreement or disagreement (1 = strongly agree to 5 = strongly disagree) were elicited in response to these statements. Exploratory factor analysis was completed on the 6 items using principal axis factoring and varimax rotation. A one factor solution was extracted. A self esteem scale was computed for all respondents who had responses to at least 4 of the 6 items. The mean of the items were calculated and multiplied by 6 to obtain a total *self esteem score*, with higher scores indicating lower self esteem. The alpha reliability of the scale was .85. The scores ranged from 6 to 28.

The residuals-versus-predicted values plot of the self-esteem variable indicated heteroscedasticity. Power transformations were explored to determine if the distribution could be improved to better approximate a normal distribution. I computed the ladder of

powers and the variable was transformed using the natural log. However, the regression results remained the same and the distribution was still non-normal. As with the depressive symptomatology scale, changing the level of measurement to ordinal-level was considered, but potential findings for changes in self-esteem could be lost. This research used the slightly skewed scale after considering how the large sample size, use of weighting variables, and survey data analysis could help correct the effects of heteroscedasticity.

Ridolfo and Milkie (2008) created a comprehensive body image measure using Add Health data that I replicated using my sample. The measure used *distortion for overweight* to estimate body image. Respondents were asked about the topic of general health at wave 1 and wave 2 of the in-home interview, "How do you think of yourself in terms of weight?" Responses included: "very underweight," "slightly underweight," "about the right weight," "slightly overweight," and "very overweight." This variable was used to measure the respondents' perceived body weight.

A new variable was created to measure BMI of respondents at wave 1 and wave 2. Each respondent's height and weight was self-reported at wave 1. Each respondent's height and weight was self-reported at wave 2, but the interviewer also measured and weighed the respondent. The self-reported measure was used at wave 1, as this was the only measure available, and the actual height and weight taken by the interviewer was used for wave 2.

The variable for BMI at wave 1 was created using the reported weight and height and the BMI equation from the Centers for Disease Control and Prevention (2000) (BMI= weight (lbs) x 703 / (height (in))^2). The variable for height in feet was

converted to inches and added to the height variable in inches to create a total height in inches variable. BMI was calculated by dividing weight in pounds by the squared height in inches and multiplied by 703. "A body mass index-for-age percentiles: girls, 2 to 20 years" growth chart for the United States was obtained from the Center for Disease Control and Prevention (2000). The growth chart specified BMI rates less than the 5th percentile as "underweight," 5th percentile to less than 85th percentile as "healthy weight," 85th percentile to less than 95th percentile as "overweight," and greater than or equal to 95th percentile as "obese." A new variable indicating BMI rating was created to classify respondents BMI as "underweight," "healthy weight," "overweight," and "obese."

The dependent variable, *distorted body image*, was calculated by using the new BMI rating and the variable measuring respondents view of their weight. Respondents were classified as having a "distorted body image" if their BMI was considered healthy or underweight, but they reported being slightly overweight or very overweight. All other respondents were classified as having "no distorted body image" for the purposes of this study (Ridolfo & Milkie, 2008). The variable identified adolescents who wrongly perceived their body as being overweight. The process was repeated for the measured height and weight variables at wave 2. This research did not warrant analyzing diagnostic statistics since this variable was dichotomous.

The dependent variable for *disordered eating behaviors* was measured from questions asked during the general health section of the adolescent in-home interview. Respondents were asked first, "Are you trying to lose weight, gain weight, or stay the same weight?" If respondents answered "lose weight" or "stay the same weight," they

were asked, "During the past seven days, which of the following things did you do in order to lose weight or to keep from gaining weight?" Responses were "dieted," "exercised," "made yourself vomit," "took diet pills," "took laxatives," "other," and "none." I created a disordered eating behaviors scale by summing the number of responses reported (dieted, exercised, vomited, diet pills, laxatives, and other). Respondents who reported "none" were coded "0." Scores ranged from 0 to 6, with high scores reflecting a higher number of disordered eating behaviors.

I computed an alternate disordered eating behaviors variable by creating a dichotomized variable in an attempt to uncover stronger effects. I used the same variables as I used in the previous scale. The alternate scale excluded respondents who reported that they dieted and/or exercised to lose weight, as these are more common methods used to lose weight. I created the scale by summing responses reported for the other categories (vomited, diet pills, laxatives, other). Respondents who reported that they "dieted" and/or "exercised," and those who reported "none" were coded "0." Scores ranged from 0 to 4, with high scores reflecting a higher number of disordered eating behaviors. I examined the distribution and dichotomized responses; "0" represented respondents who did not display disordered eating behaviors and "1" represented respondents who displayed any disordered eating behaviors (those who scored a one and above on the scale). The first scale (0 to 6) was analyzed using ordinary least squares regression and the alternate dichotomous variable (0, 1) was analyzed using logistic regression. I found the same conclusions after analyzing both scales; the dichotomized variable did not uncover stronger effects. The interval-level scale ranging from 0 to 6 was reported in this study because it was a more precise measurement of the number of

disordered eating behaviors. Furthermore, I did not want to exclude dieting and exercising from the scale, since some female adolescents may have used these methods in an excessive and unhealthy way.

The residuals-versus-predicted values plot of the disordered eating behaviors scale ranging from 0 to 6 displayed a heteroscedastic relationship. A power transformation was not appropriate because of the concentration of low values at 0 and 1. After examining the distribution, an ordinal-level measure was calculated by combining respondents who scored a 3, 4, or 5 on the scale. This group was defined as demonstrating disordered eating behaviors. Respondents in the remaining categories were classified as not demonstrating disordered eating behaviors. I conducted an ordered logistic regression with the new variable and the findings were examined. Once again, the results were similar to the ordinary least squares regression using the interval-level variable. The original interval-level measure was kept for analysis because the ordered logistic regression and ordinal-level variable did not improve the distribution or affect the findings.

Sexual Initiation Variables

In conducting secondary data analysis, researchers are forced to make decisions regarding the best way to evaluate data and reduce bias. This can be especially difficult when working with variables measuring a sensitive topic, such as sex, and when the unit of analysis is adolescents. To ensure the most accurate predictor variables were used to measure early sexual initiation and change in psychological outcomes over time, this study used multiple independent variables for analysis to find a holistic and best fitting

model. The predictor variables were operationalized in different ways for analysis by using interval-level measurement and nominal categories.

The first independent variable created was *time since first sexual initiation*. During the in-home interview on the topic of contraception, respondents were asked, "Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a male inserts his penis into a female's vagina." Respondents who answered "no" skipped the rest of this section. Respondents who answered "yes" continued on to a follow-up question. The follow-up questions were: "In what month and year did you have sexual intercourse for the very first time?" A new variable was created for the date of first sexual initiation using the reported month and year. Since the day was not reported, the number "15" was input for every date. The steps were repeated for the second wave of data to create a date of first sexual initiation variable.

In some circumstances, discrepancies existed when two different dates were reported for wave 1 and wave 2 or a date was reported at wave 1 and then not reported at wave 2. To overcome these discrepancies, a new variable was created to indicate the date of first sexual initiation (combining the two previous variables into one variable for analysis). This variable was created in multiple steps by first using the date of sexual initiation reported at wave 1. If no date was reported at wave 1, then the date reported at wave 2 was used to include all respondents who initiated between waves. Although there were some discrepancies in reported dates between the two waves, the first wave date was used because the first interview occurred closer to the occurrence of first reported sexual initiation. Memory of sexual initiation should be more accurate when reported closer to the original event. The independent variable, time since first sexual initiation,

was then computed by subtracting the interview date at wave 2 from the new variable reporting the date of sexual initiation. A dummy variable was created for respondents who reported they did not have sex at wave 1 or at wave 2. This dummy variable was coded 0 for "those who initiated sex" and 1 for "those who never had sex." For the variable, time since first sexual initiation, respondents who never had sex were assigned a zero. This is an interval-level variable measured in months to indicate the number of months since sexual initiation.

Age at first sexual initiation was calculated by subtracting the birthdates of respondents from the variable indicating the date of sexual initiation. The result was converted into months for analysis. Respondents who did not initiate sex were assigned their current age at wave 2.

A categorical independent variable was created to represent whether the respondent initiated sex early, initiated sex late, never initiated sex, or initiated sex but no date was reported. I determined the cut-off ages for each of these categories after reviewing the literature on early sexual initiation. Whitehead and Ooms (1999) found that age 17 was the modal age of sexual initiation in the 1990s. For the purposes of this variable, an age had to be selected for early sexual initiation. The Alan Guttmacher Institute (2010) published the most recent report with relevant statistics in January 2010. The report examined American teen sexual and reproductive health, and found that by age 15, only 13% of (never-married) teens had initiated sex. By the age of 19, the percentage of never-married teens who had initiated sex had increased dramatically to 70%. After examining these statistics, I decided to define *early sexual initiation* for this study as females who had sexual intercourse prior to the age of 16. Respondents were

classified as *initiating sex late* if they initiated sex at 16 or older, and those who had not initiated sex by the wave 2 interview were classified as *never initiated sex*. The last category was labeled *unknown sex* for those who reported they had had sex by the time of wave 1 or wave 2, but did not report dates. An age of initiation could not be calculated without the dates. The unknown sex and the never initiated sex variables were used as control variables in all the analyses, as these respondents did not have a reported age of sexual initiation and my imputation procedure could affect the findings. Separate dummy variables were created for each of these categories for analysis with those who never initiated sex by wave 2 as the reference category.

Control Variables

Based on previous studies and theory, a variety of statistical controls were used to rule out potential sources of spuriousness. Missing data were examined for each control variable discussed in this section. Nominal variables with missing cases were assigned a dummy variable indicating missing status, with the dummy variable being entered into the regression models. Interval and ratio variables with missing cases were also assigned a dummy variable to indicate missing status (missing flag). Mean substitution was used to impute a value for the missing cases. The variable with imputed missing values and the missing flag variable were then included in the regression models.

The *age at wave 1* was calculated by subtracting the wave 1 interview date by the respondents' birth date, reported in months so that it was consistent with other variables measuring time. A *race* variable was generated by using an adapted program code found on the program code repository provided by the Add Health team (UNC Carolina Population Center). A single race variable was constructed from six variables asked at

wave 1 during the general introductory section of the in-home interview. Respondents were first asked, "Are you of Hispanic or Latino origin?" If the respondent said "yes," their race was designated as "Hispanic" and they were eliminated from all other race categories that were marked in a subsequent question. The following question was, "What is your race? You may give more than one answer." Respondents could select "White," "Black or African American," "American Indian or Native American," "Asian or Pacific Islander," or "other." Although respondents could select more than one answer, they were only placed into one race category for the *race/ethnicity* variable. If the respondent selected "Black or African American" along with any other race, they were classified as "Black or African American" and eliminated from the other selected categories. This process was repeated for the remaining race categories in this order: Asian, Native American, other, and White. This variable combined the multiple race options and Hispanic variable to construct mutually exclusive categories for analysis (UNC Caroline Population Center, n.d.). For statistical analysis for this study the race variable was collapsed into 4 categories: White, African American, Hispanic, and other. Dummy variables were created for these; White was the reference category.

A control variable for *family structure* was created using the household roster section of the adolescent in-home interview at wave 1. Respondents were asked by the interviewer to name every person who lived in their household. The respondent was able to list up to 20 household members. The respondent was asked, "What is {NAME}'s relationship to you?" If the respondent selected "mother" or "father," the interviewer asked, "which description best fits {NAME}'s relationship to you?" The respondent was able to identify the parent as the following: biological father, step father, adoptive father,

step/adoptive father, other, biological mother, step mother, adoptive mother, step/adoptive mother, foster mother, or other. Only the first 10 household rosters were necessary in order to obtain all of the parent information.

The family structure variable was created using multiple steps in SPSS. The "count values within cases" option was used in SPSS to categorize the type of parent reported (e.g., biological father, step father, adoptive father). This command resulted in separate dummy variables for each type of parent. The dummy variables were summed for each respondent to compute a new variable, *number of parents in household*, with categories "0" for no parents in household, "1" for a one-parent household, "2" for a two-parent household, and "3" for a three-parent household. Using the number of parents in household variable and the dummy variables for each type of parent, a family type categorical variable was produced. The family type variable was categorized as both biological parents, other two-parent families, single mother household, single father household, and other family structures. Respondents who reported having two parents in the household that did not include both biological parents were classified as "other two-parent families." A "single mother household" was defined as a household headed by one mother, which could include a biological mother, step mother, adoptive mother, step/adoptive mother, foster mother, or other mother. A "single father household" was defined in the same way using the various types of fathers. "Other family structures" included those who specified a three-parent household or no parents in the household. The "other family structure" category included a variety of nontraditional households, such as living with grandparents, siblings, husbands/wives, cousins, or aunts/uncles. I

created dummy variables for each category, with both biological parents as the reference category.

Parental education was also controlled by using the highest obtained education level of either parent. The variable was created using four separate variables. To ensure the most accurate information was obtained, a parent's response for highest education was used from the interviewer-administered parental questionnaire from wave 1. The parent was asked how far they went in school and if relevant, how far their current (spouse/partner) went in school. On the in-school questionnaire at wave 1, adolescents were also asked their mother's and father's highest obtained educational level. The responses from these four variables were categorized into less than high school, high school graduate or GED, some college, and college graduate or higher. The parental education variable was created by taking the highest obtained level of education between the parent and partner, based off the parent's self-report. If data were missing from both these variables, then the adolescent report of highest education obtained by their resident mother was used. If this variable was also missing, then the adolescent report of highest education obtained by their resident father was used. A missing flag variable was created for all remaining missing values. Computing the parental education level variable in steps ensured the new variable included the most possible cases. Dummy variables were created for each category, with college degree or higher as the reference category.

A variable for *household income* was created to control for socioeconomic status. During the parental questionnaire at wave 1, the parent was asked, "About how much total income, before taxes did your family receive in 1994? Include your own income, the income of everyone else in your household, and income from welfare benefits,

dividends, and all other sources." The parent could respond within a range of $0 through $999 thousand. A missing flag was made for all missing values. The control variable for household income was a continuous variable in thousands of dollars, with mean substitution replacing all the missing values.

Sexual context variables were considered control variables, as they could be a potential source of spuriousness. On the in-home questionnaire at wave 1 and wave 2, adolescents were asked if they had ever had non-romantic sex with anyone. They were also asked if they had ever had sex for drugs or money. Moreover, respondents were asked if they ever were forced to have sex. A control variable for *non-romance sex* was generated by including any respondent who reported having non-romance sex with anyone at wave 1 or wave 2. Those who had ever had sex for drugs or money, or had ever had forced sex by wave 1 or wave 2, were also added to the non-romance sex control variable. The variable was coded "1" for all respondents who reported having non-romance sex. The variable was coded "0" to include all respondents who had not had non-romance sex and those who had never initiated sex (by the time of the interview at wave 2). A missing flag was created for any remaining missing values and included in the regression model.

Adolescents who had forced sex or had sex for drugs or money were controlled due to the possible psychological effects. During the in-home interview, respondents were asked if they ever were forced to have sex by wave 1 or wave 2. A dichotomous variable, labeled *rape*, was coded as "1" for respondents who reported ever having forced sex by wave 1 or wave 2 and "0" for those who did not report forced sex, and those who

had never initiated sex. A missing flag was created for all remaining missing values and entered into the regression model.

Dating status is measured based on the adolescents' responses at wave 1 during the in-home interview. Adolescents were asked if they had dated someone in the past 18 months, if they had held hands with a non-family member, kissed a non-family member, or told a non-family member that they loved them. Respondents who selected "yes" to any of the questions regarding holding hands, kissing, or telling someone they loved them, were classified as participating in "liked behavior." A categorical variable was created for dating status with "1" representing those who had dated, "2" representing liked behavior, and "3" representing those who had never dated nor participated in liked behavior. A dichotomous variable was created for analysis with "1" representing those who dated and "0" representing those who never dated or had shown liked behavior.

Religiosity was measured according to the adolescents' responses to how important religion was to them. The respondent could answer "very important," "fairly important," "fairly unimportant," and "not important at all." A missing flag was created for missing values. The missing values were replaced by mean substitution, which resulted in a 1.6, a rating between religion being very important and fairly important to the adolescent. A religiosity control variable was created, with "1" for religion being very important, "1.6" representing the mean substitution for missing values, "2" for religion being fairly important, "3" for religion being fairly unimportant, and "4" for religion being not important at all. This variable was ordinal, but was treated as interval-level for analysis.

Respondents were asked at wave 1 how advanced their physical development was compared to other females their age. Response categories were, "I look younger than most," "I look younger than some," "I look about average," "I look older than some," and "I look older than most." A *maturity* control variable was created by collapsing these responses into two categories. The responses, "I look older than some" and "I look older than most" were coded as "1" for advanced physical maturity. All other respondents were coded "0." A missing flag was used for all missing values and included in the regression model.

As discussed previously in the literature review, emotional struggles among adolescent females are not uncommon. Due to the nature of the study, each of the psychological outcome variables were controlled, since previous depressive symptoms, low self-esteem, poor body image, and disordered eating behaviors, would skew the results. Otherwise, a potential finding in the data could prove spurious when controlling for these emotional outcomes at wave 1.

Reliability and Validity

The Add Health dataset has been used widely across many disciplines studying adolescent behaviors and health outcomes. The scales for the dependent variables were constructed after extensively reviewing past studies using Add Health. Depressive symptomatology was based on the Center for Epidemiologic Studies depression scale (CES-D) (Radloff, 1977). The CES-D scale is a self-report depression scale that can be used when researching the general population. The CES-D is a short scale that uses symptoms of depression that have been used in longer, validated studies. The scale's construct validity has been tested by looking at correlations with clinical ratings of

depression and its correlation with other self-report measures. The Center for Epidemiologic Studies found the scale to have adequate test-retest reliability, as well as high internal consistency (Radloff, 1977). A modified version of the CES-D scale was used in this study with a total of 11 items. The modified version was used after completing an exploratory factor analysis and after reviewing past studies, which primarily used the 11-item scale when measuring depression symptoms with Add Health data.

The 6-item self-esteem scale is comparable to Rosenberg's self-esteem scale (1965), and has been used by other Add Health researchers. Two items were taken directly from Rosenberg's scale, while the other items were comparable to those in Rosenberg's scale. Goodman and Whitaker (2002) used the 6-item scale in their study of depression and adolescent obesity, and also found excellent reliability (alpha = .85).

An objective measure of height and weight was preferred for the distorted body image scale, but considering the self-report was the only measure available at wave 1, it had to be used for analysis. The Add Health design team revised this measure at wave 2, actually measuring respondents. Goodman, Hinden, and Khandelwal (2000) studied the wave 2 Add Health data and reported that the correlation between self-reported and measured height and weight was .94 and .95, respectively. In their review of previous studies, Halpern, King, Oslak, and Udry (2005) discussed research that examined the self-reported and measured height and weight data from Add Health (specific waves were not specified), and found that the under-reporting of weight varied systematically with actual weight. Respondents who were below average in weight tended to over-report their weight, while those respondents who were above average tended to under-report.

Procedures

For initial data management, SPSS Statistics 17.0 was used. For data analysis and diagnostic statistics, Stata 10 was used so that results were corrected for design features, such as clustering of respondents within schools. First, I generated frequency distributions and scatterplots to examine the distributions of the independent and dependent variables used in the analysis. Means, medians, standard deviations, proportions, and measures of skewness were generated when possible, and reported as appropriate. Bivariate analysis was conducted by computing Pearson's correlation coefficients when appropriate and by using cross-tabular analysis with categorical variables.

All multivariate equations were lagged, and control variables were entered in a hierarchical fashion (see Figure 1). Specifically, each dependent variable (measured at wave 1) was entered into the first model. The second model included all of the control variables and their missing flags. The independent variables measuring age at first sexual initiation were entered into the last model. As can be seen in Figure 1, the "last" regression model for each dependent variable was run twice, with *time since sexual initiation* and *initiation age* as the first independent variables, and *early initiators*, *late initiators*, and those who *never initiated* as the second set of independent variables. Depressive symptomatology, self-esteem, and disordered eating behaviors were analyzed using ordinary least squares regression, while body-image was analyzed using logistic regression. To correct for design effects of the public-use data, a cluster variable and weight variable for wave 2 were used. Variance inflation factors were requested after each regression equation to check for multicollinearity. Diagnostic statistics, such as

residuals-versus-predicted values plots, were also used to assess whether the assumptions of ordinary least squares multiple regression were being met. My hypotheses were supported if a statistically significant and substantively important relationship existed between early sexual initiation and the dependent variables.

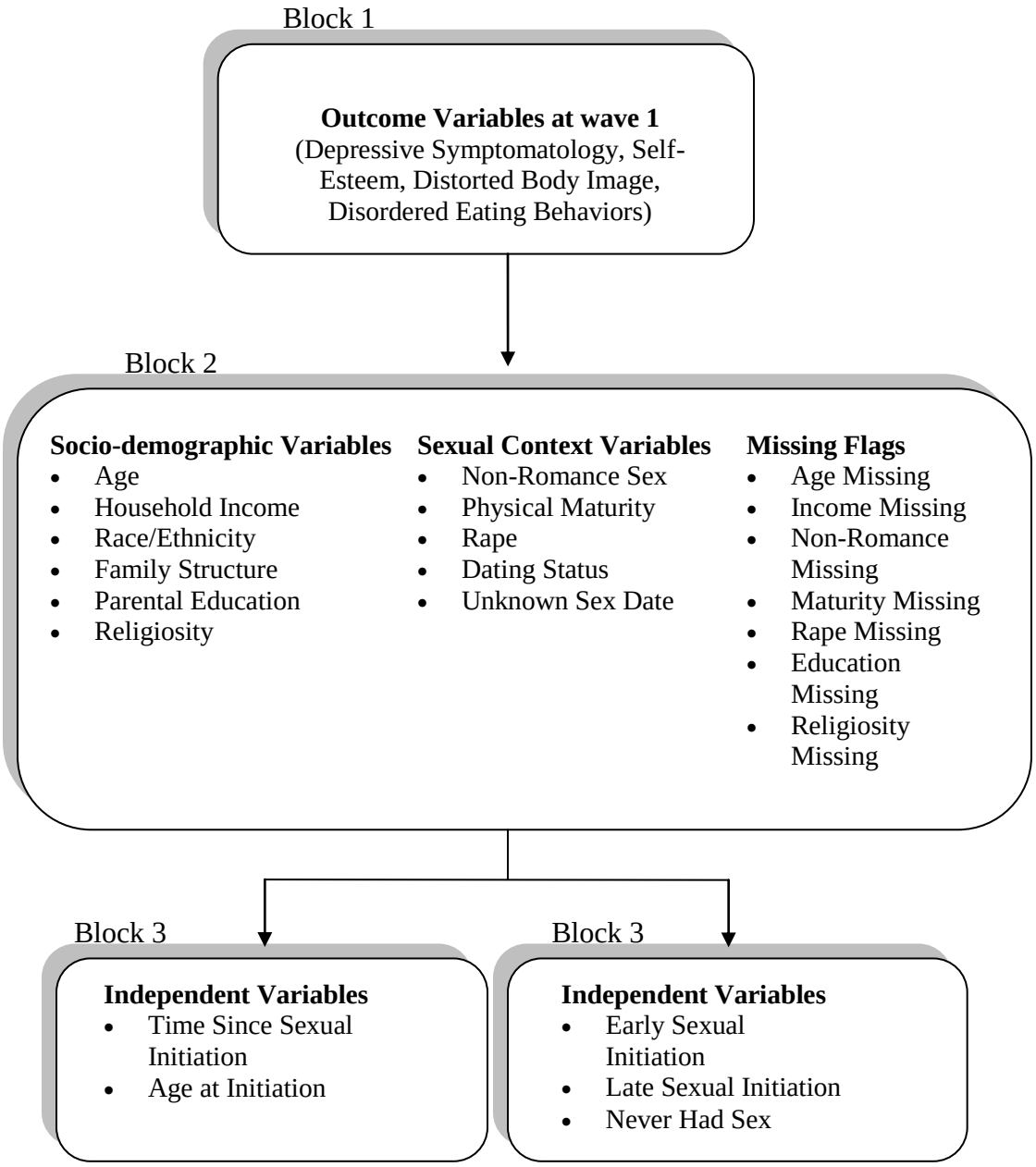

Figure 1. Organizational chart showing sequential order of the blocked regression models.

CHAPTER IV: FINDINGS

This chapter provides univariate descriptive statistics for the variables used in this study. Results from the multivariate analysis are discussed according to the hypotheses outlined in Chapter II. This study's purpose was to determine whether an early age at first intercourse (prior to age 16) resulted in an increase of negative psychological outcomes among adolescent females. Specifically, this study examined the effects of sexual initiation on female adolescent depressive symptomatology, self-esteem, body image, and disordered eating behaviors. I anticipated that adolescents who initiated sex early (prior to the age of 16) would have higher levels of depressive symptomatology, lower self-esteem, more distorted body image, and more disordered eating behaviors compared to adolescent females who initiated sex after age 16 or had not initiated sex by wave 2.

This study found a significant relationship between sexual initiation and depressive symptomatology. Female adolescents who initiated sex early had higher levels of depressive symptomatology at wave 2 compared to those who never initiated sex by wave 2. Furthermore, levels of depressive symptomatology decreased as the age of female adolescents at sexual initiation increased. Time since first sexual initiation also affected depressive symptomatology, with a decrease in symptoms occurring as time increased (in months).

Univariate Analyses

Psychological Measures

Descriptive statistics of the variables are shown in Table 1. The depressive symptomatology scale at wave 2 was positively skewed, with scores ranging from 0 to

Table 1

Descriptive Statistics for Analytic Variables, Add Health Waves 1-2

	n	*Mean*[1]	*SD*
Psychological measures			
Depressive symptomatology, wave 1	2379	6.45	5.07
Depressive symptomatology, wave 2[2]	2383	6.75	5.17
Self-esteem, wave 1	2378	11.80	3.61
Self-esteem, wave 2[2]	2381	11.30	3.58
Distorted body image, wave 1	2267	.18	
Distorted body image, wave 2[2]	2331	.16	
Disordered eating behaviors, wave 1	1934	.96	.70
Disordered eating behaviors, wave 2[2]	1914	1.02	.73
Sexual initiation variables[3]	2385		
Early sex		.29	
Late sex		.13	
Never sex*		.56	
Unknown sex		.02	
Time since initiation in months		10.62	17.72
Sexual initiation age in months		182.29	19.85
Control variables	2385		
Age in months		184.99	18.68
Race			
White*		.66	
African American		.15	
Hispanic		.13	
Other		.06	
Family structure			
Both biological parents*		.54	
Other two-parent		.12	
Single parent		.29	
Other family structure		.05	
Parental education			
Less than high school		.10	
High school or GED		.25	
Some college		.25	
College degree plus*		.28	
Education missing		.11	
Household income ($1,000s)		46.76	44.32
Income missing		.21	
Non-romantic sex		.26	
Non-romantic sex missing		.01	
Rape		.08	
Rape missing		.01	

Dated	.60	
Religiosity	1.61	.69
Religiosity missing	.14	
Perceived advanced physical maturity	.41	
Maturity missing	.01	

[1] Weighted estimates. Proportions for dummy variables. Proportions may not sum to exactly 1.00 because of rounding.
[2] Dependent variable
[3] Sexual initiation variables measured at wave 1 and updated at wave 2 for wave 1 non-response and non-initiators.
* Omitted Category

30. Respondents' mean score on the scale was 6.75, representing a low overall score. The standard deviation of the scale was 5.17. The majority of scores were concentrated at the low end of the scale, with few outliers toward the high end, explaining the positive skew in the distribution.

The self-esteem scale at wave 2 had a slight positive skew, with a mean of 11.30, a standard deviation of 3.58, and actual scores ranged from 6 to 28. The distorted body image scale was dichotomous and initial data analysis found that 16% of respondents at wave 2 had distorted body image, while 84% did not. The disordered eating behavior scale at wave 2 was examined, and the distribution was positively skewed. The variable had a small number of possible values between 0 and 6. Respondents' mean score was 1.02, the standard deviation was .73, with the majority (77%) having a score of 0 or 1. Scores were heavily concentrated at the lower end of the scale. Slightly over one-fifth (21%) of respondents scored 2 on the scale; 2% scored 3; .10% scored 4; and, only .05% scored 5.

Sexual Initiation Variables

Two sets of independent variables were created to determine the best fitting model to measure change in emotions over time. The first set of independent variables measured, in months, the time since the adolescent initiated sex and their age at sexual initiation. Adolescent females' time since sexual initiation ranged from 0 months to 197 months. The mean was 10.62 months since first sexual initiation; the standard deviation was 17.72.

The age of initiation variable also had a wide range of values, from 47 months to 252 months, or from 3 years of age to 21 years of age. The mean was 182.29 months

(15.19 years); the standard deviation was 19.85. Cases in which the respondents reported initiating sex prior to the age of 10 years old were investigated further to determine if the results were an error. One respondent reported sexual initiation at 3 years of age; two reported initiation at 4; two reported initiation at 6; two respondents reported initiation at 7; three reported initiation at 8; five reported initiation at 9; and, five reported initiation at 10. All respondents who reported initiating sex prior to the age of 8 also reported that they had been raped. Two additional respondents who reported initiating sex prior to the age of 10 also reported having been raped. Due to the proportion of respondents who reported being raped prior to the age of 10, all cases were kept in the analyses and deemed valid for the study. This will be discussed further in the univariate descriptive statistics of the rape control variable.

The second set of independent variables measured respondents who had had sex early (prior to the age of 16), had had sex late (after the age of 16), had never had sex (by the wave 2 interview), or who had had sex but no initiation dates were provided. The results indicated that the majority of respondents (56%) had not initiated sex at the time of the interview at wave 2; 29% had initiated sex prior to 16 years of age; 13% had initiated after 16 years of age; and 2% had initiated sex but did not report the date.

Control Variables

Owing to the number of dependent variables and sample size, the data analysis used numerous control variables. Respondents' age at wave 1 (in months) was controlled in the model using the categorical independent variable. Age was not included in the models with time since first sexual initiation and initiation age, due to multicollinearity.

Respondents' age at wave 1 ranged from 11.58 years old to 21 years old, with a mean of 184.99 months (15.42 years) and a standard deviation of 18.68.

Respondents' race varied: 66% of the sample identified as White; 15% identified as African American; 12% identified as Hispanic; and, 6% were placed in the "other" category, which included those who identified as Asian, Native American, or other.

This research examined family structure, with 54% of respondents reporting that they lived with both biological parents; 29% reported living in a single parent family; 12% lived in another two-parent family, while 5% lived in an "other family structure." Highest education level obtained by one parent was reported, with 28% having a college degree or more. Parents who had had some college made up 25% of the sample; 25% had a high school degree or GED; and, 10% had less than a high school degree. The remaining 11% were missing values on this variable. This study used total household income to control for socioeconomic status of the adolescent. Household income, as reported by a parent, ranged from $0 to $900,000. The mean household income of the sample was $47,000.

Sexual experiences varied within the sample, with 26% of adolescents reporting they had had non-romantic sex. Respondents who reported having had sex for drugs or money, and those who reported having been raped were also included in the non-romantic sex variable. The current research found that 2.4% of respondents reported having sex for drugs or money, and 8% of respondents reported having been raped. The data analysis indicated that 19% of female adolescents who had initiated sex had been raped (8% of the total sample). Only 17% of the sample had never dated; 60% reported

that they had dated in the past 18 months; and, 24% reported that they had held hands, kissed, or told someone they loved them in the past 18 months.

Religiosity is an ordinal variable being treated as interval-level. The majority of respondents reported religion as important in their lives. A total of 45% of respondents reported religion as very important in their lives; 33% reported religion as fairly important; 5% reported religion as fairly unimportant; and, 3% reported religion as not important at all. The remaining 14% had missing values, which were imputed using mean substitution (1.6) between religion being very important and fairly important. Adolescent females in the sample were also asked their physical development compared to peers. Respondents who rated themselves as looking older than peers made up 41% of the sample, while 59% rated themselves as average or younger looking.

Psychological variables were measured at wave 1 and entered into the regression models first as control variables to effectively measure change in emotions over time. The presence of negative psychological outcomes at wave 1 could influence the levels of negative psychological outcomes at wave 2. Controlling for wave 1 psychological measures ultimately provided a better test of the associations between the other control variables and each outcome variable. However, some of the respondents had had sex prior to wave 1, and including their wave 1 psychological scores could be viewed as over-controlling each regression model. This study's findings are conservative since wave 1 psychological measures were controlled, and the effects could increase if these controls were removed. The depression scale potentially ranged from 0 to 33. Respondents' mean depression score at wave 1 was 6.45, the standard deviation was 5.07, with actual scores ranging from 0 to 31. Respondents' levels of depressive

symptomatology appeared to be relatively low at wave 1, with approximately 95% of the sample scoring below 16 on the scale.

The self-esteem scale potentially ranged from 6 to 30, with lower scores representing higher self-esteem. Respondents' mean self-esteem score was 11.8 at wave 1, with a standard deviation of 3.61; actual scores ranged from 6 to 28. If the respondent felt indifferent and answered "neither agree nor disagree" for all of the self esteem questions, their score would have been an 18 on the self-esteem scale. Approximately 95% of respondents had scores of 18 or below, suggesting that most of the sample did not suffer from low self-esteem.

The disordered eating behaviors scale could potentially range from 0 to 6. Respondents did not exhibit many disordered eating behaviors at wave 1, with actual scores ranging from 0 to 4. Respondents' mean score was .96; the standard deviation was .70. Only 1.3% of the sample demonstrated disordered eating behaviors with a score of 3 or 4 on the scale. Body image was a dichotomous variable, with 18% of respondents at wave 1 being categorized as having a distorted body image, while 82% did not have a distorted body image.

The hypotheses presented in Chapter II were tested by using multivariate ordinary least squares regression and logistic regression. This study examined the following psychological outcomes: depressive symptomatology, self-esteem, distorted body image, and disordered eating behaviors. The data analysis used ordinary least squares regression to evaluate depressive symptomatology, self-esteem, and disordered eating behaviors. Respondents' body image was evaluated using logistic regression. The regression equations used a hierarchical sequence, with the variables entered in block order. The

first regression treated depressive symptomatology as the dependent variable. The second regression treated self-esteem as the dependent variable. The third regression treated body image as the dependent variable, and the last regression treated disordered eating behaviors as the dependent variable. Each dependent variable was run separately with two different independent variables. The first model used the categorical independent variables—early sexual initiation (prior to age 16), late sexual initiation (after age 16), those who had not initiated sex at the time of the wave 2 interview, and those who had had sex but did not provide a date for analysis (labeled "unknown sex"). The dependent variables were then regressed on the interval-level independent variables: time since first sexual intercourse and age at sexual initiation.

Regression Results

Each psychological outcome is discussed separately below. For each outcome, three regression models are shown in the tables: a baseline model 1 with only the wave 1 measure of the psychological outcome in the model, model 2 with additional demographic and social controls, and a final model 3 containing the preferred version of the sexual initiation measures of substantive interest in this thesis. For each outcome, I only discuss results from the reported model 3 in detail.

Depressive Symptomatology

The results were similar when depressive symptomatology was regressed on the two separate independent variables. Explained variance increased as each block was entered into the model. The model using time since sexual initiation and age at initiation as independent variables explained 31% of the variance in depressive symptomatology at wave 2. Significant predictors are shown in Table 2. Although both analyses using the

Table 2

Linear Regression Results for Depressive Symptomatology Scores, Add Health Waves 1-2[1]

	Model 1			Model 2			Model 3		
Depressive score wave 2	*b*	se_b	*β*	*b*	se_b	*β*	*b*	se_b	*β*
Depressive score wave 1	.546**	.024	.536	.506**	.024	.496	.510**	.024	.500
Household income				-.003	.002	-.028	-.003	.002	-.027
Income missing				.103	.320	.008	.132	.323	.010
Non-romantic sex				.282	.379	.024	.545	.401	.047
Non-romantic sex missing				-1.238	1.100	-.023	-1.083	1.129	-.020
Other race				1.010**	.470	.047	1.042**	.469	.049
African American				.497	.333	.034	.530	.339	.037
Hispanic				.529	.379	.034	.533	.378	.034
Other two-parent family				.800**	.353	.050	.792**	.351	.049
Single parent family				-.329	.250	-.029	-.320	.253	-.028
Other family structure				.091	.499	.004	.226	.498	.010
Perceived physical maturity				.781**	.207	.074	.767**	.208	.073
Maturity missing				1.955	1.225	.040	1.948	1.222	.040
Rape				.525	.564	.028	.559	.568	.030
Rape missing				1.623	1.145	.032	1.489	1.184	.029
Dated				.449**	.195	.043	.597**	.209	.057
Less than high school				.655	.400	.039	.704*	.403	.041
High school or GED				.443	.295	.037	.446	.290	.038
Some college				.171	.274	.014	.157	.274	.013
Education missing				.406	.447	.024	.494	.433	.030

Table 2

Regression Results for Depressive Symptomatology Scores, Add Health Waves 1-2[1], Continued

	Model 1			Model 2			Model 3		
Depressive score w2	*b*	se_b	β	*b*	se_b	β	*b*	se_b	β
Religiosity				.074	.123	.010	.073	.122	.010
Religiosity missing				.233	.354	.015	.236	.355	.016
Unknown sex				.906	.772	.026	1.046	.762	.030
Time since initiation							-.017††	.010	-.060
Initiation age							-.012††	.006	-.048
R^2		.287			.311			.313	

[1] All estimates are weighted. All estimates are corrected for sample design, except effect sizes, β. N = 2379

* $p < .10$, two-tailed.

** $p < .05$, two-tailed.

† $p < .10$, one-tailed.

†† $p < .05$, one-tailed.

two separate independent variables were significant, only the model using the interval-level variables are presented in Table 2 because the level of measurement is more precise. For every 1 point increase respondents scored on the depressive symptomatology scale at wave 1, their score at wave 2 increased by .51 points, net of all controls. Adolescent females in the "other" race category scored 1.04 points higher than white females on the depressive symptomatology scale, net of all controls. Adolescent females who lived in another two-parent household, compared to adolescents who lived in a home with both biological parents, scored higher on the depressive symptomatology scale (*b* = .792). Another two-parent household was defined as not including both biological parents, but could include step-parents, adoptive parents, or other two-parent family forms. Females who perceived themselves as being advanced in physical maturity (*b* = .767), and those who had dated (*b* = .597), scored higher on depressive symptomatology. Adolescents whose parents' highest obtained education was less than a high school degree scored higher on the depressive symptomatology scale (*b* = .704) compared to adolescents whose parents had a college degree or more.

As shown in Table 2, the variable, time since first sexual initiation, net of all controls, was found to be significant (*b* = -.017). As the time since first sexual initiation increased, scores on depressive symptomatology decreased. The age of initiation was also a significant predictor; with every month increase in age of sexual initiation, depressive symptomatology scores decreased by .012 points, net of all controls. This is equivalent to a modest .144 point reduction in mean depressive symptomatology score for an additional year of age (12 month) delay in sexual initiation. Together with time since sexual initiation, net of other variables, the total reduction in mean depression score

was .348 points for each additional year delay in initiation. Controlling wave 1 depressive symptomatology ultimately provided a better test of the association between the sexual initiation variables and depressive symptomatology at wave 2. It is important to recognize that the depressive symptomatology effects at wave 2 are conservative, since wave 1 measures were controlled, and could be stronger than appears in the regression results.

The significant variables were similar in the regression model (not shown) using the categorical independent variables (early initiators/late initiators/non-initiators). Compared to adolescent females who never initiated sex by wave 2, females who initiated sex prior to the age of 16 scored .713 points higher on the depressive symptomatology scale, net of all controls. Early initiators also scored higher on depressive symptomatology compared to those who initiated later, after the age of 16, although the difference was not statistically significant. Overall, the age of sexual initiation among female adolescents had an effect on the psychological outcome, depressive symptomatology. Furthermore, the findings demonstrated that depressive symptomatology decreased as the time since sexual initiation increased, so time helped female adolescents overcome their depressive symptoms.

Self-Esteem

I found similar regression results for the separate independent variables. Neither of the independent variables was statistically significant. The model presented used time since first sexual initiation and initiation age as the predictor variables to remain consistent in reporting the interval-level variables (see Table 3). Model 3 explained 33% of the variance in the self-esteem scale at wave 2. The self-esteem scale at wave 1 was a

Table 3

Linear Regression Results for Self-Esteem Scores, Add Health Waves 1-2[1]

	Model 1			Model 2			Model 3		
Self-esteem score wave 2	*b*	se_b	β	*b*	se_b	β	*b*	se_b	β
Self-esteem score wave 1	.554**	.021	.559	.538**	.022	.543	.538**	.022	.543
Household income				-.003**	.001	-.034	-.003**	.001	-.034
Income missing				.065	.200	.007	.064	.200	.007
Non-romantic sex				.158	.194	.019	.158	.251	.020
Non-romantic sex missing				.371	.575	.010	.373	.590	.010
Other race				.277	.343	.019	.272	.342	.018
African American				-.456**	.182	-.045	.457**	.184	-.045
Hispanic				.279	.263	.026	.275	.264	.025
Other two-parent family				.044	.239	.004	.049	.236	.004
Single parent family				.219	.163	.028	.222	.161	.028
Other family structure				.034	.281	.002	.025	.286	.002
Perceived physical maturity				.228	.146	.031	.236	.144	.032
Maturity missing				1.251	.910	.037	1.257	.911	.037
Rape				-.071	.316	-.006	-.061	.316	-.005
Rape missing				-.667	.560	-.019	-.669	.564	-.019
Dated				.059	.144	.008	.045	.160	.006
Less than high school				-.456	.339	-.039	-.458	.343	-.039
High school or GED				-.283	.193	-.034	-.279	.190	-.034
Some college				-.527**	.170	-.064	-.525**	.170	-.064
Education missing				.203	.354	.018	.196	.355	.017

Table 3

Regression Results for Self-Esteem Scores, Add Health Waves 1-2[1], Continued

	Model 1			Model 2			Model 3		
Self-esteem score w2	*b*	se_b	β	*b*	se_b	β	*b*	se_b	β
Religiosity				.189**	.094	.036	.190**	.094	.037
Religiosity missing				.113	.203	.011	.115	.204	.011
Unknown sex				.466	.720	.019	.465	.720	.019
Time since initiation							.001	.007	.003
Initiation age							.002	.004	.048
R^2		.313			.327			.327	

[1] All estimates are weighted. All estimates are corrected for sample design, except effect sizes, β. N = 2378

* $p < .10$, two-tailed.

** $p < .05$, two-tailed.

† $p < .10$, one-tailed.

†† $p < .05$, one-tailed.

significant predictor. Recall that the self-esteem scale was coded so that higher scores indicated poorer self-esteem. With every one point increase on the self-esteem scale (lower self-esteem) at wave 1, the score at wave 2 increased by .538 points (lower self-esteem). Parental household income was significant (b = -.003), with adolescents having higher self-esteem (lower self-esteem score) as household income increased. African American adolescents had higher self-esteem (b = -.457) compared to White adolescents. Females' perceived physical maturity was marginally significant, with those being more advanced having lower self-esteem (b = .236). The highest obtained education by a parent was significant in one category. Adolescents whose parent had some college had higher self-esteem (b = -.525) compared to those whose parent had a college degree or more. Adolescents' religiosity was also significant, with those reporting higher levels of religiosity having higher levels of self-esteem (b = .190).

In the alternative formulation of model 3 (not shown), the regression coefficients indicated some mean differences. Although lacking in statistical significance, adolescents who initiated sex early had lower self-esteem (higher scores) than those who initiated later (b = .076), or who never initiated sex by wave 2 (b = .179). The regression results with independent variables, time since sexual initiation and the age of initiation, also were not statistically significant (Table 3); therefore, the hypotheses were not supported. Overall, the data analysis did not show a relationship between age of sexual initiation and self-esteem.

Body Image

As shown in Table 4, this study found significant predictors of distorted body image at wave 2 based on logistic regression. The regression model presented in Table 4

Table 4

Logistic Regression Results for Distorted Body Image, Add Health Waves 1-2[1]

	Model 1			Model 2			Model 3		
Body image score wave 2	*OR*	se_b	β	*OR*	se_b	β	*OR*	se_b	β
Body image score wave 1	8.551**	1.286	.396	7.564**	1.153	.371	7.382**	1.115	.367
Household income				1.000	.001	-.008	1.000	.001	-.008
Income missing				.867	.208	-.014	.858	.210	-.016
Non-romantic sex				1.234	.282	.035	1.211	.297	.027
Non-romantic sex missing				4.619*	3.707	.037	4.368*	3.315	.035
Other race				1.496	.365	.034	1.438	.339	.031
African American				.566**	.132	-.048	.560**	.133	-.049
Hispanic				.862	.201	-.017	.858	.199	-.018
Other two-parent family				1.066	.226	.006	1.088	.230	.008
Single parent family				.824	.145	-.024	.837	.147	-.022
Other family structure				1.784**	.516	.041	1.696*	.516	.037
Perceived physical maturity				1.716**	.233	.081	1.796**	.241	.088
Maturity missing				1.615	.941	.016	1.648	.962	.015
Rape				.912	.253	-.013	.939	.272	-.010
Rape missing				.129*	.149	-.045	.124*	.135	-.045
Dated				1.276	.202	.033	1.176	.193	.018
Less than high school				.975	.278	-.001	.963	.270	-.002
High school or GED				1.186	.219	.024	1.221	.222	.026
Some college				1.070	.230	.009	1.088	.237	.011
Education missing				.968	.298	-.010	.958	.299	-.014

Table 4

Logistic Regression Results for Distorted Body Image, Add Health Waves 1-2[1], Continued

	Model 1			Model 2			Model 3		
Body image score w2	*OR*	se_b	β	*OR*	se_b	β	*OR*	se_b	β
Religiosity				1.156	.107	.034	1.166*	.107	.035
Religiosity missing				1.204	.233	.019	1.225	.239	.021
Unknown sex				2.575	1.685	.049	2.551	1.669	.048
Time since initiation							1.005	.006	.036
Initiation age							1.013††	.004	.075
Pseudo R^2		.142			.174			.180	

[1] All estimates are weighted. All estimates are corrected for sample design, except effect sizes, β. N = 2267

* $p < .10$, two-tailed.

** $p < .05$, two-tailed.

† $p < .10$, one-tailed.

†† $p < .05$, one-tailed.

used time since first sexual initiation and age at initiation as the sexual initiation variables, since this model was a better predictor of distorted body image and the alternative categorical variable was not statistically significant. Adolescents with a distorted body image at wave 1 had over 7 times higher odds of having a distorted body image at wave 2, compared to adolescents who did not have distorted body image at wave 1. Compared to White female adolescents, African American adolescents had almost half the odds (*OR* = .56) of having distorted body image at wave 2. Adolescents living in a household classified as "other family structure" had 1.70 times the odds of having distorted body image, compared to those adolescents living with both biological parents (at the .10 significance level). Females with perceived advanced physical maturity had 1.80 times the odds of having distorted body image, compared to those who were average or younger looking (at the .10 significance level). Adolescents with lower religiosity had 1.17 times higher odds of having distorted body image. Each additional one-month increase in age at sexual initiation *increased* the odds of having a distorted body image by 1.013, a modest effect. In other words, the age of sexual initiation increased the odds of distorted body image by 16%. The data analysis indicated similar predictors in the model using categorical independent variables (early initiation/late initiation), but the sexual initiation independent variables were not statistically significant.

Disordered Eating Behaviors

As shown in Table 5, the linear regression model of disordered eating behaviors used the categorical versions of the sexual initiation variables (model 3). The analysis using the categorical independent variable is presented, since the interval-level variable

Table 5

Linear Regression Results for Disordered Eating Behaviors, Add Health Waves 1-2[1]

	Model 1			Model 2			Model 3		
Disordered eating score wave 2	*b*	se_b	β	*b*	se_b	β	*b*	se_b	β
Disordered eating score wave 1	.397**	.026	.380	.376**	.026	.360	.510**	.024	.500
Age				.001	.001	.021	.000	.001	.008
Household income				.000	.000	.021	.000	.000	.021
Income missing				.000	.051	.000	.001	.051	.001
Non-romantic sex				-.057	.050	-.034	-.022	.055	-.013
Non-romantic sex missing				.057	.226	.006	.096	.221	.011
Other race				-.055	.063	-.017	-.056	.063	-.018
African American				-.120**	.056	-.056	-.117**	.056	-.055
Hispanic				.003	.058	.001	.001	.058	.000
Other two-parent family				.028	.064	.013	.028	.064	.013
Single parent family				.023	.045	.015	.031	.045	.020
Other family structure				-.144	.098	-.042	-.130	.098	-.038
Perceived physical maturity				.201**	.040	.136	.207**	.039	.141
Maturity missing				.007	.172	.001	.011	.170	.002
Rape				.009	.080	.003	.019	.080	.007
Rape missing				-.287*	.173	-.040	-.309*	.176	-.043
Dated				.041	.040	.027	.049	.044	.033
Less than high school				.067	.076	.028	.069	.076	.029
High school or GED				-.012	.051	-.007	-.007	.051	-.004
Some college				-.014	.049	-.009	-.013	.048	-.008
Education missing				.037	.067	.015	.040	.067	.017

Table 5

Linear Regression Results for Disordered Eating Behaviors, Add Health Waves 1-2[1], Continued

	Model 1			Model 2			Model 3		
Disordered eating score w2	*b*	se_b	β	*b*	se_b	β	*b*	se_b	β
Religiosity				-.036	.024	-.034	-.033	.025	-.031
Religiosity missing				-.032	.059	-.014	-.032	.058	-.015
Unknown sex				.044	.107	.009	.018	.111	.004
Early sex							-.076†	.053	-.047
Late sex							.048	.058	.021
R^2		.144			.172			.174	

[1] All estimates are weighted. All estimates are corrected for sample design, except effect sizes, β. N = 1914

* $p < .10$, two-tailed.
** $p < .05$, two-tailed.
† $p < .10$, one-tailed.
†† $p < .05$, one-tailed.

was not significant. Compared to those who never initiated sex (by the interview at wave 2), female adolescents who initiated sex early scored .076 points lower on the disordered eating scale, net of other variables. This finding will be discussed in Chapter V. The independent variables, time since sexual initiation and initiation age, were not significant in predicting disordered eating behaviors. Other significant predictors of disordered eating behaviors at wave 2 were disordered eating behaviors at wave 1, race, and perceived advanced physical maturity. All things being equal, for every one-point increase on the disordered eating scale at wave 1, female adolescents' scores at wave 2 increased by .373 on the disordered eating scale. Compared to White adolescents, African American adolescents scored lower on the disordered eating scale (b = -.117). Female adolescents with perceived advanced physical maturity scored .207 points higher on the disordered eating scale, all things being equal.

Summary

Owing to the number of hypotheses in this study, I will summarize below whether or not the results supported each hypothesis.

Hypothesis 1a: Female adolescents who initiate sexual intercourse early will have higher levels of depressive symptomatology at wave 2 on average than late initiators.

Hypothesis 1b: Female adolescents who initiate sexual intercourse early will have higher levels of depressive symptomatology at wave 2 on average than non-initiators.

This study found partial support for the first set of hypotheses. Those who initiated sex early (prior to the age of 16) had higher levels of depressive symptomatology at wave 2 when compared to those who had never initiated sex by wave 2. This was a statistically significant relationship. Those who initiated sex early did not

have significantly higher levels of depressive symptomatology than those who initiated late.

Hypothesis 2a: Female adolescents who initiate sexual intercourse early will have lower levels of self-esteem at wave 2 on average than late initiators.

Hypothesis 2b: Female adolescents who initiate sexual intercourse early will have lower levels of self-esteem at wave 2 on average than non-initiators.

The results did not support these hypotheses. The data analysis did not find a statistically significant relationship between the categorical independent variables (early initiators, late initiators, non-initiators) and self-esteem.

Hypothesis 3a: Female adolescents who initiate sexual intercourse early will be more likely to have distorted body image at wave 2 on average than late initiators.

Hypothesis 3b: Female adolescents who initiate sexual intercourse early will be more likely to have distorted body image at wave 2 on average than non-initiators.

The logistic regression results yielded no statistically significant relationships for the categorical independent variables (early initiators, late initiators, and non-initiators) and distorted body image.

Hypothesis 4a: Female adolescents who initiate sexual intercourse early will have a greater number of disordered eating behaviors at wave 2 on average than late initiators.

Hypothesis 4b: Female adolescents who initiate sexual intercourse early will have a greater number of disordered eating behaviors at wave 2 on average than non-initiators.

The evidence did not support these hypotheses. The data analysis found a statistically significant relationship between early initiators of sex and disordered eating behaviors in the opposite direction from what was predicted. Those who initiated sex

early had lower scores on the disordered eating scale, compared to those who never initiated sex and those who initiated sex late. In fact, those who initiated early had the lowest scores on the disordered eating behaviors scale.

Hypothesis 5: As the time since first sexual intercourse increases for female adolescents, negative psychological outcomes will decrease.

The research found limited support for this hypothesis. As time since sexual initiation increased (in months), rates of depressive symptomatology decreased. No other statistically significant relationships were found between time since sexual initiation and self-esteem, distorted body image, or disordered eating behaviors.

Hypothesis 6: As the age of sexual initiation increases, negative psychological outcomes will decrease.

The data supported this hypothesis in regards to depressive symptomatology. As initiation age increased (in months), depressive symptomatology decreased. This research also found a statistically significant relationship between initiation age and distorted body image, although this was in the opposite direction from what I had predicted. As initiation age increased by one month, the odds of distorted body image were 1.01 times greater. This relationship was very modest, however, considering an odds ratio equal to one has no effect. When examining self-esteem and disordered eating behaviors among female adolescents, the results did not support the hypothesis.

The following chapter will provide an overview of the thesis findings and a discussion of how this study contributes to literature on female adolescent sexual initiation and psychological outcomes. This chapter will also discuss the limitations of this study and suggestions for future research.

CHAPTER V: DISCUSSION

In this chapter, I will discuss previous research and the implications of my findings. I will conclude with limitations of the study, directions for future research, and my final thoughts. This study's main research question was: Does an early age at first intercourse increase the likelihood of negative psychological effects on adolescent females? This thesis used wave 1 and wave 2 of the National Longitudinal Study of Adolescent Health to examine the effects of early sexual initiation among female adolescents on levels of depressive symptomatology, self-esteem, body image, and disordered eating behaviors.

Previous Research

Much of the literature on adolescent sexual initiation has focused on the negative physical consequences of early sexual initiation, such as increased risk for unplanned pregnancy, sexually transmitted diseases, and a greater number of sexual partners over time. Research that has examined psychological consequences has focused mainly on depression as a broad category, while ignoring other possible psychological outcomes. Many past studies also used cross-sectional analysis, rather than a longitudinal dataset. This study contributes to literature on early sexual initiation by discussing change in psychological outcomes over time, using national longitudinal data and continuous dependent variables rather than dichotomized measures.

Nolen-Hoeksema (as cited in Berk, 2004) found that depression occurred twice as often in adolescent females as in adolescent males. Depression can be caused by a combination of biological and environmental factors; negative experiences such as parental divorce, the end of romantic relationships, or troubles at school can induce

depression. Previous studies reported mixed results in regards to the direction of causality between depression and early sexual initiation. A small number of studies suggested that depressed females were more likely to initiate sex early, while other studies suggested that females who initiated sex early were more likely to develop depression.

This study has a strong advantage over previous research based on cross-sectional data only. Controlling for wave 1 depressive symptomatology provided a more conservative test of the association between early sexual initiation and depressive symptomatology. However, some respondents had sex before wave 1, and so including their wave 1 depressive symptomatology score could be viewed as "over-controlling" the model. Respondents who initiated sex prior to wave 1 may have experienced higher depressive symptomatology. Their levels of depressive symptomatology could have decreased by the time they were interviewed at wave 1. This study's results then are more conservative and effect sizes could actually be stronger. The present study found adolescent females who initiated sex early scored higher on the depressive symptomatology scale compared to those who had not initiated sex by wave 2. The age of initiation was also significant, with those who initiated sex later having lower scores on depressive symptomatology. The ability to control for wave 1 depression to determine temporal order and the use of a nationally representative sample make this an important finding.

The data analysis has suggested a cause for concern among the population of females who matured early. Female adolescents who perceived themselves as being more advanced in physical maturity did not fare as well on levels of depressive

symptomatology, self-esteem, disordered eating behaviors, or body image. These females had higher levels of depressive symptomatology than females who reported looking average or younger than peers.

There was also a marginally significant relationship, with more physically mature females having lower self-esteem than their peers. More physically mature females scored higher on the disordered eating behaviors scale, and had 1.80 greater odds of having distorted body image when compared to their average or younger looking peers. As Whitehead and Ooms (1999) suggested, some 13 year old female adolescents may look like adults, but they are still developing emotionally and cognitively, and are not ready to assume adult roles such as engaging in sexual activity.

The variable measuring early sexual initiation was compared to the variable measuring perceived physical maturity. Of those who initiated sex early, 56% considered themselves to look older than their peers, whereas 44% considered themselves to look average or younger than their peers. The percentages changed slightly for those who initiated sex after 16 or were still virgins at wave 2. Of those who initiated sex late, the majority (58%) looked average or younger compared to peers, while 42% of late initiators were more advanced in physical maturity. Of the adolescents who had never had sex by wave 2 of the study, 66% looked average or younger than peers, while 34% were more advanced in physical maturity.

An initial concern of this study was that a younger population of female adolescents who initiated sex early may be more vulnerable to psychological outcomes compared to other high school females because they are still developing emotionally and cognitively. This study's findings suggest, however, that this might be the case only

among those females who perceive themselves to be more physically mature. These findings suggest that if a female empowerment movement (Ridolfo & Milkie, 2008) does exist among early initiators of sex, it may not be experienced equally among all groups of female adolescents. Those who mature early may be as impacted by this movement and feel more negative psychological outcomes after initiating sex.

Berk (2004) explained from a psychological perspective how reasoning skills take until late adolescence to be fully developed, at which point adolescents are more efficient in decision making and planning. Younger females who do not have fully developed reasoning skills may be more susceptible to give into the pressure to have sex. This might explain why young females have reported feelings of resentment and regret after their first sexual intercourse (Whitehead & Ooms, 1999). This could be especially true for those who gave into the pressure to have sex and if it was relatively unwanted, or perhaps completely involuntary. Albert, Brown, and Flanigan (2003) reported that one in ten females who initiated sex prior to the age of 15 described it as non-voluntary. My study found that 23% of those who initiated sex prior to the age of 16 reported it as non-voluntary, in contrast to 14% of those who initiated after 16. My findings suggest that non-voluntary sex among female adolescents may be more prevalent than Albert et al. reported, taking into consideration that their study included rape prior to 15 and the current study examined it prior to 16.

Regardless, the incidence of rape among those who initiated sex early was alarming. This study found 8% of female adolescents reported rape. Of those adolescents who reported being raped, approximately 77% initiated sex prior to the age of 16. While the rape variable was statistically controlled in this study due to the

psychological implications, the variable had no impact on depressive symptomatology, self-esteem, body image, or disordered eating behaviors. These findings do provide support for previous literature that found that the younger the age at first sexual intercourse, the higher the proportion of reported rape (Abma, Martinez, Mosher, & Dawson, 2004).

Implications

This study's most noteworthy finding was the causal relationship between early sexual initiation and depressive symptomatology. This finding underscores the importance of using longitudinal data analysis to clarify the direction of causality between variables. The majority of past research used cross-sectional analysis, and some researchers argued that teenagers self-medicated their depression with early sexual activity (Hallfors, Waller, Bauer, Ford, & Halpern, 2005). This study provided a better test of the association between depressive symptoms and early sexual initiation by controlling depressive symptoms at wave 1 to determine whether a causal relationship existed between the two variables. Adolescent females who initiated sex early scored higher on the depressive symptomatology scale compared to those who had not initiated sex by wave 2. The age of initiation was also significant, with those who initiated sex later having lower scores on depressive symptomatology.

These findings suggest that females are likely to have lower levels of depressive symptomatology if they wait to initiate sex after the age of 16. Previous research has found that depression is common among female adolescents (Whitehead & Ooms, 1999). Determining causation between earlier age at sexual initiation and depressive symptomatology has important implications for those concerned about the mental health

of young females. This research indicates that early sexual initiation is a behavior that may predict higher levels of depressive symptoms in female adolescents. Educators, parents, and those who provide health services to young females should be aware of the effects of early sexual initiation on depressive symptoms. This research suggests that discussions with adolescent females about sexual initiation should include not only possible physical consequences, but also the emotional aspects of first intercourse.

I also found a relationship between the time since sexual initiation and levels of depressive symptomatology. As more time passed since first sexual intercourse, levels of depressive symptomatology decreased. This is an encouraging finding for female adolescents experiencing higher levels of depressive symptomatology after first sex, since their symptoms are likely to decrease over time rather than getting worse. This finding might not apply to those female adolescents who were raped or had relatively unwanted sex.

This study's most consistent predictors of higher levels of depressive symptomatology, lower self-esteem, more distorted body image, and greater disordered eating behavior, were the presence of these outcomes at wave 1. Regardless of the time of sexual initiation, adolescent females who exhibited these behaviors and attitudes at wave 1 were more likely to experience these negative psychological outcomes at wave 2. Adolescents reporting higher levels of depressive symptomatology at wave 1 were more at risk of becoming more depressed after early sexual initiation. Previous cross-sectional studies indicated that females with higher levels of depressive symptomatology initiated sex at an earlier age (Whitbeck, Hoyt, Miller, and Kao, 1992). A longitudinal study using Add Health data found that higher depressive symptoms were a significant predictor of

sexual onset for 13 year-old females (Longmore, Manning, Giordano, and Rudolph, 2004). The current research suggests that those females who initiated sex early and had higher levels of depressive symptomatology at wave 1 were likely to exacerbate their depressive symptoms after initiating sexual intercourse.

With regard to self-esteem, disordered eating behaviors, and body image, the results suggest that initiating sex prior to the age of 16 did not have as many negative implications for female adolescents as were predicted. My results were actually in the opposite direction as hypothesized for distorted body image and disordered eating behaviors. Compared to those who had not initiated sex by wave 2, adolescent females who initiated sex early reported less distorted body image and disordered eating behaviors. These findings support the idea of a "girl power" movement (Ridolfo & Milkie, 2008), since those who initiated sex seemed to have a stronger sense of self in regards to their bodies. The results suggest that these females tended to be more confident in their bodies and had a more realistic perception of their body weight. Perhaps these adolescents felt more comfortable with their bodies or felt validation over their attractiveness because they had had sex. Adolescent females who did not initiate sex by wave 2 had higher levels of disordered eating behaviors, suggesting these adolescents were more self-conscious of their body weight. These adolescents could have felt more insecure because they did not receive as much acknowledgement of their sexual attractiveness compared to peers who had initiated sex. These adolescents could have felt more pressure to give into societal messages of what is considered physically attractive. They could have been seeking recognition of their sexual attractiveness because they had not yet initiated sex.

This study suggests that a "girl power" movement (Ridolfo & Milkie, 2008) may not be experienced equally by all young females. Females who matured early physically may be less likely to be impacted by this movement and feel more negative psychological outcomes after initiating sex. Female adolescents who perceived themselves as being more advanced in physical maturity did not fare as well on levels of depressive symptomatology, self-esteem, disordered eating behaviors, or body image. These females had higher levels of depressive symptomatology compared to females who looked average or younger than their peers. They were also more likely to have lower self-esteem. They scored higher on the disordered eating behaviors scale, and had 1.80 greater odds of having a distorted body image when compared to their average or younger looking peers. As Whitehead and Ooms (1999) suggested, some 13 year old female adolescents may look like adults, but they are still developing emotionally and cognitively, and are not ready to assume adult roles such as engaging in sexual activity. This research suggests that females who mature early may need additional support to develop positive mental health and self image.

I found that the incidence of rape among those who initiated sex early was alarming. Of those adolescents who reported ever being raped, approximately 77% initiated sex prior to the age of 16. These findings have implications for young females who initiate sex early because the younger the age at first sexual intercourse, the higher the proportion of reported rape (Abma, Martinez, Mosher, & Dawson, 2004).

Limitations

This study had various limitations. When secondary data analysis is used to examine a sensitive topic, such as sex, the variables can be problematic. The unit of

analysis, adolescents, can also be challenging when using self-reported data. While males tend to over-report rates of sexual activity, females tend to under-report their sexual activity (Zenilman, 2005). Discrepancies can also occur when using a panel study. Adolescents were first asked if they had ever had sex. If they responded "yes," then they were asked to provide the date they first had sex. Adolescents who answered "no" skipped out of the section. Adolescents were asked the same questions regarding sexual activity at wave 1 and wave 2. Some adolescents who said they initiated sex at wave 1 could then say they did not initiate sex at wave 2. There were 58 respondents (2.4% of the sample) who reported having sex at wave 1, but then reported being virgins at wave 2. The reasons for this discrepancy may vary. Adolescent females could have felt ashamed that they had had sex, and changed their answer at wave 2. Possibly a past relationship could have ended with whom the adolescent had sex, and out of resentment the adolescent claimed to be a virgin again. This is a common limitation when using self-report data. The data are subjective in nature and self-report bias can occur.

The variables used to assess whether respondents had initiated sex and their initiation age were based on the self-reported dates of first sex provided in the follow-up question. If respondents reported a date of initiation at wave 1, it was used for analysis to determine their age of sexual initiation. If they did not report a date at wave 1, but did at wave 2, then the wave 2 date was used for analysis. For those who reported dates at both wave 1 and wave 2, the date at wave 1 was used for analysis, as this date was closer to the original occurrence of first sex. The Add Health data asked for the specific month and year of sexual initiation, so the date closest to the occurrence was used, since

respondents were more likely to forget the date the further away it was from the original occurrence.

A second limitation is the way Add Health data measured sexual initiation. Respondents were asked to provide the date they first had sex (month and year). Although asking the question in this manner can provide the most accurate date and findings, it also leaves additional room for error. If the respondent made a mistake on reporting the year, their age of initiation was incorrect by at least one year. Error could have been minimized by also asking respondents how old they were in years when they first initiated sex, as this is something more adolescents would recall accurately.

A third limitation was the self-reported height and weight of the adolescent at wave 1. The Add Health design team made revisions to this at wave 2. At wave 2, the interviewers measured each respondent to ensure an accurate report of height and weight. Effects could have been lost on the distorted body image variable due to the self-reported data at wave 1, since female adolescents tend to under-report their weight. Farrell, Lee, and Shafran (as cited in Conley & Boardman, 2007) found that adolescent females with eating disorders tend to overestimate their weight, which could have also affected my results for distorted body image. Although limitations exist within the present study, the use of a nationally representative study and longitudinal analysis provide a useful resource for understanding implications of early sexual initiation among adolescent females.

Directions for Future Research

This study suggests that additional longitudinal research is warranted to further examine early sexual initiation among adolescent females. This research should be

replicated using the full, contractual dataset of Add Health, as well as more recent waves of Add Health data. Wave 3 (2001-02) and wave 4 (2007-08) of the Add Health data should be investigated to assess if earlier age at sexual initiation during wave 1 and wave 2 had any long-term implications on the psychological well-being of respondents. Such research would also help to assess whether the patterns found in this study have persisted up to the present. If future research confirms that adolescent females who initiate sex early have higher levels of depressive symptomatology, then educators, parents, and those providing health services should be aware of these negative effects on the mental health of young females.

Future research should also test a mediation model between early sexual initiation, negative physical consequences, and depressive symptomatology. Negative physical consequences of early sexual initiation, such as unintended pregnancy or the risk of sexually transmitted infections, may increase levels of depressive symptomatology. A possible mediation model should be examined further.

Levels of depressive symptomatology decreased as the time since sexual initiation increased. This finding could potentially be spurious if rates of depression decreased as a result of the individual growing out of adolescence into young adulthood. Future longitudinal research should examine this relationship using time since sexual initiation as the independent variable. One could study adolescents with high levels of depressive symptomatology at baseline, and compare those who initiated sex early to those who did not. Levels of depressive symptomatology could then be evaluated at a later wave to determine if levels decreased further among adolescents who initiated sex early.

Another useful study would be an examination of the relationship between early sexual initiation and adolescents' self image. Findings from this study suggested that sexual initiation had a positive impact on an adolescents' body image and disordered eating behaviors. Using self-reported data from adolescents, additional variables measuring self confidence, self efficacy, and perception of their bodies could be used to assess if earlier age at sexual initiation has a positive impact on self image.

This study used a previously unstudied variable in relation to early sexual initiation, the disordered eating behaviors scale. Researchers need to examine this variable further using longitudinal data. This research found less disordered eating behaviors among those adolescents who had initiated sex compared to those who had never initiated sex by wave 2. The full contractual Add Health dataset should be used to replicate this scale with the larger sample. Respondents who had not initiated sex by wave 2 could be examined further into late adolescence at wave 3. Levels of disordered eating behaviors of those adolescents who did not initiate sex at wave 2, but had initiated by wave 3, should be examined. This research would determine if sexual initiation predicts less disordered eating behaviors among young females.

Future longitudinal research should be conducted on those female adolescents who reported advanced physical maturity at wave 1. These adolescents experienced higher depressive symptomatology, lower self-esteem, more disordered eating behaviors, and more distorted body image at wave 2. This sample should be examined at wave 3 and wave 4 to determine if these negative psychological outcomes persist into late adolescence and young adulthood. This research could investigate other self image variables to see if negative psychological affects subside among this sample.

Conclusion

This study has provided evidence that early sexual initiation can have a negative effect on adolescent females' levels of depressive symptomatology. Previous studies have called into question the temporal order of depression and sexual initiation. Because this study was longitudinal, the findings do support a causal relationship between early sexual initiation and depressive symptomatology. In addition, controlling for wave 1 depressive symptomatology provided a more conservative and better test of this relationship. This study also fills a particular gap in the literature regarding sexual initiation and female adolescents by examining a previously unstudied outcome – disordered eating behaviors.

Overall, except for depressive symptomatology, early sexual initiation did not have negative effects on the other psychological outcomes: self-esteem, body image, or disordered eating behaviors. Adolescent females may actually experience a more positive self perception of their bodies after sexual initiation. These findings, however, did not occur across all groups of young females. Adolescent females with perceived advanced physical maturity consistently exhibited more negative psychological outcomes. These adolescent females had higher levels of depressive symptomatology, lower self-esteem, poorer body image, and more disordered eating behaviors. Previous research found that females who matured early were more at risk of initiating sex from a younger age. The current research suggests that these females who mature early are also more at risk for depressive symptomatology, lower self-esteem, more distorted body image, and greater disordered eating behaviors. These females may need additional support throughout adolescence to develop positive mental and physical health.

Adolescent females with higher levels of depressive symptomatology prior to initiating sex are also at a greater risk of exacerbating their depressive symptoms after sexual intercourse. Although this study did not find support for all of the hypotheses as predicted, the use of a nationally representative sample of adolescents in the United States between grades 7-12 and longitudinal analysis provide a useful resource for understanding the implications of early sexual initiation among adolescent females.

RESEARCH ACKNOWLEDGEMENTS

This research uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516-2524 (addhealth@unc.edu). No direct support was received from grant P01-HD31921 for this analysis.

REFERENCES

Abma, J.C., Martinez, G.M., Mosher, W.D., & Dawson, B.S. (2004). Teenagers in the United States: sexual activity, contraceptive use, and childbearing, 2002. National Center for Health Statistics. *Vital and Healthy Statistics, 23*(24), 1-87.

Alan Guttmacher Instititute. (January, 2010). *Facts on American teens' sexual and reproductive health*. Retrieved February 12, 2010 from http://www.guttmacher.org/pubs/FB-ATSRH.html.

Albert, B., Brown, S., & Flanigan, C.M. (Eds.) (2003). *14 and younger: The sexual behavior of young adolescents (summary)*. Washington, DC: National Campaign to Prevent Teen Pregnancy.

Bachanas, P.J., Morris, M.K., Lewis-Gess, J.K., Sarett-Cuasay, E.J., Sirl, K., Ries, J.K., et al. (2002). Predictors of risky sexual behavior in African-American adolescent girls: Implications for prevention interventions. *Journal of Pediatric Psychology, 27*, 519-530.

Berk, L.E. (2004). *Development through the lifespan* (3rd ed). Boston: Pearson.

Brown, J.D. (2002). Mass media influences on sexuality. *Journal of Sex Research, 39*, 42-45.

Brumberg, J. (1997). *The body project: An intimate history of American girls*. New York: Vintage Books, A Division of Random House.

Cash, T.F. & Deagle, E.A. III (1997). The nature and extent of body-image disturbances in anorexia nervosa and bulimia nervosa: A meta-analysis. *International Journal of Eating Disorders, 22,* 107-125.

Cauffman, E., & Steinberg, L. (1996). Interactive effects of menarcheal status and dating on dieting and disordered eating among adolescent girls. *Developmental Psychology, 32,* 631-635.

Center for Disease Control and Prevention. (2000, May 30). *2 to 20 years: Girls' body mass index-for-age percentiles*. Retrieved April 10, 2010 from http://www.cdc.gov/growthcharts/data/set1clinical/cj41l024.pdf

Cicchetti, D., & Toth, S.L. (1998). The development of depression in children and adolescents. *American Psychologist, 53,* 221-241.

Conley, A., & Boardman, J.D. (2007). Weight overestimation as an indicator of disordered eating behaviors among young women in the United States. *International Journal of Eating Disorders, 40,* 441-445.

Culbertson, F.M. (1997). Depression and gender: An international review. *American Psychologist, 52,* 25-51.

Goodman, E., Hinden, B.R., & Khandelwal, S. (2000). Accuracy of teen and parental reports of obesity and body mass index. *Pediatrics, 106,* 52-58.

Goodman, E. & Whitaker, R.C. (2002). A prospective study of the role of depression in the development and persistence of adolescent obesity. *Pediatrics, 110,* 497-504.

Granillo, T., Jones-Rodrigues, G., & Carvajal, S.C. (2005). Prevalence of eating disorders in Latina adolescents: Associations with substance use and other correlates. *Journal of Adolescent Health, 36,* 214-220.

Gray-Little, B., & Carels, R. (1997). The effects of racial and socioeconomic consonance on self-esteem and achievement in elementary, junior high, and high school students. *Journal of Research on Adolescence, 7,* 109-131.

Gray-Little, B., & Hafdahl, A.R. (2000). Factors influencing racial comparisons of self-esteem: A quantitative review. *Psychological Bulletin, 126,* 26-54.

Grunbaum, J.A., Kann, L., Kinchen, S., Ross, J., Hawkins, R., Lowry, W.A., Harris, T., McManus, D., Chyen, & Collins, J. (2004). Youth risk behavior surveillance-United States, 2003. *MMWR Surveillance Summaries 53*(2), 1-96.

Hallfors, D.D., Waller, M.W., Bauer, D., Ford, C.A., & Halpern, C.T. (2005). Which comes first in adolescence—sex and drugs or depression? *American Journal of Preventive Medicine*, *29,* 163-170.

Halpern, C.T., King, R.B., Oslak, S.G., & Udry, J.R. (2005). Body mass index, dieting, romance, and sexual activity in adolescent girls: Relationships over time. *Journal of research on adolescence, 15,* 535-559.

Halpern, C. T., Udry, J. R., Campbell, B., & Suchindran, C. (1999). Effects of body fat on weight concerns, dating, and sexual activity: A longitudinal analysis of black and white adolescent girls. *Developmental Psychology, 35,* 721-736.

Harris, K.M., Duncan, G.J., & Boisjoly, J. (2002). Evaluating the role of 'nothing to lose' attitudes on risky behavior in adolescence. *Social Forces, 80,* 1005-39.

Harris, K.M., Halper, C.T., Whitsel, E., Hussey, J. Tabor, J., Entzel, P. & Udry, J.R. (2009). *The National Longitudinal Study of Adolescent Health: Research Design*. Retrieved January 1, 2009 from http://www.cpc.unc.edu/projects/addhealth/codebooks/wave2.

Harris, K.M. & Udry, J.R. *National Longitudinal Study of Adolescent Health (Add Health), 1994-2002 [Computer file]*. ICPSR21600-v2. Ann Arbor, MI: Inter-

university Consortium for Political and Social Research [distributor], 2008-10-31. doi: 10.3886/ICPSR21600.

Johnson, Noyes, & Rector. (2003). *Sexually active teenagers are more likely to be depressed and to attempt suicide*. The Heritage Foundation, Washington, D.C. Retrieved March 26, 2009, from http://www.heritage.org/Research/Abstinence/cda0304.cfm?renderforprint=1.

Jones, D.C. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology, 40*, 823-835.

Kelley, M.S. & Peterson J.L. (1997). *The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994-1996: A user's guide to the machine-readable files and documentation* (Data Sets 48-50, 98, A1-A3). Los Altos, CA: Sociometrics Corporation, American Family Data Archive.

Kemper, K.A., Sargent, R.G., Drane, J.W., Valois, R.F., & Hussey, J.R. (1994). Black and white females' perceptions of ideal body size and social norms. *Obesity Research, 2*, 117-126.

Kohler, P.K., Manhart, L.E., & Lafferty, W.E. (2008). Abstinence-only and comprehensive sex education and the initiation of sexual activity and teen pregnancy. *Journal of Adolescent Health, 42*(4): 344-351. Retrieved January 12, 2010, from http://www.advocatesforyouth.org/index.php?option=com_ content&task=view&id=46&Itemid=75

Kotchick, B.A., Shaffer, A., Forehand, R., & Miller, K.S. (2001). Adolescent sexual risk behavior: A multi-system perspective. *Clinical Psychology Review, 21*, 493-519.

Kuba, S.A. & Harris, D.J. (2001). Eating disturbances in women of color: An exploratory study of contextual factors in the development of disordered eating in Mexican-American women. *Health Care Women International, 22,* 281-298.

Laumann, E., Gagnon, J., Michael, R., & Michaels, S. (1994). *The social organization of sexuality: Sexual practices in the United States.* Chicago: University of Chicago Press.

Lee, A.M. & Lee, S. (1996). Disordered eating and its psychological correlates among Chinese adolescent females in Hong Kong. *International Journal of Eating Disorders, 20,* 177-183.

Littleton, H.L. & Ollendick, T. (2003). Negative body image and disordered eating behavior in children and adolescents: What places youth at risk and how can these problems be prevented? *Clinical Child and Family Psychology Review, 6,* 51-66.

Longmore, M.A., Manning, W.D., Giordano, P.C., & Rudolph, J.L. (2004). Self-esteem, depressive symptoms, and adolescents' sexual onset. *Social Psychology Quarterly, 67*, 279-95.

Maxwell, K.A. (2002). Friends: The role of peer influence across adolescent risk behaviors. *Journal of Youth and Adolescence, 31,* 267-277.

Michael, R.T., Gagnon, J.H., Laumann, E.O., & Kolata, G. (1994). *Sex in America*. Boston: Little, Brown.

Monette, Sullivan, & DeJong. (2005). *Applied social research: A tool for the human services (6th ed.)*. Belmont, CA: Thomson/Brooks/Cole.

Mueller, A.S., Pearson, J., Muller, C., Frank, K., and Turner, A. (2010). Sizing up peers: Adolescent girls' weight control and social comparison in the school context. *Journal of Health and Social Behavior, 51,* 64-78.

O'Donnell, L., O'Donnell, C.R., & Stueve, A. (2001). Early sexual initiation and subsequent sex-related risks among urban minority youth: The reach for health study. *Family Planning Perspectives, 33,* 268-275.

Paxton, R.J., Valois, R.F., & Drane, W. (2004). Correlates of body mass index, weight goals, and weight-management practices among adolescents. *Journal of School Health, 74,* 136-143.

Pipher, M. (1994). *Reviving Ophelia: Saving the selves of adolescent girls*. New York: G.P. Putnam's Sons.

Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. Retrieved April 15, 2009 from http://apm.sagepub.com/cgi/content/abstract/1/3/385.

Ridolfo, H. (2007). *Race and self image: How mothers' socialization matters*. Unpublished master's thesis, University of Maryland, College Park, Maryland.

Ridolfo, H. & Milkie, M. (2008, August). *Race and girls' self image: How mothers' socialization matters**. Paper presented at the meeting of the American Sociological Association, Boston, MA.

Romer, D., Black, M., Richardo, I., Feigelman, S., Kaljee, L., Galbraith, J., et al. (1994). Social influences on the sexual behavior of youth at risk for HIV exposure. *American Journal of Public Health, 84,* 977-985.

Rosenbaum, E. & Kandel, D.B. (1990). Early onset of adolescent sexual behavior and drug involvement. *Journal of Marriage and the Family, 52,* 783-798.

Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Revised ed. Middletown, CT: Wesleyan University Press.

Twenge, J.M., & Campbell, W.K. (2001). Age and birth cohort differences in self-esteem: A cross-temporal meta-analysis. *Personality and Social Psychology Review, 5,* 321-344.

UNC Carolina Population Center, Add Health. (n.d.). *Program Code*. Retrieved February 12, 2010, from http://www.cpc.unc.edu/projects/addhealth/data/code

Usmiana, S., & Daniluk, J. (1997). Mothers and their adolescent daughters: Relationship between self-esteem, gender role identity, and body image. *Journal of Youth and Adolescence, 26,* 45-60.

Weissman, M., Wolk, S., Goldstein, R.B., Moreau, D., Adams, P., & Greenwalk, S. (1999). Depressed adolescents grown up. *Journal of the American Medical Association, 281,* 1707-1713.

Whitbeck, L.B., Hoyt, D.R., Miller, M., & Kao, M. (1992). Parental support, depressed affect, and sexual experience among adolescents. *Youth and Society, 24,* 166-177.

Whitehead, D.B., & Ooms, T. (1999). *Goodbye to girlhood: What's troubling girls and what we can do about it.* Retrieved March 27, 2010, from Washington, DC, The National Campaign to Prevent Teen Pregnancy Web site: http://aspe.hhs.gov/pic/pdf/7268.pdf

Wichstrom, L. (1999). The emergence of gender difference in depressed mood: The role of intensified gender socialization. *Developmental Psychology, 35,* 232-245.

Zenilman, J.M. (2005). Behavioral interventions-rationale, measurement, and effectiveness. *Infectious Disease Clinics of North America 19*(2), 541-62.

Zimmerman, M.A., Copeland, L.A., Shope, J.T., & Dielman, T.E. (1997). A longitudinal study of self-esteem: Implications for adolescent development. *Journal of Youth and Adolescence*, *26,* 117-141.