

## **ABSTRACT**

Title of Document: LONGITUDINAL EFFECTS OF MOTHER-  
DAUGHTER RELATIONSHIPS ON YOUNG  
WOMEN'S SEXUAL RISK BEHAVIORS

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Doctor of Philosophy, 2011

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Among adolescent and young adult women, sexual risk behaviors represent a critical public health concern. This study used Waves I, II, and III of the National Longitudinal Survey of Adolescent Health to compare two theories of maternal influence on daughters' sexual risk behaviors: parenting style *versus* social learning theory. Associations between maternal parenting style (based on Wave I warmth and control) and mother-daughter communication about sex (based on Wave I comfort and frequency of communication about sex) and adolescent and young women's sexual risk behaviors (Wave II and III inconsistent condom and contraceptive use and multiple partnerships) were examined. Further, this study examined whether these associations were mediated by socioemotional characteristics (sexual self-efficacy and risk-taking behaviors) or by

sexual knowledge (sexual health knowledge and perceived barriers to contraception), respectively.

Controlling for covariates, results indicated that in adolescence: 1) authoritarian and permissive parenting were associated with an increased risk of inconsistent condom use, though this association was attenuated by socioemotional and sexual knowledge risk characteristics, whereas infrequent, uncomfortable communication about sex was associated with a decreased likelihood of inconsistent use; and 2) authoritarian parenting was associated with an increased risk of inconsistent contraceptive use, also attenuated by the addition of socioemotional and sexual knowledge risk characteristics to analyses. Results further indicated that in adulthood: 3) parenting style was not associated with inconsistent condom or contraceptive use, but may have an indirect effect on inconsistent condom use, and that uncomfortable communication about sex was associated with a decreased likelihood of inconsistent contraceptive use; and 4) parenting style was not associated with lifetime sex partnerships, but authoritarian and neglectful parenting were associated with higher numbers of past year partners.

These findings indicate that both parenting style and mother-daughter communication about sex may serve as predictors of girls' sexual risk-taking in adolescence and young adulthood and should be areas of focus when implementing sexual health prevention and intervention programs. In particular, this study provides support for utilizing parenting styles in understanding how mothers influence daughters' sexual risk-taking behaviors, however future research should examine the ways in which other variables mediate and moderate these effects.

LONGITUDINAL EFFECTS OF MOTHER-DAUGHTER RELATIONSHIPS ON  
YOUNG WOMEN'S SEXUAL RISK BEHAVIORS

By

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Dissertation submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
2011

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## ACKNOWLEDGMENTS

I would like to begin by acknowledging all those who guided and supported me throughout the process of completing this dissertation. First and foremost, I would like to express my gratitude to my dissertation committee:

**Dr. Sandy Hofferth**, for her unrivaled expertise and her ability to elevate and inform my work both in and outside the context of this dissertation; without whom I would have neither completed this project, nor done so in such a thorough and thoughtful manner.

**Dr. Joan Kahn**, for her role in helping me develop my interest and expertise in fertility and her review of the work that served as the impetus for this research.

**Dr. Maria Khan**, for her unconditional patience and her unwavering support and guidance as both a supervisor and a mentor.

**Dr. Lis Foster Maring**, for her thoughtful words and contributions to this project as well as her support of my general professional development.

**Dr. Edmond Shenassa**, for his ability to foster excitement for research and research methods and for his open-door policy and willingness to discuss the development of this project and of my professional body of work, as a whole.

I would also like to thank the **Maryland Population Research Center** for providing me access to the data, statistical package, and further training. Additionally, I would like to acknowledge the funders of my data set, the National Longitudinal Study of Adolescent

Health. This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by 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. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis.

Lastly, I would like to thank **my family and friends** and the **faculty and staff of the Family Science department** at the University of Maryland for their ongoing support of my work and my professional endeavors.

## CONTENTS

<b>Acknowledgments</b> .....	<b>ii</b>
<b>Table of Contents</b> .....	<b>iv</b>
<b>List of Tables</b> .....	<b>xi</b>
<b>List of Figures</b> .....	<b>xiv</b>
<b>Chapter 1: Introduction</b> .....	<b>1</b>
1.1. Background.....	1
1.1.1. Adolescent and Young Adult Unwanted Fertility and STI.....	1
1.1.2. Sexually Transmitted Infections (STIs).....	2
1.1.3. Sexual Risk Behaviors.....	3
1.1.4. Antecedents of Sexual Risk Behaviors.....	4
1.2. Conceptual Model.....	6
1.3. Theory: Parenting Style and Socioemotional Development.....	8
1.4. Alternative Theory: Mother-Daughter Communication about Sex.....	9
1.5. Current Study.....	10
<b>Chapter 2: Literature Review</b> .....	<b>14</b>
2.1. Sexual Risk Outcomes.....	15
2.1.1. Teen and Unintended Fertility.....	15
2.1.2. Sexually Transmitted Infections (STIs).....	17
2.2. Sexual Risk Behaviors.....	19
2.2.1. Multiple Partnerships.....	20
2.2.3. Inconsistent Condom Use – STI Risk.....	21
2.2.4. Inconsistent Contraceptive Use – Unintended Pregnancy Risk.....	22
2.3. Determinants of Sexual Risk Behavior.....	23
2.3.1. Low Sexual Self-Efficacy.....	23
2.3.2. High Risk-Taking Behaviors.....	24
2.3.3. Low Sexual Health Knowledge.....	25
2.3.4. High Perceived Barriers to Contraception.....	26
2.4. Other Factors that Influence Adolescent Sexual Risk Behaviors.....	26
2.5. Mother-Daughter Relationship Characteristics, Gender, and STI Risk Behaviors.....	28
2.6. Theoretical Model: Maternal Parenting Style and Sexual Risk.....	30
2.6.1. Mother-Daughter Warmth.....	32
2.6.2. Maternal Control.....	32
2.7. Alternative Theoretical Model: Mother-Daughter Communication about sex and Sexual Risk.....	33
2.7.1. Maternal Comfort with Communication about Sex.....	35
2.7.2. Frequency of Communication about Sex.....	36
2.8. Effect of Potential Confounding Variables on STI Risk Behaviors.....	36
2.8.1. Age.....	37
2.8.2. Race/Ethnicity.....	37
2.8.3. Maternal Education.....	38
2.8.4. Ratio of Income to the Poverty Line.....	38
2.8.5. Religiosity.....	39
2.8.6. Family Structure.....	39

2.8.7. Risky Peer Influence.....	40
2.9. Current Study.....	40
<b>Chapter 3: Methods.....</b>	<b>45</b>
3.1. Data.....	45
3.1.1. Description of the Data.....	45
3.1.2. Survey Design.....	46
3.1.3. Participants.....	48
3.1.4. Analytic Samples.....	49
3.2. Variables.....	50
3.2.1. Independent Variables (Wave I).....	50
3.2.1.1. Parenting Style.....	50
3.2.1.1.1. Maternal Warmth.....	50
3.2.1.1.2. Maternal Control.....	50
3.2.1.2. Mother-Daughter Communication about Sex.....	51
3.2.1.2.1. Maternal Comfort with Communication about Sex.....	51
3.2.1.2.2. Frequency of Communication about Sex.....	52
3.2.2. Covariates (Wave I).....	52
3.2.2.1. Age.....	52
3.2.2.2. Race/Ethnicity.....	52
3.2.2.4. Ratio of Family Income to Poverty.....	53
3.2.2.3. Maternal Education.....	53
3.2.2.5. Religiosity.....	53
3.2.2.6. Household Structure.....	54
3.2.2.7. Peer Substance Use.....	54
3.2.2.8. Peer Acceptance of Sex.....	55
3.2.2.9. Low Sexual Self-Efficacy.....	55
3.2.2.10. High Risk-Taking Behaviors.....	56
3.2.2.11. Low Sexual Health Knowledge.....	56
3.2.2.12. High Perceived Barriers to Contraception.....	57
3.2.2.13. Age at Sexual Initiation (Wave III).....	58
3.2.2.14. Adolescent Inconsistent Condom/Contraceptive Use (Wave II).....	58
3.2.3. Mediators (Wave II).....	58
3.2.3.1. Low Sexual Self-Efficacy.....	58
3.2.3.2. High Risk-Taking Behavior.....	59
3.2.3.3. Low Sexual Health Knowledge.....	59
3.2.3.4. High Perceived Barriers to Contraception.....	60
3.2.4. Dependent Variables (Waves II and III).....	61
3.2.4.1. Inconsistent Condom Use.....	61
3.2.4.2. Inconsistent Contraceptive Use.....	62
3.2.4.3. Multiple Sex Partnerships.....	63
3.3. Analyses.....	63
3.3.1. Analytic Design.....	63
3.3.2. Human Subjects.....	67
<b>Chapter 4: Results – Descriptives.....</b>	<b>71</b>

4.1. Population Sociodemographic Characteristics (Wave I).....	72
4.2. Analytic Sample Sociodemographic Characteristics (Wave I).....	74
4.2.1. Non-Virgins at Wave II.....	74
4.2.2. Past Year Partnerships at Wave III.....	75
4.3. Mother-Daughter Relationship Characteristics.....	78
4.3.1. Maternal Parenting Style.....	78
4.3.2. Mother-Daughter Communication about Sex.....	78
4.4. Socioemotional and Sexual Knowledge Risk Characteristics.....	80
4.4.1. Analytic Sample Socioemotional Risk Characteristics.....	80
4.4.1.1. Low Sexual Self-Efficacy.....	80
4.4.1.2. High Risk-Taking Behavior.....	80
4.4.2. Analytic Sample Sexual Knowledge Risk Characteristics.....	80
4.4.2.1. Low Sexual Health Knowledge.....	80
4.4.2.2. High Perceived Barriers to Contraception.....	80
4.5. Associations between Mother-Daughter Relationship Characteristics and Socioemotional Characteristics.....	82
4.5.1. Parenting style and Low Sexual Self-Efficacy.....	82
4.5.2. Mother-Daughter Communication about Sex and Low Sexual Self- Efficacy.....	82
4.5.3. Parenting Style and High Risk-Taking Behavior.....	82
4.5.4. Mother-Daughter Communication about Sex and High Risk-Taking Behavior.....	83
4.6. Associations between Mother-Daughter Relationship Characteristics and Sexual Knowledge Characteristics.....	83
4.6.1. Parenting Style and Low Sexual Health Knowledge.....	83
4.6.2. Mother-Daughter Communication about Sex and Low Sexual Health Knowledge.....	83
4.6.3. Parenting Style and High Perceived Barriers to Contraception.....	83
4.6.4. Mother-Daughter Communication about Sex and High Perceived Barriers to Contraception.....	84
4.7. Sexual Risk-Taking Behaviors.....	86
<b>Chapter 5: Results – Adolescence.....</b>	<b>88</b>
5.1. Inconsistent Condom Use.....	89
5.1.1. Maternal Parenting Style (Wave I) and Inconsistent Condom Use (Wave II).....	89
5.1.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave II).....	92
5.1.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave II).....	92
5.1.4. Socioemotional Risk (Wave II) and Inconsistent Condom Use (Wave II).....	93
5.1.5. Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave II).....	94
5.1.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Condom Use (Wave II).....	96

5.1.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Condom Use (Wave II).....	99
5.1.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave II) [Full Model].....	100
5.2. Inconsistent Contraceptive Use.....	102
5.2.1. Maternal Parenting Style (Wave I) and Inconsistent Contraceptive Use (Wave II).....	102
5.2.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave II).....	105
5.2.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave II).....	105
5.2.4. Socioemotional Risk (Wave II) and Inconsistent Contraceptive Use (Wave II).....	106
5.2.5. Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave II).....	107
5.2.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Contraceptive Use (Wave II).....	109
5.2.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Contraceptive Use (Wave II).....	112
5.2.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave II) [Full Model].....	114
<b>Chapter 6: Results – Young Adulthood.....</b>	<b>115</b>
6.1. Lifetime Partnerships.....	116
6.1.1. Maternal Parenting Style (Wave I) and Lifetime Partnerships (Wave III).....	116
6.1.2. Mother-Daughter Communication about Sex (Wave I) and Lifetime Partnerships (Wave III).....	119
6.1.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Lifetime Partnerships (Wave III).....	119
6.1.4. Socioemotional Risk (Wave II) and Lifetime Partnerships (Wave III).....	120
6.1.5. Sexual Knowledge Risk (Wave II) and Lifetime Partnerships (Wave III).....	121
6.1.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Lifetime Partnerships (Wave III).....	123
6.1.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and	

Lifetime Partnerships (Wave III).....	126
6.1.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Lifetime Partnerships (Wave III) [Full Model].....	126
6.2. Past Year Partnerships.....	129
6.2.1. Maternal Parenting Style (Wave I) and Past Year Partnerships (Wave III).....	129
6.2.2. Mother-Daughter Communication about Sex (Wave I) and Past Year Partnerships (Wave II).....	132
6.2.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Past Year Partnerships (Wave II).....	132
6.2.4. Socioemotional Risk (Wave II) and Past Year Partnerships (Wave II).....	133
6.2.5. Sexual Knowledge Risk (Wave II) and Past Year Partnerships (Wave II).....	133
6.2.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Past Year Partnerships (Wave III).....	136
6.2.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Past Year Partnerships (Wave III).....	139
6.2.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Past Year Partnerships (Wave III) [Full Model].....	139
6.3. Inconsistent Condom Use.....	141
6.3.1. Maternal Parenting Style (Wave I) and Inconsistent Condom Use (Wave III).....	141
6.3.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave III).....	144
6.3.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave III)..	144
6.3.4. Socioemotional Risk (Wave II) and Inconsistent Condom Use (Wave III).....	145
6.3.5. Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave III).....	145
6.3.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Condom Use (Wave III).....	148
6.3.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Condom Use (Wave III).....	151
6.3.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave III) [Full	

Model] .....	151
6.4. Inconsistent Contraceptive Use.....	155
6.4.1. Maternal Parenting Style (Wave I) and Inconsistent Contraceptive Use (Wave III).....	155
6.4.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave III).....	158
6.4.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave III).....	158
6.4.4. Socioemotional Risk (Wave II) and Inconsistent Contraceptive Use (Wave III).....	159
6.4.5. Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave III).....	160
6.4.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Contraceptive Use (Wave III).....	162
6.4.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Contraceptive Use (Wave III).....	165
6.4.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave III) [Full Model].....	165
<b>Chapter 7: Discussion.....</b>	<b>168</b>
7.1 Review of Hypotheses.....	174
7.1.1. Hypothesis 1.....	174
7.1.2. Hypothesis 2.....	176
7.1.3. Hypothesis 3.....	178
7.1.4. Hypothesis 4.....	181
7.1.5. Hypothesis 5.....	183
7.1.6. Hypothesis 6.....	186
7.1.7. Hypothesis 7.....	188
7.1.8. Hypothesis 8.....	190
7.1.9. Hypothesis 9.....	191
7.2. Comparing Theoretical Models: Parenting Style <i>versus</i> Mother-Daughter Communication about Sex.....	193
7.3. Additional Findings: Covariates.....	195
7.3.1. Adolescent Inconsistent Condom and Contraceptive Use.....	195
7.3.2. Young Adulthood Inconsistent Condom and Contraceptive Use.....	195
7.3.3. Young Adulthood Multiple Partnerships.....	196
7.4. Limitations.....	197
7.4.1. Data.....	197
7.4.2. Sample.....	198
7.4.3. Independent Variables.....	200
7.4.4. Dependent Variables.....	202

7.4.5. Longitudinal Effects.....	203
7.5. Implications.....	205
7.5.1. Programmatic Implications.....	205
7.5.1.1. Adolescence.....	205
7.5.1.2. Young Adulthood.....	205
7.5.2. Policy.....	206
7.5.3. Future Research.....	207
7.5.3.1. Alternate Theories.....	207
7.5.3.2. Longitudinal Associations and Alternate Methods.....	208
7.5.3.3. Contraceptive Choice and Dual Method Use.....	209
7.5.3.4. Gender-Specific Associations.....	210
7.5.3.5. Race/Ethnic-Specific Associations.....	211
7.5.3.6. Interactive Effects.....	212
7.6. Discussion.....	213
<b>Appendix A: Sexually Transmitted Infections (STIs).....</b>	<b>216</b>
<b>Appendix B: Institutional Review Board (IRB) Document.....</b>	<b>220</b>
<b>References.....</b>	<b>222</b>

## LIST OF TABLES

Table 1. Research Aims.....	11
Table 2. Research Questions.....	44
Table 3. Hypotheses.....	69
Table 4a. Sociodemographic Characteristics (Wave I) of Virgin and Non-Virgin (Wave II) Adolescents.....	73
Table 4b. Sociodemographic Characteristics (Wave I) of Respondents with Past Year Multiple Partnerships (Wave III).....	77
Table 4c. Mother-Daughter Relationship Characteristics.....	79
Table 4d. Socioemotional and Sexual Knowledge Risk at Waves I and II.....	81
Table 4e. Associations between Mother-Daughter Relationship Characteristics (Wave I) and Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II)..	85
Table 4f. Sexual Risk-Taking in Adolescence (Wave II) and Young Adulthood (Wave III).....	87
Table 5a. Associations between Adolescent Mother, Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Condom Use (Wave II) [Independent Variables and Dependent Variables, Reduced Form].....	90
Table 5b. Associations between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Adolescent Inconsistent Condom Use (Wave II) [Mediators and Dependent Variables].....	95
Table 5c. Associations between Adolescent Mother, Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Condom Use (Wave II) [Full Model].....	97

Table 5d. Associations between Adolescent Mother, Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Contraceptive Use (Wave II) [Independent Variables and Dependent Variables, Reduced Form].....	104
Table 5e. Associations between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Adolescent Inconsistent Contraceptive Use (Wave II) [Mediators and Dependent Variables].....	109
Table 5f. Associations between Adolescent Mother, Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Contraceptive Use (Wave II) [Full Model].....	111
Table 6a. Associations between Adolescent Mother, Daughter Relationship Characteristics (Wave I) and Young Adult Lifetime Partnerships (Wave III) [Independent Variables and Dependent Variables, Reduced Form].....	118
Table 6b. Associations between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Lifetime Partnerships (Wave III) [Mediators and Dependent Variables].....	123
Table 6c. Associations between Adolescent Mother, Daughter Relationship Characteristics (Wave I) and Young Adult Lifetime Partnerships (Wave III) [Full Model].....	125
Table 6d. Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Past Year Partnerships (Wave III) [Independent Variables and Dependent Variables, Reduced Form].....	131
Table 6e. Associations between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Past Year Partnerships (Wave III) [Mediators	

	and Dependent Variables].....	136
Table 6f.	Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Past Year Partnerships (Wave III) [Full Model].....	138
Table 6g.	Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Condom Use (Wave III) [Independent Variables and Dependent Variables, Reduced Form].....	144
Table 6h.	Associations between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Inconsistent Condom Use (Wave III) [Mediators and Dependent Variables].....	149
Table 6i.	Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Condom Use (Wave III) [Full Model].	152
Table 6j.	Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Contraceptive Use (Wave III) [Independent Variables and Dependent Variables, Reduced Form].....	157
Table 6k.	Associations between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Inconsistent Contraceptive Use (Wave III) [Mediators and Dependent Variables].....	162
Table 6l.	Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Contraceptive Use (Wave III) [Full Model].....	164
Table 7a.	Findings – Adolescence.....	170
Table 7b.	Findings – Young Adulthood.....	172

## LIST OF FIGURES

Figure 1. Maternal Effects on Adolescent and Young Adult Women's Sexual Risk-Taking Behaviors.....	13
Figure 2. Baron and Kenny's (1986) Model of Mediation.....	65

## **CHAPTER 1: INTRODUCTION**

Among adolescent and young adult women, unintended fertility and sexually transmitted infections (STIs) represent a critical area of concern for public health professionals. In order to reduce the prevalence of unintended fertility and STI, it is imperative that researchers focus on the determinants of these two outcomes – sexual risk behaviors. This chapter begins by providing an overview of statistics regarding unintended teen and young adult fertility and STIs, and describes a few of the sexual risk behaviors underlying pregnancy and STI, including multiple partnerships, inconsistent condom use, and inconsistent contraceptive use. This chapter also reviews literature that points to the importance of mothers in adolescent sexual risk decisions and proposes 2 theoretical models to explain how mothers might influence their daughters' risk of engaging in sexual risk behaviors: one that asserts that poor maternal parenting style leads to poor socioemotional outcomes which lead to sexual risk behaviors, and one that asserts that poor mother-daughter communication about sex leads to poor sexual health knowledge which leads to sexual risk behaviors. Finally, this chapter will provide an overview of the research design with which these two theoretical models will be explored.

### **1.1. Background**

#### **1.1.1. Adolescent and Young Adult Unwanted Fertility and STI**

Although data have shown a decline in the number of teenage pregnancies in the United States (U.S.) to a historic low in 2005, rates rose for the first time in a decade the following year (Kost, Henshaw, & Carlin, 2010). This is concerning, as over 750,000 teenage pregnancies were reported in 2005, alone - a rate of 71.5 pregnancies per 1,000

females aged 15 - 19 years (Kost, Henshaw, & Carlin). Of these pregnancies, 215,000 resulted in induced abortions, 117,000 in fetal losses, and 425,000 in live births.

Likewise, although teen birth rates dropped 6% among 15 - 17 year olds and dropped 7% among 18 - 19 year olds between 2008 and 2009 (Hamilton, Martin, & Ventura, 2010), the numbers of births remain high, with nearly 40 out of 1,000 teens aged 15 - 19 reporting a birth in 2009. These statistics warrant attention from researchers, as the incidence of teen pregnancy and childbirth in the United States is higher than in any other industrialized nation (Singh & Darroch, 2000) and represents a costly financial burden to the country. In 2004, for instance, an estimated \$9.1 billion in public funding was expended on teenage childbearing (Hoffman, 2006).

### **1.1.2. Sexually Transmitted Infections (STIs)**

In addition to the risk of teen or unintended fertility, adolescent and young adult sexual activity and risky sexual behavior is associated with the added risk of STIs. In the U.S., STIs represent an urgent public health concern, with approximately 19 million new STI infections reported each year (CDC, 2010c). Adolescents and young adults aged 15 - 24 account for approximately nine million of these new STI cases each year, and they represent the individuals with the highest rates of Human Papillomavirus (HPV), trichomoniasis, and Chlamydia infection (Weinstock, Berman & Cates, 2004; CDC, 2009b); in fact, the latter three STIs account for 88% of sexually transmitted infections among adolescents and young adults aged 15 - 24, with more than 4.6 million Human Papillomavirus (HPV), 7.4 million trichomoniasis, and 1.2 million Chlamydia infections each year (CDC, 2007c; CDC, 2009b; Weinstock, Berman, & Cates, 2004) (see Appendix A for more information on these STIs). Although some STIs, including

trichomoniasis and Chlamydia can be cured or treated with antibiotics, they often result in long-lasting, negative outcomes, such as pelvic inflammatory disorder and female infertility when individuals do not seek treatment (CDC, 2009b).

Perhaps of greater concern, adolescents and young adults represent a high risk category for being infected with HIV/AIDs. In 2006, for example, more than 5,000 adolescents and young adults aged 13 - 24 in the 33 states reporting HIV/AIDs statistics to the Centers for Disease Control and Prevention (CDC) were diagnosed with HIV/AIDS, accounting for approximately 14% of individuals diagnosed with HIV/AIDs each year in the United States (CDC, 2008b). As a whole, the numbers surrounding STI and HIV infection among adolescents and young adults are concerning, as STIs are associated with enormous economic and health consequences. For example, the direct costs of STIs in the U.S. have been estimated as being approximately 16.4 billion dollars (CDC, 2010c), and it has been estimated that infection among adolescents and young adults accounts for 6.5 billion dollars of that burden (Chesson, et al., 2004).

### **1.1. 3. Sexual Risk Behaviors**

According to nationally-representative data, nearly half (46%) of high school students in the United States reported having had sex and 14% reported having had four or more partners (CDC, 2010c). Moreover, of the adolescents who reported being sexually active, more than a third (39%) reported that they did not use a condom during their most recent sexual intercourse and 80% reported that neither they nor their partner had used birth control pills to prevent pregnancy before their last sexual intercourse (CDC). Together, the high proportion of adolescents who initiate sexual activity and the apparent inconsistency in subsequent adolescent condom and contraceptive use represent

a cause for concern, considering that these behaviors are associated with a high risk of pregnancy and/or sexually transmitted infection.

#### **1.1.4. Antecedents of Sexual Risk Behaviors**

In order to reduce teen and unintended young adult fertility and to reduce the number of STIs in the U.S., policy-makers need to address the behavioral antecedents of sexual risk outcomes, which include multiple sex partnerships, inconsistent condom use, and inconsistent contraceptive use (Aral, 2002). It is especially critical that researchers focus on the antecedents of sexual risk that originate in adolescence, as early prevention may reduce sexual risk behaviors throughout the life course. In particular, it is essential to identify the ways to prevent or reduce sexual activity and sexual risk-taking among teenage and adolescent girls. Although the risk of sexually transmitted disease is severe enough to justify public health concern on its own, the added component of teenage pregnancy imposes further consequences for girls. Sexually active adolescent and young adult girls represent the group that is least prepared for a pregnancy or birth in terms of social and financial support and that is particularly susceptible to STIs in terms of knowledge of and access to sexual and reproductive health knowledge, condoms, and contraceptives. Moreover, adolescent and young adult girls have riskier health and psychosocial outcomes associated with pregnancy and STIs than older adult women; for example, adolescent girls exhibit a higher proportion of pregnancies that end in abortion than do adult women (Institute of Medicine, 1995). As such, the stakes are higher for female adolescents than for male adolescents and higher for young women than older women; thus, there are fundamental differences in the need to address teenage and young adult women's motivation to engage or abstain from sexual risk behaviors.

A number of studies have focused on establishing the relative effect of the aforementioned risk behaviors (multiple partnership, inconsistent condom use, and inconsistent contraceptive use) on actual pregnancy and STI risk. Aside from abstinence, the most effective way to prevent STIs, HIV, and pregnancy is the consistent use of condoms and birth control. For example, the FDA reports that in one year, only one to five pregnancies per 100 individuals who use a form of hormonal birth control should be expected – and the risk is even less for individuals who use other methods such as sterilization and intrauterine devices (FDA, 2007). This number is slightly higher for condoms at 11 - 16 pregnancies, but still represents a reduced risk (FDA). Further, a review of 45 cross-sectional and cohort studies that examined the relationship between condom use and infection with Chlamydia established that condom use (both correct and consistent use) is associated with a reduced risk of infection (Warner, et al., 2006). Similarly, a summary report by the National Institute of Allergy and Infectious Diseases indicated that condoms seem to protect users from infection with Chlamydia and trichomoniasis (National Institute of Allergy and Infectious Diseases, 2001).

In addition to the established relationship between condom use and inconsistent contraceptive use and pregnancy and STI, multiple sexual partnerships have been established as indicators of pregnancy and STI risk. Multiple partnerships have been associated with an increased likelihood of contracting an STI; a study of over 18,000 clinic attendees, for instance, revealed that the risk of infection with Chlamydia increased with higher numbers of sexual partners (Hughes, et al., 2000). Taken together, these behavioral antecedents of pregnancy and STI represent an important area of public health

research; by identifying the pathways from which these sexual risk outcomes emerge, it may be possible to reduce the risk to adolescent and young adult women in the U.S.

## **1.2. Conceptual Model**

Several studies have examined the sociological and ecological determinants of pregnancy and STI risk behaviors (see DiClemente, Salazar, & Crosby, 2007; Miller, 2002 for reviews). It has been established that several family and parenting characteristics represent influential antecedents of sexual risk behavior; of particular note, it seems that parent-child relationships are important factors in the development and expression of sexual risk behaviors. Namely, parent-child relationships seem to play a significant role in determining the risk of teens' sexual activity, inconsistent condom use, inconsistent contraceptive use, and STI (see Markham, et al. 2010 for a review). In particular, it has been established that family connectedness and monitoring or control and parent-child communication about sex both are associated with adolescents' sexual and reproductive health behaviors, including condom use, number of sexual partners, and sexual risk perceptions and intentions (Dittus & Jaccard, 2000; Jaccard & Dittus, 2000; Markham, et al.).

Although previous studies have highlighted the influence of parent-child relationship characteristics on adolescents' sexual risk behaviors, Markham and colleagues (2010) asserted that adolescents have different relationships with mothers than fathers; further, they determined that studies that examined the role of mothers and fathers separately yielded more meaningful results than those analyzing mothers and fathers together. In particular, it seems that mother-child relationships play an especially important role in understanding the motivational factors underlying adolescents' decision

to engage in sexual risk behaviors (Fox, 1981; Miller & Fox, 1987), including behaviors related to contraceptive use (Jaccard, Dittus, & Gordon, 1996), multiple sex partnerships (Whitaker, Miller, & Clark, 2000), and sexual self-efficacy (Taris & Semin, 1998).

However, prior studies have had conflicting findings with regards to the impact of mother-daughter relationships on sexual risk behaviors. For instance, some have found that higher levels of parent-child closeness or warmth are inversely related to STI risk behaviors (including inconsistent contraceptive use) (Kirby, 2002); others have found that there is no relationship or even that there is a positive relationship (Somers & Paulson, 2000).

Although the link between mother-daughter relationship factors and adolescents' sexual and reproductive health behaviors has been established, there remains a need to add to the literature regarding mother-daughter relationships. It bears repeating that teenage and young adult women represent an especially vulnerable population for sexual risk outcomes: first and foremost, there are categorically different risks associated with sexual activity for males and females, as females are differentially affected by pregnancy and fertility. Second, there are significant differences in STI risk between men and women; for example, women are more likely than men to be infected with bacterial STIs such as Chlamydia and are more likely to have infections that result in secondary risks of STI, such as infertility (National Institute of Allergy and Infectious Diseases, 2001). Similarly, HPV is thought to be of greater risk to females than males, as HPV has been shown to be the leading cause of cervical cancer and because men are generally considered to be carriers (CDC, 2008a).

Third, and perhaps most importantly, parent-child relationships differ between

gender groups; namely, there are recognizable differences in the relationships between mother-son dyads and mother-daughter dyads. For instance, adolescents identify with and report higher levels of closeness with their same-sex parents (Starrels, 1994). Such variation in relationship quality may have important implications for understanding the specific effects of mother-daughter relationships, yet there is limited longitudinal research that directly examines the mechanisms that underlie the link between mother-daughter relationship variables and sexual risk outcomes in adolescence and into young adulthood.

### **1.3. Theory: Parenting Style and Socioemotional Development**

In the current study, the role of mother-daughter relationships in individuals' decisions to engage in risky sexual behaviors can best be conceptualized by understanding the role of maternal parenting style. Parenting style, which can be operationalized based on the two dimensions of warmth and control (Baumrind, 1971, 1978) has consistently been identified as a significant correlate or predictor of children's and adolescents' psychosocial functioning (Baumrind, 1985; Maccoby & Martin, 1983; Rollins & Thomas, 1979). Though few studies have examined the relationship between parenting style and sexual risk behaviors, those that have yielded differing results. For example, Huebner and Howell (2003) found that, in a sample of rural, racially and ethnically diverse 7<sup>th</sup> through 12<sup>th</sup> grade students, parenting style did not significantly affect sexual risk taking, as measured by levels of partnerships and condom use. Yet Pittman and Chase-Lansdale (2001) found that parenting style did affect sexual activity and sexual initiation among impoverished, Black adolescent females.

Although there have been mixed findings when examining the effect of parenting style on sexual risk taking, numerous studies have found that, independently, both parenting style dimensions (warmth and control) are associated with the expression of STI risk behaviors. Namely, prior studies have found significant associations – both positive and negative – between these qualities and sexual risk behaviors such as multiple sex partnerships (see Buhi & Goodson, 2006 for a review). Thus, it is posited that, together, these qualities act as important mechanisms in the relationship mother-daughter relationships and sexual risk behaviors. Specifically, one of the ways mothers may influence sexual risk behaviors is through their parenting style, and, if this is the case, it is hypothesized that negative parenting styles – that is, parenting styles which are low in control and/or low in warmth – lead to poor psychosocial or socioemotional development (namely low sexual self-efficacy and high risk-taking behaviors) which, in turn, affect adolescent and young adult risky sexual behaviors.

#### **1.4. Alternative Theory: Mother-Daughter Communication about Sex**

Alternatively, it is possible that the effect of mother-daughter relationships on sexual risk behaviors can better be understood using the Social Learning theory. This theory is appropriate for understanding the effect that a given mother-daughter relationship characteristic (in this case, mother-daughter communication about sex) has on an individual's expression of sexual risk behaviors. Specifically, Social Learning theory is centered on the idea of observational learning; that is, people learn from one another – especially from people who hold meaningful roles in their lives. People provide examples of ways of behaving at that moment or in the future, and family

members (such as parents) act as particular powerful models to children and adolescents (Bandura, 1969a).

Social learning theorists assert that, through modeling, individuals gain knowledge, learn about social situations, and develop self-regulation. This idea highlights the potential role of mother-daughter communication about sex on adolescent and young adult women's expression of sexual risk behaviors. Namely, the frequency and comfort with sex-related communication mothers exhibit may affect whether adolescents learn about sexual risks and whether they, subsequently, display risky sexual behaviors. It can be assumed, then, that individuals' sexual risk behaviors are influenced by mother-daughter relationships in part due to mothers' abilities to teach healthy sexual norms, values, and knowledge to their adolescents. It is hypothesized that poor mother-daughter communication about sex leads to poor knowledge of sexual and reproductive health behaviors and high perceived barriers to contraception, which, in turn, affects teen and young adult women's sexual risk taking behaviors.

### **1.5. Current Study**

The purpose of this study is to compare the direct and indirect effects of maternal parenting style and mother-daughter communication about sex on sexual risk behaviors (see Figure 1 on page 13; Table 1). Specifically, this study examined whether maternal parenting style (based on measures of both maternal warmth and maternal control) or mother-daughter communication about sex (based on the frequency of communication and maternal comfort with communication about sex) are associated with sexual risk behaviors (based on measures of multiple partnerships, inconsistent condom use, and inconsistent contraceptive use) among adolescent and young adult women.

Further, this study examined whether the relationship between maternal parenting style and sexual risk-taking is mediated by daughters' socioemotional development, as measured by sexual self-efficacy and risk-taking behaviors. Likewise, this study examined whether the relationship between mother-daughter communication about sex and sexual risk-taking is mediated by sexual health knowledge and perceived barriers to contraception. Moreover, this study assessed whether the two mother-daughter relationship characteristics represent important predictors of risk by examining the potential predictive relationship of mother-daughter relationship characteristics in adolescence and sexual risk behaviors in later adolescence and young adulthood, controlling for potential covariates of sexual risk.

*Table 1. Research Aims*

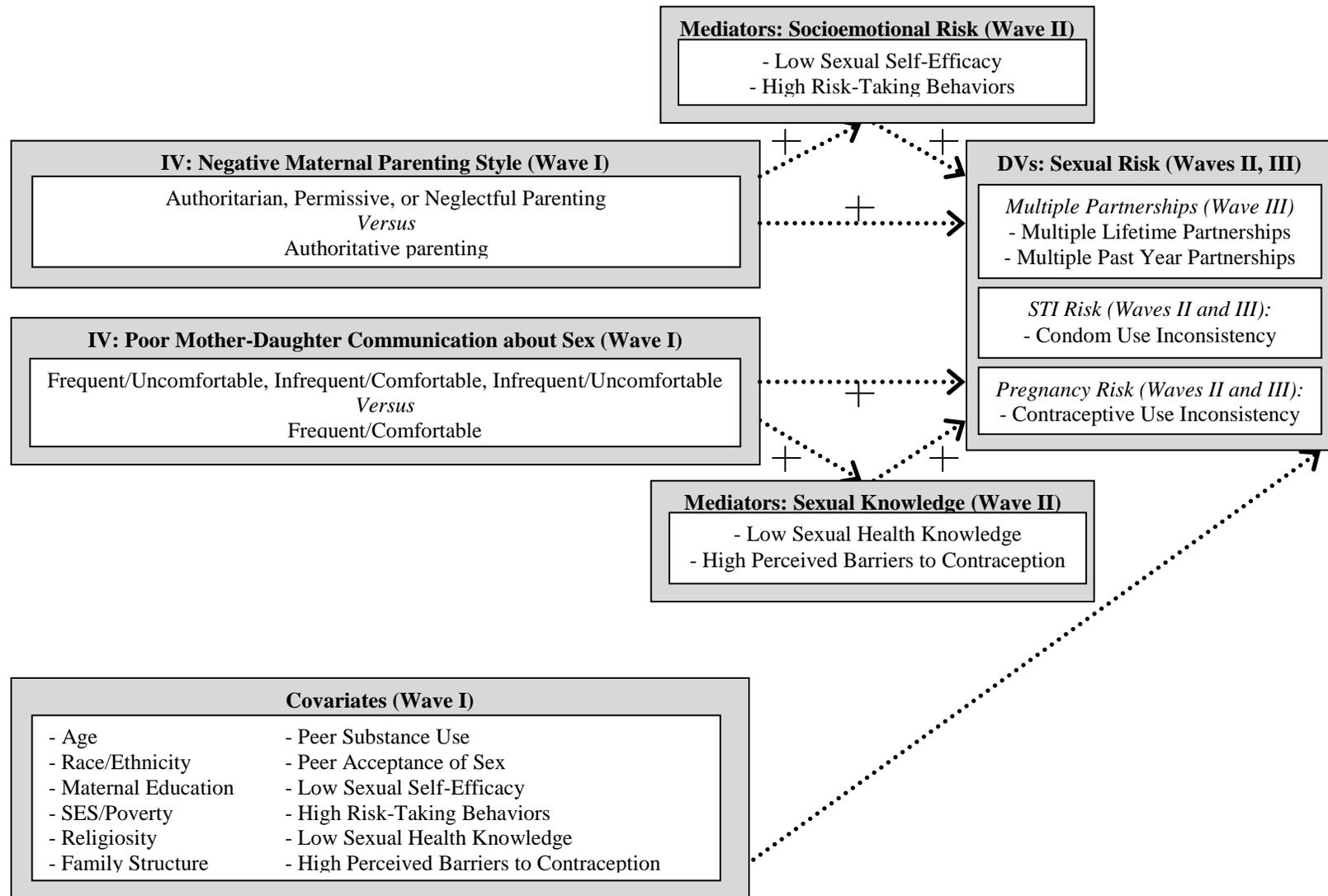
<b>Aim 1a:</b> Does maternal parenting style have an effect on sexual risk behaviors?
<b>Aim 1b:</b> Does mother-daughter communication about sex have an effect on sexual risk behaviors?
<b>Aim 2a:</b> Does maternal parenting style have an effect on sexual self-efficacy and risk-taking behaviors?
<b>Aim 2b:</b> Does mother-daughter communication about sex have an effect on sexual health knowledge and perceived barriers to contraception?
<b>Aim 3:</b> Do sexual self-efficacy, risk-taking behaviors, sexual health knowledge, and perceived barriers to contraception affect sexual risk behaviors?
<b>Aim 4a:</b> Does maternal parenting style have both direct and indirect effects on sexual risk behaviors?
<b>Aim 4b:</b> Does mother-daughter communication about sex have both direct and indirect effects on sexual risk behaviors?

Thus, this study explored the direct and indirect effects that mother-daughter relationship characteristics (maternal parenting style and/or mother-daughter communication about sex) have on sexual risk behaviors. Using nationally-representative, longitudinal data from Waves I (1994 - 1995, adolescence), II (1996, late adolescence) and III (2001 - 2002, young adulthood) of the National Longitudinal Study of Adolescent Health (Add Health), the associations between both maternal parenting

style and mother-daughter communication about sex and adolescents' sexual self-efficacy, risk-taking behaviors, sexual health knowledge, and perceived barriers to contraception were examined. Additionally, the relationships between these mother-daughter relationship characteristics and actual sexual risk behaviors in adolescence and young adulthood (multiple partnerships, inconsistent condom use, and inconsistent contraceptive use) were explored. It was then determined whether sexual self-efficacy, risk-taking behaviors, sexual health knowledge, and perceived barriers to contraception mediated the aforementioned associations.

Unadjusted associations and adjusted associations (controlling for age, race/ethnicity, maternal education, the ratio of household income to the poverty line, religiosity, family structure, peer substance use, peer acceptance of sex, and, in the case of Wave III analyses, Wave II sexual risk-taking behaviors) were examined. Analyses were weighted and accounted for the cluster design, thus yielding nationally-representative estimates. By examining longitudinal associations between mother-daughter relationships and teen and young adult sexual risk behaviors, it may be possible to identify at-risk groups and to create and implement individual- and community-based intervention programs for pregnancy and STI risk.

Figure 1. Maternal Effects on Adolescent and Young Adult Women's Sexual Risk-Taking Behaviors



## **CHAPTER 2: LITERATURE REVIEW**

Within the field of public health, the sexual risk behaviors and reproductive health behaviors of adolescents and young adults are often the focus of research, prevention and intervention programs, and policy. Two sexual risk outcomes — teen pregnancies or unintended young adult pregnancies and sexually transmitted infections (STIs) — are particularly important public health domains because of their later consequences for adolescent and young adult women and for the general population. This chapter will begin by outlining the prevalences and associated consequences of these outcomes and will then describe the sexual risk behaviors that precede these outcomes, including multiple sex partnerships, inconsistent condom use, and inconsistent contraceptive use. This chapter also will discuss how low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception underlie the aforementioned sexual risk behaviors.

Additionally, this chapter will provide a theoretical framework to explain how mother-daughter relationships affect how and why adolescents and young adults express these sexual risk behaviors. Specifically, the primary theory behind this study is that maternal parenting style leads to the socioemotional motivators of sexual risk behaviors such as low sexual self-efficacy and high risk-taking behaviors, which, in turn, lead to the display of sexual risk behaviors. An alternative theoretical framework also will be presented which will describe – through a Social Learning lens – how mother-daughter communication about sex leads to knowledge-based motivators of sexual risk behaviors, such as low sexual health knowledge and high perceived barriers to contraception, which lead to the expression of the sexual risk behaviors. Finally, the chapter will conclude

with a brief discussion of the potential covariates to these relationships and with an overview of the current study.

## **2.1. Sexual Risk Outcomes**

### **2.1.1. Teen and Unintended Fertility**

Perhaps the most notable risk involved with adolescent sexual behavior is that of teenage and young adult unintended fertility. More than a third (34%) of young women become pregnant at least once before they reach the age of 20 (Henshaw, 2003), and more than 80% of teenage births are unintended (Chandra, Martinez, Mosher, Abma & Jones, 2005). Though teen pregnancies demonstrated a decline to a historic low in 2005, the numbers increased again from 2005 to 2007 (Kost, Henshaw, & Carlin, 2010). Additionally, although adolescent girls exhibit a higher proportion of pregnancies that end in abortion than do adult women (Institute of Medicine, 1995), the number of teen births in the U.S. remains high; in 2009, there were approximately 39.1 births per 1,000 teenagers 15 to 19 years old (Hamilton, Martin, & Ventura). More recently, it seems that teen births are decreasing – between 2008 and 2009, teen births among 15 to 17 year olds dropped 6% and among 18 and 19 year olds dropped 7% (Hamilton, Martin, & Ventura, 2010); however the numbers still are concerning, as teen fertility is associated with negative socioeconomic and maternal and infant health outcomes, including an increased likelihood of: dropping out of high school (Maynard, 1996), raising children in a single-parent home (Hoffman, 2006), and having infant and child health and developmental problems (Wolfe & Perozek, 1997; Sims & Luster, 2002).

Unintended pregnancies and fertility among young adult women represent widespread and serious public health issues, as well. According to Chandra, Martinez,

Mosher, Abma, and Jones (2005) “pregnancy is classified as ‘intended’ if the woman indicated that she wanted to become pregnant at about the time she did or sooner or ‘didn’t care’ about the timing of the pregnancy. Pregnancies that occurred sooner than the woman wanted are classified as ‘mistimed’ and pregnancies that were not wanted then or at any time in the future are considered ‘unwanted.’ ‘Unintended’ refers to pregnancies that were either unwanted or mistimed” (p. 10). In the United States, unintended pregnancies account for 49% of all pregnancies and 44% of pregnancies resulting in a live birth (Finer & Henshaw, 2006). For example, of the six and a half million pregnancies in the United States in 2001, more than three million were unintended, of which over two million were attributable to young women under the age of 30 (National Campaign to Prevent Teen Pregnancy, 2008). These numbers are especially alarming, as the rate of unintended fertility seems to be increasing for this group. between 1994 and 2001, for example, the rate of unplanned pregnancy stayed relatively stable among all women of child-bearing age (15 to 44 years), yet, there was an increase among young women in their twenties; in 2002, 54% of births to women 18 and 19 years old were classified as unintended, 29% to women 20 to 24 years old, and 15% to women 25 to 29 years old (Chandra, Martinez, Mosher, Abma, & Jones). Further, women in their twenties account for more than half of all abortions, with a third (33%) attributable to those aged 20 to 24 and a quarter (24%) attributable to those aged 25 to 29 (Guttmacher, 2010).

These numbers warrant attention, as unintended fertility amongst teenagers and young adults is associated with high societal cost outcomes - in the United States, for instance, the direct medical costs associated with unplanned pregnancies are estimated to

be five billion dollars (Trussel, 2007). Additionally, unintended pregnancy is associated with negative maternal and child health outcomes, including an increased likelihood of abortion (Jones, Darroch, & Henshaw, 2002), increased chance of subsequent unintended pregnancies (Kuroki, et al., 2008), a decreased likelihood of initiating early prenatal care (Korenman, Kaestner, & Joyce, 2002), and an increased chance of premature birth, low birth weight, and neonatal death (Kost, Landry, & Darroch, 1998; Orr, et al., 2000), to name a few.

Though men are affected by teen and unintended fertility, as well, there are categorically different implications associated with pregnancy for males and females. Most obviously, males cannot become pregnant and thus are exposed to less physical risk associated with fertility. They are also less likely to bear the financial and psychosocial burdens of a child if the pregnancy leads to a birth; for example, 80% of teen fathers do not marry the mothers of their first children, and they often pay less than \$800 per year in child support (Maynard, 1997). As such, there is a particular need for research to focus on young women's exposure to unintended pregnancy via sexual risk-taking.

### **2.1.2. Sexually Transmitted Infections (STIs)**

Based on statistics of reportable STIs, the Centers for Disease Control and Prevention (2009b) estimate that more than 19 million new infections occur in the United States each year, with approximately nine million occurring among young people aged 15 to 24. Compared to older adults, sexually active adolescents aged 15 to 19 and young adults aged 20 to 24 are at increased risk for STIs (CDC), and data suggest that, although adolescents and young adults only represent a quarter of the sexually experienced population, they account for nearly half of all new STIs (Weinstock, Berman, & Cates,

2004) (see Appendix A for more information of the prevalences and incidences of the three most common STIs among adolescents and young adults: HPV, Chlamydia, and trichomoniasis). Moreover, these numbers actually may underestimate the true incidence of STIs in these populations, as many STIs go undetected or unreported.

Due to the high number of STIs in the United States and to the potential negative health consequences associated with STIs, there is considerable need to examine the determinants and predictors of infection. Both the short-term and long-term consequences of STI represent serious and urgent public health concerns (see Appendix A for more information on some of the negative health outcomes associated with STIs). Depending on the infection, short-term consequences for women can include vaginal discharge, painful or burning sensations during urination, and lower abdominal and back pain, to name a few. Long-term consequences of STIs include genital and other cancers, infertility, pelvic inflammatory disease, ectopic pregnancy, and negative maternal and child health outcomes, including pre-term delivery, low birth weight (Eng, 1997), and infant STI, conjunctivitis, blindness, bone deformities, pneumonia, neonatal sepsis, neurologic damage, deafness, acute hepatitis, meningitis, chronic liver disease, cirrhosis, and even death (CDC, 2007b).

Although some STIs, such as Chlamydia and trichomoniasis, are curable, previous infection does not preclude individuals from subsequent infection. Furthermore, it is estimated that untreated STIs result in more than 24,000 U.S. women becoming infertile each year (CDC, 2007b). Failure to seek treatment is an especially salient risk with STIs such as Chlamydia, which are known as “silent” diseases due to frequently mild or absent symptoms (CDC, 2010). Additionally, even those who seek treatment are

often re-infected by partners if the partners do not seek testing or treatment. Furthermore, infection with STIs such as trichomoniasis and Chlamydia has been shown to facilitate transmission of HIV – an undeniable public health concern (CDC, 2007c; CDC, 2009b).

Of particular public health concern are the clear gender differences that exist in the incidence of STIs and their sequelae. Namely, the burden of STIs falls disproportionately on women (Aral & Holmes, 1999); for example, women are more likely to be infected with Chlamydia than men and are more likely to have infections that result in secondary risks of STI such as infertility (National Institute of Allergy and Infectious Diseases, 2001) (see Appendix A for more information on these secondary risks). In fact, in 2008 the rate of reported chlamydial infection among women was almost three times higher than the rate among men (CDC, 2009b). As another example, women are more likely to be infected with trichomoniasis, due, in part, to the fact that women can acquire the disease from infected men or women, but men usually contract it only from infected women (CDC, 2007c). Similarly, HPV is considered more of a threat to females whereas males are considered more as carriers of the virus (CDC, 2008a). Although these differences in reported STIs can be partially attributed to increased screening and diagnosis during routine reproductive care among women, it has also been asserted that women (and, in particular, young women) are biologically more susceptible to such bacterial infections (2010a). As such, females who are exposed to sexual contact represent a priority group for research and intervention.

## **2.2. Sexual Risk Behaviors**

In examining teen and unintended fertility and STI, one must first recognize the antecedents to these sexual risk outcomes. Conceptually, one can assume that the

possibility of teen and unintended fertility and/or STI transmission is influenced by two proximate determinants of risk: the quantity of sexual activity (based on numbers of sexual partners) and the quality of sexual activity (based on whether the sexual activity prevents exposure to STI through use of condoms and/or to pregnancy through use of a contraceptive method). That is, directly underlying the risk of pregnancy and/or STI infection is the act of engaging in sexual intercourse, and this risk is elevated with increased numbers of sexual partners and decreased condom or contraceptive use consistency. As such, sexual risk behaviors can be defined by the following: multiple partnerships, inconsistent condom use, and inconsistent contraceptive use.

### **2.2.1. Multiple Partnerships**

Multiple sexual partnerships represent an inherent sexual risk, as they increase the probability of being exposed to pregnancy or STI. In fact, Darroch, et al. (2001) posited that the high rate of teenage childbearing in the U.S., compared to other developed countries can be partially attributed to the increased rate of multiple partnerships among U.S. teens. Similarly, prior research has established that having had multiple sex partnerships increases the probability of exposure to an infected partner (Anderson & Dahlberg, 1992). Moreover, previous studies have found that multiple partnerships were also linked to self-reported STI, including Chlamydia and trichomoniasis (Evan, Tasker, & McRea, 1993; Joffe, et al., 1992). This finding has been mimicked in studies that have examined the link between multiple partnerships and biologically-confirmed STI; for example, the findings of a study of more than 18,000 clinic attendees indicated that higher numbers of sex partnerships were associated with an elevated risk of STI (Hughes, et al., 2000). In fact, in a sample of young adults (college students), Joffe et al. (1992)

found that among several potential exposures – including condom use – a high level of multiple partnerships (five or more partners) was the only significant independent indicator of STI. These findings are important to consider as one in ten (11%) adolescent females report multiple partnerships (four or more people) during their lifetimes (CDC, 2010c), and one in five (21%) young adult females (aged 20 to 24) report multiple partnerships (seven or more people) during their lifetime (Lindberg, Jones, & Santelli, 2008).

### **2.2.3. Inconsistent Condom Use – STI Risk**

According to the CDC (2010b) some STIs, such as HIV, chlamydia, and trichomoniasis, can be transmitted when infected urethral or vaginal secretions contact mucosal surfaces (such as the male urethra, the vagina, or cervix) and some, such as HPV, are transmitted through contact with infected skin or mucosal surfaces. Based on several laboratory studies, though, it has been asserted that, if used correctly, condoms provide a barrier that is impermeable to viral and bacterial STI particles (Carey, et al., 1992; Lytle, et al., 1997; Judson, et al., 1989). In fact, the FDA (2007) asserts that, aside from abstinence, male condoms are the best protection against HIV and other STIs. A review of prior research by the National Institute of Allergy and Infectious Diseases indicated that condoms seem to have a protective effect against infection with STIs such as Chlamydia and trichomoniasis (see National Institute of Allergy and Infectious Diseases, 2001 for a review). Similarly, research has found that condom non-use is associated with an increased risk of STIs such as Chlamydia (Weismeier, Lovett, & Forsythe, 1984). In fact, a review of 45 cross-sectional and cohort studies that examined the relationship between condom use and infection with STIs such as Chlamydia

established that condom use (both correct and consistent use) is associated with a reduced risk of infection (Warner, et al., 2006). Additionally, condom use is associated with a decreased risk of pregnancy; male condoms, for example, are 85 - 95% effective in preventing pregnancy (CDC, 2009b). These findings are important, as only about half (54%) of sexually active adolescent females reported that their partner used a condom at their most recent sexual intercourse (CDC, 2010c).

#### **2.2.4. Inconsistent Contraceptive Use – Unintended Pregnancy Risk**

Aside from abstinence, the most effective way to avoid teen and unintended pregnancies is by using contraception, yet many young women do not use contraceptives or do not use them consistently. Past research indicated that sexually active adolescents who do not use contraceptives have a 90% chance of becoming pregnant within a year (Harlap, Kost, & Forrest , 1991), yet in the United States it is estimated that 4.5 million women (7.4% of reproductive-age women) do not report using contraceptives, leaving them at risk for unintended pregnancies (Mosher, et al., 2004). In fact, some studies estimate that number to be much higher – as many as one in six non-sterilized, reproductive age women report not currently using contraceptives, and one in four report having had unprotected sex within the previous year (Frost, Singh, & Finer, 2007). Yet, seven out of ten sexually active women of reproductive age report not wanting to become pregnant, representing a large population of women who are at risk for unintended pregnancy (Guttmacher, 2010). Of all women at risk for an unintended pregnancy, though, the two-thirds who use contraception consistently and correctly account for only 5% of unintended pregnancies (Guttmacher). Previous studies have highlighted the role of inconsistent and ineffective use on unplanned pregnancies (Branden, 1998; Frost &

Darroch, 2008; Trussel, 2004). As to be expected, the rate of unplanned pregnancy is higher among women who report long-term non-use of contraceptives or who report gaps in contraceptive method use than among those who report continuous, consistent use of contraceptives (Glei, 1999).

### **2.3. Determinants of Sexual Risk Behavior**

It is posited that the decision to engage in the aforementioned risky sexual behaviors is affected by one's socioemotional development, in terms of one's level of sexual self-efficacy and risk-taking behavior, and by one's general sexual knowledge, in terms of one's sexual health knowledge and perceived barriers to contraception. As such, the pathway of pregnancy or STI risk can be conceptualized as follows: low sexual self-efficacy, high risk-taking behavior, low sexual health knowledge, and high perceived barriers to contraception lead sexual risk behaviors, including increased numbers of sexual partnerships, and increased inconsistent condom and/or contraceptive use. In turn, these behaviors leave individuals vulnerable to infection and unwanted pregnancies. This assumption is supported by numerous prior studies which have demonstrated a link between low sexual self-efficacy, high risk-taking, a low sexual health knowledge, and high perceived barriers to contraception and multiple sex partnerships, inconsistent condom use, and inconsistent contraceptive use (see Aral, 2002; DiClemente, Salazar, & Crosby, 2007; Kirby, 2002 for reviews).

#### **2.3.1. Low Sexual Self-Efficacy**

It has been established that a belief in one's own ability to negotiate safe sex is a key factor in reducing sexual risk behaviors (Boyer & Kegeles, 1991; Boyer, Tschann, & Shafer, 1999). Pearson (2006) noted that a sense of personal control and self-efficacy

were associated with avoiding risky sexual behavior, yet had little effect on the decision to engage in “other, more desirable, sexual experiences” (p. 623). It seems, then, that individuals must possess a certain sense of sexual self-efficacy in order to avoid engaging in risky sexual practices. A sense of personal control or self-efficacy provides a sense of empowerment and an awareness that outcomes are the results of one’s own actions or decisions. Prior research has demonstrated the relationship between this sense of personal control and sexual decision making, including decisions related to condom use (Brien & Thombs, 1994; Goh, Primavera, & Bartalini, 1996; Levinson, 1986, 1995; Pearson, 2006). Further, higher levels of self-efficacy among adolescents and young adults have been shown to be associated with fewer sexual risk factors, as measured by increased condom and contraceptive usage, decreased multiple partnerships, and decreased risk of STI (Jemmott, Jemmott, Spears, Hewitt, & Cruz-Collins, 1992; Kalichman, et al., 2002; Levinson, Wan, & Beamer, 1998; Reitman et al., 1996; Rosenthal, Moore, & Flynn, 1991; Sable, Libbus, & Chiu, 2000; Sieving et al., 1997).

### **2.3.2. High Risk-Taking Behaviors**

Risk-taking behaviors, such as those related to delinquency and conduct disorders, have been found to be associated with sexual risk taking. For example, having a history of risk behavior has been found to be associated with inconsistent condom use (Brown, DiClemente, & Park, 1992). Similarly, delinquency is associated with higher numbers of lifetime sexual partners (Aalsma, Tong, Temkit, & Tu, 2008). In fact, there is evidence that delinquency in adolescence is predictive of multiple partnerships in young adulthood, controlling for other demographic characteristics (Aalsma, Tong, Wiehe, & Tu, 2010). Moreover, adolescents who have been involved in the criminal justice system are at a

higher risk of earlier sexual initiation, condom non-use, lower levels of sexual health knowledge, and STIs (Belenko, et al., 2008; Fergusson & Woodward, 2000; Lofy, Hofmann, Mosure, Fine, & Marrasso, 2006; Ramrakha, et al., 2007; Roberston & Levin, 1999; Romero, et al., 2007; Teplin, et al., 2005). Additionally, conduct disorders in adolescents have been found to predict adolescent pregnancy (Kovacs, Krol, & Voti, 1994). These findings highlight the effect of general risk behaviors on sexual risk.

### **2.3.3. Low Sexual Health Knowledge**

In order to prevent STI or pregnancy, individuals require a certain degree of knowledge regarding healthy sexual practices. That is, it has been posited that adolescents and young adults must possess knowledge of pregnancy and STIs, routes of STI transmission and infection, and vulnerabilities to pregnancy, and of potential consequences of risky sexual behavior in order to negotiate safe sexual practices, including, for example, the use of condoms (Boyer & Kegeles, 1991). Specifically, higher levels of sexual health knowledge (as measured by one's perceived risk of infection, condom use expectancies, and so forth) are associated with decreased sexual risk behaviors among adolescents and young adults, particularly decreased multiple partnerships and increased condom use (Basen-Engquist & Parcel, 1992; Hingson et al., 1990; Norris & Ford, 1994b; Sieving et al., 1997). This implies that those with low sexual health knowledge would be more likely to demonstrate the opposite behaviors (increased multiple partnerships and decreased condom use). In fact, research supports this supposition; for example one study found that individuals who reported low sexual health knowledge – specifically regarding contraceptive methods – demonstrated more

contraceptive non-use and were more likely to experience an unintended fertility than those with higher sexual health knowledge (Iuliano, Speizer, Santelli, & Kendall, 2006).

#### **2.3.4. High Perceived Barriers to Contraception**

Allgeier and Allgeier (1991) posited that four factors influence young people's contraceptive use: birth control education, motivation to employ contraception, existence of reliable contraception, and easy access to contraception. Studies have shown that when women perceive a form of contraception to be easy to use or access, they are more likely to choose to use that contraceptive (Steiner, et al., 2003). One study indicated that a quarter of women at public health clinics who reported a potential unintended pregnancy said they would have been more likely to use oral contraceptives if they had been available over-the-counter (that is, if they had perceived fewer barriers to accessing this method) (Sable, Libbus, & Chin, 2000). Similarly, a study of young women in a STI clinic setting reported that barriers to easy use of contraceptive methods are associated with non-use or inconsistent use (Ramstrom, Baron, Crane, & Shlay, 2002). Thus, it appears that perceiving high barriers to accessing or using contraceptive methods lead to inconsistent use of that method or failure to use that method, altogether.

#### **2.4. Other Factors that Influence Adolescent Sexual Risk Behaviors**

Underlying the aforementioned sexual risk behaviors (multiple sex partnerships, inconsistent condom use, and inconsistent contraceptive use) and the determinants of sexual risk behaviors described above (low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception) are a multitude of individual and social factors. An important step in identifying the predictors of sexual risk, then, is identifying these factors.

To begin, it is necessary to explore why adolescent and young adult women engage in and exhibit STI risk behaviors such as multiple partnerships and inconsistent condom use. According to Ott, Millstein, Ofner, and Halpern-Felsher (2006), adolescents may engage in sexual activity for physical, relationship-oriented, social, or individual reasons, yet they do not necessarily indicate the reasons why adolescents might refrain from sexual risk taking. For example, perceived pregnancy or STI risks may provide a reason to abstain from sex or to practice safer sex, but there is some research that indicates fears of pregnancy or sexually-transmitted diseases are not deterrents for adolescents (Ott, et al., 2004). Thus, it is possible that rather, than intrapersonal determinants of sexual risk behavior, there are interpersonal or ecological determinants of risk that determine adolescent and young adult's sexual risk-taking behaviors. Prior studies have examined several sociological and ecological determinants and antecedents of sexual risk behaviors (see DiClemente, Salazar, & Crosby, 2007; Miller, 2002 for reviews), and it appears that these include individual characteristics, relational factors, familial characteristics, community factors, and societal factors. In particular, it has been established that parental characteristics and parent-child relationships represent influential antecedents of sexual risk behavior (Dittus & Jaccard, 2000; Jaccard & Dittus, 2000; Markham, et al., 2010), and it appears that mother-daughter relationships play an especially important role in understanding the factors underlying adolescents' decision to have sex, with or without contraception (Fox, 1981; Miller & Fox, 1987).

Based upon studies that have examined maternal influence on adolescent and young adult sexual risk behaviors, numerous family processes and factors have been identified, including those related to parent-child relationships and practices (see

Markham, et al., 2010; Miller, 2002; and Perrino, Gonzalez-Soldevilla, Pantin, & Szapocznik, 2000 for reviews). As Perrino, Gonzalez-Sold villa, Pantin, and Szapocznik note, “three areas have been at the forefront of research: (1) parent-adolescent communication, (2) parents as social learning facilitators, and (3) family relations” (p.85). In particular, research on factors that reduce STI risk-taking behaviors has emphasized the importance of parental closeness or warmth (Inazu & Fox, 1986; Somers & Paulson, 2000; Somers & Vollmar, 2006), parental supervision, monitoring, and control (Huebner & Howell, 2003; Newcomer & Udry, 1984), and parent-child communication (Fisher, 1986; Fox, & Inazu, 1981; Hutchinson, 2004; Hutchinson & Cooney, 1998; Hutchinson, et al. 2003; Sneed, 2008).

Mothers have the ability to affect their children’s propensity to engage in sexual risk behaviors through their parenting practices and through a process of teaching, modeling, and active socialization with healthy sexual practices and norms. The maternal role in preventing adolescent and young adult women from exhibiting risky sexual behaviors also can be viewed as a complex process requiring dynamic teaching and modeling strategies that will effect change in the child’s knowledge, attitudes, and cognitive decision-making skills (Bandura, 1992; Boyer & Kegeles, 1991). So one can conceptualize two pathways through which parent-child relationship characteristics affect sexual risk behaviors: parenting style and communication about sex.

## **2.5. Mother-Daughter Relationship Characteristics, Gender, and STI Risk Behaviors**

Though parent-child relationships, in general, seem to play an important role in determining individuals’ subsequent STI risk behaviors, mothers seem to play an

especially important role in understanding the motivational factors underlying adolescents' decisions to engage in sexual activity and sexual risk behaviors, such as sex without contraception (Fox, 1981; Miller & Fox, 1987). Additionally, although it has been established that various mother-child relationship characteristics are associated with sexual risk-taking among adolescents and young adults, it is also acknowledged that there are differential relationships between mother-son dyads and mother-daughter dyads. For example, adolescents identify with and report higher levels of closeness with their same-sex parent (Starrels, 1994), meaning that mothers may have a particularly important role in young women's lives. Further, daughters are more sensitive to family affect than boys (Conger et al., 1993), and there are clear differences in how girls and boys are socialized by their parents in terms of healthy sexual behavior; for example, adolescent and teenage girls report more communication about sex with their parents than do boys (Rosenthal & Feldman, 1999; Sneed, 2008). As such, it is hypothesized that mother-daughter relationships might play a key part in adolescent and young adult women's expression of sexual risk taking behaviors.

Because mothers represent key figures in the lives of adolescents, and because it is widely accepted that "parents are significant agents in the sexual socialization of youth, and that parent-adolescent relationships play an important role in the process" (Somers & Vollmar, 2006, p. 452), it is posited that mother-daughter relationships can significantly affect individuals' learning and expression of risky sexual behavior. Specifically, based on prior research, it is posited that 1) maternal warmth and control (parenting style) and 2) mother-daughter communication about sex are associated with adolescents' and young adults' sexual and reproductive health behaviors, including condom use, number of

sexual partners, and sexual risk perceptions and intentions (Dittus & Jaccard, 2000; Markham, et al., 2010).

## **2.6. Theoretical Model: Maternal Parenting Style and Sexual Risk**

Key proponents of parenting style such as Baumrind (1983) and Maccoby and Martin (1983) assert that parenting style can be operationalized based on two dimensions: warmth and control. Together, these dimensions create four categories of parenting style (Baumrind, 1971, 1978) that have been consistently identified as significant correlates or predictors of children and adolescents' psychosocial functioning (Maccoby & Martin, 1983; Rollins & Thomas, 1979).

Namely, parenting style can be labeled as follows: 1) authoritative parents: high warmth and high control (this group is often associated with the best psychosocial outcomes); 2) authoritarian parents: low warmth and high control; 3) permissive parents: high warmth and low control, and 4) neglectful parents: low warmth and low control. Authoritative parents “monitor and impart clear standards for their children’s conduct. They are assertive, but not intrusive and restrictive. Their disciplinary methods are supportive, rather than punitive. They want their children to be assertive as well as socially responsible, and self-regulated as well as cooperative” (Baumrind, 1991, p. 62). This style of parenting is, thus, thought to lead to higher levels of self-efficacy and non-deviant behavior. Authoritarian parents “are obedience- and status-oriented, and expect their orders to be obeyed without explanation” (p. 62). Permissive parents “are more responsive than they are demanding. They are nontraditional and lenient, do not require mature behavior, allow considerable self-regulation, and avoid confrontation” (p. 62).

Finally, neglectful parents are low in both their control and their responsiveness; they are often seen as rejecting of their children.

Though few studies have examined the effects of both dimensions on sexual risk taking simultaneously, those that have yield differing results. For example, Huebner and Howell (2003) found that, in a sample of 7<sup>th</sup> through 12<sup>th</sup> grade students, parenting style does not significantly affect sexual risk taking, as measured by levels of partnerships and condom use. Yet other research indicates that parenting style does affect sexual activity and sexual initiation for certain groups, such as impoverished, Black adolescent females (Pittman & Chase-Lansdale, 2001).

Although there have been mixed findings when examining the effect of parenting style of sexual risk taking, it has been established that the two dimensions of parenting style (warmth and control) individually represent important determinants of sexual behavior. It is possible that maternal warmth, for instance, would protect against sexual risk behaviors because daughters would not want to upset their mothers. At the same time, it is possible that maternal warmth might promote sexual risk taking because daughters know they will be unconditionally accepted and loved. Likewise, maternal control over daughters might protect against sexual risk taking because daughters have less opportunity to engage in sexual risk behaviors, yet it may also promote risk taking because daughters feel the need to rebel against overly protective mothers.

These links have each been demonstrated in previous literature; numerous studies have found significant associations – both positive and negative – between maternal involvement or warmth, the quality of relationship, the number of rules and boundaries, and support and sexual risk behaviors such as early sexual initiation and multiple

partnerships (see Buhi & Goodson, 2006 for a review). Given these findings, it is important that the effects of maternal warmth and maternal control (both reviewed below) be further explored but also that future research examine the effect of these two dimensions in tandem, as classified by the four types of parenting style.

### **2.6.1. Mother-Daughter Warmth**

Parent-child connectedness appears to be a factor that is associated with sexual and reproductive behaviors; for instance, numerous studies have found that high levels of closeness or warmth between parents and children are related to delays in sexual activity (Inazu & Fox, 1980; Jaccard, Dittus, & Gordon, 1996; McNeely, et al., 2002; Resnick, et al., 1997; Weinstein & Thornton, 1989). Sieving, McNeely, and Blum (2000), for example, determined that close, connected mother-daughter relationships are associated with delays in sexual initiation, and they asserted that the quality of this relationship has significant predictive implications for delaying adolescents' sexual activity. Likewise, Ream and Savin-Williams (2005) found that warm, more adult relationships between parents and adolescents may prevent adolescents from engaging in sexual activity. It is hypothesized that warm, supportive relationships might give children the ability to develop a sense of sexual self-efficacy, which, in turn, would lead to delay of or avoidance of sexual risk behaviors. Additionally, it is hypothesized that children with warm relationships with their mothers would be less likely to want to disappoint or upset her by engaging in risk-taking behaviors.

### **2.6.2. Maternal Control**

Maternal control may represent the most straightforward influence on adolescent STI risk behavior. It has been found that supervision and control over an adolescent's

actions prevents or reduces adolescent risk-taking – and there is evidence to suggest that indirect supervision or control (such as knowing where a child is and what he or she is doing) has as strong an effect as direct supervision or control (Gillmore, et al., 1993; Rosenthal, et al., 1996; Steinburg, Fletcher, & Darling, 1994). The reverse has been found to be true as well; permissive parenting styles lead to earlier sexual initiation and higher rates of risky sexual behavior (Sieving, McNeely, & Blum, 2000). It is posited that daughters with mother's who provide consistent monitoring or control of their behavior have less opportunity to engage in risky sexual behaviors, and risky behaviors, in general. It is also posited that mothers who provide more structure in their parenting style leads children to develop a greater sense of self-regulation and, thus, self-efficacy.

### **2.7. Alternative Theoretical Model: Mother-Daughter Communication about Sex and Sexual Risk**

Although maternal parenting style may represent a meaningful indicator of adolescent and young adult sexual risk taking, it is possible that another theory better captures the relationship between mother-daughter relationship characteristics and sexual risk behaviors. Namely, one can consider the tenets of the Social Learning theory, which posits that learning occurs through a process of observation and of modeling (Bandura, 1969a). In particular, this theory asserts that the motivation to learn and perform a behavior is contingent upon what is learned from those around them. According to this theory, modeling is a particularly effective learning tool when the person modeling a behavior is important in an individual's life; parents, and in particular, mothers represent such figures.

That is, the Social Learning theory posits that key figures in one's life – such as mothers – act as particularly powerful models to children and adolescents (Bandura, 1969a). Through teaching and modeling, individuals learn about social situations, including sexual situations. This clarifies the role of mother-daughter communication about sex since the frequency and comfort with sex-related communication may affect whether adolescents learn about sexual risks and whether they, subsequently, display risky sexual behaviors. That is, it can be assumed that mother-daughter communication about sex influences individuals' subsequent STI risk behaviors, in part, due to mothers' abilities to teach healthy sexual norms, values, and knowledge to their adolescents.

Research indicates that parent-adolescent communication about sex can protect against a multitude of sexual risk behaviors (see DiIorio, Pluhar, Belcher, 2003 for a review). In particular, prior studies indicated that mother-daughter communication about sex is linked with delayed initiation of sexual activity (Fox, 1981; Fox & Inazu, 1980) and reduced sexual risk taking (Meneses, et al. 2006). Among adolescents who are already sexually active, parent-adolescent communication about sex is associated with greater condom use efficacy (Hutchinson & Cooney, 1998) and increased condom use (Hutchinson, 2004; Kotchick, Dorsey, Miller, & Forehand, 1999; Whitaker & Miller, 2000). Other findings suggest that parent-child communication about sex does not significantly affect adolescents' sexual knowledge, attitudes, or contraceptive choices, but does result in more highly correlated values about sex and sexual activity (Fisher, 1986).

Regardless of the effect of parent-child communication about sex, it has been found that parents and adolescents alike report dissatisfaction with the quantity and

quality of communication about sex that occurs within their relationship (Feldman & Rosenthal, 2000). A lack of both quantity (as indicated by frequency) and quality (as indicated by comfortable communication) may represent underlying reasons why STI risk behaviors and, consequently, STI incidences are so high. Jaccard, Dodge, and Dittus (2002) indicated that there are five factors that influence the extent of communication about sex between parents and adolescents: the source of communication, the recipient, the family context, how the message is communicated, and the communication, itself. Because the frequency and context of the message are vital components to the communication (both described below), mother-daughter communication about sex may influence the factors that motivate adolescent to engage in risky sexual behavior.

### **2.7.1. Maternal Comfort with Communication about Sex**

Although communication has been shown to have a significant effect on adolescent sexual behavior, knowledge and comfort are both reported as being significant impediments to communication about sex with one's children (Jaccard, Dittus, & Gordon, 2000; Rafaelli, Bogenschneider, & Flood, 1998). Specifically, mothers' communication of strong disapproval towards sexual activity has been demonstrated to have a direct influence on adolescents' sexual behavior (McNeely, et al., 2002). However, these conclusions are often deduced from cross-sectional data that underestimate the bidirectional nature of the relationship. That is, higher rates of adolescent sexual activity and risky sexual behavior may necessitate increased parental communication (Kirby, 2002), so research should take into account the directionality of these factors. It is hypothesized that low maternal comfort with communication about sex would lead to lower levels of sexual health knowledge and less motivation to exhibit

sexual and reproductive health through the use of birth control, thus leading to more sexual risk-taking behaviors among the daughters.

### **2.7.2. Frequency of Communication about Sex**

Fox and Inazu (1981) suggest that a lack of communication about sex may arise from conservative mores that surround the social rules dictating what should or should not be discussed or perhaps from the fact that mothers may feel uncomfortable talking about sex-related topics if they feel they do not know enough about the topic to discuss it with their adolescents. In any case, it has been found that less communication is associated with less sexual knowledge (Somers & Paulson, 2000). It has also been found that there is an effect of communication on sexual risk behaviors; for instance, Hutchinson, et al. (2003) found that, among Black and Hispanic adolescent females, increased mother-daughter communication about sex and sexual risks was associated with fewer occurrences of unprotected sexual intercourse. It is possible that less frequent mother-daughter communication about sex will lead to lower levels of sexual health knowledge and less motivation to exhibit sexual and reproductive health through the use of condoms or birth control, thus leading to more sexual risk behaviors.

### **2.8. Effect of Potential Confounding Variables on STI Risk Behaviors**

Several antecedents of sexual risk behaviors have been identified in addition to those that have been described. Included are those related to various individual, family, school, and community factors. In particular, it has been established that the following are represent predictors of sexual risk and, thus, were included as covariates in the current study: age, race/ethnicity, maternal education, poverty, religiosity, peer risk factors, and family structure (see Kirby, 2002 for a review).

### **2.8.1. Age**

Among very young adolescents, sexual activity is relatively rare, but such behavior becomes more common in the later teenage years (Guttmacher, 2006), that is, age is an important sociodemographic characteristic to control, as sexual experience becomes more normative with age. As sexual activity becomes more prevalent, so do sexual risk behaviors and outcomes. For example, the occurrence of multiple lifetime sex partnerships necessarily increases in likelihood with age. It is also important to control since this sample only includes those who are sexually active and because contraceptive use increases with increasing age at first sex (Abma, et al., 2002). Further, age warrants attention in examining sexual risk behaviors, as the burden of sexual risk, such as infection with STIs, falls disproportionately on the young (Aral & Holmes, 1999).

### **2.8.2. Race/Ethnicity**

It has been established that there are significant racial/ethnic disparities in sexual risk behaviors among adolescents and young adults. For example, Black and Hispanic high school students are more likely to have had intercourse (65% and 49%, respectively) than White students (42%) (CDC, 2010c). Black and Hispanic students are also more likely to have had sexual intercourse before the age of 13 (15% and 7%, respectively) than White students (3%) and more likely to have had four or more sex partners in their lifetime (29% and 14%) than White students (11%) (CDC, 2010c). Additionally, minority status (in particular, being Black or Hispanic) is associated with lower rates of contraceptive use and higher rates of contraceptive failure and unintended pregnancies (Finer & Henshaw, 2006; Fu, et al. 1999; Mosher, et al., 2004; Ranjit, et al. 2001).

There are also significant differences in the risk of STI between racial/ethnic groups; for example, although the incidence of Chlamydia increased for all racial and ethnic groups between the years of 1998 and 2008, the rate of Chlamydia among Black individuals was more than eight times higher than among White individuals, and the rate among Hispanic individuals was nearly three times higher than among Whites (CDC, 2009b). Similarly, though few studies estimate the incidence and prevalence of trichomoniasis infection, it appears that, among reproductive aged women, Blacks are more than 10 times more likely to be infected with trichomoniasis than Whites or Hispanics (Sutton, et al. 2007). Additionally, it seems that the racial/ethnic gap in sexual risk behaviors may be increasing - from 2001 to 2005, for instance, the percentage of high school students who had ever engaged in sexual intercourse increased among Black (61% to 68%) and Hispanic students (48% to 51%), yet there was no significant increase among White students (Eaton, et al., 2006).

### **2.8.3. Maternal Education**

Mother's level of education is a widely known covariate of risk behaviors, including those related to STI risk, and, thus, were controlled. For example, higher maternal education has been shown to be inversely related to onset of intercourse and directly related to use of contraception (Hayward, Grady, & Billy, 1990).

### **2.8.4. Ratio of Income to the Poverty Line**

It has been found that individuals who live in poverty are more likely to engage in sexual risk behaviors; for example, Davis (2009) found that, among young adults, living in poverty was associated with having increased numbers of multiple sex partnerships and decreased levels of contraceptive use. Additionally, low socioeconomic status is

associated with lower rates of contraceptive use and higher rates of contraceptive failure and unintended pregnancies (Finer & Henshaw, 2006; Fu, et al. 1999; Mosher, et al., 2004; Ranjit, et al. 2001). Further, it has been estimated that two-thirds of pregnancies among young adults in the lowest income brackets (<200% of the poverty line) are unintended (National Campaign to Prevent Teen and Unplanned Pregnancy, 2008).

### **2.8.5. Religiosity**

Regardless of religious affiliation, research has indicated that religiosity represents a protective factor against sexual risk taking. For example, it has been found that individuals who are religious, especially those who report high levels of religiosity, initiate sexual activity at a later age than those who report lower levels of religiosity (Resnick, et al., 1997), and that the religiosity effect is especially significant for girls (Meier, 2003). As another example, Gold, et al. (2010) found that girls with high religiosity were less likely to have had sexual intercourse and, among those who were already sexual active, were less likely to have been pregnant or to have had multiple (more than four) sex partners.

### **2.8.6. Family Structure**

Santelli, Lowry, Brener, and Robin (2000) found that family structure has a significant effect on adolescents' sexual activity. For example, compared with living in a two-parent household, living in a single-parent household has been associated with an increased probability of early initiation of sexual intercourse (Young, Jenson, Olsen, & Cundick, 1991). In fact, it has been asserted that living in a two-parent household may be more effective at reducing sexual risk taking than other parent-child relationship factors (Lenciauskiene & Zaborskis, 2008).

### **2.8.7. Risky Peer Influences**

Research indicates that, throughout adolescence, having peers who are engaged in risky or deviant behavior is associated with increased sexual risk-taking, including inconsistent condom use (Biglan, et al., 1990; Metzler, Noell, Biglan, Ary, & Smolkowski, 1999). Two indicators of risky peer behavior are substance use and peer promotion or acceptance of sexual activity. Substance use in adolescence represents a risky behavior within peer groups, which is related to risky sexual behavior; peer acceptance of sex is indicative of peer sexual activity, which is related to having riskier sex partners and exposing oneself to riskier behaviors such as having sex with an infected partner and not using condoms or contraceptives.

## **2.9. Current Study**

The current study explored the direct and indirect effects that mother-daughter relationship characteristics (maternal parenting style and/or mother-daughter communication about sex) have on three identified sexual risk behaviors (multiple partnerships, inconsistent condom use, and inconsistent contraceptive use) in adolescence and young adulthood. That is, this study assessed the associations between mother-daughter relationship characteristics and sexual risk behaviors, and it assessed the potential mediating effects that factors which affect motivation to engage in risk sexual behavior (low sexual self-efficacy, high risk-taking, low sexual health knowledge, and high perceived barriers to contraception) have on the latter relationship (Table 2).

Specifically, this study investigated whether low sexual self-efficacy and high risk-taking behaviors mediated the relationship between maternal parenting style and sexual risk behaviors and whether low sexual health knowledge and high perceived

barriers to contraception mediated the relationship between mother-daughter communication about sex and sexual risk behaviors. Thus, this study incorporated a mediating mechanism in assessing the direct and indirect role-of mother-daughter relationships and adolescent and young adult sexual risk behaviors. As Baron and Kenny (1986) note, a mediating hypothesis “recognizes that an active organism intervenes between stimulus and response” (p. 1176). In this sense, it is hypothesized that mother child relationships impact an adolescent’s motivation to engage in sexual risk behavior which, in turn, impacts their development and expression of sexual risk behaviors. This study, thus, has the following aims (Table 2):

- Aim 1a) To determine whether any maternal parenting style aside from one which demonstrates both warmth and control (authoritative parenting) leads to sexual risk taking in adolescence and young adulthood.
- Aim 1b) To determine whether any mother-daughter communication about sex aside from one that exemplifies both comfortable and frequent communication about sex leads to sexual risk taking in adolescence and young adulthood.
- Aim 2a) To determine whether any maternal parenting style aside from authoritative parenting leads to low sexual self-efficacy and high risk-taking behaviors.
- Aim 2b) To determine whether any mother-daughter communication about sex aside from one which exemplifies both comfortable and frequent communication about sex leads to low sexual health knowledge and high perceived barriers to contraception.

- Aim 3) To assess whether low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception mediate the relationship between mother-daughter relationship characteristics and sexual risk behaviors
  - o Aim 3a) To determine whether low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception are associated with sexual risk behaviors.
  - o Aim 3b) To evaluate whether the addition of low sexual self-efficacy and high risk-taking behaviors as mediators attenuates the association between maternal parenting style and sexual risk behaviors, thus implying mediation.
  - o Aim 3c) To evaluate whether the addition of low sexual health knowledge and high perceived barriers to contraception as mediators attenuates the association between maternal parenting style and sexual risk behaviors, thus implying mediation.

Based on the above aims, it was hypothesized that any maternal parenting style aside from one which demonstrated both warmth and control (authoritative parenting) would lead to lower sexual self-efficacy and higher risk-taking behaviors and that any style of mother-daughter communication about sex aside from one which exemplified both comfortable and frequent communication about sex would lead to lower levels of sexual health knowledge and higher perceived barriers to contraception (Table 2). It was also hypothesized that any maternal parenting style aside from authoritative and that any style of mother-daughter communication about sex aside from one that exemplified both

comfortable and frequent communication about sex would lead to higher levels of sexual risk taking in adolescence. It was further hypothesized that sexual self-efficacy and risk-taking in adolescence would mediate the relationship between parenting style and sexual risk-taking and that levels of sexual health knowledge and perceived barriers to contraception in adolescence would mediate the relationship between mother-daughter communication about sex and sexual risk taking. Finally, it was hypothesized that these associations would not only be seen when examining the effect of mothers on adolescent sexual risk-taking behaviors, but also on young adulthood sexual risk-taking behaviors, though to a lesser degree.

Using nationally-representative, longitudinal data from Waves I (1994-1995, adolescence), II (1995 - 1996, adolescence) and III (2001 - 2002, young adulthood) of the National Longitudinal Study of Adolescent Health (Add Health), the associations between mother-daughter relationship characteristics and STI risk were explored (see Table 2 on next page). Unadjusted associations and adjusted associations (controlling for age, race/ethnicity, maternal education, poverty, religiosity, household structure, peer substance use, peer acceptance of sex, low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception at Wave I and sexual risk-taking behaviors at Wave II in the analyses examining Wave III outcomes) were examined. Analyses were weighted to account for the complex cluster design, thus yielding nationally-representative estimates. By examining longitudinal associations between mother-daughter relationships and sexual risk outcomes, it may be possible to identify at-risk groups and to create and implement individual- and community-based intervention programs.

Table 2: Research Questions

Research Question	Pathway	Hypothesis
Aim 1: Does maternal parenting style have an effect on sexual risk behaviors?	IVs → DVs (Parenting Style)	Individuals whose mothers exhibited parenting styles with low warmth and/or low control (authoritarian, permissive, and neglectful) will all lead to multiple partnerships, inconsistent condom use, and inconsistent contraceptive use, compared to individuals whose mothers exhibited a parenting style with high warmth and high control (authoritative, the reference group).
Aim 1b: Does mother-daughter communication about sex have an effect on sexual risk behaviors?	IVs → DVs (Communication)	Less comfortable and/or less frequent mother-daughter communication about sex will lead to multiple partnerships, inconsistent condom use, and inconsistent contraceptive use, compared to individuals whose mothers exhibited a parenting style with high warmth and high control (authoritative, the reference group).
Aim 2a: Does maternal parenting style have an effect on self-efficacy and risk-taking behaviors?	IVs → Mediators (Parenting Style)	Individuals whose mothers exhibited parenting styles with low warmth and/or low control (authoritarian, permissive, and neglectful) will have low sexual self-efficacy and high risk-taking behaviors, compared to individuals whose mothers exhibited a parenting style with high warmth and high control (authoritative, the reference group).
Aim 2b: Does mother-daughter communication about sex have an effect on sexual health knowledge and perceived barriers to contraception?	IVs → Mediators (Communication)	Less comfortable and/or less frequent mother-daughter communication about sex will lead to low sexual health knowledge and high perceived barriers to contraception, compared to individuals whose mothers exhibited a parenting style with high warmth and high control (authoritative, the reference group).
Aim 3a: Do self-efficacy, risk-taking behaviors, sexual health knowledge, and perceived barriers to contraception affect sexual risk behaviors?	Mediators → DVs	Low self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception each will be associated with multiple partnerships, inconsistent condom use, and inconsistent contraceptive use.
Aim 3b: Does maternal parenting style have both direct and indirect effects on sexual risk behaviors?	IVs → DVs [Through Mediators] (Parenting Style)	The effect of maternal parenting style on sexual risk behaviors will be mediated by an individuals' low sexual self-efficacy and high risk-taking behaviors.
Aim 3c: Does mother-daughter communication about sex have both direct and indirect effects on sexual risk behaviors?	IVs → DVs [Through Mediators] (Communication)	The effect of mother-daughter communication about sex on sexual risk behaviors will be mediated by an individuals' low sexual health knowledge and high perceived barriers to contraception.

## **CHAPTER 3: METHODS**

This chapter will begin by providing an overview of the data that will be used for this study and of the survey from which the data were collected. Additionally, this chapter will provide a detailed description of the variables that were used in the research design of this study, including independent, dependent, and control variables, as well as potential mediating variables. Next, this chapter will outline the analytic methods that were used. Finally, this chapter will conclude with a discussion of issues related to human subjects.

### **3.1. Data**

#### **3.1.1. Description of the Data**

Data for this study were drawn from the National Longitudinal Study of Adolescent Health (Add Health), a longitudinal cohort study that was initially funded by three grants from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) and by support from 23 other federal agencies and foundations. The Add Health project was directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill. The data set is distributed by the Inter-University Consortium for Political and Social Research (ICPSR) via the Data Sharing for Demographic Research (DSDR) project.

Add Health is currently the largest, most comprehensive longitudinal survey of adolescents ever undertaken. Add Health data were appropriate for use in the current study because the survey asked adolescents about their psychosocial and demographic characteristics and about health-related behaviors in adolescence and young adulthood;

data were also collected from a parent. As such, this dataset could be used to examine how mother-daughter relationship characteristics affect adolescent and young adult behaviors.

### **3.1.2. Survey Design**

The Add Health study began in 1994 by identifying the high schools and their feeder middle schools from which to collect data (Harris, et al., 2009). Eligible high schools included an 11<sup>th</sup> grade and had an enrollment of at least thirty students. Of those that were identified, 70% participated in the study, and those that declined to participate were replaced with a school in the same stratum (Harris, et al.). Based on the identified high schools, several feeder middle schools were invited to participate (if the high school did not already include 7<sup>th</sup> and 8<sup>th</sup> grades, in which case no additional feeder school was identified) (Harris, et al.). Eligible middle schools included a 7<sup>th</sup> grade, had at least five students attend the affiliated high school, and had the highest probability of the identified feeders of sending students to the affiliated high school (Harris, et al.).

The complete data collection spanned 80 communities and included 132 schools; specifically, data were obtained from 90,118 students and 144 school administrators in the United States from 80 high schools and 52 middle schools. Data were collected from adolescents, their peers, school administrators, parents, siblings, friends, and romantic partners through multiple waves of data collection. For survey questions that asked about sensitive topics, such as sexual risk behaviors, adolescents listened to questions through earphones and entered their responses into a laptop computer, thereby reducing the potential for bias in self-reported responses

The initial In-School interview was self-administered in 1994 to more than 90,000 students after obtaining parental permission; the survey lasted less than an hour and contained questions regarding such topics as sociodemographic characteristics, household structure, and friendships (Harris, et al., 2009). Regardless of whether they had completed a questionnaire or not, approximately 17 students per stratum (approximately 200 per high school/middle school pair) were invited to participate in the In-Home survey following the In-School survey (Harris, et al.). These participants made up the core sample, which included 12,105 adolescents. Four racial/ethnic groups of individuals were identified from self-reported In-School questionnaire data and were also selected to participate in the In-Home survey. These individuals – who were Black (with a parent with a college degree), Chinese, Cuban, and Puerto Rican – make up the ethnic oversample. Oversamples were also drawn from groups of individuals who self-identified as disabled and who had genetic siblings in the study; there were also 16 schools from which all students were selected for participation in the In-Home study so as to examine social and peer networks (Harris, et al.).

Once the household adolescent sample was identified and consent obtained, the Wave I In-Home Survey was administered in 1994 - 1995. This survey collected data on health, peer networks, family relations, and risk behaviors including those that relate to substance use and sexual risk-taking. Additionally, a parent (the mother was preferred) was asked to complete the Parent Survey, which collected data on neighborhood characteristics, sociodemographic characteristics, and parent-child communication and interaction. Wave II surveyed approximately 15,000 of the same students one year later. It included those who were in grades 7 - 11 at Wave I and who were not self-identified as

disabled; survey administrators did not attempt to find or re-interview the adolescents who were in 12<sup>th</sup> grade at Wave I.

Wave III data collection occurred in 2001 - 2002 when the original respondents were young adults aged 18 to 28 years old. Respondents who could be located (N = 15,170) answered survey questions regarding sociodemographic characteristics, relationship and employment information, and health and risk behaviors. Additionally, Wave III collected biological specimens (urine) to determine infection with three curable sexually transmitted infections (STIs) – *Chlamydia trachomatis*, *Neisseria gonorrhoea* and *Trichomonas vaginalis*. A fourth wave, Wave IV, was collected in 2007 - 2008 and collected additional bio-samples and genetic information, in addition to data regarding sociodemographic, psychosocial, and relationship characteristics.

### **3.1.3. Participants**

The complete Add Health dataset has data from a nationally representative sample of more than 20,000 7<sup>th</sup>-12<sup>th</sup> graders in the U.S. who participated in the Wave I In-Home survey. The dataset currently includes two waves of data collected during adolescence in 1994 - 1995 (age range 11 - 21) and one year later in 1996 (age range 12 - 22) as well as two waves of data collected during young adulthood in 2001 - 2002 (age range 18 - 28) and in 2007 - 2008 (age range 24 - 34).

In the current study, data from the Wave I In-Home Parent Survey and the Wave I In-Home and In-School survey were used, in addition to data from the Wave II and Wave III In-Home Survey. Participants' data was weighted according to the core weights at Wave III and was corrected for the complex cluster design. That is, SAS survey procedures were used in analysis to account for the systematic sampling method and

stratification of the Add Health study in order to produce values and associations, which are nationally representative with respect to region of country, urbanicity, school size, school type, and race/ethnicity.

#### **3.1.4. Analytic Samples**

This sample examined adolescent independent variables and later adolescent and early adulthood dependent variables; as such, Waves I, II, and III were used (N = 20,774). Because longitudinal associations were examined, only respondents with valid Wave III weight, cluster, and strata values were included in the sample (n = 10,828). Additionally, because this study focused on adolescent and young adult women, boys were omitted from the sample (n = 5,728). Similarly, because this study examined mother-daughter relationships (not father-daughter relationships), only individuals whose mothers completed the parent survey were included (n = 4,725). Further, because some questions regarding sexual risk taking at Wave I were only asked of those 15 years and older, only those who were 15 years old or older at Wave I were included in the analytic sample (n = 2,983). Therefore, all had reached age 22 by Wave III. Likewise, because this study focused on sexual risk-taking outcomes, only those who had initiated vaginal sex at Wave II were included in the analyses (n = 1,682).

Finally, only those who had non-missing values on independent variables and mediators were used (n = 1,564). Also, since young adult inconsistent condom and contraceptive use measures were based on past year sexual experiences, only those who reported at least one past year sex partner at Wave III were included in the sample for analyses examining these sexual risk behaviors (n = 1,429)

## 3.2. Variables

### 3.2.1. Independent Variables (Wave I)

#### 3.2.1.1. Parenting Style

Based on indicators of maternal warmth and maternal control (see below), an indicator of maternal parenting style was constructed. Namely, respondents were categorized as having authoritarian (low warmth, high control), permissive (high warmth, low control), or neglectful (low warmth, low control) mothers, *versus* authoritative mothers, the reference group (high warmth, high control).

**3.2.1.1.1. Maternal warmth.** Maternal warmth was assessed using the following three Wave I In-Home survey items: “*How close do you feel toward your [mother/adoptive mother/stepmother/foster mother/etc.]?*” and “*Most of the time, your mother is warm and loving toward you*” and “*Overall, you are satisfied with your relationship with your mother*” Response options to the first question ranged from 1 (not at all) to 5 (very much). Response options to the second and third questions were reverse-coded so they ranged from 1 (strongly disagree) to 5 (strongly agree). Valid responses were summed and averaged based on the number of non-missing valid responses. Using a cut-off score of the median, respondents were dichotomously coded as having low warmth (0) or high warmth (1).

**3.2.1.1.2. Maternal control.** Maternal control was determined from responses to seven Section 16 Wave I In-Home survey items: “*Do your parents let you make your own decisions about the time you must be home on weekend nights? The people you hang around with? What you wear? How much television you watch? Which television programs you watch? What time you go to bed on week nights? What you eat?*”

Respondents answered either no (0) or yes (1) to each question. Valid responses were reverse-coded, summed and averaged based on the number of non-missing valid responses in order to determine a maternal control score from 0 (low control) to 1 (high control). Using a cut-off score of the median, respondents were dichotomously coded as either having low control (0) or high control (1).

### 3.2.1.2. Mother-Daughter Communication about Sex

Based on indicators of maternal comfort with communication about sex and frequency of mother-daughter communication about sex (see below), individuals were categorized as having four types of mother-daughter communication about sex: infrequent and uncomfortable, frequent and uncomfortable, infrequent and comfortable, *versus* frequent and comfortable communication about sex (the reference group).

**3.2.1.2.1. Maternal comfort with communication about sex.** Maternal comfort with communication about sex was based on responses to five Parent Survey items: “*You really don’t know enough about sex and birth control to talk about them with [name]. It would embarrass [name] to talk to you about sex and birth control. It would be difficult for you to explain things if you talked with [name] about sex and birth control. [Name] will get the information somewhere else, so you don’t really need to talk to her about sex and birth control. Talking about birth control with [name] would only encourage her to have sex.*” The possible responses to these questions ranged from 1 (strongly agree) to 5 (strongly disagree). Valid responses were summed and averaged based on the number of non-missing valid responses in order to determine a control score from 0 (low comfort) to 5 (high comfort). Using a cut-off score of the median, respondents were dichotomously

coded as either having low comfort with communication about sex (0) or high comfort (1).

**3.2.1.2.2. Frequency of communication about sex.** Frequency of communication about sex was determined from mothers' responses to the questions: *"How much have you and [name] talked about her having sexual intercourse and the negative or bad things that would happen if she got pregnant? The dangers of getting a sexually transmitted disease? The negative or bad impact on her social life because she would lose the respect of others? The moral issues of not having sexual intercourse?"* and *"How much have you talked to [name] about birth control? About sex?"* Valid responses ranged from 0 (not at all) to 4 (a great deal) and were summed and averaged based on the number of valid responses to determine a score. Using a cut-off score of the median, respondents were dichotomously coded from 0 (infrequent of communication about sex) to 1 (frequent of communication about sex).

### **3.2.2. Covariates (Wave I)**

#### 3.2.2.1. Age

The adolescent's Wave I age was calculated from the birth month and year, subtracted from the interview date. Responses ranged from 15 to 21 at Wave I; due to low frequencies, the 18, 19, 20, and 21 year olds were collapsed into one group, so ages included 15 (the reference group), 16, 17, and 18 or older.

#### 3.2.2.2. Race/Ethnicity

Adolescent race/ethnicity was based on responses to two questions: *"Are you of Hispanic or Latino origin?"* and *"What is your race?"* Those who responded "yes" to the first question were coded as Hispanic. Those who responded "no" were coded

according to their response to the latter question as being White (the reference group), Black, Asian American/Pacific Islander, or American Indian/Alaskan Native, or other.

#### 3.2.2.3. Maternal Education

Maternal education was based on the mother's Wave I self-report response to the question, "*How far did you go in school?*" if she provided a valid response, otherwise it was determined by her daughter's response to the question "*How far in school did she go?*" regarding the resident mother. Responses were dummy-coded into three categories: less than a high school education (the reference group), a high school education, or more than a high school education.

#### 3.2.2.4. Ratio of Family Income to Poverty

Poverty status was determined based on the ratio of family income to the poverty line (by household number) at Wave I. Adolescents were asked a series of 17 household roster questions to determine the number of people living in the same household as the adolescent. Based on the number of completed household roster sections, the number of people in the household was calculated. Additionally, parents were 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.*" Those with missing values were assigned the mean income. Subsequently, those whose household income (the year Wave I data collection began) was 133% or less of the 1994 federal poverty line (by household size) were coded as living in poverty *versus* not living in poverty (the reference group).

#### 3.2.2.5. Religiosity

The adolescent's religiosity was calculated by summing scores on the following

Wave I In-Home questions: “*In the past 12 months, how often did you attend religious services?*” (scored on a scale of 1 - “once a week or more” to 4 - “never”), “*How important is religion to you?*” (scored from 1 - “very important” to 4 - “not important at all”), and “*How often do you pray?*” (scored from 1 - “at least once a day” to 5 - “never”). Responses to the three questions were reverse coded, so that high scores indicated high levels of religiosity and low scores indicated low levels of religiosity. Individuals who reported that they were not religious and, thus, were told to skip these questions, were given scores of 0. Scores were summed and averaged based on non-missing values. Religiosity was then dummy coded to three categories: not religious (a score of 0) (the reference group), somewhat religious (scores greater than 0 and less than 4), and very religious (scores greater than or equal to 4).

#### 3.2.2.6. Household Structure

Household structure was based on responses to the 17 sets of household member roster questions that were asked of the adolescent in the Wave I In-Home survey. For each set that an adolescent identified an additional member in her household, she was asked the question, “*What is {NAME}'s relationship to you?*” Among the response options were father and mother. If the adolescent identified a father and a mother in the current household roster, they were asked to specify the type of mother or father that was in the household (biological, step, adoptive, or foster). Participants were coded living with two biological or adoptive/foster parents (the reference group), living with a parent and a step-parent, living with a single parent, or living with no parent in the household.

#### 3.2.2.7. Peer Substance Use

Peer substance use was assessed based on responses to the Wave I questions: “*Of*

*your 3 best friends, how many smoke at least 1 cigarette a day?” “Of your 3 best friends, how many drink alcohol at least once a month?” and “Of your 3 best friends, how many use marijuana at least once a month?”* Adolescents who reported at least one best friend who used at least one of these substances were coded as having peer substance use, those who did not report having a best friend that used a substance in adolescence were coded as not having peer substance use (the reference group).

#### 3.2.2.8. Peer Acceptance of Sex

Peer acceptance of sex was assessed from the Wave I question *“If you had sexual intercourse, your friends would respect you more.”* The possible responses to this question ranged from 1 (strongly agree) to 5 (strongly disagree). Those who reported that they agreed or strongly agreed with this statement were coded as having peer acceptance of sex. Those who reported that neither agreed nor disagreed, disagreed, or strongly disagreed with coded as not having peer acceptance of sex (the reference group)

#### 3.2.2.9. Low Sexual Self-Efficacy

Low sexual self-efficacy at Wave I was included as a control in order to account for the potential endogeneity of mother-daughter relationship characteristics in the associations with Wave II low sexual self-efficacy and was based on three Wave I questions: *“If you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on? How sure are you that you could plan ahead to have some form of birth control available? How sure are you that you could resist sexual intercourse if your partner did not want to use some form of birth control?”* Responses ranged from 1 (very sure) to 5 (very unsure) and 6 (“I never want to use birth control”). Valid responses were summed and averaged based on

non-missing responses; high scores represented having a low sexual self-efficacy and low scores represented not having low sexual self-efficacy.

#### 3.2.2.10. High Risk-Taking Behaviors

High risk-taking behavior at Wave I was included as a control in order to account for the potential endogeneity of mother-daughter relationship characteristics in the associations with Wave II high risk-taking behaviors and was based on responses to 8 Wave I survey questions: *“In the past 12 months, how often did you lie to your parents or guardians about where you had been or whom you were with? Take something from a store without paying for it? Run away from home? Drive a car without its owner’s permission? Steal something worth more than \$50? Go into a house or building to steal something? Steal something worth less than \$50? Act loud, rowdy, or unruly in a public place?”* Responses ranged from 0 (never) to 3 (5 or more times). Individuals who reported engaging in each activity at least once were given scores of 1 on that question; those who had never engaged in that activity were given scores of 0. Valid scores were summed so that high scores indicated high levels of risk-taking behaviors and low scores indicated low levels of risk-taking behaviors.

#### 3.2.2.11. Low Sexual Health Knowledge

Low sexual health knowledge at Wave I was included as a control in order to account for the potential endogeneity of mother-daughter relationship characteristics in the associations with Wave II low sexual health knowledge and was determined from responses to a number of Wave I In-Home survey items: *“When a woman has sexual intercourse, almost all sperm die inside her body after about six hours. When using a condom, the man should pull out of the woman right after he has ejaculated (come). Most*

*women's periods are regular, that is, they ovulate (are fertile) fourteen days after their periods begin. Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms. When putting on a condom, it is important to have it fit tightly, leaving no space at the tip. Vaseline can be used with condoms, and they will work just as well. The most likely time for a woman to get pregnant is right before her period starts. Even if the man pulls out before he ejaculates (even if ejaculation occurs outside of the woman's body), it is still possible for the woman to become pregnant."*

Responses were marked as true (1) or false (2). Correct answers were recoded as 0's and incorrect answers were recoded as 1's. Responses were summed, with high scores representing having low sexual health knowledge and low scores representing not having low sexual health knowledge.

#### 3.2.2.12. High Perceived Barriers to Contraception

High perceived barriers to contraception at Wave I were included as a control in order to account for the potential endogeneity of mother-daughter relationship characteristics in the associations with high perceived barriers to contraception at Wave II and were assessed by responses to Wave I questions: *"How much do you agree or disagree with each of the following statements: In general, birth control is too much of a hassle to use. In general, birth control is too expensive to buy. It takes too much planning ahead of time to have birth control on hand when you're going to have sex. It [is/would be] too hard to get a boy to use birth control with you. For you, using birth control [interferes/would interfere] with sexual enjoyment. It [is/would be] easy for you to get birth control. Using birth control is morally wrong. If you used birth control, your friends might think that you were looking for sex."* Responses ranged from 1 "strongly agree" to

5 “strongly disagree.” Valid responses were reverse coded and summed; high scores represented having high perceived barriers to contraception and low scores represented not having high perceived barriers to contraception.

#### 3.2.2.13. Age of Sexual Initiation (Wave III)

In analyses examining lifetime and past year sex partnerships at Wave III, the additional control of age of sexual initiation was added to analyses. This variable was added so as to account for the proportion of time a young woman has been sexually active (in conjunction with the control variable of age). This variable was assessed retrospectively at Wave III and was coded as a continuous variable.

#### 3.2.2.14. Adolescent Inconsistent Condom/Contraceptive Use (Wave II)

In analyses examining inconsistent condom at Wave III and examining inconsistent contraceptive use at Wave III, adolescent (Wave II) inconsistent condom use and inconsistent contraceptive use were controlled, respectively. This was done so as to assess the direct effects of the independent variables and to assess the direct effects of adolescent mother-daughter relationship characteristics on young adulthood outcomes. These variables were the same measures as were used in the analyses examining adolescent sexual risk outcomes (Sections 3.2.4.1. and 3.2.4.2.).

### **3.2.3. Mediators (Wave II)**

#### 3.2.3.1. Low Sexual Self-Efficacy

Low sexual self-efficacy at Wave II was based on three Wave II questions: *“If you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on? How sure are you that you could plan ahead to have some form of birth control available? How sure are you that*

*you could resist sexual intercourse if your partner did not want to use some form of birth control?” Responses ranged from 1 (very sure) to 5 (very unsure) and 6 (“I never want to use birth control”). Valid responses were summed and averaged based on non-missing responses; high scores represented having a low sexual self-efficacy and low scores represented not having low sexual self-efficacy.*

#### 3.2.3.2. High Risk-Taking Behavior

High risk-taking behavior at Wave II was based on responses to 8 Wave II survey questions: *“In the past 12 months, how often did you lie to your parents or guardians about where you had been or whom you were with? Take something from a store without paying for it? Run away from home? Drive a car without its owner’s permission? Steal something worth more than \$50? Go into a house or building to steal something? Steal something worth less than \$50? Act loud, rowdy, or unruly in a public place?”*

Responses ranged from 0 (never) to 3 (5 or more times). Individuals who reported engaging in each activity at least once were given scores of 1 on that question; those who had never engaged in that activity were given scores of 0. Valid scores were summed so that high scores indicated high levels of risk-taking behaviors and low scores indicated low levels of risk-taking behaviors.

#### 3.2.3.3. Low Sexual Health Knowledge

Low sexual health knowledge at Wave II was determined from responses to a number of Wave II In-Home survey items: *“When a woman has sexual intercourse, almost all sperm die inside her body after about six hours. When using a condom, the man should pull out of the woman right after he has ejaculated (come). Most women’s periods are regular, that is, they ovulate (are fertile) fourteen days after their periods*

*begin. Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms. When putting on a condom, it is important to have it fit tightly, leaving no space at the tip. Vaseline can be used with condoms, and they will work just as well. The most likely time for a woman to get pregnant is right before her period starts. Even if the man pulls out before he ejaculates (even if ejaculation occurs outside of the woman's body), it is still possible for the woman to become pregnant.*” Responses were marked as true (1) or false (2). Correct answers were recoded as 0's and incorrect answers were recoded as 1's. Responses were summed, with high scores representing having low sexual health knowledge and low scores representing not having low sexual health knowledge.

#### 3.2.3.4. High Perceived Barriers to Contraception

High perceived barriers to contraception at Wave II were assessed by responses to Wave II questions: *“How much do you agree or disagree with each of the following statements: In general, birth control is too much of a hassle to use. In general, birth control is too expensive to buy. It takes too much planning ahead of time to have birth control on hand when you're going to have sex. It [is/would be] too hard to get a boy to use birth control with you. For you, using birth control [interferes/would interfere] with sexual enjoyment. It [is/would be] easy for you to get birth control. Using birth control is morally wrong. If you used birth control, your friends might think that you were looking for sex.”* Responses ranged from 1 “strongly agree” to 5 “strongly disagree.” Valid responses were reverse coded and summed; high scores represented having high perceived barriers to contraception and low scores represented not having high perceived barriers to contraception.

### **3.2.4. Dependent Variables (Waves II and III)**

#### **3.2.4.1. Inconsistent Condom Use**

Inconsistent condom use in adolescence was determined from the Wave II questions: *“Did you or your partner use any method of birth control when you had sexual intercourse most recently?”* Responses included “no,” “yes,” or “I have only had intercourse once.” If respondent answered “no” they were coded as exhibiting inconsistent condom use (1). For those who responded yes, they were asked *“What method of birth control did you or your partner use?”* Response options included 13 options, one of which was “condom.” Respondents who did not report that they used a condom as one of their methods of birth control at their most recent intercourse were coded as exhibiting inconsistent condom use (1); those who responded that they had used a condom as one of their methods were coded as not exhibiting inconsistent condom use (0, the reference group). Additionally, the respondents who said that they had only had sex once since were asked *“Did you or your partner use any method of birth control the first time you had sexual intercourse?”* If respondent answered “no” they were coded as exhibiting inconsistent condom use (1). For those who responded yes, they were asked *“What method of birth control did you or your partner use?”* Response options included 13 options, one of which was “condom.” Again, respondents who did not report that they used a condom were coded as exhibiting inconsistent condom use (1); those who responded that they had used a condom as one of their methods were coded as not exhibiting inconsistent condom use (0, the reference group).

Young adult inconsistent condom use was based on responses to the following Wave III question regarding sex in the previous 12 months: *“On how many of these*

*occasions did your partner use a condom?” Responses ranged from 0 (none) to 4 (all). Those who responded with a 0, 1, 2, or 3 were coded as exhibiting inconsistent condom use (1); those who reported they had used a condom on all of these occasions (responses of 4) were coded as not exhibiting inconsistent condom use (0, the reference group).*

#### 3.2.4.2. Inconsistent Contraceptive Use

Inconsistent contraceptive use in adolescence was determined from the Wave II questions: *“Did you or your partner use any method of birth control when you had sexual intercourse most recently?”* Responses included “no,” “yes,” or “I have only had intercourse once.” If respondent answered “no” they were coded as exhibiting inconsistent condom use (1). For those who responded yes, they were asked *“What method of birth control did you or your partner use?”* Respondents who did not report that they used a condom, birth control pills, a diaphragm, an IUD, Norplant, the ring, or Depo Provera as one of their methods of birth control at their most recent intercourse were coded as exhibiting inconsistent contraceptive use (1); those who responded that they had used one of these methods were coded as not exhibiting inconsistent contraceptive use (0, the reference group). Additionally, the respondents who said that they had only had sex once since were asked *“Did you or your partner use any method of birth control the first time you had sexual intercourse?”* If respondent answered “no” they were coded as exhibiting inconsistent condom use (1). For those who responded yes, they were asked, *“What method of birth control did you or your partner use the first time you had sexual intercourse?”* Again, respondents who did not report that they used a condom, birth control pills, a diaphragm, an IUD, Norplant, the ring, or Depo Provera at their most recent intercourse were coded as exhibiting inconsistent contraceptive use

(1); those who responded that they had used one of these methods were coded as not exhibiting inconsistent contraceptive use (0, the reference group).

Young adult inconsistent contraceptive use was based on the Wave III question *“In the past 12 months, which of the following methods of birth control have you used? Mark all that apply.”* Respondents who did not report using either birth control pills, an implant, a birth control shot (Depo Provera), a diaphragm, or female sterilization or who did not report using condoms at all sexual intercourses in the prior year were coded as having inconsistent contraceptive use (1) and those who reported using at least one of these methods (or condoms at all sexual intercourses) were coded as not having inconsistent contraceptive use (0, the reference group).

#### 3.2.4.3. Multiple Sex Partnerships

Wave III (young adulthood) multiple sex partnerships was measured in two ways: lifetime partnerships and past year partnerships. To assess lifetime partnerships, participants were first asked *“Have you ever had vaginal intercourse?”* then asked *“With how many partners have you ever had vaginal intercourse, even if only once?”* Past year partnerships were then assessed from the question: *“With how many different partners have you had vaginal intercourse in the past 12 months?”* Responses were continuous. To correct for the skewness of these responses and to make them more normally distributed, analyses used the natural log of these numbers, plus one.

### **3.3. Analyses**

#### **3.3.1. Analytic Design**

Weighted means and frequencies of the sample’s sociodemographic characteristics at Waves I, II, and III were estimated. Descriptive statistics were obtained

for all independent and dependent variables and t-tests were run on key sociodemographic variables to determine whether there were any significant differences between those who did or did not provide valid responses for these variables.

Additionally, t-tests were used to compare individuals who were and were not included in the analytic sample (virgins *versus* non-virgins at Wave II and those who had no past year partnerships *versus* those who had at least one sex partners in the past year) on sociodemographic characteristics.

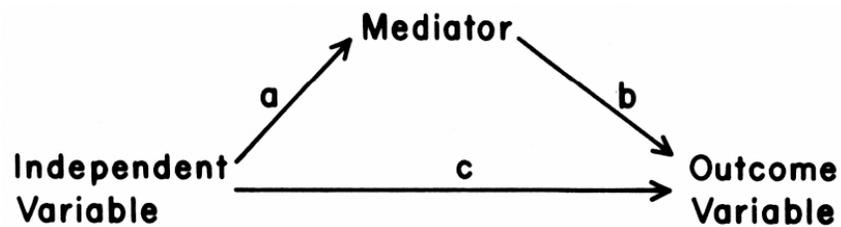
In order to assess the conceptual model which assumes that mother-daughter characteristics have an effect on sexual risk behaviors, as mediated by self-efficacy, risk-taking behaviors, sexual health knowledge, and perceived barriers to contraception (see Figure 1 on page 13), it was necessary to assess the significance of several associations. Baron and Kenny (1986) assert that to confirm mediation, significant associations must be demonstrated between:

- A) Mother-daughter relationship characteristics (parenting style and mother-daughter communication about sex) and the hypothesized socioemotional mediators (low sexual self-efficacy and high risk-taking behaviors) and sexual knowledge mediators (low sexual health knowledge and high perceived barriers to contraception);
- B) Hypothesized socioemotional mediators (low sexual self-efficacy and high risk-taking behaviors) and sexual knowledge mediators (low sexual health knowledge and high perceived barriers to contraception) and sexual risk behaviors (multiple partnerships, inconsistent condom use, and inconsistent contraceptive use); and

C) Mother-daughter relationship characteristics (parenting style or mother-daughter communication about sex) and sexual risk behaviors (multiple partnerships, inconsistent condom use, and inconsistent contraceptive use).

Additionally, the relationship between mother-daughter relationship characteristics and sexual risk behaviors (C) should be attenuated when self-efficacy and risk-taking behaviors or sexual health knowledge and perceived barriers to contraception – the hypothesized mediators – are added into the model. See Baron and Kenny (1986) model below:

*Figure 2. Baron and Kenny's (1986) Model of Mediation*



In order to assess the latter associations, logistic regression was used to examine the unadjusted and adjusted (controlling for age, race/ethnicity, maternal education, poverty, religiosity, household structure, peer substance use, peer acceptance of sex, low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception at Wave I and sexual risk-taking behaviors at Wave II in the analyses examining Wave III outcomes) odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between each mother-daughter characteristic at Wave I (maternal parenting style and mother-daughter communication about sex) and each sexual risk behavior outcome at Wave II (multiple partnerships, inconsistent condom use,

and inconsistent contraceptive use) (see Table 2). The independent variables were added to models individually and at the same time.

Using the same methods, unadjusted and adjusted ORs and 95% CIs were estimated for the longitudinal associations between each mother-daughter characteristic and each sexual risk behavior (multiple partnerships, inconsistent condom use, and inconsistent contraceptive use) at Wave III.

In order to determine if the mother-daughter characteristics had both direct and indirect effects on sexual risk behaviors, the relationship between the independent variables and hypothesized mediators was assessed. Using ordinal regression, ORs and 95% CIs were estimated for the relationships between maternal parenting style and mother-daughter communication about sex and both the socioemotional mediators (low sexual self-efficacy and high risk-taking behaviors) and the sexual knowledge mediators (low sexual health knowledge and high perceived barriers to contraception). Additionally, logistic regression was used to estimate ORs and 95% CIs for the association between the four hypothesized mediators and each sexual risk behavior.

Finally, the socioemotional mediators (low sexual self-efficacy and high risk-taking behaviors and the sexual knowledge mediators (low sexual health knowledge and high perceived barriers to contraception) were added to the models individually and at the same time and logistic regressions were used to estimate adjusted ORs and 95% CIs for the associations between the mother-daughter characteristics and each sexual risk behavior at Wave II and each sexual risk behavior at Wave III.

Analyses were run using SAS Version 9.2. The complex survey design of the data set was accommodated by accounting for stratification, clustering, and unequal selection probabilities in order to produce nationally representative estimates.

### **3.3.2. Human Subjects**

When Add Health was initiated, the schools from which data were collected were selected with unequal probability of selection. The data consist of numerical computer files. Respondents are only identified by an assigned number that is not linked to individual identifying information in the dataset. The current analyses were conducted using a special file that includes all the data and which was only available to the investigator through a special confidential data enclave in the Maryland Population Research Center (MPRC), University of Maryland. Permission was granted for the use of these data in this room. Data were not removed from this room.

The analyses produced only aggregate tabulations for adolescents and their mothers based on sociodemographic characteristics. Informed consent was obtained by the original investigators. Parents were informed prior to survey distribution and could prohibit their children from participating (Harris, et al., 2009).

There are no foreseeable risks or benefits to the subjects in these analyses, because existing data were used. Potential benefits to the population exist, as research may identify health patterns and modifiable predictors of risk. Confidentiality was maintained in the current study, as the investigator had no contact with subjects and had access to the data only through the MPRC confidential data lab. The investigator had no known conflicts of interest, and ethical approval for this research was obtained from the University of Maryland at College Park Institutional Review Board (see Appendix B).

An exemption (#4) was requested and granted for this project as this study was based the fact that the investigator analyzed existing data that came from publicly available sources in which the data were recorded in such a manner that subjects could not be identified directly or through identifiers linked to the participants.

Table 3. Hypotheses

Hypotheses	Pathway	Waves
<b>Independent Variables and Mediators</b>		
<i>Hypothesis 1:</i> Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of socioemotional risk (low sexual self-efficacy/high risk-taking behaviors).	Parenting Style ↓ Socioemotional Risk Mediators	I ↓ II
<i>Hypothesis 2:</i> Mother child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of sexual knowledge risk mediators (low sexual health knowledge/high perceived barriers to contraception).	Communication about Sex ↓ Sexual Knowledge Risk Mediators	I ↓ II
<b>Sexual Risk-Taking Behaviors</b>		
<i>Hypothesis 3:</i> Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of sexual risk-taking behaviors.	Parenting Style ↓ Multiple Lifetime Partnerships	I ↓ III
	Parenting Style ↓ Multiple Past Year Partnerships	I ↓ III
	Parenting Style ↓ Inconsistent Condom Use	I ↓ II ↓ III
	Parenting Style ↓ Inconsistent Contraceptive Use	I ↓ II ↓ III
<i>Hypothesis 4:</i> Mother child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of sexual risk-taking behaviors.	Communication about Sex ↓ Multiple Lifetime Partnerships	I ↓ III
	Parenting Style ↓ Multiple Past Year Partnerships	I ↓ III
	Communication about Sex ↓ Inconsistent Condom Use	I ↓ II ↓ III
	Communication about Sex ↓ Inconsistent Contraceptive Use	I ↓ II ↓ III
<i>Hypothesis 5:</i> Socioemotional mediators will be associated with a greater likelihood of sexual risk taking behaviors.	Socioemotional Mediators ↓ Multiple Lifetime Partnerships	II ↓ III
	Socioemotional Mediators ↓ Multiple Past Year Partnerships	II ↓ III
	Socioemotional Mediators ↓ Inconsistent Condom Use	II ↓ II ↓ III
	Socioemotional Mediators ↓ Inconsistent Contraceptive Use	II ↓ II ↓ III
	Socioemotional Mediators ↓ Inconsistent Contraceptive Use	II ↓ II ↓ III

Table 3. Continued

<i>Hypothesis 6:</i> Sexual knowledge mediators will be associated with a greater likelihood of sexual risk taking behaviors.	Sexual Knowledge Mediators ↓ Multiple Lifetime Partnerships	II ↓ III
	Sexual Knowledge Mediators ↓ Multiple Past Year Partnerships	II ↓ III
	Sexual Knowledge Mediators ↓ Inconsistent Condom Use	II    II ↓    ↓ II    III
	Sexual Knowledge Mediators ↓ Inconsistent Contraceptive Use	II    II ↓    ↓ II    III
<i>Hypothesis 7:</i> The addition of the socioemotional mediators will attenuate the association between maternal parenting style and sexual risk-taking behaviors implying mediation.	Parenting Style ↓ Multiple Lifetime Partnerships [Through Socioemotional Mediators]	I ↓ II ↓ III
	Parenting Style ↓ Multiple Past Year Partnerships [Through Socioemotional Mediators]	I ↓ II ↓ III
	Parenting Style ↓ Inconsistent Condom Use [Through Socioemotional Mediators]	I    I ↓    ↓ II    II ↓    ↓ III
	Parenting Style ↓ Inconsistent Contraceptive Use [Through Socioemotional Mediators]	I    I ↓    ↓ II    II ↓    ↓ III
<i>Hypothesis 8:</i> The addition of the sexual knowledge mediators will attenuate the association between mother-daughter communication about sex and sexual risk-taking behaviors implying mediation.	Communication about Sex ↓ Multiple Lifetime Partnerships [Through Sexual Knowledge Mediators]	I ↓ II ↓ III
	Parenting Style ↓ Multiple Past Year Partnerships [Through Sexual Knowledge Mediators]	I ↓ II ↓ III
	Communication about Sex ↓ Inconsistent Condom Use [Through Sexual Knowledge Mediators]	I    I ↓    ↓ II    II ↓    ↓ III
	Communication about Sex ↓ Inconsistent Contraceptive Use [Through Sexual Knowledge Mediators]	I    I ↓    ↓ II    II ↓    ↓ III
<i>Hypothesis 9:</i> Maternal effect will remain in adulthood, though lose strength.	-----	-----

## **CHAPTER 4: RESULTS – DESCRIPTIVES**

This chapter begins by providing an overview of the sociodemographic characteristics of the study population: girls, aged 15 or older at Wave I, whose mothers provided survey data. This chapter then provides an overview of the sociodemographic characteristics of the analytic sample (non-virgins at Wave II) and a subset of that analytic sample (those with at least one past year sex partner at Wave III) that were used in these analyses. This chapter compares these samples to those who were excluded from the sample (e.g. virgins at Wave II or those with no past year sex partner at Wave III).

The first sample comprised non-virgins at Wave II; this sample was used to assess sexual risk-taking behaviors (inconsistent condom and contraceptive use) at Wave II and past year and lifetime partnerships at Wave III. Sample sociodemographic characteristics are presented and compared to characteristics of those who were virgins at Wave II. The second sample comprised those who had at least one sex partner in the previous year at Wave III; this sample was needed to assess young adulthood condom and contraceptive use and was compared to those who had no sex partners in the previous year.

This chapter also provides information regarding the mother-daughter relationship characteristics (at Wave I) among the analytic sample and the socioemotional and sexual knowledge characteristics (at Wave I and II) among the analytic sample. This chapter then examines the statistical significance of associations between mother-daughter relationship characteristics (the independent variables) and the socioemotional and sexual knowledge characteristics (the hypothesized mediators), a necessary step according to Baron and Kenny's (1986) model of mediation. Finally, this chapter concludes with a description of the sexual risk-taking behaviors among the young women in this sample.

#### **4.1. Population Sociodemographic Characteristics (Wave I)**

Among all girls aged 15 or older at Wave I with a mother who provided survey data and who were not missing values on weight, strata, cluster, or independent variables (N = 2758), approximately a third (35%) of the population was aged 15 at Wave I, a third (34%) was aged 16, and a quarter (24%) was aged 17; only 8% were aged 18 or older (Table 4a., column 1). Most of the girls were White (70%), followed by Black (16%) and Hispanic (11%); 2% and 1% were Asian/Pacific Islander or were of another race/ethnicity, respectively.

The majority had a mother who attained more than a high school education (51%); 32% had a mother with only a high school education and 17% had a mother with less than a high school education. Most were living in a household with two biological or adoptive parents (59%); 10% were living with a step-parent household, 27% were living with a single parent, and 4% were not living with any parents. More than one-fifth (22%) were living in poverty at Wave I.

The majority of these girls were somewhat religious (51%); 12% reported not being religious at all and 37% reported being very religious. Nearly three-quarters (73%) reported having at least one best friend who used illicit substances at Wave I, and less than a third (30%) reported that their friends would respect them more if they had sex.

Table 4a. Sociodemographic Characteristics (Wave I) of Virgin and Non-Virgin (Wave II) Adolescents

	All Girls <sup>a</sup> Weighted % (N = 2,758)	Virgins Weighted % (n = 1,182)	Non-Virgins (Analytic Sample) Weighted % <sup>b</sup> (n = 1,564)
<b>Sociodemographics (Wave I)</b>			
<i>Age</i>			
Age 15 (Reference)	34.7	45.8	26.3
Age 16	33.5	31.2	35.4
Age 17	23.8	17.5	28.7
Age 18+	8.0	5.7	9.7
<i>Race/Ethnicity</i>			
White (Reference)	70.0	71.2	69.2
Black	15.6	9.6	20.2
Hispanic	10.9	14.8	8.0
Asian/Pacific Islander	2.4	4.5	1.6
Other	1.0	1.0	1.0
<i>Maternal Education</i>			
Less than High School (Reference)	17.2	15.9	18.2
High School	31.8	28.2	34.6
More than High School	51.0	55.9	47.3
<i>Poverty</i>			
No (Reference)	77.6	81.8	74.5
Yes	22.4	18.2	25.5
<i>Religiosity</i>			
Not Religious	12.2	6.6	16.4
Somewhat Religious	50.5	44.4	55.1
Very Religious	37.3	48.9	28.5
<i>Household Structure</i>			
Biological/Adopted Parents (Reference)	59.0	70.9	50.0
Stepparents	9.9	7.5	11.7
Single Parent	27.3	19.2	33.3
No Parents	3.7	2.4	4.7
<b>Risky Peers</b>			
<i>Peer Substance Use</i>			
No Peer Substance Use (Reference)	27.1	42.4	15.4
Peer Substance Use	72.9	57.6	84.6
<i>Peer Approval of Sex</i>			
Peer Disapproval of Sex (Reference)	71.1	80.0	64.3
Peer Acceptance of Sex	28.9	20.0	35.7

<sup>a</sup> All girls aged 15 or older at Wave I, with a mother who provided survey data and who were not missing data on weight, cluster, strata or independent variables

<sup>b</sup> All differences between virgins vs. non-virgins are statistically significant at the  $p < 0.05$  level

Note: Percentages may not add up to 100 due to rounding error; sample n's may not add up to 2,758 due to missing values

## 4.2. Analytic Sample Sociodemographic Characteristics (Wave I)

### 4.2.1. Non-Virgins at Wave II

Among those who reported having had sex by Wave II ( $n = 1,546$ ), a quarter (26%) of the population was aged 15 at Wave I, a third (35%) was aged 16, less than a third (29%) was aged 17, and a tenth (10%) was aged 18 or older (Table 4a., column 3). T-tests revealed that, compared to the virgins at Wave II ( $n = 1,182$ ), the analytic sample (the non-virgins) were significantly older ( $p < 0.01$ ). Again, most of the girls in this sample were White (69%), followed by Black (20%) and Hispanic (8%); 2% and 1% were Asian/Pacific Islander or were of another race/ethnicity, respectively. Compared to the virgins, the analytic sample had significantly fewer Whites, Hispanics, and Asian/Pacific Islanders ( $p < 0.01$ ) and more Blacks ( $p < 0.01$ ).

Nearly half of this sample had a mother who attained more than a high school education (47%); 35% had a mother with only a high school education and 18% had a mother with less than a high school education. Compared to the virgins, this sample had significantly fewer mothers with more than a high school education ( $p < 0.01$ ) and more mothers with a high school education or less ( $p < 0.01$ ). Half of the girls in this sample were living in a household with two biological or adoptive parents (50%); 12% were living with a step-parent, a third (33%) were living with a single parent, and 5% were not living with any parent. Compared to the virgins, fewer were living with biological or adoptive parents ( $p < 0.01$ ), and more were living with stepparents, a single parent, or no parent ( $p < 0.01$ ). More than a quarter of this sample (26%) was living in poverty at Wave I. Compared to the virgins, this percentage was significantly higher ( $p < 0.01$ ).

The majority of this sample was somewhat religious (55%), whereas 16% reported not being religious at all and 29% reported being very religious. Compared to

the virgins, this sample had more girls with no or moderate levels of religiosity ( $p < 0.01$ ) and fewer girls with high levels of religiosity ( $p < 0.01$ ). Most of this sample (85%) reported having at least one best friend who used illicit substances at Wave I, and more than a third (36%) reported that their friends would respect them more if they had sex. Compared to the virgins, more of these girls had friends who used substances ( $p < 0.01$ ) and more reported that their friends approved of sex ( $p < 0.01$ ).

#### **4.2.2. Past Year Partnerships at Wave III**

Among those who reported having at least one sex partners in the previous year in young adulthood (at Wave III) ( $n = 1,429$ ), about a quarter (27%) were aged 15 at Wave I, more than a third (36%) were aged 16, about a quarter (28%) were aged 17, and less than 10% were aged 18 or older (Table 4b., column 3). T-tests revealed that there were no significant age differences between those who reported having at least one sex partner in the previous year, compared to those who reported having no sex partner in the past year ( $n = 114$ ). Again, the majority of the girls in this sample (those who had at least one sex partner in the past year) were White (69%), followed by Black (21%) and Hispanic (8%); Asian/Pacific Islander and those of another race/ethnicities accounted for 2% and 1% of the sample, respectively. Compared to those without a past year partnership, this sample had significantly fewer Hispanics ( $p < 0.05$ ) and more Blacks ( $p < 0.05$ ) and individuals of an “other” race ( $p < 0.01$ ).

Nearly half of this sample had a mother who attained more than a high school education (48%); more than a third (35%) had a mother with only a high school education and 17% had a mother with less than a high school education. Compared to those without a past year partnership, this sample had more mothers with more than a high school education ( $p < 0.05$ ) and fewer mothers with a high school education or less

( $p < 0.01$ ). Half of the girls in this sample were living in a household with two biological or adoptive parents at Wave I (50%), 11% were living with a stepparent, a third (34%) were living with a single parent, and 5% were not living with any parent. Compared to those without a past year partnership, more of these girls were living with a single parent in adolescence ( $p < 0.05$ ). A quarter of this sample (25%) was living in poverty at Wave I. Compared to those without a past year partnership, this percentage was significantly lower ( $p < 0.05$ ).

The majority of this sample was somewhat religious (55%), 17% reported not being religious at all and 29% reported being very religious. There were no significant differences in religiosity between those who did and did not report a past year partnership. Most of this sample (85%) reported having at least one best friend who used illicit substances at Wave I, and more than a third (36%) reported at Wave I that their friends would respect them more if they had sex. Compared to those without multiple past year partnerships, more of these girls had friends who used substances in adolescence ( $p < 0.05$ ).

Table 4b. Sociodemographic Characteristics (Wave I) of Respondents with Past Year Multiple Partnerships (Wave III)<sup>a</sup>

	All Girls <sup>a</sup> Weighted % (N = 1,564)	0 Past Year Partnerships Weighted % (n = 114)	1+ Past Year Partnerships (Analytic Sample) Weighted % (n = 1,429)	
<b>Sociodemographics (Wave I)</b>				
<i>Age</i>				
Age 15 (Reference)	26.3	21.6	26.7	
Age 16	35.4	32.2	35.9	
Age 17	28.7	35.6	27.8	
Age 18+	9.7	10.5	9.6	
<i>Race/Ethnicity</i>				
White (Reference)	69.2	69.0	69.2	
Black	20.2	13.2	20.7	*
Hispanic	8.0	14.8	7.5	*
Asian/Pacific Islander	1.6	2.8	1.5	
Other	1.0	0.0	1.1	**
<i>Maternal Education</i>				
Less than High School (Reference)	18.2	33.9	17.2	**
High School	34.6	29.2	34.7	
More than High School	47.3	36.9	48.1	*
<i>Poverty</i>				
No (Reference)	74.5	63.8	75.2	
Yes	25.5	36.2	24.8	*
<i>Religiosity</i>				
Not Religious (Reference)	16.4	13.9	16.5	
Somewhat Religious	55.1	54.8	54.9	
Very Religious	28.5	31.7	28.6	
<i>Household Structure</i>				
Biological/Adopted Parents (Reference)	50.0	52.5	50.2	
Stepparents	11.7	16.3	11.1	
Single Parent	33.3	24.9	33.8	*
No Parents	4.7	6.2	4.7	
<b>Risky Peers</b>				
<i>Peer Substance Use</i>				
No Peer Substance Use (Reference)	15.4	23.6	15.0	
Peer Substance Use	84.6	76.4	85.0	*
<i>Peer Approval of Sex</i>				
Peer Disapproval of Sex (Reference)	64.3	69.6	63.6	
Peer Acceptance of Sex	35.7	30.4	36.4	

<sup>a</sup> All girls aged 15 or older at Wave I, with a mother who provided survey data, who were non-virgins by Wave II, and who were not missing data on weight, cluster, strata or independent variables

Note: Percentages may not add up to 100 due to rounding error; sample n's may not add up to 1,564 due to missing values

\*\*  $p < 0.01$ , \* $p < 0.05$  difference between those with 0 versus 1+ past year partnerships

### **4.3. Mother-Daughter Relationship Characteristics**

#### **4.3.1. Maternal Parenting Style**

Within the analytic sample, daughters' responses indicated that 45% had mothers who could be classified as authoritative (high warmth and high control) (Table 4c.), 30% had mothers who could be classified as authoritarian (low warmth and high control), 14% had mothers who could be classified as permissive (high warmth and low control), and 10% had mothers who could be classified as neglectful (low warmth and low control).

#### **4.3.2. Mother-Daughter Communication about Sex**

Within the analytic sample, 41% of mothers reported that their communication with their daughters regarding sex and sex-related topics was frequent and comfortable (Table 4c.), 15% reported frequent, uncomfortable communication, 22% reported infrequent, comfortable communication, and 23% reported infrequent, uncomfortable communication.

*Table 4c. Mother-Daughter Relationship Characteristics*

	Weighted %
<b>Maternal Parenting Style (Adolescents Reports)</b>	
Authoritative	45.3
Authoritarian	30.4
Permissive	14.3
Neglectful	9.9
<b>Mother-Daughter Communication about Sex (Mothers' Reports)</b>	
Frequent and Comfortable (Reference)	40.7
Frequent and Uncomfortable	14.8
Infrequent and Comfortable	22.0
Infrequent and Uncomfortable	22.5

<sup>a</sup> n = 1,564 Females aged 15 - 20 (Wave I) in the United States  
 Note: Percentages may not add up to 100 due to rounding error

#### **4.4. Socioemotional and Sexual Knowledge Risk Characteristics**

##### **4.4.1. Analytic Sample Socioemotional Risk Characteristics**

**4.4.1.1. Low sexual self-efficacy.** On average, most of the girls in the analytic sample did not exhibit low sexual self-efficacy at Wave I (mean: 1.62, range: 0 – 5 [lowest sexual self-efficacy], standard deviation (SD): 0.81) (Table 4d.). Even fewer had low sexual self-efficacy at Wave II (mean: 1.51, range: 0 - 5, SD: 0.74).

**4.4.1.2. High risk-taking behavior.** Most of the girls did not report high risk-taking behavior at Wave I (mean: 0.62, range: 0 – 1 [highest risk-taking behavior], SD: 0.20) (Table 4d.). Even fewer reported high risk-taking behavior at Wave II (mean: 0.29, range: 0 - 1, SD: 0.19).

##### **4.4.2. Analytic Sample Sexual Knowledge Risk Characteristics**

**4.4.2.1. Low sexual health knowledge.** On average, most of the girls did not have low sexual health knowledge at Wave I (mean: 0.33, range: 0 – 1 [lowest sexual health knowledge], SD: 0.17) (Table 4d.). Even fewer had low sexual health knowledge at Wave II (mean: 0.31, range: 0 - 1, SD: 0.16).

**4.4.2.2. High perceived barriers to contraception.** On average, most of the girls did not report high perceived barriers to contraception at Wave I (mean: 1.18, range: 0 – 4 [highest perceived barriers to contraception], SD: 0.61) (Table 4d.). Slightly fewer reported high perceived barriers to contraception at Wave II (mean: 1.13, range: 0 - 4, SD: 0.66).

*Table 4d. Socioemotional and Sexual Knowledge Risk at Waves I and II<sup>a</sup>*

	Weighted Mean	Standard Deviation
<b>Covariates (Wave I)</b>		
<i>Socioemotional Risk</i>		
Low Sexual Self-Efficacy (continuous scale from 0 - 5)	1.62	0.81
High Risk-Taking Behavior (continuous scale from 0 - 1)	0.26	0.20
<i>Sexual Knowledge Risk</i>		
Low Sexual Health Knowledge (continuous scale from 0 - 1)	0.33	0.17
High Perceived Barriers to Contraception (continuous scale from 0 - 4)	1.18	0.61
<b>Mediators (Wave II)</b>		
<i>Socioemotional Risk</i>		
Low Sexual Self-Efficacy (continuous scale from 0 - 5)	1.51	0.74
High Risk-Taking Behavior (continuous scale from 0 - 1)	0.19	0.19
<i>Sexual Knowledge Risk</i>		
Low Sexual Health Knowledge (continuous scale from 0 - 1)	0.31	0.16
High Perceived Barriers to Contraception (continuous scale from 0 - 4)	1.13	0.66

<sup>a</sup> n = 1,564 Females aged 15 - 20 (Wave I) in the United States

## **4.5. Associations between Mother-Daughter Relationship Characteristics and Socioemotional Characteristics**

In order to assess whether parenting style and/or mother-daughter communication about sex had both direct and indirect effects on adolescent and young adult sexual risk-taking, it was necessary to test the statistical significance of associations between mother-daughter relationship characteristics (the independent variables) and the socioemotional and sexual knowledge characteristics (the mediators). This represented a necessary first step according to Baron and Kenny's (1986) model of mediation. Shown in Table 4e. are the associations between these two sets of independent variables, both included in analyses at the same time.

**4.5.1. Parenting style and low sexual self-efficacy.** Controlling for covariates, authoritarian parenting style at Wave I was significantly associated with low sexual self-efficacy, compared to authoritative parenting (the reference group) (adjusted odds ratio (AOR): 0.67) (Table 4e., column 1). Permissive and neglectful parenting also seemed to be associated with a lower likelihood of exhibiting low sexual self-efficacy, though these associations were not significant (neglectful parenting had a borderline significant association with decreased likelihood of having low sexual self-efficacy at the  $p < 0.10$  level).

**4.5.2. Mother-daughter communication about sex and low sexual self-efficacy.** Adjusted analyses indicated that no form of mother-daughter communication about sex at Wave I was significantly associated with low sexual self-efficacy at Wave II (Table 4e., column 1).

**4.5.3. Parenting style and high risk-taking behavior.** Adjusted analyses

revealed that, compared to authoritative parenting, authoritarian parenting at Wave I was associated with a significantly decreased likelihood of exhibiting high risk-taking behaviors at Wave II (AOR: 0.69) (Table 4e., column 2). Permissive and neglectful parenting styles did not seem to be significantly associated with high risk-taking behaviors.

#### **4.5.4. Mother-daughter communication about sex and high risk-taking**

**behavior.** Adjusted analyses indicated that no form of mother-daughter communication about sex at Wave I was significantly associated with high risk-taking behavior at Wave II (Table 4e., column 2).

### **4.6. Associations between Mother-Daughter Relationship Characteristics and Sexual Knowledge Characteristics**

#### **4.6.1. Parenting style and low sexual health knowledge.**

Adjusted analyses indicated that maternal parenting style at Wave I was not significantly associated with low sexual health knowledge at Wave II (Table 4e., column 3).

#### **4.6.2. Mother-daughter communication about sex and low sexual health**

**knowledge.** Adjusted analyses indicated that mother-daughter communication about sex at Wave I was not significantly associated with low sexual health knowledge at Wave II (Table 4e., column 3).

#### **4.6.3. Parenting style and high perceived barriers to contraception.**

Controlling for covariates, authoritarian parenting style at Wave I was associated with a marginally lower likelihood of reporting high perceived barriers to contraception at Wave II, compared to authoritative parenting (AOR: 0.69) (Table 4e., column 4). Additionally, neglectful parenting was associated with a significantly lower likelihood of reporting

high perceived barriers to contraception (AOR: 0.57). Permissive parenting did not seem to be significantly associated with high perceived barriers to contraception.

**4.6.4. Mother-daughter communication about sex and high perceived barriers to contraception.** Adjusted analyses indicated that mother-daughter communication about sex at Wave I was not significantly associated with high perceived barriers to contraception at Wave II (Table 4e., column 4).

Table 4e. Associations<sup>a</sup> between Mother-Daughter Relationship Characteristics (Wave I) and Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II)<sup>b</sup>

	Socioemotional Risk		Sexual Knowledge Risk	
	Low Sexual Self-Efficacy	High Risk-Taking Behaviors	Low Sexual Health Knowledge	High Perceived Barriers to Contraception
<b>Maternal Parenting Style (Adolescents Reports)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	0.67 (0.49, 0.90) **	0.69 (0.51, 0.93) *	1.20 (0.97, 1.48)	0.69 (0.54, 0.88) **
Permissive	0.70 (0.44, 1.11)	1.35 (0.90, 2.03)	1.30 (0.95, 1.78)	1.01 (0.70, 1.45)
Neglectful	0.66 (0.43, 1.01)	0.82 (0.50, 1.36)	1.56 (0.98, 2.48)	0.57 (0.40, 0.82) **
<b>Mother-Daughter Communication about Sex (Mothers' Reports)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	1.08 (0.69, 1.69)	1.22 (0.80, 1.86)	0.82 (0.56, 1.21)	0.98 (0.67, 1.42)
Infrequent and Comfortable	0.80 (0.59, 1.07)	0.80 (0.59, 1.09)	1.06 (0.81, 1.38)	1.25 (0.91, 1.74)
Infrequent and Uncomfortable	0.81 (0.57, 1.13)	1.02 (0.71, 1.45)	1.05 (0.79, 1.41)	1.07 (0.79, 1.45)

<sup>a</sup> Adjusted Odds Ratios (ORs) and 95% Confidence Intervals (CIs), controlling for Wave I age, race/ethnicity, maternal education, poverty, religiosity, household structure, peer substance use, and peer acceptance of sex

<sup>b</sup>  $n = 1,564$  females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

#### **4.7. Sexual Risk-Taking Behaviors**

In adolescence (Wave II), slightly less than half (43%) reported inconsistent condom use, and slightly less than a third (30%) reported inconsistent contraceptive use (Table 4f.).

In young adulthood (Wave III), the weighted mean number of lifetime partnerships was 7.6 (range: 0 - 50, SD: 7.7). The weighted mean number of past year partnerships was 1.6 (range: 0 - 22, SD: 1.7).

Among those who reported at least one sex partner in the past year in young adulthood (at Wave III), the majority (84%) reported being inconsistent in their use of condoms; only 13% reported being inconsistent in their use of contraceptives. This sample (those who reported at least one sex partner in the past year) was used, as opposed to the full analytic sample (all those who had initiated sex in adolescence), since Wave III measures of inconsistent condom and contraceptive use were based on past year use, and those without a partner in the past year clearly would not report use of condoms or contraceptives, yet would remain at low risk for STIs or unintended pregnancies.

*Table 4f. Sexual Risk-Taking in Adolescence (Wave II) and Young Adulthood (Wave III)<sup>a</sup>*

	Weighted %	Weighted Mean	Standard Deviation	Range
<b>Adolescent Sexual Risk-Taking (Wave II, Most Recent Sex)</b>				
Inconsistent Condom Use	43.4	—	—	—
Inconsistent Contraceptive Use	29.8	—	—	—
<b>Young Adult Sexual Risk-Taking (Wave III, Past Year)</b>				
Lifetime Partnerships	—	7.55	7.66	0 - 50
Past Year Partnerships	—	1.60	1.74	0 - 22
Inconsistent Condom Use <sup>b</sup>	84.4	—	—	—
Inconsistent Contraceptive Use <sup>b</sup>	12.7	—	—	—

<sup>a</sup> N = 1,564 females aged 15 - 20 (Wave I) in the United States

<sup>b</sup> n = 1,429 Females aged 15 - 20 aged 15 - 20 (Wave I) in the United States that reported 1+ sexual partners in the past year in young adulthood (Wave III)

Note: Percentages may not add up to 100 due to rounding error

## CHAPTER 5: RESULTS – ADOLESCENCE

This chapter will provide a detailed description of the associations between adolescent (Wave I) mother-daughter relationship characteristics (independent variables) and adolescent (Wave II) sexual risk-taking behaviors related to STI risk (Part 1: condom use inconsistency) and pregnancy risk (Part 2: inconsistent contraceptive use). Specifically, each part of this chapter will begin by describing unadjusted and adjusted associations between maternal parenting style and the specific sexual risk-taking behavior (Models I and II, respectively), followed by unadjusted and adjusted associations between mother-daughter communication about sex and the sexual risk-taking behavior (Models III and IV, respectively). This chapter will then examine adjusted associations between both maternal parenting style and mother-daughter communication about sex and the sexual risk-taking behavior (Model V).

Next, this chapter will examine the associations between Wave II socioemotional and sexual knowledge indicators (hypothesized mediators) and each sexual risk-taking behavior (Models VI and VII, respectively). Finally, this chapter will describe associations between both parenting style and mother-daughter communication about sex and the sexual risk-taking behavior, with the addition of only the socioemotional mediators (Model VIII), only the sexual knowledge mediators (Model IX), then both the socioemotional and sexual knowledge mediators (Model X: full model).

The associations between the independent and dependent variables will be assessed both with and without mediators in order to determine if mediation is present. Additionally, after the addition of new variables to each nested model, the -2 log likelihood will be presented, in order to assess the goodness of fit of each model.

## 5.1. Inconsistent Condom Use

### 5.1.1. Maternal Parenting Style (Wave I) and Inconsistent Condom Use (Wave II)

**Model I.** Unadjusted analyses revealed that both authoritarian and permissive parenting styles at Wave I were associated with an increased risk of adolescent inconsistent condom use a year later at Wave II, compared to the authoritative parenting style (authoritarian odds ratio (OR): 1.63; permissive OR: 1.70) (Table 5a., Model I).

**Model II.** Adjusted analyses (controlling for age, race/ethnicity, poverty, religiosity, household structure, peer substance use, peer acceptance of sex, low sexual self-efficacy, high risk-taking behavior, low sexual health knowledge, and high perceived barriers to contraception at Wave I) revealed that only authoritarian parenting remained significantly associated with an increased risk of inconsistent condom use, compared to authoritative parenting (authoritarian AOR: 1.56) (Table 5a., Model II).

*Covariates.* In this model, living in a single parent household, having best friends who used illicit substances, having low sexual self-efficacy, and having high perceived barriers to contraception at Wave I were all associated with an increased likelihood of exhibiting inconsistent condom use at Wave II (Table 5a., Model II).

*Goodness of fit.* Having added 21 degrees of freedom between Models I and II, the chi-square value of the change in -2 log likelihood ratio (a change of 99.59) indicated that Model II (with covariates) was a significantly better fit at the  $p < 0.001$  level than Model I (without covariates).

Table 5a. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Condom Use<sup>b</sup> (Wave II)<sup>c</sup>  
 [Independent Variables and Dependent Variables, Reduced Form]

	Model I Parenting Style	Model II Parenting Style	Model III Communication	Model IV Communication	Model V Parenting Style and Communication
-2 Log Likelihood	1754.37	1654.78	1767.68	1659.42	1643.42
<b>Maternal Parenting Style (Wave I)</b>					
Authoritative	Reference	Reference			Reference
Authoritarian	1.63 (1.13, 2.36) **	1.56 (1.08, 2.25) *			1.65 (1.14, 2.39) **
Permissive	1.70 (1.08, 2.69) *	1.63 (0.97, 2.76)			1.29 (1.00, 2.85) *
Neglectful	1.59 (0.97, 2.62)	1.14 (0.67, 1.93)			1.24 (0.70, 2.20)
<b>Mother-Daughter Communication about Sex (Wave I)</b>					
Frequent and Comfortable			Reference	Reference	Reference
Frequent and Uncomfortable			0.85 (0.53, 1.36)	0.77 (0.48, 1.26)	0.72 (0.43, 1.19)
Infrequent and Comfortable			0.75 (0.51, 1.10)	0.68 (0.45, 1.04)	0.66 (0.43, 1.02)
Infrequent and Uncomfortable			0.73 (0.49, 1.08)	0.67 (0.45, 0.99) *	0.62 (0.42, 0.93) *
<b>Covariates (Wave I)</b>					
<i>Age</i>					
Age 16		1.01 (0.71, 1.45)		1.02 (0.72, 1.45)	1.02 (0.71, 1.46)
Age 17		1.25 (0.87, 1.81)		1.34 (0.96, 1.86)	1.30 (0.91, 1.85)
Age 18+		1.34 (0.70, 2.57)		1.45 (0.81, 2.60)	1.41 (0.74, 2.68)
<i>Race/Ethnicity</i>					
Black		0.75 (0.43, 1.30)		0.74 (0.42, 1.32)	0.75 (0.43, 1.32)
Hispanic		1.71 (1.00, 2.94)		1.78 (1.03, 3.07) *	1.87 (1.09, 3.21) *
Asian/Pacific Islander		1.16 (0.39, 3.51)		1.18 (0.36, 3.86)	1.27 (0.41, 3.90)
Other		2.00 (0.41, 9.69)		1.80 (0.31, 10.27)	1.80 (0.38, 8.46)
<i>Maternal Education</i>					
High School		1.06 (0.64, 1.77)		1.01 (0.60, 1.69)	1.01 (0.61, 1.67)

Table 5a. Continued

<i>Poverty</i>					
Yes	1.34 (0.95, 1.91)		1.36 (0.94, 1.96)	1.33 (0.93, 1.91)	
More than High School	1.14 (0.72, 1.79)		1.09 (0.69, 1.72)	1.07 (0.68, 1.68)	
<i>Religiosity</i>					
Somewhat Religious	0.91 (0.54, 1.54)		0.90 (0.54, 1.51)	0.91 (0.54, 1.52)	
Very Religious	0.75 (0.45, 1.26)		0.74 (0.44, 1.27)	0.77 (0.46, 1.28)	
<i>Household Structure</i>					
Stepparents	0.95 (0.54, 1.69)		0.91 (0.52, 1.59)	0.91 (0.54, 1.52)	
Single Parent	1.60 (1.15, 2.23)	**	1.55 (1.14, 2.11)	1.54 (1.13, 2.10)	**
No Parents	1.41 (0.53, 3.73)		1.28 (0.51, 3.23)	1.41 (0.54, 3.67)	
<i>Risky Peers</i>					
Peer Substance Use	1.76 (1.06, 2.92)	*	1.68 (1.02, 2.79)	1.73 (1.04, 2.86)	*
Peer Acceptance of Sex	1.26 (0.92, 1.71)		1.26 (0.92, 1.73)	1.27 (0.93, 1.75)	
<i>Socioemotional Risk (Wave I)</i>					
Low Sexual Self-Efficacy	1.40 (1.17, 1.67)	**	1.40 (1.17, 1.66)	1.41 (1.18, 1.68)	**
High Risk-Taking Behavior	1.84 (0.87, 3.90)		2.21 (1.01, 4.83)	1.81 (0.85, 3.86)	*
<i>Knowledge Risk (Wave I)</i>					
Low Sexual Health Knowledge	0.49 (0.17, 1.38)		0.47 (0.17, 1.33)	0.44 (0.16, 1.27)	
High Perceived Barriers to Contraception	1.30 (1.03, 1.63)	*	1.29 (1.03, 1.61)	1.31 (1.05, 1.63)	*

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent condom use was defined as the non-use of a condom at most recent intercourse

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **5.1.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave II)**

**Model III.** Unadjusted analyses revealed that mother-daughter communication about sex at Wave I was not significantly associated with an increased risk of inconsistent condom use a year later at Wave II (Table 5a., Model III).

**Model IV.** Adjusted analyses strengthened the associations between the infrequent communication styles and inconsistent condom use; infrequent, uncomfortable communication about sex at Wave I was associated with a decreased likelihood of inconsistent condom use at Wave II, compared to frequent, comfortable communication about sex (AOR: 0.67) (Table 5a., Model IV).

*Covariates.* In this model, being Hispanic, living in a single parent household, having best friends who use illicit substances, having low sexual self-efficacy, exhibiting high risk-taking behaviors, and high perceived barriers to contraception at Wave I were associated with an increased risk of inconsistent condom use at Wave II (Table 5a., Model IV).

*Goodness of fit.* Having added 21 degrees of freedom between Models III and IV, the chi-square value of the change in -2 log likelihood ratio (a change of 108.26) indicated that Model IV (with covariates) was a better fit at the  $p < 0.001$  level than Model III (without covariates).

### **5.1.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave II)**

**Model V.** Adjusted analyses examining the effects of both maternal parenting style and mother-daughter communication about sex revealed that the associations

between authoritarian and permissive parenting styles strengthened and were significantly associated with an increased risk of inconsistent condom use at Wave II, compared to authoritative parenting (authoritarian AOR: 1.65; permissive AOR: 1.29). Analyses also revealed that the associations between mother-daughter communication about sex and inconsistent condom use strengthened; though, again, only infrequent, uncomfortable communication about sex was significantly associated with a decreased likelihood of inconsistent condom use (AOR: 0.62) (Table 5a., Model V).

*Covariates.* In this model, being Hispanic, living in a single parent household, having best friends who used illicit substances, exhibiting low sexual self-efficacy, and having high perceived barriers to contraception at Wave I were all associated with an increased risk of inconsistent condom use at Wave II (Table 5a., Model V).

*Goodness of fit.* Having added three degrees of freedom between Model II (parenting style only) and Model V (parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (a change of 11.36) indicated that Model V was a better fit than Model II (parenting style) at the  $p < 0.01$  level. Additionally, having added three degrees of freedom between Model IV (mother-daughter communication about sex only) and Model V (parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (a change of 16.00) indicated that Model V was also a better fit than Model IV (communication about sex) at the  $p < 0.0025$  level.

#### **5.1.4. Socioemotional Risk (Wave II) and Inconsistent Condom Use (Wave II)**

**Model VI.** Controlling for covariates, low sexual self-efficacy at Wave II was significantly associated with an increased risk of inconsistent condom use at Wave II

(AOR: 1.61) (Table 5b., Model VI). High risk taking behavior at Wave II was not significantly associated with inconsistent condom use.

*Covariates.* In this model, being aged 17, living in a single parent household, having best friends who use illicit substances, and having low sexual self-efficacy at Wave I were significantly associated with an increased likelihood of inconsistent condom use (Table 5b., Model VI).

#### **5.1.5. Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave II)**

**Model VII.** Controlling for covariates, having high perceived barriers to contraception at Wave II was significantly associated with an increased risk of inconsistent condom use at Wave II (AOR: 1.92) (Table 5b., Model VII). Low sexual health knowledge at Wave II was not significantly associated with inconsistent condom use.

*Covariates.* In this model, living in a single parent household, having best friends who use illicit substances, and having low sexual self-efficacy at Wave I were significantly associated with an increased likelihood of inconsistent condom use (Table 5b., Model VII).

Table 5b. Associations<sup>a</sup> between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Adolescent Inconsistent Condom Use<sup>b</sup> (Wave II)<sup>c</sup> [Mediators and Dependent Variables]

	Model VI Socioemotional Risk		Model VII Sexual Knowledge Risk	
-2 Log Likelihood	1639.12		1616.28	
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy	1.61 (1.28, 2.03)	**		
High Risk-Taking Behavior	1.21 (0.45, 3.29)			
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			0.51 (0.17, 1.54)	
High Perceived Barriers to Contraception			1.92 (1.44, 2.55)	**
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	1.08 (0.77, 1.53)		1.05 (0.73, 1.49)	
Age 17	1.40 (1.00, 1.96)	*	1.27 (0.91, 1.78)	
Age 18+	1.48 (0.82, 2.66)		1.50 (0.83, 2.74)	
<i>Race/Ethnicity</i>				
Black	0.75 (0.43, 1.33)		0.73 (0.40, 1.32)	
Hispanic	1.52 (0.89, 2.61)		1.51 (0.89, 2.57)	
Asian/Pacific Islander	0.93 (0.30, 2.90)		1.01 (0.32, 3.21)	
Other	1.93 (0.34, 11.05)		1.57 (0.28, 8.73)	
<i>Maternal Education</i>				
High School	1.09 (0.63, 1.86)		1.08 (0.63, 1.87)	
More than High School	1.13 (0.69, 1.85)		1.17 (0.72, 1.90)	
<i>Poverty</i>				
Yes	1.29 (0.90, 1.86)		1.33 (0.93, 1.91)	
<i>Religiosity</i>				
Somewhat Religious	0.91 (0.52, 1.57)		0.90 (0.52, 1.55)	
Very Religious	0.71 (0.40, 1.25)		0.69 (0.39, 1.22)	
<i>Household Structure</i>				
Stepparents	0.94 (0.54, 1.63)		0.94 (0.54, 1.64)	
Single Parent	1.70 (1.22, 2.36)	**	1.55 (1.11, 2.15)	**
No Parents	1.31 (0.53, 3.26)		1.28 (0.51, 3.23)	
<i>Risky Peers</i>				
Peer Substance Use	1.76 (1.05, 2.95)	*	1.72 (1.00, 2.93)	*
Peer Acceptance of Sex	1.18 (0.87, 1.60)		1.24 (0.90, 1.71)	
<i>Socioemotional Risk (Wave I)</i>				
Low Sexual Self-Efficacy	1.25 (1.05, 1.48)	*	1.34 (1.12, 1.61)	**
High Risk-Taking Behavior	1.69 (0.64, 4.50)		1.91 (0.89, 4.06)	
<i>Knowledge Risk (Wave I)</i>				
Low Sexual Health Knowledge	0.58 (0.17, 1.35)		0.53 (0.16, 1.79)	
High Perceived Barriers to Contraception	1.23 (0.98, 1.54)		1.02 (0.78, 1.35)	

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent condom use was defined as the non-use of a condom at most recent intercourse

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **5.1.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Condom Use (Wave II)**

**Model VIII.** Adjusted analyses revealed that, examining maternal parenting style and mother-daughter communication about sex with the addition of the socioemotional mediators, associations between authoritarian and permissive parenting and inconsistent condom use weakened, and only authoritarian parenting remained significantly associated with inconsistent condom use (AOR: 1.53) (Table 5c., Model VIII). However, the associations between both low frequency communication styles and inconsistent condom use strengthened (infrequent, comfortable AOR: 0.63; infrequent, uncomfortable AOR: 0.61). Additionally, among the socioemotional mediators, low sexual self-efficacy remained significantly associated with inconsistent condom use (AOR: 1.59).

*Covariates.* In this model, living with a single parent, having friends who used substances, having low sexual self-efficacy, and having high perceived barriers to contraception at Wave I were associated with inconsistent condom use (Table 5c., Model VIII).

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model VIII (parenting style, mother-daughter communication about sex, and the socioemotional mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 45.98) indicated that Model VIII was a significantly better fit than Model V at the  $p < 0.0025$  level.

Table 5c. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Condom Use<sup>b</sup> (Wave II)<sup>c</sup> [Full Model]

	Model V Parenting Style and Communication	Model VIII Parenting Style, Communication, and Socioemotional Risk	Model IX Parenting Style, Communication, and Sexual Knowledge Risk	Model X Full Model
-2 Log Likelihood	1643.42	1630.72	1607.97	1591.6
<b>Maternal Parenting Style (Wave I)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	1.65 (1.14, 2.39) **	1.53 (1.05, 2.23) *	1.59 (1.10, 2.31) *	1.51 (1.03, 2.20) *
Permissive	1.29 (1.00, 2.85) *	1.61 (0.95, 2.73)	1.64 (0.95, 2.82)	1.57 (0.92, 2.70)
Neglectful	1.24 (0.70, 2.20)	1.18 (0.67, 2.10)	1.11 (0.64, 1.94)	1.08 (0.62, 1.88)
<b>Mother-Daughter Communication about Sex (Wave I)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	0.72 (0.43, 1.19)	0.73 (0.44, 1.20)	0.72 (0.43, 1.23)	0.73 (0.43, 1.23)
Infrequent and Comfortable	0.66 (0.43, 1.02)	0.63 (0.40, 0.99) *	0.69 (0.45, 1.07)	0.66 (0.42, 1.04)
Infrequent and Uncomfortable	0.62 (0.42, 0.93) *	0.61 (0.40, 0.94) *	0.61 (0.41, 0.92) *	0.61 (0.39, 0.93) *
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy		1.59 (1.26, 2.01) **		1.46 (1.14, 1.87) **
High Risk-Taking Behavior		1.24 (0.45, 3.40)		1.11 (0.40, 3.08)
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			0.57 (0.18, 1.74)	0.53 (0.17, 1.61)
High Perceived Barriers to Contraception			1.90 (1.44, 2.52) **	1.72 (1.31, 2.27) **
<b>Covariates (Wave I)</b>				
Age				
Age 16	1.02 (0.71, 1.46)	1.08 (0.76, 1.55)	1.06 (0.73, 1.52)	1.10 (0.77, 1.59)
Age 17	1.30 (0.91, 1.85)	1.41 (1.00, 2.01)	1.29 (0.91, 1.83)	1.38 (0.97, 1.96)
Age 18+	1.41 (0.74, 2.68)	1.49 (0.79, 2.83)	1.54 (0.81, 2.93)	1.58 (0.83, 3.00)

Table 5c. Continued

<i>Race/Ethnicity</i>								
Black	0.75 (0.43, 1.32)		0.75 (0.43, 1.33)		0.74 (0.41, 1.35)		0.75 (0.41, 1.35)	
Hispanic	1.87 (1.09, 3.21)	*	1.72 (1.00, 2.97)		1.72 (1.01, 2.95)	*	1.63 (0.94, 2.80)	
Asian/Pacific Islander	1.27 (0.41, 3.90)		1.07 (0.35, 3.33)		1.17 (0.39, 3.55)		1.03 (0.34, 3.14)	
Other	1.80 (0.38, 8.46)		1.75 (0.37, 8.24)		1.46 (0.32, 6.74)		1.46 (0.32, 6.79)	
<i>Maternal Education</i>								
High School	1.01 (0.61, 1.67)		1.04 (0.61, 1.78)		1.05 (0.61, 1.79)		1.06 (0.61, 1.85)	
More than High School	1.07 (0.68, 1.68)		1.07 (0.66, 1.74)		1.10 (0.69, 1.77)		1.10 (0.67, 1.81)	
<i>Poverty</i>								
Yes	1.33 (0.93, 1.91)		1.27(0.88, 1.83)		1.31 (0.91, 1.88)		1.26 (0.87, 1.83)	
<i>Religiosity</i>								
Somewhat Religious	0.91 (0.54, 1.52)		0.91 (0.54, 1.56)		0.90 (0.53, 1.54)		0.91 (0.52, 1.58)	
Very Religious	0.77 (0.46, 1.28)		0.74 (0.43, 1.28)		0.72 (0.42, 1.24)		0.71 (0.40, 1.25)	
<i>Household Structure</i>								
Stepparents	0.91 (0.54, 1.52)		0.91 (0.51, 1.61)		0.91 (0.51, 1.62)		0.90 (0.50, 1.62)	
Single Parent	1.54 (1.13, 2.10)	**	1.63 (1.20, 2.22)	**	1.50 (1.09, 2.05)	*	1.59 (1.16, 2.17)	**
No Parents	1.41 (0.54, 3.67)		1.40 (0.56, 3.52)		1.39 (0.54, 3.58)		1.40 (0.56, 3.48)	
<i>Risky Peers</i>								
Peer Substance Use	1.73 (1.04, 2.86)	*	1.77 (1.06, 2.93)	*	1.72 (1.01, 2.94)	*	1.77 (1.04, 3.01)	**
Peer Acceptance of Sex	1.27 (0.93, 1.75)		1.20 (0.88, 1.64)		1.26 (0.92, 1.74)		1.20 (0.87, 1.66)	
<i>Socioemotional Risk (Wave I)</i>								
Low Sexual Self-Efficacy	1.41 (1.18, 1.68)	**	1.27 (1.07, 1.52)	**	1.37 (1.31, 1.65))	**	1.27 (1.06, 1.53)	*
High Risk-Taking Behavior	1.81 (0.85, 3.86)		1.45 (0.55, 3.81)		1.59 (0.75, 3.36)		1.40 (0.55, 3.58)	
<i>Knowledge Risk (Wave I)</i>								
Low Sexual Health Knowledge	0.44 (0.16, 1.27)		0.41 (0.14, 1.19)		0.43 (0.12, 1.51)		0.43 (0.12, 1.53)	
High Perceived Barriers to Contraception	1.31 (1.05, 1.63)	*	1.25 (1.01, 1.56)	*	1.05 (0.80, 1.38)		1.05, 0.80, 1.38)	

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent condom use was defined as the non-use of a condom at most recent intercourse

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **5.1.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Condom Use (Wave II)**

**Model IX.** Adjusted analyses revealed that, examining maternal parenting style and mother-daughter communication about sex with the addition of the sexual knowledge mediators, associations between authoritarian and permissive parenting styles and inconsistent condom use weakened from Model V, and only authoritarian parenting remained significantly associated with inconsistent condom use (AOR: 1.59) (Table 5c., Model IX). The association between infrequent, comfortable communication about sex and inconsistent condom use weakened and was not significant, whereas the association between infrequent, comfortable communication about sex and condom use inconsistency strengthened (infrequent, uncomfortable AOR: 0.61). Additionally, among the sexual knowledge mediators, high perceived barriers to contraception remained significantly associated with inconsistent condom use (AOR: 1.90).

*Covariates.* In this model, being Hispanic, living in a single parent household, having best friends who use illicit substances, and having low sexual self-efficacy at Wave I were associated with an increased likelihood of inconsistent condom use at Wave II (Table 5c., Model IX).

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model IX (parenting style, mother-daughter communication about sex, and the sexual knowledge mediators), the chi-square value of the change in -2 log likelihood ratio indicated (a change of 35.45) that Model IX was a better fit than Model V at the  $p < 0.001$  level.

**5.1.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave II) [Full Model]**

**Model X.** In the full model (with both maternal parenting style and mother-daughter communication about sex variables, both socioemotional and sexual knowledge mediators, and covariates), analyses revealed that authoritarian parenting remained significantly associated with inconsistent condom use (AOR: 1.51) (Table 5c., Model X). The authoritarian parenting odds ratio was weaker than before the socioemotional and the sexual knowledge mediators were added (a decline of 22%) (Table 5c., Model X). In contrast, the significant association between infrequent, uncomfortable communication about sex remained (AOR: 0.61) and did not weaken in Model X, compared to Model V.

In Model X, one of the hypothesized socioemotional mediators, low sexual self-efficacy at Wave II, remained significantly associated with an increased risk of inconsistent condom use (AOR: 1.72). Also in Model X, one of the sexual knowledge mediators, high perceived barriers to contraception, was associated with an increased likelihood of inconsistent condom use (AOR: 1.58) (Table 5c., Model X). Despite the facts that 1) parenting style was associated with an increased likelihood of inconsistent condom use, 2) low-sexual self-efficacy and high perceived barriers to contraception were associated with inconsistent condom use, and 3) the addition of these variables weakened the associations, it was not possible to conclude that the hypothesized mediators in fact acted as mediators in this model. That is, analyses revealed that there was a significant association between authoritarian parenting and a *decreased* likelihood of low sexual self-efficacy and of having high perceived barriers to contraception (Table

4e.), so the weakened association between parenting style and inconsistent condom use seemed to imply that the socioemotional and sexual risk variables might be better conceptualized as confounders. Further, the sexual knowledge risk variables (the significant one in this model being high perceived barriers to contraception) did not mediate the relationship between mother-daughter communication about sex and inconsistent condom use, since communication about sex was not associated with high perceived barriers to contraception (or any of the hypothesized mediators), and, as a result, the communication style associations did not weaken when comparing models with and without these mediators.

*Covariates.* In the full model, living in a single parent household, having best friends who use illicit substances, and having low sexual self-efficacy at Wave I were significantly associated with an increased risk of inconsistent condom use at Wave II (Table 5c., Model X).

*Goodness of fit.* Comparing Model X and Model V, which had a difference in degrees of freedom of four, the chi-square value (a change of 51.82) indicated that Model X was a better fit at the  $p < 0.001$  level. Additionally, comparing Model X and Model VIII (parenting style, communication about sex, and socioemotional mediators) and Model X and Model IX (parenting style, communication about sex, and sexual knowledge mediators), both of which had a differences in degrees of freedom of two, chi-square values (changes of 69.12 and 16.37, respectively) indicated that Model X was a better fit than either Model VIII or IX at the  $p < 0.001$  level. Thus, the -2 log likelihood ratio indicated that Model X was a better fit than any other model.

## 5.2. Inconsistent Contraceptive Use

### 5.2.1. Maternal Parenting Style (Wave I) and Inconsistent Contraceptive Use (Wave II)

**Model I.** Unadjusted analyses revealed that authoritarian parenting style at Wave I was associated with an increased risk of inconsistent contraceptive use a year later at Wave II, compared to authoritative parenting style (OR: 1.49) (Table 5d., Model I).

**Model II.** Analyses revealed that, controlling for covariates, the association between authoritarian parenting style and inconsistent contraceptive use lost significance (Table 5d., Model II).

*Covariates.* In this model, being Hispanic, having friends who accept sexual activity, having low sexual self-efficacy, and having high perceived barriers to contraception at Wave I were all associated with an increased likelihood of exhibiting inconsistent contraceptive use at Wave II (Table 5d., Model II).

*Goodness of fit.* Having added 21 degrees of freedom between Models I and II, the chi-square value of the change in -2 log likelihood ratio (a change of 104.39) indicated that Model II (with covariates) was a significantly better fit than Model I (without covariates) at the  $p < 0.001$  level.

Table 5d. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Contraceptive<sup>b</sup> Use (Wave II)<sup>c</sup>  
 [Independent Variables and Dependent Variables, Reduced Form]

	Model I Parenting Style	Model II Parenting Style	Model III Communication	Model IV Communication	Model V Parenting Style and Communication
-2 Log Likelihood	1578.98	1474.59	1585.19	1476.81	1468.83
<b>Maternal Parenting Style (Wave I)</b>					
Authoritative	Reference	Reference			Reference
Authoritarian	1.49 (1.02, 2.19) *	1.47 (0.97, 2.22)			1.54 (1.02, 2.33) *
Permissive	1.13 (0.70, 1.82)	1.16 (0.66, 2.02)			1.18 (0.68, 2.06)
Neglectful	1.28 (0.76, 2.16)	0.81 (0.57, 1.81)			1.08 (0.60, 1.93)
<b>Mother-Daughter Communication about Sex (Wave I)</b>					
Frequent and Comfortable			Reference	Reference	Reference
Frequent and Uncomfortable			1.00 (0.66, 1.51)	0.78 (0.51, 1.20)	0.74 (0.48, 1.14)
Infrequent and Comfortable			0.84 (0.55, 1.28)	0.78 (0.49, 1.25)	0.77 (0.48, 1.22)
Infrequent and Uncomfortable			0.85 (0.56, 1.29)	0.72 (0.47, 1.10)	0.68 (0.44, 1.04)
<b>Covariates (Wave I)</b>					
<i>Age</i>					
Age 16		0.81 (0.54, 1.22)		0.80 (0.54, 1.19)	0.81 (0.54, 1.23)
Age 17		0.96 (0.60, 1.54)		0.96 (0.62, 1.48)	0.98 (0.62, 1.56)
Age 18+		1.11 (0.56, 2.17)		1.10 (0.60, 2.01)	1.15 (0.59, 2.24)
<i>Race/Ethnicity</i>					
Black		0.91 (0.53, 1.57)		0.91 (0.52, 1.61)	0.93 (0.53, 1.63)
Hispanic		2.35 (1.36, 4.07) **		2.44 (1.42, 4.18) **	2.55 (1.49, 4.37) **
Asian/Pacific Islander		1.11 (0.56, 2.17)		1.10 (0.38, 3.18)	1.16 (0.41, 3.24)
Other		3.40 (0.80, 14.44)		3.13 (0.69, 14.22)	3.18 (0.76, 13.37)
<i>Maternal Education</i>					
High School		0.96 (0.58, 1.58)		0.92 (0.56, 1.53)	0.91 (0.55, 1.51)
More than High School		1.03 (0.67, 1.60)		0.99 (0.62, 1.57)	0.97 (0.61, 1.54)

Table 5d. Continued

<i>Poverty</i>						
Yes	1.23 (0.87, 1.75)		1.24 (0.88, 1.75)		1.23 (0.87, 1.75)	
<i>Religiosity</i>						
Somewhat Religious	1.45 (0.82, 2.54)		1.44 (0.81, 2.55)		1.43 (0.81, 2.54)	
Very Religious	1.65 (0.93, 2.95)		1.66 (0.92, 3.01)		1.68 (0.94, 3.00)	
<i>Household Structure</i>						
Stepparents	0.79 (0.40, 1.57)		0.77 (0.39, 1.53)		0.76 (0.38, 1.50)	
Single Parent	1.57 (0.95, 2.27)		1.40 (0.93, 2.13)		1.42 (0.93, 2.16)	
No Parents	1.84 (0.73, 4.64)		1.70 (0.70, 4.12)		1.85 (0.75, 4.58)	
<i>Risky Peers</i>						
Peer Substance Use	1.22 (0.73, 2.04)		1.19 (0.72, 1.99)		1.20 (0.72, 2.01)	
Peer Acceptance of Sex	1.40 (1.03, 1.91)	*	1.41 (1.03, 1.92)	*	1.42 (1.03, 1.94)	*
<i>Socioemotional Risk (Wave I)</i>						
Low Sexual Self-Efficacy	1.35 (1.08, 1.67)	**	1.35 (1.10, 1.65)	**	1.35 (1.09, 1.67)	**
High Risk-Taking Behavior	2.20 (0.90, 5.38)		2.52 (1.05, 6.04)	*	2.14 (0.89, 5.19)	
<i>Knowledge Risk (Wave I)</i>						
Low Sexual Health Knowledge	0.68 (0.25, 1.90)		0.66 (0.25, 1.73)		0.63 (0.23, 1.73)	
High Perceived Barriers to Contraception	1.38 (1.04, 1.83)	*	1.40 (1.07, 1.82)	*	1.39 (1.06, 1.83)	*

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use a form of contraception (condom, hormonal birth control pills, diaphragm, IUD, Norplant, ring, or Depo Provera injection) at most recent intercourse

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **5.2.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave II)**

**Model III.** Unadjusted analyses revealed that mother-daughter communication about sex at Wave I was not associated with an increased risk of inconsistent contraceptive use a year later at Wave II (Table 5d., Model III).

**Model IV.** Adjusted analyses again indicated that mother-daughter communication about sex was not significantly associated with an increased risk of contraceptive use at Wave II (Table 5d., Model IV).

*Covariates.* In this model, being Hispanic, having friends who accept sexual activity, having low sexual self-efficacy, exhibiting high risk-taking behaviors, and having high perceived barriers to contraception at Wave I were all associated with an increased likelihood of exhibiting inconsistent contraceptive use at Wave II (Table 5d., Model IV).

*Goodness of fit.* Having added 21 degrees of freedom between Models III and IV, the chi-square value of the change in -2 log likelihood ratio (a change of 108.38) indicated that Model IV (with covariates) was a significantly better fit than Model III (without covariates) at the  $p < 0.001$  level.

### **5.2.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave II)**

**Model V.** Adjusted analyses examining the effect of both maternal parenting style and mother-daughter communication about sex revealed that the authoritarian parenting style strengthened and was significantly associated with an increased risk of inconsistent contraceptive use at Wave II, compared to authoritative parenting (AOR: 1.54) (Table

5d., Model V).

*Covariates.* In this model, being Hispanic, having friends who accept sexual activity, having low sexual self-efficacy, and having high perceived barriers to contraception at Wave I were all associated with an increased likelihood of exhibiting inconsistent contraceptive use at Wave II (Table 5d., Model V).

*Goodness of fit.* Having added three degrees of freedom between Model II (parenting style only) and Model V (both parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (a change of 5.76) indicated that Model V was not a statistically better fitting model than Model II (parenting style only). However, having added three degrees of freedom between and between Model IV (mother-daughter communication about sex only) and Model V (both parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (a change of 7.98) indicated that Model V was a better fit than Model IV (mother-daughter communication about sex only) at the  $p < 0.05$  level.

#### **5.2.4. Socioemotional Risk (Wave II) and Inconsistent Contraceptive Use (Wave II)**

**Model VI.** Controlling for covariates, both low sexual self-efficacy and high risk-taking behavior at Wave II were significantly associated with an increased risk of inconsistent contraceptive use at Wave II (low sexual self-efficacy AOR: 1.69; high risk-taking AOR: 2.83) (Table 5e., Model VI).

*Covariates.* In this model, being Hispanic, living in a single parent household in adolescence, and having high perceived barriers to contraception at Wave I were significantly associated with an increased likelihood of inconsistent contraceptive use

(Table 5e., Model VI).

### **5.2.5. Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave II)**

**Model VII.** Controlling for covariates, having high perceived barriers to contraception at Wave II was significantly associated with an increased risk of inconsistent contraceptive use at Wave II (AOR: 2.41) (Table 5e., Model VII). Low sexual health knowledge at Wave II was not significantly associated with inconsistent contraceptive use.

*Covariates.* In this model, being Hispanic, having friends who approved of sex, and having low sexual self-efficacy at Wave I were significantly associated with an increased likelihood of inconsistent contraceptive use (Table 5e., Model VII).

Table 5e. Associations<sup>a</sup> between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Adolescent Inconsistent Contraceptive Use<sup>b</sup> (Wave II)<sup>c</sup> [Mediators and Dependent Variables]

	Model VI Socioemotional Risk		Model VII Sexual Knowledge Risk	
-2 Log Likelihood	1439.00		1428.81	
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy	1.69 (1.34, 2.11)	**		
High Risk-Taking Behavior	2.83 (1.15, 6.97)	*		
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			1.08 (0.34, 3.39)	
High Perceived Barriers to Contraception			2.41 (1.74, 3.33)	**
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	0.84 (0.58, 1.21)		0.83 (0.55, 1.24)	
Age 17	1.05 (0.70, 1.58)		0.90 (0.58, 1.38)	
Age 18+	1.22 (0.66, 2.25)		1.19 (0.63, 2.23)	
<i>Race/Ethnicity</i>				
Black	0.90 (0.52, 1.56)		0.87 (0.48, 1.57)	
Hispanic	2.03 (1.17, 3.54)	*	2.06 (1.22, 3.47)	**
Asian/Pacific Islander	0.84 (0.32, 2.20)		0.97 (0.35, 2.72)	
Other	3.33 (0.70, 15.99)		2.64 (0.53, 13.11)	
<i>Maternal Education</i>				
High School	1.01 (0.60, 1.69)		1.03 (0.61, 1.76)	
More than High School	1.00 (0.62, 1.62)		1.12 (0.70, 1.78)	
<i>Poverty</i>				
Yes	1.17 (0.81, 1.68)		1.20 (0.86, 1.67)	
<i>Religiosity</i>				
Somewhat Religious	1.56 (0.88, 2.77)		1.45 (0.80, 2.63)	
Very Religious	1.71 (0.93, 3.12)		1.54 (0.85, 2.80)	
<i>Household Structure</i>				
Stepparents	0.80 (0.42, 1.53)		0.78 (0.39, 1.55)	
Single Parent	1.58 (1.03, 2.42)	*	1.37 (0.89, 2.12)	
No Parents	1.83 (0.75, 4.46)		1.67 (0.67, 4.19)	
<i>Risky Peers</i>				
Peer Substance Use	1.23 (0.72, 2.09)		1.16 (0.66, 2.05)	
Peer Acceptance of Sex	1.28 (0.93, 1.77)		1.40 (1.03, 1.90)	*
<i>Socioemotional Risk (Wave I)</i>				
Low Sexual Self-Efficacy	1.17 (0.95, 1.44)		1.28 (1.02, 1.61)	*
High Risk-Taking Behavior	1.35 (0.54, 3.36)		2.12 (0.90, 5.02)	
<i>Knowledge Risk (Wave I)</i>				
Low Sexual Health Knowledge	0.66 (0.25, 1.78)		0.47 (0.14, 1.58)	
High Perceived Barriers to Contraception	1.34 (1.01, 1.78)	*	1.00 (0.71, 1.41)	

<sup>a</sup> Odds ratios and 95% confidence intervals<sup>b</sup> Inconsistent contraceptive use was defined as the non-use a form of contraception (condom, hormonal birth control pills, diaphragm, IUD, Norplant, ring, or Depo Provera injection) at most recent intercourse<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **5.2.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Contraceptive Use (Wave II)**

**Model VIII.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the socioemotional mediators, the association between authoritarian parenting style and inconsistent contraceptive use weakened and was no longer significant (Table 5f., Model VIII). The association between mother-daughter communication about sex and inconsistent contraceptive use remained insignificant. Both low sexual self-efficacy and high risk-taking behaviors remained significantly associated with inconsistent contraceptive use (low sexual self-efficacy AOR: 1.68; high risk-taking AOR: 2.77).

*Covariates.* In this model, being Hispanic, living in a single parent household, and having high perceived barriers to contraception at Wave I were significantly associated with an increased likelihood of inconsistent contraceptive use (Table 5f., Model VIII).

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model VIII (parenting style, mother-daughter communication about sex, and the socioemotional mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 46.28) indicated that Model VIII was a better fit than Model V at the  $p < 0.001$  level.

Table 5f. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Adolescent Inconsistent Contraceptive Use<sup>b</sup> (Wave II)<sup>c</sup> [Full Model]

	Model V Parenting Style and Communication	Model VIII Parenting Style, Communication, and Socioemotional Risk	Model IX Parenting Style, Communication, and Sexual Knowledge Risk	Model X Full Model
-2 Log Likelihood	1468.83	1422.85	1410.79	1387.84
<b>Maternal Parenting Style (Wave I)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	1.54 (1.02, 2.33) *	1.38 (0.90, 2.12)	1.50 (1.00, 2.27)	1.39 (0.90, 2.14)
Permissive	1.18 (0.68, 2.06)	1.14 (0.66, 1.96)	1.13 (0.63, 2.03)	1.10 (0.63, 1.94)
Neglectful	1.08 (0.60, 1.93)	1.01 (0.55, 1.88)	0.98 (0.56, 1.72)	0.94 (0.52, 1.70)
<b>Mother-Daughter Communication about Sex (Wave I)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	0.74 (0.48, 1.14)	0.75 (0.48, 1.17)	0.73 (0.44, 1.19)	0.74 (0.45, 1.19)
Infrequent and Comfortable	0.77 (0.48, 1.22)	0.72 (0.44, 1.17)	0.80 (0.50, 1.28)	0.75 (0.46, 1.24)
Infrequent and Uncomfortable	0.68 (0.44, 1.04)	0.67 (0.43, 1.04)	0.66 (0.43, 1.02)	0.66 (0.42, 1.03)
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy		1.68 (1.32, 2.12) **		1.49 (1.15, 1.92) **
High Risk-Taking Behavior		2.77 (1.11, 6.91) *		2.37 (0.96, 5.86)
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			1.14 (0.36, 3.61)	1.03 (0.32, 3.34)
High Perceived Barriers to Contraception			2.42 (1.76, 3.33) **	2.16 (1.58, 2.96) **
<b>Covariates (Wave I)</b>				
Age				
Age 16	0.81 (0.54, 1.23)	0.86 (0.59, 1.25)	0.85 (0.56, 1.29)	0.88 (0.59, 1.31)
Age 17	0.98 (0.62, 1.56)	1.10 (0.71, 1.69)	0.95 (0.60, 1.49)	1.04 (0.67, 1.60)
Age 18+	1.15 (0.59, 2.24)	1.30 (0.66, 2.56)	1.30 (0.66, 2.55)	1.42 (0.72, 2.82)

Table 5f. Continued

<i>Race/Ethnicity</i>								
Black	0.93 (0.53, 1.63)		0.92 (0.36, 2.39)		0.91 (0.50, 1.68)		0.91 (0.50, 1.67)	
Hispanic	2.55 (1.49, 4.37)	**	2.27 (1.31, 3.92)	**	2.34 (1.39, 2.92)	**	2.14 (1.25, 3.65)	**
Asian/Pacific Islander	1.16 (0.41, 3.24)		0.92 (0.36, 2.39)		1.10 (0.41, 3.01)		0.93 (0.37, 2.37)	
Other	3.18 (0.76, 13.37)		3.13 (0.71, 13.78)		2.56 (0.57, 11.55)		2.59 (0.56, 11.97)	
<i>Maternal Education</i>								
High School	0.91 (0.55, 1.51)		0.97 (0.57, 1.63)		0.98 (0.58, 1.68)		1.00 (0.58, 1.73)	
More than High School	0.97 (0.61, 1.54)		0.95 (0.57, 1.57)		1.04 (0.64, 1.68)		0.99 (0.59, 1.67)	
<i>Poverty</i>								
Yes	1.23 (0.87, 1.75)		1.16 (0.80, 1.68)		1.19 (0.85, 1.67)		1.14 (0.79, 1.63)	
<i>Religiosity</i>								
Somewhat Religious	1.43 (0.81, 2.54)		1.53 (0.86, 2.72)		1.43 (0.78, 2.61)		1.51 (0.82, 2.78)	
Very Religious	1.68 (0.94, 3.00)		1.73 (0.96, 3.10)		1.54 (0.86, 2.77)		1.60 (0.89, 2.90)	
<i>Household Structure</i>								
Stepparents	0.76 (0.38, 1.50)		0.77 (0.40, 1.47)		0.74 (0.37, 1.47)		0.74 (0.58, 1.44)	
Single Parent	1.42 (0.93, 2.16)		1.54 (1.00, 2.37)	*	1.36 (0.87, 2.10)		1.46 (0.94, 2.27)	
No Parents	1.85 (0.75, 4.58)		1.93 (0.79, 4.73)		1.82 (0.72, 4.57)		1.88 (0.77, 4.61)	
<i>Risky Peers</i>								
Peer Substance Use	1.20 (0.72, 2.01)		1.21 (0.72, 2.05)		1.15 (0.66, 2.03)		1.17 (0.66, 2.05)	
Peer Acceptance of Sex	1.42 (1.03, 1.94)	*	1.30 (0.93, 1.82)		1.42 (1.04, 1.96)	*	1.33 (0.96, 1.85)	
<i>Socioemotional Risk (Wave I)</i>								
Low Sexual Self-Efficacy	1.35 (1.09, 1.67)	**	1.19 (0.96, 1.47)		1.30 (1.03, 1.63)	*	1.18 (0.94, 1.48)	
High Risk-Taking Behavior	2.14 (0.89, 5.19)		1.22 (0.49, 3.06)		1.80 (0.74, 4.35)		1.15 (0.47, 2.85)	
<i>Knowledge Risk (Wave I)</i>								
Low Sexual Health Knowledge	0.63 (0.23, 1.73)		0.69 (0.22, 1.61)		0.41 (0.12, 1.37)		0.43 (0.13, 1.44)	
High Perceived Barriers to Contraception	1.39 (1.06, 1.83)	*	1.35 (1.02, 1.79)	*	1.00 (0.71, 1.43)		1.02 (0.71, 1.47)	

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use a form of contraception (condom, hormonal birth control pills, diaphragm, IUD, Norplant, ring, or Depo Provera injection) at most recent intercourse

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **5.2.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Contraceptive Use (Wave II)**

**Model IX.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the sexual knowledge mediators, the association between authoritarian parenting style and inconsistent contraceptive use weakened and was no longer significant, and the association between communication and inconsistent contraceptive remained non-significant (Table 5f., Model IX). Among the sexual knowledge mediators, having high perceived barriers to contraception was significantly associated with inconsistent contraceptive use (AOR: 2.42).

*Covariates.* In this model, being Hispanic, having friends who accept sexual activity, and having low sexual self-efficacy, at Wave I were associated with an increased likelihood of inconsistent contraceptive use at Wave II (Table 5f., Model IX).

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model IX (parenting style, mother-daughter communication about sex, and the sexual knowledge mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 58.04) indicated that Model IX was a better fit than Model V at the  $p < 0.001$  level.

### **5.2.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave II) [Full Model]**

**Model X.** In the full model (with both maternal parenting style and mother-

daughter communication about sex variables, both socioemotional and sexual knowledge mediators, and covariates), analyses revealed that no form of parenting style was significantly associated with inconsistent contraceptive use, again suggesting mediation (Table 5f., Model X). The association between mother-daughter communication about sex and inconsistent contraceptive use remained non-significant. The authoritarian parenting odds ratio lost significance after the socioemotional and the sexual knowledge mediators were added (a decline of 28%).

Specifically, among the socioemotional mediators in Model X, low sexual self-efficacy at Wave II remained significantly associated with inconsistent contraceptive use (AOR: 1.29). Also in this model, one of the sexual knowledge mediators, high perceived barriers to contraception, was associated with an increased likelihood of inconsistent contraceptive use (AOR: 2.16) (Table 5f., Model X). Despite the facts that 1) parenting style was associated with an increased likelihood of inconsistent contraceptive use, 2) low-sexual self-efficacy and high perceived barriers to contraception were associated with inconsistent condom use, and 3) the addition of these variables attenuated the associations, it was not possible to conclude that the hypothesized mediators in fact acted as mediators in this model. That is, analyses revealed that there was a significant association between authoritarian parenting and a *decreased* likelihood of low sexual self-efficacy and of having high perceived barriers to contraception (Table 4e.), so the weakened association between parenting style and inconsistent condom use seems to imply that the socioemotional and sexual risk variables might be better conceptualized as confounders. Further, since communication about sex was not associated with any hypothesized mediator, and since communication about sex was not associated with

inconsistent contraceptive use, it appears that mother-daughter communication about sex had neither direct nor indirect effects on this sexual risk behavior in adolescence.

*Covariates.* In the full model, being Hispanic was the only confounding variable significantly associated with an increased risk of inconsistent contraceptive use at Wave II (Table 5f., Model X).

*Goodness of fit.* Comparing Model X and Model V, which had a difference in degrees of freedom of six, the change in the -2 log likelihood (a change of 80.99) chi-square value indicated that Model X was a better fit at the  $p < 0.001$  level. Additionally, comparing Model X and Model VIII (parenting style, communication about sex, and socioemotional mediators) and Model X and Model IX (parenting style, communication about sex, and sexual knowledge mediators), both of which had a differences in degrees of freedom of two, the changes in -2 log likelihoods (changes of 35.01 and 22.95, respectively) chi-square values indicated that Model X was a better fit than either Model VIII or IX at the  $p < 0.001$  level. Thus, the -2 log likelihood ratio indicated that Model X was a better fit than any other model.

## CHAPTER 6: RESULTS – YOUNG ADULTHOOD

This chapter will provide a detailed description of the associations between adolescent (Wave I) mother-daughter relationship characteristics (independent variables) and young adult (Wave III) sexual risk-taking behaviors including lifetime partnerships (Part 1), past year multiple partnerships (Part 2), inconsistent condom use (Part 3) and inconsistent contraceptive use (Part 4). Specifically, each part of this chapter will begin by describing unadjusted and adjusted associations between maternal parenting style and the sexual risk-taking behavior (Models I and II, respectively), followed by unadjusted and adjusted associations between mother-daughter communication about sex and the sexual risk-taking behavior (Models III and IV, respectively). This chapter will then examine adjusted associations between both maternal parenting style and mother-daughter communication about sex and the sexual risk-taking behavior (Model V).

Next, this chapter will examine the associations between Wave II socioemotional and sexual knowledge indicators (mediators) and the sexual risk-taking behavior (Models VI and VII, respectively). Finally, this chapter will describe associations between both parenting style and mother-daughter communication about sex and the sexual risk-taking behavior, with the addition of only the socioemotional mediators (Model VIII), only the sexual knowledge mediators (Model IX), then both the socioemotional and sexual knowledge mediators (Model X: full model).

The associations between the independent and dependent variables will be assessed both with and without mediators in order to determine if mediation is present. Additionally, after the addition of new variables to each nested model, the -2 log likelihood will be presented, in order to assess the goodness of fit of each model.

## 6.1. Lifetime Partnerships

### 6.1.1. Maternal Parenting Style (Wave I) and Lifetime Partnerships (Wave III)

**Model I.** Unadjusted analyses revealed that, compared to authoritative parenting, neglectful parenting was significantly associated with having a higher numbers of lifetime partners (AOR: 1.71) (Table 6a., Model I).

**Model II.** Adjusted analyses (controlling for covariates and age at first sex) revealed that parenting style at Wave I was no longer associated with having a higher number of lifetime partnerships (Table 6a., Model II).

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, having best friends who used illicit substances at Wave I, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6a., Model II). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models I and II, the chi-square value of the change in -2 log likelihood ratio (a change of 600.12) indicated that Model II (with covariates) was a significantly better fit than Model I (without covariates) at the  $p < 0.001$  level.

Table 6a. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Lifetime Partnerships<sup>b</sup> (Wave III)<sup>c</sup>  
 [Independent Variables and Dependent Variables, Reduced Form]

	Model I Parenting Style	Model II Parenting Style	Model III Communication	Model IV Communication	Model V Parenting Style and Communication
-2 Log Likelihood	8756.29	8156.17	8760.63	8149.64	8148.66
<b>Maternal Parenting Style (Wave I)</b>					
Authoritative	Reference	Reference			Reference
Authoritarian	1.35 (0.98, 1.86)	1.05 (0.76, 1.44)			1.06 (0.76, 1.49)
Permissive	1.12 (0.73, 1.73)	0.94 (0.61, 1.45)			0.94 (0.61, 1.44)
Neglectful	1.71 (1.16, 2.52) **	1.08 (0.68, 1.71)			1.10 (0.69, 1.74)
<b>Mother-Daughter Communication about Sex (Wave I)</b>					
Frequent and Comfortable			Reference	Reference	Reference
Frequent and Uncomfortable			0.82 (0.60, 1.11)	1.11 (0.76, 1.60)	1.10 (0.76, 1.58)
Infrequent and Comfortable			0.97 (0.67, 1.41)	1.10 (0.79, 1.54)	1.10 (0.78, 1.55)
Infrequent and Uncomfortable			0.68 (0.49, 0.95) *	0.79 (0.57, 1.11)	0.78 (0.56, 1.10)
<b>Covariates (Wave I)</b>					
<i>Age</i>					
Age 16		1.67 (1.13, 2.45) **		1.70 (1.16, 2.47) **	1.70 (1.15, 2.51) **
Age 17		1.60 (1.10, 2.31) *		1.60 (1.14, 2.25) **	1.61 (1.12, 2.32) *
Age 18+		1.76 (1.14, 2.70) *		1.78 (1.17, 2.71) **	1.81 (1.19, 2.75) **
<i>Race/Ethnicity</i>					
Black		1.12 (0.86, 1.47)		1.14 (0.87, 1.50)	1.14 (0.87, 1.49)
Hispanic		0.93 (0.54, 1.60)		0.98 (0.57, 1.68)	0.98 (0.57, 1.69)
Asian/Pacific Islander		0.70 (0.35, 1.42)		0.72 (0.35, 1.49)	0.73 (0.35, 1.50)
Other		0.62 (0.18, 2.16)		0.60 (0.17, 2.13)	0.61 (0.17, 2.16)
<i>Maternal Education</i>					
High School		1.94 (1.19, 3.15) **		1.99 (1.25, 3.17) **	1.97 (1.24, 3.15) **
More than High School		1.96 (1.29, 2.98) **		1.95 (1.30, 2.94) **	1.94 (1.30, 2.90) **

Table 6a. Continued

<i>Poverty</i>						
Yes	1.00 (0.74, 1.35)		1.00 (0.74, 1.36)		1.00 (0.74, 1.35)	
<i>Religiosity</i>						
Somewhat Religious	0.84 (0.54, 1.31)		0.84 (0.55, 1.29)		0.84 (0.54, 1.31)	
Very Religious	0.87 (0.56, 1.36)		0.88 (0.57, 1.35)		0.88 (0.56, 1.37)	
<i>Household Structure</i>						
Stepparents	1.16 (0.77, 1.75)		1.18 (0.78, 1.78)		1.17 (0.77, 1.77)	
Single Parent	1.24 (0.96, 1.60)		1.22 (0.94, 1.59)		1.22 (0.95, 1.58)	
No Parents	1.66 (0.99, 2.80)		1.70 (1.01, 2.88)	*	1.72 (1.02, 2.89)	*
<i>Risky Peers</i>						
Peer Substance Use	1.41 (1.01, 1.96)	*	1.41 (1.01, 1.97)	*	1.40 (1.01, 1.96)	*
Peer Acceptance of Sex	1.16 (0.92, 1.45)		1.16 (0.93, 1.45)		1.16 (0.93, 1.45)	
<i>Socioemotional Risk (Wave I)</i>						
Low Sexual Self-Efficacy	1.11 (0.92, 1.35)		1.12 (0.93, 1.26)		1.12 (0.92, 1.36)	
High Risk-Taking Behavior	3.74 (1.93, 7.26)	**	3.86 (2.03, 7.33)	**	3.77 (1.93, 7.39)	**
<i>Knowledge Risk (Wave I)</i>						
Low Sexual Health Knowledge	0.44 (0.20, 0.99)	*	0.43 (0.19, 0.98)	*	0.44 (0.20, 0.99)	*
High Perceived Barriers to Contraception	0.84 (0.67, 1.05)		0.84 (0.67, 1.06)		0.83 (0.67, 1.05)	
<b>Adolescent Sexual Risk (Wave II)</b>						
Age at First Sex	0.68 (0.63, 0.73)	**	0.68 (0.63, 0.73)	**	0.68 (0.63, 0.73)	**

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Natural log of lifetime number of partners, plus 1

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \* $p < 0.05$

### **6.1.2. Mother-Daughter Communication about Sex (Wave I) and Lifetime Partnerships (Wave II)**

**Model III.** Unadjusted analyses revealed that, compared to frequent, comfortable mother-daughter communication about sex, infrequent, uncomfortable communication about sex at Wave I was associated with having a lower number of lifetime partnerships at Wave III (AOR: 0.68) (Table 6a., Model III).

**Model IV.** Adjusted analyses (controlling for covariates and age at first sex) revealed that mother-daughter communication about sex at Wave I was no longer associated with having a higher number of lifetime partnerships (Table 6a., Model IV).

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, living with no parent at Wave I, having best friends who used illicit substances, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6a., Model IV). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models III and IV, the chi-square value of the change in  $-2 \log$  likelihood ratio (a change of 610.99) indicated that Model IV (with covariates) was a better fit at the  $p < 0.001$  level than Model III (without covariates).

### **6.1.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Lifetime Partnerships (Wave II)**

**Model V.** Adjusted analyses examining the effect of both maternal parenting style

and mother-daughter communication about sex revealed that neither was associated with number of lifetime partnerships (Table 6a., Model V).

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, living with no parent at Wave I, having best friends who used illicit substances at Wave I, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6a., Model V). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

*Goodness of fit.* Having added three degrees of freedom between Model II (parenting style only) and Model V (parenting style and mother-daughter communication about sex) and between Model IV (mother-daughter communication about sex only) and Model V (parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (a change of 7.51) indicated that Model V was a better fit than Model II (parenting style only) at the  $p < 0.05$  level. However, the chi-square value of the change in -2 log likelihood ratio (a change of 0.98) indicated Model V was not a significantly better fit than Model IV (communication about sex only).

#### **6.1.4. Socioemotional Risk (Wave II) and Lifetime Partnerships (Wave II)**

**Model VI.** Controlling for covariates, high risk taking behavior at Wave II was significantly associated with having a higher number of lifetime partnerships at Wave III (AOR: 2.24) (Table 6b., Model VI). Low sexual self-efficacy was not associated with having a higher number of lifetime partnerships.

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6b., Model VI). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

#### **6.1.5. Sexual Knowledge Risk (Wave II) and Lifetime Partnerships (Wave II)**

**Model VII.** Controlling for covariates, neither low sexual health knowledge nor high perceived barriers to contraception at Wave II were significantly associated with having a higher number of lifetime partnerships at Wave III (Table 6b., Model VII).

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, having best friends who used illicit substances, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6b., Model VII). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

Table 6b. Associations<sup>a</sup> between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Lifetime Partnerships<sup>b</sup> (Wave III)<sup>c</sup> [Mediators and Dependent Variables]

	Model VI Socioemotional Risk		Model VII Sexual Knowledge Risk	
-2 Log Likelihood	8143.48		8135.75	
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy	1.16 (0.95, 1.41)			
High Risk-Taking Behavior	2.24 (1.25, 4.12)	**		
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			0.75 (0.35, 1.64)	
High Perceived Barriers to Contraception			1.10 (0.88, 1.36)	
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	1.71 (1.19, 2.45)	**	1.66 (1.14, 2.41)	**
Age 17	1.67 (1.18, 2.37)	**	1.58 (1.11, 2.23)	*
Age 18+	1.85 (1.20, 2.84)	**	1.74 (1.13, 2.67)	*
<i>Race/Ethnicity</i>				
Black	1.13 (0.85, 1.49)		1.13 (0.87, 1.49)	
Hispanic	0.88 (0.51, 1.50)		0.91 (0.53, 1.57)	
Asian/Pacific Islander	0.65 (0.32, 1.32)		0.69 (0.35, 1.37)	
Other	0.60 (0.17, 2.13)		0.59 (0.17, 2.1)	
<i>Maternal Education</i>				
High School	1.96 (1.21, 3.19)	**	1.95 (1.20, 3.16)	**
More than High School	1.92 (1.26, 2.91)	**	1.97 (1.29, 3.00)	**
<i>Poverty</i>				
Yes	0.99 (0.73, 1.33)		0.99 (0.73, 1.35)	
<i>Religiosity</i>				
Somewhat Religious	0.85 (0.54, 1.32)		0.84 (0.55, 1.30)	
Very Religious	0.87 (0.56, 1.35)		0.86 (0.56, 1.33)	
<i>Household Structure</i>				
Stepparents	1.18 (0.79, 1.76)		1.18 (0.79, 1.78)	
Single Parent	1.27 (0.97, 1.66)		1.24 (0.96, 1.60)	
No Parents	1.69 (1.00, 2.85)		1.68 (1.00, 2.82)	
<i>Risky Peers</i>				
Peer Substance Use	1.40 (1.00, 1.97)		1.41 (1.01, 1.96))	*
Peer Acceptance of Sex	1.23 (0.90, 1.41)		1.15 (0.92, 1.45)	
<i>Socioemotional Risk (Wave I)</i>				
Low Sexual Self-Efficacy	1.07 (0.89, 1.28)		1.11 (0.92, 1.34)	
High Risk-Taking Behavior	2.47 (1.22, 4.99)	*	3.76 (1.99, 7.09)	**
<i>Knowledge Risk (Wave I)</i>				
Low Sexual Health Knowledge	0.43 (0.19, 0.96)	*	0.48 (0.20, 1.14)	
High Perceived Barriers to Contraception	0.84 (0.67, 1.06)		0.83 (0.65, 1.04)	
<b>Adolescent Sexual Risk (Wave II)</b>				
Age at First Sex	0.68 (0.63, 0.73)	**	0.68 (0.63, 0.73)	**

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Natural log of lifetime number of partners, plus 1

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \*  $p < 0.05$

### **6.1.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Lifetime Partnerships (Wave II)**

**Model VIII.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the socioemotional mediators, associations between both parenting style and mother-daughter communication about sex remained unassociated with having a higher number of lifetime partnerships (Table 6c., Model VIII). Of the socioemotional mediators, again, only high risk-taking behavior was associated with having a higher number of lifetime partnerships at Wave III (AOR: 2.21).

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, living with no parent at Wave I, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6c., Model VIII). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model VIII (parenting style, mother-daughter communication about sex, and the socioemotional mediators), the chi-square value of the change in -2 log likelihood ratio (a change of -6.40) indicated that Model VIII was not a significantly better fit than Model V. In fact, it appeared as though Model V (with fewer degrees of freedom) was a statistically significantly better fitting model than Model VIII at the  $p < 0.05$  level.

Table 6c. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Lifetime Partnerships<sup>b</sup> (Wave III)<sup>c</sup> [Full Model]

	Model V Parenting Style and Communication	Model VIII Parenting Style, Communication, and Socioemotional Risk	Model IX Parenting Style, Communication, and Sexual Knowledge Risk	Model X Full Model
-2 Log Likelihood	8148.66	8155.06	8146.86	8134.86
<b>Maternal Parenting Style (Wave I)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	1.06 (0.76, 1.49)	1.04 (0.74, 1.45)	1.05 (0.75, 1.47)	1.03 (0.74, 1.44)
Permissive	0.94 (0.61, 1.44)	0.93 (0.61, 1.43)	0.94 (0.61, 1.44)	0.93 (0.61, 1.43)
Neglectful	1.10 (0.69, 1.74)	1.12 (0.70, 1.79)	1.07 (0.67, 1.71)	1.10 (0.68, 1.77)
<b>Mother-Daughter Communication about Sex (Wave I)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	1.10 (0.76, 1.58)	1.09 (0.75, 1.58)	1.10 (0.76, 1.59)	1.09 (0.75, 1.58)
Infrequent and Comfortable	1.10 (0.78, 1.55)	1.06 (0.75, 1.49)	1.11 (0.79, 1.56)	1.07 (0.76, 1.50)
Infrequent and Uncomfortable	0.78 (0.56, 1.10)	0.78 (0.56, 1.08)	0.79 (0.56, 1.10)	1.28 (0.33, 5.00)
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy		1.16 (0.95, 1.41)		1.15 (0.94, 1.41)
High Risk-Taking Behavior		2.21 (1.23, 3.97) **		2.19 (1.21, 3.97) **
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			0.76 (0.35, 1.62)	0.76 (0.36, 1.61)
High Perceived Barriers to Contraception			1.10 (0.89, 1.35)	1.04 (0.83, 1.30)
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	1.70 (1.15, 2.51) **	1.75 (1.20, 2.55) **	1.70 (1.15, 2.52) **	1.74 (1.19, 2.54) **
Age 17	1.61 (1.12, 2.32) *	1.70 (1.19, 2.42) **	1.60 (1.12, 2.30) *	1.69 (1.18, 2.41) **
Age 18+	1.81 (1.19, 2.75) **	1.91 (1.26, 2.89) **	1.81 (1.19, 2.75) **	1.91 (1.26, 2.89) **

Table 6c. Continued

<i>Race/Ethnicity</i>								
Black	1.14 (0.87, 1.49)		1.13 (0.86, 1.48)		1.15 (0.88, 1.49)		1.14 (0.87, 1.49)	
Hispanic	0.98 (0.57, 1.69)		0.92 (0.53, 1.59)		0.96 (0.55, 1.66)		0.91 (0.53, 1.58)	
Asian/Pacific Islander	0.73 (0.35, 1.50)		0.68 (0.33, 1.40)		0.72 (0.35, 1.45)		0.67 (0.33, 1.36)	
Other	0.61 (0.17, 2.16)		0.59 (0.16, 2.13)		0.59 (0.16, 2.13)		0.58 (0.16, 2.13)	
<i>Maternal Education</i>								
High School	1.97 (1.24, 3.15)	**	1.98 (1.25, 3.16)	**	1.98 (1.24, 3.14)	**	1.98 (1.25, 3.14)	**
More than High School	1.97 (1.24, 3.15)	**	1.90 (1.27, 2.84)	**	1.94 (1.30, 2.90)	**	1.89 (1.26, 2.83)	**
<i>Poverty</i>								
Yes	1.00 (0.74, 1.35)		0.99 (0.73, 1.33)		0.99 (0.73, 1.35)		0.98 (0.73, 1.34)	
<i>Religiosity</i>								
Somewhat Religious	0.84 (0.54, 1.31)		0.85 (0.54, 1.34)		0.84 (0.54, 1.31)		0.85 (0.54, 1.34)	
Very Religious	0.88 (0.56, 1.37)		0.88 (0.56, 1.39)		0.87 (0.56, 1.36)		0.88 (0.56, 1.39)	
<i>Household Structure</i>								
Stepparents	1.17 (0.77, 1.77)		1.18 (0.78, 1.77)		1.18 (0.78, 1.78)		1.18 (0.79, 1.78)	
Single Parent	1.22 (0.95, 1.58)		1.25 (0.96, 1.62)		1.22 (0.95, 1.57)		1.25 (0.96, 1.62)	
No Parents	1.72 (1.02, 2.89)	*	1.74 (1.03, 2.93)	*	1.74 (1.04, 2.93)	*	1.76 (1.04, 2.97)	*
<i>Risky Peers</i>								
Peer Substance Use	1.40 (1.01, 1.96)	*	1.39 (0.99, 1.94)		1.40 (1.00, 1.95)	*	1.39 (0.99, 1.94)	
Peer Acceptance of Sex	1.16 (0.93, 1.45)		1.13 (0.91, 1.41)		1.16 (0.93, 1.45)		1.13 (0.91, 1.41)	
<i>Socioemotional Risk (Wave I)</i>								
Low Sexual Self-Efficacy	1.12 (0.92, 1.36)		1.07 (0.89, 1.28)		1.11 (0.92, 1.35)		1.07 (0.89, 1.28)	
High Risk-Taking Behavior	3.77 (1.93, 7.39)	**	2.49 (1.18, 5.25)	*	3.73 (1.91, 7.29)	**	2.49 (1.18, 5.25)	*
<i>Knowledge Risk (Wave I)</i>								
Low Sexual Health Knowledge	0.44 (0.20, 0.99)	*	0.43 (0.19, 0.97)	*	0.48 (0.20, 1.12)		0.47 (0.20, 1.12)	
High Perceived Barriers to Contraception	0.83 (0.67, 1.05)		0.83 (0.66, 1.04)		0.81 (0.64, 1.02)		0.82 (0.65, 1.04)	
<b>Adolescent Sexual Risk (Wave II)</b>								
Age at First Sex	0.68 (0.63, 0.73)	**	0.68 (0.63, 0.73)	**	0.68 (0.63, 0.73)	**	0.68 (0.63, 0.73)	**

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Natural log of lifetime number of partners, plus 1

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \*  $p < 0.05$

### **6.1.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Lifetime Partnerships (Wave II)**

**Model IX.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the sexual knowledge mediators, associations between both parenting style and mother-daughter communication about sex remained unassociated with having a higher number of lifetime partnerships (Table 6c., Model IX). Again, neither sexual knowledge mediator was associated with lifetime number of partnerships.

*Covariates.* In this model, being aged 16, 17, or 18 or older at Wave I (compared to being aged 15 at Wave I), having a mother with a high school education or more than a high school education, living with no parent at Wave I, having best friends who used illicit substances at Wave I, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6c., Model IX). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model IX (parenting style, mother-daughter communication about sex, and the sexual knowledge mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 1.80) indicated that Model IX was not a significantly better fit than Model V.

### **6.1.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Lifetime**

## Partnerships (Wave II) [Full Model]

**Model X.** In the full model (with both maternal parenting style and mother-daughter communication about sex variables, both socioemotional and sexual knowledge mediators, and covariates), analyses revealed that associations between both parenting style and mother-daughter communication about sex remained unassociated with having a higher number of lifetime partnerships (Table 6c., Model X).

Of the socioemotional and sexual knowledge mediators, only high risk-taking behavior was associated with having a higher number of lifetime partnerships at Wave III (AOR: 2.19). However, because parenting style (namely, authoritarian parenting) was associated with a *decreased* likelihood of high risk-taking behavior (Table 4e.), and because parenting style was not associated with lifetime partnerships in adjusted analyses, it appears that, parenting style was neither directly nor indirectly associated with lifetime number of partners.

*Covariates.* In the full model, being aged 16, 17, or 18 or older at Wave I (compared to age 15), having a mother with a high school education or more than a high school education, living with no parent at Wave I, and exhibiting high risk-taking behaviors at Wave I were all associated with having a higher number of lifetime partnerships at Wave III (Table 6a., Model X). Having low sexual health knowledge at Wave I and initiating sex at a later age were both associated with having a decreased number of lifetime partnerships in young adulthood.

*Goodness of fit.* Comparing Model X and Model V, which had a difference in degrees of freedom of four, the chi-square value of the change in the -2 log likelihood ratio (a change of 13.80) indicated that Model X was a better fit at the  $p < 0.01$  level.

Additionally, comparing Model X and Model VIII (parenting style, communication about sex, and socioemotional mediators) and Model X and Model IX (parenting style, communication about sex, and sexual knowledge mediators), both of which had a differences in degrees of freedom of two, chi-square values of the change in -2 log likelihoods (changes of 20.20 and 12.00, respectively) indicated that Model X was a better fit than either Model VIII or IX at the  $p < 0.001$  and  $p < 0.0025$  level, respectively. Thus, the -2 log likelihood ratio indicated that Model X was a better fit than any other model.

## 6.2. Past Year Partnerships

### 6.2.1. Maternal Parenting Style (Wave I) and Past Year Partnerships (Wave III)

**Model I.** Unadjusted analyses revealed that, compared to authoritative parenting, both authoritarian parenting and neglectful parenting at Wave I were significantly associated with having a higher number of past year partners (authoritarian OR: 1.63; neglectful OR: 2.51) (Table 6d., Model I).

**Model II.** Adjusted analyses (controlling for covariates and age at first sex) revealed that both authoritarian parenting and neglectful parenting at Wave I remained associated with having a higher number of past year partners (authoritarian AOR: 1.44; neglectful AOR: 2.42) (Table 6d., Model II).

*Covariates.* In this model, being Black and exhibiting high risk-taking behaviors at Wave I were both associated with having a higher number of past year partnerships at Wave III (Table 6d., Model II). Being age 18 or older at Wave I and initiating sex at a later age were both associated with having a decreased number of past year partnerships in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models I and II, the chi-square value of the change in -2 log likelihood ratio (a change of 234.13) indicated that Model II (with covariates) was a significantly better fit than Model I (without covariates) at the  $p < 0.001$  level.

Table 6d. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Past Year Partnerships<sup>b</sup> (Wave III)<sup>c</sup>  
 [Independent Variables and Dependent Variables, Reduced Form]

	Model I Parenting Style	Model II Parenting Style	Model III Communication	Model IV Communication	Model V Parenting Style and Communication
-2 Log Likelihood	3830.38	3596.25	3862.41	3614.94	3591.84
<b>Maternal Parenting Style (Wave I)</b>					
Authoritative	Reference	Reference			Reference
Authoritarian	1.63 (1.17, 2.27) **	1.44 (1.01, 2.05) *			1.43 (0.98, 2.08)
Permissive	1.13 (0.77, 1.66)	1.29 (0.88, 1.87)			1.27 (0.87, 1.87)
Neglectful	2.51 (1.66, 3.77) **	2.42 (1.63, 3.59) **			2.40 (1.62, 3.56) **
<b>Mother-Daughter Communication about Sex (Wave I)</b>					
Frequent and Comfortable			Reference	Reference	Reference
Frequent and Uncomfortable			1.21 (0.85, 1.71)	1.24 (0.83, 1.85)	1.21 (0.81, 1.79)
Infrequent and Comfortable			1.18 (0.77, 1.83)	1.36 (0.88, 2.12)	1.31 (0.85, 2.03)
Infrequent and Uncomfortable			0.97 (0.65, 1.44)	1.09 (0.72, 1.65)	1.02 (0.68, 1.54)
<b>Covariates (Wave I)</b>					
<i>Age</i>					
Age 16		1.04 (0.73, 1.48)		1.11 (0.78, 1.57)	1.06 (0.74, 1.51)
Age 17		0.77 (0.54, 1.09)		0.84 (0.58, 1.20)	0.77 (0.54, 1.09)
Age 18+		0.59 (0.35, 1.00) *		0.64 (0.38, 1.07)	0.59 (0.35, 1.02)
<i>Race/Ethnicity</i>					
Black		2.13 (1.51, 3.01) *		2.22 (1.58, 3.10) **	2.16 (1.53, 3.04) **
Hispanic		0.91 (0.57, 1.45)		0.92 (0.58, 1.48)	0.91 (0.57, 1.45)
Asian/Pacific Islander		0.63 (0.29, 1.39)		0.63 (0.29, 1.36)	0.64 (0.30, 1.37)
Other		0.75 (0.31, 1.83)		0.81 (0.38, 1.69)	0.78 (0.34, 1.77)
<i>Maternal Education</i>					
High School		1.07 (0.70, 1.64)		1.11 (0.72, 1.71)	1.10 (0.72, 1.67)
More than High School		1.33 (0.91, 1.95)		1.25 (0.93, 1.95)	0.78 (0.34, 1.77)

Table 6d. Continued

<i>Poverty</i>						
Yes	1.06 (0.75, 1.50)		1.12 (0.77, 1.62)		1.07 (0.75, 1.52)	
<i>Religiosity</i>						
Somewhat Religious	0.88 (0.56, 1.38)		0.87 (0.55, 1.35)		0.89 (0.57, 1.39)	
Very Religious	0.92 (0.58, 1.46)		0.84 (0.52, 1.34)		0.92 (0.58, 1.46)	
<i>Household Structure</i>						
Stepparents	0.87 (0.58, 1.30)		0.90 (0.59, 1.37)		0.88 (0.58, 1.31)	
Single Parent	0.80 (0.61, 1.05)		0.81 (0.61, 1.08)		0.79 (0.60, 1.05)	
No Parents	1.26 (0.70, 2.26)		1.17 (0.67, 2.05)		1.25 (0.70, 2.24)	
<i>Risky Peers</i>						
Peer Substance Use	1.14 (0.83, 1.59)		1.19 (0.85, 1.66)		1.16 (0.83, 1.62)	
Peer Acceptance of Sex	1.08 (0.82, 1.43)		1.07 (0.81, 1.41)		1.08 (0.81, 1.42)	
<i>Socioemotional Risk (Wave I)</i>						
Low Sexual Self-Efficacy	1.04 (0.88, 1.22)		1.07 (0.90, 1.27)		1.04 (0.88, 1.23)	
High Risk-Taking Behavior	2.01 (1.07, 3.77)	*	2.38 (1.27, 4.46)	**	1.98 (1.06, 3.69)	*
<i>Knowledge Risk (Wave I)</i>						
Low Sexual Health Knowledge	1.18 (0.46, 3.04)		1.18 (0.45, 3.09)		1.23 (0.47, 3.19)	
High Perceived Barriers to Contraception	1.06 (0.84, 1.34)		1.06 (0.84, 1.34)		1.05 (0.83, 1.33)	
<b>Adolescent Sexual Risk (Wave II)</b>						
Age at First Sex	0.90 (0.81, 1.00)	*	0.88 (0.79, 0.98)	*	0.89 (0.81, 0.99)	*

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Natural log of number of partners in the past year, plus 1

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \*  $p < 0.05$

### **6.2.2. Mother-Daughter Communication about Sex (Wave I) and Past Year Partnerships (Wave III)**

**Model III.** Unadjusted analyses revealed that mother-daughter communication about sex at Wave I was not associated with past year partnerships at Wave III (Table 6d., Model III).

**Model IV.** Adjusted analyses (controlling for covariates and age at first sex) revealed that mother-daughter communication about sex at Wave I was, again, not associated with having a higher number of past year partnerships (Table 6d., Model IV).

*Covariates.* In this model, being Black and exhibiting high risk-taking behaviors at Wave I were both associated with having a higher number of past year partnerships at Wave III (Table 6d., Model IV). Initiating sex at a later age was associated with having a decreased number of past year partnerships in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models III and IV, the chi-square value of the change in  $-2 \log$  likelihood ratio (a change of 247.47) indicated that Model IV (with covariates) was a better fit at the  $p < 0.001$  level than Model III (without covariates).

### **6.2.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Past Year Partnerships (Wave III)**

**Model V.** Adjusted analyses examining the effect of both maternal parenting style and mother-daughter communication about sex revealed that the effect of authoritarian parenting at Wave I lost significance. Neglectful parenting, however, remained significantly associated with increased number of past year partnerships (AOR: 2.40) (Table 6d., Model V). Mother-daughter communication about sex at Wave I remained

unassociated with past year partnerships.

*Covariates.* In this model, being Black or exhibiting high risk-taking behaviors at Wave I were both associated with having a higher number of past year partnerships at Wave III (Table 6d., Model V). Initiating sex at a later age was associated with having a decreased number of past year partnerships in young adulthood.

*Goodness of fit.* Having added three degrees of freedom between Model II (parenting style only) and Model V (parenting style and mother-daughter communication about sex) and between Model IV (mother-daughter communication about sex only) and Model V (parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (changes of 4.41 and 23.10) indicated that Model V was not a significantly better fit than Model II (parenting style only), but that Model V was a significantly better fit than Model IV (communication about sex only) at the  $p < 0.001$  level.

#### **6.2.4. Socioemotional Risk (Wave II) and Past Year Partnerships (Wave III)**

**Model VI.** Controlling for covariates, high risk taking behavior at Wave II was significantly associated with having a higher number of past year partnerships at Wave III (AOR: 3.17) (Table 6e., Model VI). Low sexual self-efficacy was not associated with number of past year partnerships.

*Covariates.* In this model, being Black was associated with having a higher number of past year partnerships at Wave III (Table 6e., Model VI). Initiating sex at a later age was associated with having a decreased number of past year partnerships.

#### **6.2.5. Sexual Knowledge Risk (Wave II) and Past Year Partnerships (Wave III)**

**Model VII.** Controlling for covariates, neither low sexual health knowledge nor

high perceived barriers to contraception at Wave II were significantly associated with having a higher number of past year partnerships at Wave III (Table 6e., Model VII).

*Covariates.* In this model, being Black and exhibiting high risk-taking behaviors at Wave I were both associated with having a higher number of past year partnerships at Wave III (Table 6e., Model VII). Initiating sex at a later age was associated with having a decreased number of past year partnerships in young adulthood.

Table 6e. Associations<sup>a</sup> between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Past Year Partnerships<sup>b</sup> (Wave III)<sup>c</sup> [Mediators and Dependent Variables]

	Model VI Socioemotional Risk		Model VII Sexual Knowledge Risk	
-2 Log Likelihood	3604.48		3618.46	
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy	1.13 (0.92, 1.39)			
High Risk-Taking Behavior	3.17 (1.49, 6.75)	**		
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			0.93 (0.37, 2.32)	
High Perceived Barriers to Contraception			1.13 (0.90, 1.41)	
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	1.12 (0.79, 1.57)		1.10 (0.78, 1.56)	
Age 17	0.89 (0.61, 1.29)		0.84 (0.59, 1.20)	
Age 18+	0.70 (0.42, 1.17)		0.64 (0.38, 1.08)	
<i>Race/Ethnicity</i>				
Black	2.17 (1.54, 3.06)	**	2.18 (1.56, 3.05)	**
Hispanic	0.88 (0.54, 1.44)		0.92 (0.57, 1.47)	
Asian/Pacific Islander	0.59 (0.27, 1.28)		0.62 (0.29, 1.34)	
Other	0.76 (0.34, 1.71)		0.75 (0.33, 1.70)	
<i>Maternal Education</i>				
High School	1.11 (0.71, 1.72)		1.08 (0.70, 1.67)	
More than High School	1.32 (0.91, 1.91)		1.35 (0.92, 1.98)	
<i>Poverty</i>				
Yes	1.11 (0.76, 1.61)		1.11 (0.77, 1.60)	
<i>Religiosity</i>				
Somewhat Religious	0.88 (0.56, 1.39)		0.86 (0.55, 1.34)	
Very Religious	0.85 (0.53, 1.38)		0.82 (0.51, 1.33)	
<i>Household Structure</i>				
Stepparents	0.89 (0.59, 1.34)		0.89 (0.58, 1.36)	
Single Parent	0.83 (0.63, 1.09)		0.80 (0.60, 1.06)	
No Parents	1.22 (0.70, 2.14)		1.17 (0.66, 2.08)	
<i>Risky Peers</i>				
Peer Substance Use	1.15 (0.84, 1.58)		1.07 (0.82, 1.41)	
Peer Acceptance of Sex	1.04 (0.79, 1.37)			
<i>Socioemotional Risk (Wave I)</i>				
Low Sexual Self-Efficacy	1.01 (0.84, 1.21)		1.06 (0.89, 1.26)	
High Risk-Taking Behavior	1.33 (0.66, 2.67)		2.43 (1.24, 4.43)	**
<i>Knowledge Risk (Wave I)</i>				
Low Sexual Health Knowledge	1.12 (0.42, 3.00)		1.13 (0.40, 3.14)	
High Perceived Barriers to Contraception	1.07 (0.85, 1.34)		1.02 (0.80, 1.31)	
<b>Adolescent Sexual Risk (Wave II)</b>				
Age at First Sex	0.89 (0.80, 0.98)	*	0.88 (0.80, 0.98)	*

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Natural log of number of partners in the past year, plus 1

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \*  $p < 0.05$

### **6.2.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Past Year Partnerships (Wave III)**

**Model VIII.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the socioemotional mediators, neglectful parenting at Wave I remained significantly associated with having a higher number of past year partners (AOR: 2.44) (Table 6f., Model VIII). Mother-daughter communication about sex was not associated with past year partnerships. Of the socioemotional mediators, only high risk-taking behavior was associated with increased numbers of past year partners (AOR: 3.26).

*Covariates.* In this model, being Black was associated with having a higher number of past year partnerships at Wave III (Table 6f., Model VIII). Initiating sex at a later age was associated with having a decreased number of past year partnerships in young adulthood.

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model VIII (parenting style, mother-daughter communication about sex, and the socioemotional mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 15.25) indicated that Model VIII was a significantly better fit than Model V at the  $p < 0.001$  level.

Table 6f. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Past Year Partnerships<sup>b</sup> (Wave III)<sup>c</sup> [Full Model]

	Model V Parenting Style and Communication	Model VIII Parenting Style, Communication, and Socioemotional Risk	Model IX Parenting Style, Communication, and Sexual Knowledge Risk	Model X Full Model
-2 Log Likelihood	3591.84	3576.59	3590.83	3576.33
<b>Maternal Parenting Style (Wave I)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	1.43 (0.98, 2.08)	1.39 (0.96, 2.03)	1.42 (0.98, 2.08)	1.39 (0.95, 2.04)
Permissive	1.27(0.87, 1.87)	1.30 (0.88, 1.91)	1.27 (0.87, 1.86)	1.30 (0.88, 1.91)
Neglectful	2.40 (1.62, 3.56) **	2.44 (1.66, 3.59) **	2.37 (1.57, 3.56) **	2.43 (1.62, 3.63) **
<b>Mother-Daughter Communication about Sex (Wave I)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	1.21 (0.81, 1.79)	1.22 (0.82, 1.98)	1.21 (0.81, 1.80)	1.22 (0.82, 1.81)
Infrequent and Comfortable	1.31 (0.85, 2.03)	1.28 (0.83, 1.98)	1.33 (0.86, 2.05)	1.29 (0.83, 1.99)
Infrequent and Uncomfortable	1.02 (0.68, 1.54)	1.02 (0.67, 1.53)	1.03 (0.68, 1.55)	1.01 (0.68, 1.54)
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy		1.11 (0.90, 1.36)		1.10 (0.89, 1.36)
High Risk-Taking Behavior		3.26 (1.53, 6.92) **		3.22 (1.50, 6.90) **
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			1.03 (0.40, 2.64)	1.06 (0.41, 2.74)
High Perceived Barriers to Contraception			1.10 (0.88, 1.37)	1.05 (0.83, 1.32)
<b>Covariates (Wave I)</b>				
Age				
Age 16	1.06 (0.74, 1.51)	1.07 (0.76, 1.52)	1.07 (0.74, 1.52)	1.08 (0.76, 1.53)
Age 17	0.77 (0.54, 1.09)	0.80 (0.55, 1.16)	0.76 (0.54, 1.09)	0.80 (0.55, 1.16)
Age 18+	0.59 (0.35, 1.02)	0.65 (0.38, 1.11)	0.60 (0.35, 1.04)	0.65 (0.38, 1.12)

Table 6f. Continued

<i>Race/Ethnicity</i>								
Black	2.16 (1.53, 3.04)	**	2.12 (1.49, 3.02)	**	2.15 (1.52, 3.04)	**	2.12 (1.48, 3.02)	**
Hispanic	0.91 (0.57, 1.45)		0.85 (0.53, 1.39)		0.89 (0.56, 1.42)		0.85 (0.52, 1.38)	
Asian/Pacific Islander	0.64 (0.30, 1.37)		0.60 (0.28, 1.28)		0.63 (0.29, 1.34)		0.60 (0.28, 1.27)	
Other	0.78 (0.34, 1.77)		0.76 (0.33, 1.73)		0.76 (0.33, 1.75)		0.75 (0.33, 1.73)	
<i>Maternal Education</i>								
High School	1.10 (0.72, 1.67)		1.12 (0.73, 1.73)		1.10 (0.73, 1.68)		1.13 (0.74, 1.73)	
More than High School	0.78 (0.34, 1.77)		1.30 (0.90, 1.88)		1.33 (0.92, 1.94)		1.30 (0.90, 1.88)	
<i>Poverty</i>								
Yes	1.07 (0.75, 1.52)		1.06 (0.74, 1.52)		1.07 (0.75, 1.52)		1.07 (0.74, 1.53)	
<i>Religiosity</i>								
Somewhat Religious	0.89 (0.57, 1.39)		0.91 (0.58, 1.44)		0.89 (0.57, 1.38)		0.91 (0.58, 1.44)	
Very Religious	0.92 (0.58, 1.46)		0.94 (0.58, 1.51)		0.90 (0.56, 1.45)		0.93 (0.57, 1.51)	
<i>Household Structure</i>								
Stepparents	0.88 (0.58, 1.31)		0.87 (0.59, 1.30)		0.87 (0.58, 1.32)		0.87 (0.59, 1.30)	
Single Parent	0.79 (0.60, 1.05)		0.81 (0.61, 1.06)		0.79 (0.59, 1.05)		0.80 (0.60, 1.06)	
No Parents	1.25 (0.70, 2.24)		1.20 (0.73, 2.30)		1.24 (0.69, 2.24)		1.29 (0.72, 2.32)	
<i>Risky Peers</i>								
Peer Substance Use	1.16 (0.83, 1.62)		1.14 (0.83, 1.57)		1.16 (0.83, 1.61)		1.14 (0.83, 1.57)	
Peer Acceptance of Sex	1.08 (0.81, 1.42)		1.04 (0.79, 1.37)		1.08 (0.82, 1.42)		1.04 (0.80, 1.36)	
<i>Socioemotional Risk (Wave I)</i>								
Low Sexual Self-Efficacy	1.04 (0.88, 1.23)		0.98 (0.83, 1.17)		1.03 (0.87, 1.22)		0.98 (0.83, 1.17)	
High Risk-Taking Behavior	1.98 (1.06, 3.69)	*	1.10 (0.55, 2.21)		1.94 (1.03, 3.64)	*	1.10 (0.55, 2.21)	
<i>Knowledge Risk (Wave I)</i>								
Low Sexual Health Knowledge	1.23 (0.47, 3.19)		1.22 (0.46, 3.24)		1.18 (0.41, 3.41)		1.18 (0.40, 3.46)	
High Perceived Barriers to Contraception	1.05 (0.83, 1.33)		1.05 (0.83, 1.33)		1.01 (0.79, 1.30)		1.03 (0.80, 1.33)	
<b>Adolescent Sexual Risk (Wave II)</b>								
Age at First Sex	0.89 (0.81, 0.99)	*	0.89 (0.81, 0.99)	*	0.89 (0.80, 0.99)	*	0.89 (0.81, 0.99)	*

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Natural log of number of partners in the past year, plus 1

<sup>c</sup> N = 1,546 females aged 15 - 20 (Wave I) in the United States

\*\*  $p < 0.01$ , \*  $p < 0.05$

### **6.2.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Past Year Partnerships (Wave III)**

**Model IX.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the sexual knowledge mediators, neglectful parenting at Wave I remained significantly associated with having a higher number of past year partners (AOR: 2.37) (Table 6f., Model IX). Mother-daughter communication about sex was not associated with past year partnerships. Neither of the sexual knowledge mediators was associated with number of past year partnerships.

*Covariates.* In this model, being Black and exhibiting high risk-taking behaviors at Wave I were both associated with having a higher number of past year partnerships at Wave III (Table 6f., Model IX). Initiating sex at a later age was associated with having a decreased number of past year partnerships in young adulthood.

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model IX (parenting style, mother-daughter communication about sex, and the sexual knowledge mediators), the chi-square value of the change in  $-2 \log$  likelihood ratio (a change of 1.01) indicated that Model IX was not a significantly better fit than Model V.

### **6.2.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Past Year Partnerships (Wave III) [Full Model]**

**Model X.** In the full model (with both maternal parenting style and mother-daughter communication about sex variables, both socioemotional and sexual knowledge

mediators, and covariates), analyses revealed that neglectful parenting at Wave I remained significantly associated with having a higher number of past year partners (AOR: 2.43) (Table 6f., Model X). Mother-daughter communication about sex was not associated with past year partnerships.

Of the socioemotional and sexual knowledge mediators, only high risk-taking behavior was associated with having a higher number of past year partnerships at Wave III (AOR: 3.22). However, despite the fact that parenting style was associated with past year partnerships and high risk-taking behaviors were associated with past year partnerships, high risk-taking behavior did not mediate the former relationship. For one, parenting style (namely, authoritarian parenting) was associated with a *decreased* likelihood of high risk-taking behavior. Second, the addition of the hypothesized mediators did not weaken the association between parenting style and number of past year partnerships. As such, it appears that parenting style at Wave I had a direct effect on number of past year partnerships, and this relationship was not mediated by any socioemotional or sexual knowledge variables.

*Covariates.* In the full model, being Black was associated with having a higher number of past year partnerships at Wave III (Table 6f., Model X). Initiating sex at a later age was associated with having a decreased number of past year partnerships in young adulthood.

*Goodness of fit.* Comparing Model X and Model V, which had a difference in degrees of freedom of four, the chi-square value of the change in -2 log likelihoods (a change of 15.51) indicated that Model X was a better fit at the  $p < 0.005$  level. Comparing Model X and Model VIII (parenting style, communication about sex, and

socioemotional mediators) and Model X and Model IX (parenting style, communication about sex, and sexual knowledge mediators), both of which had a differences in degrees of freedom of two, the chi-square values of the changes in  $-2 \log$  likelihoods (changes of 0.26 and 14.50, respectively) indicated that Model X was not a significantly a better fit than Model VIII, but that Model X was a statistically better model than Model IX at the  $p < 0.001$  level.

### 6.3. Inconsistent Condom Use

#### 6.3.1. Maternal Parenting Style (Wave I) and Inconsistent Condom Use (Wave III)

**Model I.** Unadjusted analyses revealed that, among those with at least one sex partner in the previous year, parenting style at Wave I was not associated with inconsistent condom use at Wave III (Table 6g., Model I).

**Model II.** Adjusted analyses (controlling for covariates, for having one *versus* two or more sex partners in the past year, and for adolescent inconsistent condom use) revealed that parenting style at Wave I, again, was not associated with inconsistent condom use at Wave III (Table 6g., Model II).

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6g., Model II). Exhibiting inconsistent condom use in adolescence (Wave II) was associated with a much greater likelihood of exhibiting inconsistent condom use in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models I and II, the chi-square value of the change in -2 log likelihood ratio (a change of 319.88) indicated that Model II (with covariates) was a significantly better fit than Model I (without covariates) at the  $p < 0.001$  level.

Table 6g. Associations between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Condom Use<sup>b</sup> (Wave III)<sup>c</sup>  
 [Independent Variables and Dependent Variables, Reduced Form]

	Model I Parenting Style	Model II Parenting Style	Model III Communication	Model IV Communication	Model V Parenting Style and Communication
-2 Log Likelihood	1225.52	905.64	1225.24	903.39	897.09
<b>Maternal Parenting Style (Wave I)</b>					
Authoritative	Reference	Reference			Reference
Authoritarian	1.29 (0.84, 1.97)	0.98 (0.60, 1.61)			0.94 (0.58, 1.51)
Permissive	1.55 (0.77, 3.10)	1.68 (0.83, 3.38)			1.69 (0.84, 3.42)
Neglectful	1.44 (0.73, 2.83)	1.79 (0.86, 3.70)			1.69 (0.81, 3.53)
<b>Mother-Daughter Communication about Sex (Wave I)</b>					
Frequent and Comfortable			Reference	Reference	Reference
Frequent and Uncomfortable			1.05 (0.67, 1.63)	1.13 (0.66, 1.93)	1.13 (0.65, 1.97)
Infrequent and Comfortable			0.85 (0.52, 1.40)	0.75 (0.44, 1.27)	0.74 (0.43, 1.25)
Infrequent and Uncomfortable			1.43 (0.85, 2.40)	1.63 (0.83, 3.19)	1.61 (0.83, 3.14)
<b>Covariates (Wave I)</b>					
<i>Age</i>					
Age 16		1.44 (0.84, 2.46)		1.45 (0.84, 2.50)	1.36 (0.79, 2.36)
Age 17		1.07 (0.66, 1.71)		1.22 (0.76, 1.95)	1.06 (0.65, 1.72)
Age 18+		1.70 (0.70, 4.14)		1.96 (0.81, 4.73)	1.65 (0.68, 4.05)
<i>Race/Ethnicity</i>					
Black		0.41 (0.25, 0.68)	**	0.40 (0.25, 0.65)	** 0.39 (0.24, 0.62) **
Hispanic		0.52 (0.25, 1.07)		0.51 (0.25, 1.02)	0.48 (0.23, 1.01)
Asian/Pacific Islander		0.22 (0.06, 0.87)	*	0.22 (0.05, 0.88)	* 0.20 (0.05, 0.80) *
Other Race		0.78 (0.13, 4.64)		0.84 (0.14, 4.97)	0.81 (0.13, 5.14)
<i>Maternal Education</i>					
High School		1.03 (0.48, 2.20)		1.07 (0.51, 2.28)	1.07 (0.48, 2.37)
More than High School		0.70 (0.43, 1.14)		0.78 (0.46, 1.34)	0.77 (0.44, 1.35)
<i>Poverty</i>					
Yes		0.96 (0.63, 1.47)		0.93 (0.61, 1.41)	0.91 (0.60, 1.40)

Table 6g. Continued

<i>Religiosity</i>						
Somewhat Religious	0.87 (0.44-1.75)		0.87 (0.43, 1.77)		0.88 (0.43, 1.81)	
Very Religious	1.20 (0.50-2.91)		1.13 (0.46, 2.77)		1.18 (0.48, 2.92)	
<i>Household Structure</i>						
Stepparents	1.54 (0.77, 3.08)		1.55 (0.75, 3.20)		1.59 (0.77, 3.27)	
Single Parent	1.46 (0.87, 2.43)		1.57 (0.95, 2.60)		1.51 (0.90, 2.53)	
No Parents	1.26 (0.33, 4.91)		1.31 (0.37, 4.64)		1.28 (0.35, 4.60)	
<i>Risky Peers</i>						
Peer Substance Use	1.65 (0.93, 2.93)		1.65 (0.94, 2.92)		1.63 (0.92, 2.90)	
Peer Acceptance of Sex	1.14 (0.70, 1.87)		1.11 (0.68, 1.82)		1.13 (0.69, 1.86)	
<i>Socioemotional Risk (Wave I)</i>						
Low Sexual Self-Efficacy	0.99 (0.69, 1.43)		1.00 (0.69, 1.45)		0.99 (0.68, 1.44)	
High Risk-Taking Behavior	1.09 (0.29, 4.09)		1.13 (0.31, 4.07)		1.15 (0.31, 4.27)	
<i>Knowledge Risk (Wave I)</i>						
Low Sexual Health Knowledge	0.46 (0.13, 1.66)		0.45 (0.13, 1.50)		0.45 (0.13, 1.55)	
High Perceived Barriers to Contraception	1.18 (0.72, 1.98)		1.16 (0.73, 1.86)		1.19 (0.73, 1.94)	
<b>Adolescent Sexual Risk (Wave II)</b>						
Inconsistent Condom Use	2.37 (1.46, 3.84)	**	2.40 (1.48, 3.89)	**	2.39 (1.46, 3.90)	**
<b>Past Year Partnerships (Wave III)</b>						
2+ Partners	0.81 (0.51, 1.27)		0.83 (0.55, 1.28)		0.82 (0.52, 1.28)	

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use of condoms at every sexual intercourse in the past year

<sup>c</sup> N=1,429 Females aged 15 -20 (Wave I) in the United States who had 1+ partners in the past year

\*\* p<0.01, \*p<0.05

### **6.3.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave III)**

**Model III.** Unadjusted analyses revealed that mother-daughter communication about sex at Wave I was not associated with an increased risk of inconsistent condom use at Wave III (Table 6g., Model III).

**Model IV.** Adjusted analyses revealed that, again, mother-daughter communication about sex at Wave I was not associated with an increased risk of inconsistent condom use at Wave III (Table 6g., Model IV).

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6g., Model IV). Exhibiting inconsistent condom use in adolescence was associated with a much greater likelihood of exhibiting inconsistent condom use in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models III and IV, the chi-square value of the change in  $-2 \log$  likelihood ratio (a change of 321.85) indicated that Model IV (with covariates) was a better fit at the  $p < 0.001$  level than Model III (without covariates).

### **6.3.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Condom Use (Wave III)**

**Model V.** Adjusted analyses examining the effect of both maternal parenting style and mother-daughter communication about sex revealed that neither parenting style nor mother-daughter communication about sex was significantly associated with adulthood inconsistent condom use (Table 6g., Model V).

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated

with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6g., Model V). Adolescents who exhibited inconsistent condom use in adolescence were significantly more likely to exhibit inconsistent condom use in young adulthood.

*Goodness of fit.* Having added three degrees of freedom between Model II (parenting style only) and Model V (parenting style and mother-daughter communication about sex) and between Model IV (mother-daughter communication about sex only) and Model V (parenting style and mother-daughter communication about sex), the chi-square value of the change in  $-2 \log$  likelihood ratio (changes of 8.55 and 6.30, respectively) indicated that Model V was a significantly better fit than Model II (parenting style only) at the  $p < 0.05$  level, but that Model V was not a significantly better fit than Model IV (communication about sex only) at the  $p < 0.05$  level.

#### **6.3.4. Socioemotional Risk (Wave II) and Inconsistent Condom Use (Wave III)**

**Model VI.** Controlling for covariates, neither low sexual self-efficacy nor high risk taking behavior at Wave II were significantly associated with inconsistent condom use at Wave III.

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6h., Model VI). Exhibiting inconsistent condom use in adolescence was associated with a much greater likelihood of exhibiting inconsistent condom use in young adulthood.

#### **6.3.5. Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave III)**

**Model VII.** Controlling for covariates, neither low sexual health knowledge nor high perceived barriers to contraception at Wave II were significantly associated with inconsistent condom use at Wave III (Table 6h., Model VII).

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6h., Model VII). Exhibiting inconsistent condom use in adolescence was associated with a much greater likelihood of inconsistent condom use in young adulthood.

Table 6h. Associations<sup>a</sup> between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Inconsistent Condom Use<sup>b</sup> (Wave III)<sup>c</sup> [Mediators and Dependent Variables]

	Model VI		Model VII	
	Socioemotional Risk		Sexual Knowledge Risk	
-2 Log Likelihood	908.75		909.30	
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy	1.24 (0.86, 1.77)			
High Risk-Taking Behavior	0.59 (0.16, 2.16)			
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			2.74 (0.54, 13.79)	
High Perceived Barriers to Contraception			1.00 (0.65, 1.55)	
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	1.56 (0.92, 2.66)		1.55 (0.91, 2.63)	
Age 17	1.21 (0.75, 1.96)		1.22 (0.77, 1.93)	
Age 18+	1.98 (0.79, 4.92)		2.01 (0.83, 4.85)	
<i>Race/Ethnicity</i>				
Black	0.44 (0.27, 0.70)	**	0.42 (0.26, 0.70)	**
Hispanic	0.54 (0.27, 1.08)		0.54 (0.27, 1.10)	
Asian/Pacific Islander	0.22 (0.05, 0.93)	*	0.25 (0.06, 1.03)	
Other Race	0.80 (0.15, 4.24)		0.87 (0.14, 5.34)	
<i>Maternal Education</i>				
High School	1.04 (0.50, 2.17)		1.08 (0.52, 2.24)	
More than High School	0.73 (0.45, 1.17)		0.73 (0.45, 1.20)	
<i>Poverty</i>				
Yes	0.96 (0.63, 1.47)		0.99 (0.65, 1.50)	
<i>Religiosity</i>				
Somewhat Religious	0.84 (0.42, 1.69)		0.85 (0.43, 1.67)	
Very Religious	1.11 (0.46, 2.64)		1.12 (0.47, 2.66)	
<i>Household Structure</i>				
Stepparents	1.51 (0.75, 3.03)		1.50 (0.75, 3.00)	
Single Parent	1.56 (0.94, 2.58)		1.51 (0.92, 2.50)	
No Parents	1.27 (0.33, 4.81)		1.25 (0.33, 4.76)	
<i>Risky Peers</i>				
Peer Substance Use	1.69 (0.95, 2.98)		1.66 (0.95, 2.89)	
Peer Acceptance of Sex	1.10 (0.68, 1.79)		1.15 (0.70, 1.90)	
<i>Socioemotional Risk (Wave I)</i>				
Low Sexual Self-Efficacy	0.97 (0.69, 1.38)		1.00 (0.71, 1.42)	
High Risk-Taking Behavior	1.28 (0.30, 5.43)		1.09 (0.29, 4.08)	
<i>Knowledge Risk (Wave I)</i>				
Low Sexual Health Knowledge	0.43 (0.12, 1.56)		0.30 (0.08, 1.12)	
High Perceived Barriers to Contraception	1.12 (0.70, 1.80)		1.13 (0.64, 1.98)	
<b>Adolescent Sexual Risk (Wave II)</b>				
Inconsistent Condom Use	2.30 (1.43, 3.71)	**	2.43 (1.49, 3.95)	**
<b>Past Year Partnerships (Wave III)</b>				
2+ Partners	0.83 (0.54, 1.29)		0.83 (0.54, 1.27)	

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use of condoms at every sexual intercourse in the past year

<sup>c</sup> N=1,429 Females aged 15 -20 (Wave I) in the United States who had 1+ partners in the past year

\*\* p<0.01, \*p<0.05

### **6.3.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Condom Use (Wave III)**

**Model VIII.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the socioemotional mediators, neither low sexual health knowledge nor high perceived barriers to contraception at Wave II were significantly associated with inconsistent condom use at Wave III (Table 6i., Model VIII). Neither socioemotional mediator was significantly associated with inconsistent condom use.

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6i., Model VIII). Exhibiting inconsistent condom use in adolescence was associated with a significantly greater likelihood of exhibiting inconsistent condom use in young adulthood.

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model VIII (parenting style, mother-daughter communication about sex, and the socioemotional mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 2.87) indicated that Model VIII was not a statistically better fit than Model V.

Table 6i. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Condom Use<sup>b</sup> (Wave III)<sup>c</sup> [Full Model]

	Model V Parenting Style and Communication	Model VIII Parenting Style, Communication, and Socioemotional Risk	Model IX Parenting Style, Communication, and Sexual Knowledge Risk	Model X Full Model
-2 Log Likelihood	897.09	894.22	893.96	891.18
<b>Maternal Parenting Style (Wave I)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	0.94 (0.58, 1.51)	0.92 (0.57, 1.48)	0.95 (0.58, 1.55)	0.93 (0.57, 1.52)
Permissive	1.69 (0.84, 3.42)	1.64 (0.81, 3.33)	1.71 (0.85, 3.42)	1.65 (0.82, 3.32)
Neglectful	1.69 (0.81, 3.53)	1.68 (0.81, 3.50)	1.72 (0.84, 3.52)	1.72 (0.84, 3.51)
<b>Mother-Daughter Communication about Sex (Wave I)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	1.13 (0.65, 1.97)	1.11 (0.64, 1.94)	1.12 (0.66, 1.92)	1.09 (0.64, 1.87)
Infrequent and Comfortable	0.74 (0.43, 1.25)	0.73 (0.43, 1.23)	0.73 (0.43, 1.22)	0.71 (0.42, 1.20)
Infrequent and Uncomfortable	1.61 (0.83, 3.14)	1.60 (0.82, 3.11)	1.64 (0.85, 3.16)	1.62 (0.84, 3.14)
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy		1.23 (0.87, 1.76)		1.23 (0.86, 1.76)
High Risk-Taking Behavior		0.65 (0.17, 2.42)		0.64 (0.18, 2.35)
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			3.06 (0.56, 16.78)	2.93 (0.53, 16.16)
High Perceived Barriers to Contraception			0.96 (0.64, 1.45)	0.93 (0.62, 1.39)
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	1.36 (0.79, 2.36)	1.39 (0.80, 2.41)	1.38 (0.80, 2.39)	1.40 (0.81, 2.43)
Age 17	1.06 (0.65, 1.72)	1.05 (0.64, 1.74)	1.05 (0.65, 1.72)	1.06 (0.64, 1.75)
Age 18+	1.65 (0.68, 4.05)	1.65 (0.65, 4.18)	1.65 (0.67, 4.07)	1.63 (0.64, 4.16)
<i>Race/Ethnicity</i>				
Black	0.39 (0.24, 0.62) **	0.39 (0.25, 0.63) **	0.38 (0.23, 0.62) **	0.39 (0.24, 0.63) **
Hispanic	0.48 (0.23, 1.01)	0.49 (0.23, 1.02)	0.49 (0.23, 1.03)	0.49 (0.23, 1.04)
Asian/Pacific Islander	0.20 (0.05, 0.80) *	0.19 (0.05, 0.79) *	0.22 (0.06, 0.86) *	0.21 (0.05, 0.84) *
Other Race	0.81 (0.13, 5.14)	0.79 (0.13, 4.78)	0.88 (0.13, 6.16)	0.86 (0.13, 5.70)

Table 6i. Continued

<i>Maternal Education</i>								
High School	1.07 (0.48, 2.37)		1.07 (0.48, 2.37)		1.11 (0.50, 2.48)		1.11 (0.50, 2.48)	
More than High School	0.77 (0.44, 1.35)		0.79 (0.45, 1.38)		0.81 (0.46, 1.42)		0.82 (0.46, 1.46)	
<i>Poverty</i>								
Yes	0.91 (0.60, 1.40)		0.89 (0.58, 1.38)		0.92 (0.60, 1.40)		0.89 (0.58, 1.37)	
<i>Religiosity</i>								
Somewhat Religious	0.88 (0.43, 1.81)		0.86 (0.42, 1.79)		0.88 (0.43, 1.77)		0.86 (0.42, 1.76)	
Very Religious	1.18 (0.48, 2.92)		1.14 (0.46, 2.80)		1.15 (0.47, 2.83)		1.11 (0.46, 2.72)	
<i>Household Structure</i>								
Stepparents	1.59 (0.77, 3.27)		1.59 (0.77, 3.28)		1.59 (0.77, 3.27)		1.59 (0.77, 3.29)	
Single Parent	1.51 (0.90, 2.53)		1.55 (0.92, 2.60)		1.52 (0.90, 2.55)		1.56 (0.92, 2.62)	
No Parents	1.28 (0.35, 4.60)		1.26 (0.35, 4.47)		1.25 (0.35, 4.47)		1.24 (0.35, 4.36)	
<i>Risky Peers</i>								
Peer Substance Use	1.63 (0.92, 2.90)		1.65 (0.92, 2.96)		1.63 (0.92, 2.87)		1.65 (0.93, 2.93)	
Peer Acceptance of Sex	1.13 (0.69, 1.86)		1.11 (0.67, 1.82)		1.16 (0.69, 1.93)		1.13 (0.68, 1.89)	
<i>Socioemotional Risk (Wave I)</i>								
Low Sexual Self-Efficacy	0.99 (0.68, 1.44)		0.95 (0.67, 1.36)		0.99 (0.69, 1.43)		0.96 (0.67, 1.37)	
High Risk-Taking Behavior	1.15 (0.31, 4.27)		1.30 (0.30, 5.62)		1.16 (0.31, 4.44)		1.33 (0.31, 5.83)	
<i>Knowledge Risk (Wave I)</i>								
Low Sexual Health Knowledge	0.45 (0.13, 1.55)		0.43 (0.12, 1.52)		0.29 (0.08, 1.08)		0.29 (0.08, 1.08)	
High Perceived Barriers to Contraception	1.19 (0.73, 1.94)		1.16 (0.72, 1.89)		1.17 (0.67, 2.06)		1.16 (0.66, 2.04)	
<b>Adolescent Sexual Risk (Wave II)</b>								
Inconsistent Condom Use	2.39 (1.46, 3.90)	**	2.30 (1.40, 3.76)	**	2.43 (1.47, 4.01)	**	2.36 (1.42, 3.91)	**
<b>Past Year Partnerships (Wave III)</b>								
2+ Partners	0.82 (0.52, 1.28)		0.81 (0.52, 1.28)		0.82 (0.52, 1.27)		0.81 (0.52, 1.28)	

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use of condoms at every sexual intercourse in the past year

<sup>c</sup> N = 1,429 Females aged 15 -20 (Wave I) in the United States who had 1+ partners in the past year

\*\* p<0.01, \*p<0.05

### **6.3.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Condom Use (Wave III)**

**Model IX.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the sexual knowledge mediators, neither low sexual health knowledge nor high perceived barriers to contraception at Wave II were significantly associated with inconsistent condom use at Wave III (Table 6i., Model IX). In this model, neither of the sexual knowledge risk mediators was associated with inconsistent condom use at Wave III.

*Covariates.* In this model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6i., Model IX). Adolescents who exhibited inconsistent condom use in adolescence were significantly more likely to exhibit inconsistent condom use in young adulthood.

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model IX (parenting style, mother-daughter communication about sex, and the sexual knowledge mediators), the chi-square value of the change in  $-2 \log$  likelihood ratio (a change of 0.26) indicated that Model IX was not a statistically better fit than Model V.

### **6.3.8. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Condom Use (Wave III) [Full Model]**

**Model X.** In the full model (with both maternal parenting style and mother-daughter communication about sex variables, both socioemotional and sexual knowledge

mediators, and covariates), analyses again revealed that neither low sexual health knowledge nor high perceived barriers to contraception at Wave II were significantly associated with inconsistent condom use at Wave III (Table 6i., Model X).

In the full model, neither the socioemotional risk mediators nor the sexual knowledge risk mediators were associated with inconsistent condom use at Wave III (Table 6i., Model X). Thus, since neither socioemotional risk nor sexual knowledge risk was associated with inconsistent condom use, and since neither parenting style nor mother-child communication about sex were associated with inconsistent condom use, it appears that these variables were not directly associated with this sexual risk behavior. However, the variable that was most consistently and strongly associated with adulthood inconsistent condom use was adolescent inconsistent condom use. Since it was established in the previous chapter that parenting style was associated with adolescent inconsistent condom use, it appears that parenting style had an indirect effect on this behavior in adulthood.

*Covariates.* Again, in the full model, being Black or Asian/Pacific Islander was associated with a decreased likelihood of exhibiting inconsistent condom use at Wave III (Table 6i., Model X). As noted above, adolescents who exhibited inconsistent condom use in adolescence were significantly more likely to exhibit inconsistent condom use in young adulthood.

*Goodness of fit.* Comparing Model X and Model V, which had a difference in degrees of freedom of six, the chi-square value of the change in -2 log likelihood (a change of 5.91) indicated that Model X was not a statistically significantly better fit. Additionally, comparing Model X and Model VIII (parenting style, communication about

sex, and socioemotional mediators) and Model X and Model IX (parenting style, communication about sex, and sexual knowledge mediators), both of which had a differences in degrees of freedom of two, the chi-square values of the changes in  $-2 \log$  likelihoods (changes of 3.04 and 2.81, respectively) indicated that Model X was not a statistically significantly better fit than either Model VIII or IX.

## 6.4. Inconsistent Contraceptive Use

### 6.4.1. Maternal Parenting Style (Wave I) and Inconsistent Contraceptive Use (Wave III)

**Model I.** Unadjusted analyses revealed that, among those who had at least one sex partner in the year prior to Wave III, parenting style at Wave I was not associated with inconsistent contraceptive use at Wave III (Table 6j., Model I).

**Model II.** Adjusted analyses (controlling for covariates, for having one *versus* two or more partners in the previous year, and for adolescent inconsistent contraceptive use) among revealed that, again, among those with two or more partners in the previous year, parenting style at Wave I was not associated with inconsistent contraceptive use at Wave III (Table 6j., Model II).

*Covariates.* In this model, being Hispanic was associated with an increased likelihood of inconsistent contraceptive use (Table 6j., Model II). Having two or more partners in the previous year was associated with a decreased likelihood of exhibiting inconsistent contraceptive use in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models I and II, the chi-square value of the change in -2 log likelihood ratio (a change of 211.41) indicated that Model II (with covariates) was a significantly better fit than Model I (without covariates) at the  $p < 0.001$  level.

Table 6j. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Contraceptive Use<sup>b</sup> (Wave III)<sup>c</sup> [Independent Variables and Dependent Variables, Reduced Form]

	Model I Parenting Style	Model II Parenting Style	Model III Communication	Model IV Communication	Model V Parenting Style and Communication
-2 Log Likelihood	1083.59	872.18	1076.14	857.82	857.47
<b>Maternal Parenting Style (Wave I)</b>					
Authoritative	Reference	Reference			Reference
Authoritarian	0.89 (0.58, 1.38)	0.87 (0.49, 1.57)			0.97 (0.53, 1.77)
Permissive	0.93 (0.56, 1.57)	0.93 (0.53, 1.66)			0.98 (0.54, 1.78)
Neglectful	1.20 (0.61, 2.39)	1.05 (0.47, 2.38)			1.17 (0.51, 2.67)
<b>Mother-Daughter Communication about Sex (Wave I)</b>					
Frequent and Comfortable			Reference	Reference	Reference
Frequent and Uncomfortable			0.60 (0.32, 1.11)	0.38 (0.18, 0.80) *	0.38 (0.18, 0.81) *
Infrequent and Comfortable			0.60 (0.36, 1.01)	0.59 (0.30, 1.19)	0.59 (0.29, 1.19)
Infrequent and Uncomfortable			0.68 (0.38, 1.21)	0.51 (0.27, 0.98) *	0.51 (0.26, 0.98) *
<b>Covariates (Wave I)</b>					
<i>Age</i>					
Age 16		0.76 (0.44, 1.30)		0.77 (0.46, 1.30)	0.77 (0.45, 1.31)
Age 17		0.79 (0.43, 1.47)		0.85 (0.45, 1.57)	0.84 (0.45, 1.54)
Age 18+		0.67 (0.27, 1.66)		0.75 (0.40, 1.82)	0.74 (0.30, 1.83)
<i>Race/Ethnicity</i>					
Black		1.01 (0.51, 2.00)		1.11 (0.56, 2.21)	1.10 (0.56, 2.19)
Hispanic		2.13 (1.02, 4.42) *		2.55 (1.20, 5.41) *	2.51 (1.18, 5.37) *
Asian/Pacific Islander		1.90 (0.61, 5.92)		2.13 (0.67, 6.71)	2.09 (0.67, 6.55)
Other Race		1.28 (0.16, 10.54)		1.20 (0.14, 10.12)	1.17 (0.14, 10.13)
<i>Maternal Education</i>					
High School		0.94 (0.50, 1.79)		0.82 (0.43, 1.56)	0.81 (0.43, 1.53)
More than High School		0.57 (0.32, 1.00)		0.47 (0.26, 0.84) *	0.46 (0.26, 0.82) **
<i>Poverty</i>					
Yes		0.80 (0.48, 1.33)		0.77 (0.46, 1.29)	0.76 (0.45, 1.28)

Table 6j. Continued

<i>Religiosity</i>						
Somewhat Religious	0.71 (0.36, 1.42)		0.69 (0.35, 1.38)		0.69 (0.34, 1.40)	
Very Religious	0.47 (0.20, 1.12)		0.50 (0.21, 1.18)		0.51 (0.21, 1.22)	
<i>Household Structure</i>						
Stepparents	1.49 (0.70, 3.16)		1.33 (0.63, 2.84)		1.33 (0.61, 2.90)	
Single Parent	1.53 (0.88, 2.67)		1.45 (0.83, 2.53)		1.44 (0.82, 2.52)	
No Parents	1.47 (0.51, 4.29)		1.50 (0.51, 4.44)		1.47 (0.49, 4.43)	
<i>Risky Peers</i>						
Peer Substance Use	1.07 (0.53, 2.13)		1.03 (0.50, 2.11)		1.03 (0.51, 2.08)	
Peer Acceptance of Sex	1.03 (0.62, 1.71)		1.07 (0.64, 1.79)		1.06 (0.63, 1.79)	
<i>Socioemotional Risk (Wave I)</i>						
Low Sexual Self-Efficacy	1.12 (0.84, 1.48)		1.13 (0.85, 1.50)		1.13 (0.85, 1.50)	
High Risk-Taking Behavior	0.69 (0.15, 3.23)		0.65 (0.14, 2.90)		0.65 (0.13, 3.14)	
<i>Knowledge Risk (Wave I)</i>						
Low Sexual Health Knowledge	1.12 (0.27, 4.61)		1.01 (0.25, 4.04)		1.06 (0.26, 4.36)	
High Perceived Barriers to Contraception	1.39 (0.97, 1.98)		1.44 (1.02, 2.03)	*	1.43 (1.01, 2.03)	*
<b>Adolescent Sexual Risk (Wave II)</b>						
Inconsistent Contraceptive Use	0.80 (0.48, 1.31)		0.77 (0.46, 1.28)		0.77 (0.47, 1.28)	
<b>Past Year Partnerships (Wave III)</b>						
2+ Partners	0.43 (0.24, 0.76)	**	0.44 (0.25, 0.77)	**	0.43 (0.25, 0.76)	**

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use of at least one form of contraception (condom, hormonal birth control pills, implant, Depo Provera injection, diaphragm, female sterilization, or male sterilization) in the past year

<sup>c</sup> N = 1,429 Females aged 15 -20 (Wave I) in the United States who had 1+ partners in the past year

\*\* p<0.01, \*p<0.05

#### **6.4.2. Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave III)**

**Model III.** Unadjusted analyses revealed that mother-daughter communication about sex at Wave I was not associated with an increased risk of inconsistent contraceptive use at Wave III (Table 6j., Model III).

**Model IV.** Adjusted analyses revealed that both frequent, uncomfortable and infrequent, uncomfortable mother-daughter communication about sex in adolescence were significantly associated with a decreased likelihood of reporting inconsistent contraceptive use in young adulthood (frequent, uncomfortable AOR: 0.38; infrequent, uncomfortable AOR: 0.51) (Table 6j., Model IV).

*Covariates.* In this model, being Hispanic and reporting high perceived barriers to contraception at Wave I were associated with an increased likelihood of inconsistent contraceptive use (Table 6j., Model IV). Having a mother with more than a high school education and having two or more sex partners in the previous year were associated with a decreased likelihood of inconsistent contraceptive use in young adulthood.

*Goodness of fit.* Having added 22 degrees of freedom between Models III and IV, the chi-square value of the change in  $-2 \log$  likelihood ratio (a change of 218.32) indicated that Model IV (with covariates) was a better fit at the  $p < 0.001$  level than Model III (without covariates).

#### **6.4.3. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I) and Inconsistent Contraceptive Use (Wave III)**

**Model V.** With both parenting style and communication about sex in the model, adjusted analyses revealed that, though parenting style remained unassociated with

inconsistent contraceptive use, both frequent, uncomfortable and infrequent, uncomfortable mother-daughter communication about sex in adolescence remained significantly associated with a decreased likelihood of reporting inconsistent contraceptive use in young adulthood (frequent, uncomfortable AOR: 0.38; infrequent, uncomfortable AOR: 0.51) (Table 6j., Model V).

*Covariates.* In this model, being Hispanic and reporting high perceived barriers to contraception at Wave I were associated with an increased likelihood of inconsistent contraceptive use (Table 6j., Model V). Having a mother with more than a high school education and having two or more sex partners in the previous year were associated with a decreased likelihood of inconsistent contraceptive use in young adulthood

*Goodness of fit.* Having added three degrees of freedom between Model II (parenting style only) and Model V (parenting style and mother-daughter communication about sex) and between Model IV (mother-daughter communication about sex only) and Model V (parenting style and mother-daughter communication about sex), the chi-square value of the change in -2 log likelihood ratio (changes of 14.71 and 0.35, respectively) indicated that Model V was a significantly better fit than Model II (parenting style only) at the  $p < 0.0025$  level, but that Model V was not a significantly better fit than Model IV (communication about sex only).

#### **6.4.4. Socioemotional Risk (Wave II) and Inconsistent Contraceptive Use (Wave III)**

**Model VI.** Controlling for covariates, neither socioemotional mediator (low sexual self-efficacy or high risk-taking behaviors) was associated with inconsistent contraceptive use at Wave III (Table 6k., Model VI).

*Covariates.* In this model, being Hispanic was associated with an increased risk of

inconsistent contraceptive use (Table 6k, Model VI). Having two or more partners in the previous year was associated with a decreased likelihood of exhibiting inconsistent contraceptive use in young adulthood.

#### **6.4.5. Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave III)**

**Model VII.** Controlling for covariates, neither sexual knowledge mediator (low sexual health knowledge or high perceived barriers to contraception) was associated with inconsistent contraceptive use at Wave III (Table 6k., Model VII).

*Covariates.* In this model, having two or more partners in the previous year was the only covariate that was significantly associated with a decreased likelihood of exhibiting inconsistent contraceptive use in young adulthood. (Table 6k, Model VII).

Table 6k. Associations<sup>a</sup> between Adolescent Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Young Adult Inconsistent Contraceptive Use<sup>b</sup> (Wave III)<sup>c</sup> [Mediators and Dependent Variables]

	Model VI Socioemotional Risk		Model VII Sexual Knowledge Risk	
-2 Log Likelihood	866.95		864.00	
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy	1.35 (1.00, 1.84)			
High Risk-Taking Behavior	1.02 (0.22, 4.65)			
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			1.80 (0.36, 9.05)	
High Perceived Barriers to Contraception			1.56 (0.96, 2.53)	
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	0.78 (0.46, 1.32)		0.78 (0.45, 1.36)	
Age 17	0.83 (0.45, 1.51)		0.80 (0.42, 1.51)	
Age 18+	0.70 (0.29, 1.67)		0.72 (0.28, 1.84)	
<i>Race/Ethnicity</i>				
Black	1.03 (0.51, 2.09)		0.99 (0.50, 1.95)	
Hispanic	2.08 (1.02, 4.27)	*	2.10 (1.00, 4.42)	
Asian/Pacific Islander	1.74 (0.55, 5.53)		1.93 (0.63, 5.89)	
Other Race	1.33 (0.17, 10.42)		1.23 (0.15, 9.85)	
<i>Maternal Education</i>				
High School	0.97 (0.51, 1.83)		0.99 (0.50, 1.95)	
More than High School	0.58 (0.32, 1.03)		0.59 (0.32, 1.09)	
<i>Poverty</i>				
Yes	0.77 (0.46, 1.29)		0.790 (0.48, 1.31)	
<i>Religiosity</i>				
Somewhat Religious	0.73 (0.38, 1.44)		0.69 (0.35, 1.38)	
Very Religious	0.48 (0.20, 1.15)		0.44 (0.18, 1.04)	
<i>Household Structure</i>				
Stepparents	1.49 (0.71, 3.13)		1.48 (0.72, 3.05)	
Single Parent	1.62 (0.92, 2.85)		1.49 (0.85, 2.60)	
No Parents	1.60 (0.56, 4.55)		1.54 (0.55, 4.32)	
<i>Risky Peers</i>				
Peer Substance Use	1.11 (0.56, 2.19)		1.06 (0.52, 2.14)	
Peer Acceptance of Sex	0.99 (0.60, 1.63)		1.02 (0.61, 1.68)	
<i>Socioemotional Risk (Wave I)</i>				
Low Sexual Self-Efficacy	1.05 (0.79, 1.39)		1.10 (0.84, 1.42)	
High Risk-Taking Behavior	0.62 (0.12, 3.10)		0.61 (0.13, 2.75)	
<i>Knowledge Risk (Wave I)</i>				
Low Sexual Health Knowledge	1.00 (0.23, 4.30)		0.69 (0.14, 3.52)	
High Perceived Barriers to Contraception	1.34 (0.93, 1.93)		1.19 (0.83, 1.70)	
<b>Adolescent Sexual Risk (Wave II)</b>				
Inconsistent Contraceptive Use	0.72 (0.43, 1.22)		0.70 (0.43, 1.12)	
<b>Past Year Partnerships (Wave III)</b>				
2+ Partners	0.42 (0.24, 0.74)	**	0.41 (0.24, 0.72)	**

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use of a form of contraception (condom, hormonal birth control pills, implant, Depo Provera injection, diaphragm, female sterilization, or male sterilization) in the past year

<sup>c</sup> N = 1,429 Females aged 15 -20 (Wave I) in the United States who had 1+ partners in the past year

\*\* p<0.01, \*p<0.05

#### **6.4.6. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Socioemotional Risk (Wave II), and Inconsistent Contraceptive Use (Wave III)**

**Model VIII.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of socioemotional mediators, parenting style remained unassociated with inconsistent contraceptive use, and both frequent, uncomfortable and infrequent, uncomfortable mother-daughter communication about sex in adolescence remained significantly associated with a decreased likelihood of reporting inconsistent contraceptive use in young adulthood (frequent, uncomfortable AOR: 0.39; infrequent, uncomfortable AOR: 0.49) (Table 6I., Model VIII). Additionally, one of the socioemotional variables, low sexual self-efficacy was significantly associated with an increased likelihood of inconsistent contraceptive use (AOR: 1.38).

*Covariates.* In this model, being Hispanic and reporting high perceived barriers to contraception at Wave I were associated with an increased likelihood of inconsistent contraceptive use (Table 6I., Model VIII). Having a mother with more than a high school education and having two or more sex partners in the previous year were associated with a decreased likelihood of inconsistent contraceptive use in young adulthood

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model VIII (parenting style, mother-daughter communication about sex, and the socioemotional mediators), the chi-square value of the change in -2 log likelihoods (a change of 6.31) indicated that Model VIII was a statistically better fit than Model V at the  $p < 0.05$  level.

Table 6I. Associations<sup>a</sup> between Adolescent Mother-Daughter Relationship Characteristics (Wave I) and Young Adult Inconsistent Contraceptive Use<sup>b</sup> (Wave III)<sup>c</sup> [Full Model]

	Model V Parenting Style and Communication	Model VIII Parenting Style, Communication, and Socioemotional Risk	Model IX Parenting Style, Communication, and Sexual Knowledge Risk	Model X Full Model
-2 Log Likelihood	857.47	851.16	848.40	844.65
<b>Maternal Parenting Style (Wave I)</b>				
Authoritative	Reference	Reference	Reference	Reference
Authoritarian	0.97 (0.53, 1.77)	0.92 (0.52, 1.64)	0.95 (0.53, 1.71)	0.92 (0.52, 1.63)
Permissive	0.98 (0.54, 1.78)	0.92 (0.49, 1.71)	0.98 (0.54, 1.79)	0.94 (0.50, 1.75)
Neglectful	1.17 (0.51, 2.67)	1.13 (0.49, 2.64)	1.16 (0.51, 2.62)	1.13 (0.49, 2.63)
<b>Mother-Daughter Communication about Sex (Wave I)</b>				
Frequent and Comfortable	Reference	Reference	Reference	Reference
Frequent and Uncomfortable	0.38 (0.18, 0.81) *	0.39 (0.18, 0.82) *	0.38 (0.18, 0.79) **	0.38 (0.18, 0.80) *
Infrequent and Comfortable	0.59 (0.29, 1.19)	0.58 (0.28, 1.19)	0.60 (0.29, 1.22)	0.59 (0.28, 1.23)
Infrequent and Uncomfortable	0.51 (0.26, 0.98) *	0.49 (0.2, 0.94) *	0.50 (0.26, 0.95) *	0.49 (0.25, 0.93) *
<b>Socioemotional Risk (Wave II)</b>				
Low Sexual Self-Efficacy		1.38 (1.01, 1.88) *		1.29 (0.91, 1.82)
High Risk-Taking Behavior		1.04 (0.22, 4.89)		0.99 (0.22, 4.51)
<b>Sexual Knowledge Risk (Wave II)</b>				
Low Sexual Health Knowledge			1.93 (0.39, 9.62)	1.81 (0.37, 8.92)
High Perceived Barriers to Contraception			1.57 (0.97, 2.54)	1.48 (0.89, 2.45)
<b>Covariates (Wave I)</b>				
<i>Age</i>				
Age 16	0.77 (0.45, 1.31)	0.79 (0.47, 1.34)	0.80 (0.46, 1.38)	0.81 (0.47, 1.40)
Age 17	0.84 (0.45, 1.54)	0.88 (0.48, 1.59)	0.83 (0.44, 1.56)	0.86 (0.46, 1.60)
Age 18+	0.74 (0.30, 1.83)	0.77 (0.32, 1.89)	0.79 (0.31, 2.06)	0.81 (0.32, 2.06)
<i>Race/Ethnicity</i>				
Black	1.10 (0.56, 2.19)	1.12 (0.55, 2.24)	1.06 (0.54, 2.07)	1.08 (0.54, 2.15)
Hispanic	2.51 (1.18, 5.37) *	2.42 (1.15, 5.09) *	2.45 (1.13, 5.33) *	2.39 (1.11, 5.12) *
Asian/Pacific Islander	2.09 (0.67, 6.55)	1.86 (0.57, 6.05)	2.11 (0.68, 6.52)	1.94 (0.61, 6.18)
Other Race	1.17 (0.14, 10.13)	1.18 (0.15, 9.51)	1.12 (0.14, 8.96)	1.13 (0.15, 8.72)

Table 6I. Continued

<i>Maternal Education</i>								
High School	0.81 (0.43, 1.53)		0.83 (0.45, 1.55)		0.86 (0.44, 1.66)		0.86 (0.45, 1.64)	
More than High School	0.46 (0.26, 0.82)	**	0.47 (0.26, 0.84)	*	0.48 (0.26, 0.87)	*	0.48 (0.26, 0.88)	*
<i>Poverty</i>								
Yes	0.76 (0.45, 1.28)		0.73 (0.43, 1.25)		0.75 (0.44, 1.26)		0.72 (0.42, 1.23)	
<i>Religiosity</i>								
Somewhat Religious	0.69 (0.34, 1.40)		0.72 (0.36, 1.45)		0.68 (0.33, 1.39)		0.70 (0.34, 1.44)	
Very Religious	0.51 (0.21, 1.22)		0.52 (0.21, 1.28)		0.47 (0.20, 1.14)		0.49 (0.20, 1.20)	
<i>Household Structure</i>								
Stepparents	1.33 (0.61, 2.90)		1.34 (0.62, 2.92)		1.34 (0.62, 2.87)		1.34 (0.62, 2.88)	
Single Parent	1.44 (0.82, 2.52)		1.52 (0.85, 2.71)		1.40 (0.80, 2.47)		1.47 (0.82, 2.62)	
No Parents	1.47 (0.49, 4.43)		1.55 (0.51, 4.70)		1.50 (0.50, 4.47)		1.56 (0.52, 4.67)	
<i>Risky Peers</i>								
Peer Substance Use	1.03 (0.51, 2.08)		1.07 (0.53, 2.15)		1.02 (0.50, 2.10)		1.07 (0.52, 2.18)	
Peer Acceptance of Sex	1.06 (0.63, 1.79)		1.01 (0.60, 1.70)		1.06 (0.63, 1.77)		1.02 (0.61, 1.71)	
<i>Socioemotional Risk (Wave I)</i>								
Low Sexual Self-Efficacy	1.13 (0.85, 1.50)		1.05 (0.79, 1.40)		1.10 (0.84, 1.45)		1.05 (0.80, 1.39)	
High Risk-Taking Behavior	0.65 (0.13, 3.14)		0.60 (0.11, 3.35)		0.60 (0.12, 3.00)		0.59 (0.10, 3.50)	
<i>Knowledge Risk (Wave I)</i>								
Low Sexual Health Knowledge	1.06 (0.26, 4.36)		0.98 (0.22, 4.29)		0.64 (0.12, 3.41)		0.64 (0.11, 3.70)	
High Perceived Barriers to Contraception	1.43 (1.01, 2.03)	*	1.37 (0.96, 1.96)		1.22 (0.86, 1.72)		1.20 (0.84, 1.71)	
<b>Adolescent Sexual Risk (Wave II)</b>								
Inconsistent Contraceptive Use	0.77 (0.47, 1.28)		0.71 (0.42, 1.20)		0.68 (0.42, 1.11)		0.65 (0.40, 1.07)	
<b>Past Year Partnerships (Wave III)</b>								
2+ Partners	0.43 (0.25, 0.76)	**	0.43 (0.24, 0.76)	**	0.42 (0.24, 0.72)	**	0.42 (0.24, 0.72)	**

<sup>a</sup> Odds ratios and 95% confidence intervals

<sup>b</sup> Inconsistent contraceptive use was defined as the non-use of a form of contraception (condom, hormonal birth control pills, implant, Depo Provera injection, diaphragm, female sterilization, or male sterilization) in the past year

<sup>c</sup> N = 1,429 Females aged 15 -20 (Wave I) in the United States who had 1+ partners in the past year

\*\* p<0.01, \*p<0.05

#### **6.4.7. Maternal Parenting Style and Mother-Daughter Communication about Sex (Wave I), Sexual Knowledge Risk (Wave II), and Inconsistent Contraceptive Use (Wave III)**

**Model IX.** Adjusted analyses revealed that, examining both maternal parenting style and mother-daughter communication about sex with the addition of the sexual knowledge mediators, parenting style remained unassociated with inconsistent contraceptive use, and both frequent, uncomfortable and infrequent, uncomfortable mother-daughter communication about sex in adolescence remained significantly associated with a decreased likelihood of reporting inconsistent contraceptive use in young adulthood (frequent, uncomfortable AOR: 0.38; infrequent, uncomfortable AOR: 0.50) (Table 61., Model IX). Neither sexual knowledge mediator was significantly associated with inconsistent contraceptive use.

*Covariates.* In this model, being Hispanic was associated with an increased likelihood of inconsistent contraceptive use (Table 61., Model IX). Having a mother with more than a high school education and having two or more sex partners in the previous year were associated with a decreased likelihood of inconsistent contraceptive use in young adulthood

*Goodness of fit.* Having added two degrees of freedom between Model V (both parenting style and mother-daughter communication about sex) and Model IX (parenting style, mother-daughter communication about sex, and the sexual knowledge mediators), the chi-square value of the change in -2 log likelihood ratio (a change of 9.07) indicated that Model IX was a statistically better fit than Model V at the  $p < 0.02$  level.

#### **6.4.8. Maternal Parenting Style and Mother-Daughter Communication about Sex**

**(Wave I), Socioemotional Risk and Sexual Knowledge Risk (Wave II) and Inconsistent Contraceptive Use (Wave III) [Full Model]**

**Model X.** In the full model (with both maternal parenting style and mother-daughter communication about sex variables, both socioemotional and sexual knowledge mediators, and covariates), analyses revealed that, again, parenting style was unassociated with inconsistent contraceptive use, and that, again, both frequent, uncomfortable and infrequent, uncomfortable mother-daughter communication about sex in adolescence were significantly associated with a decreased likelihood of reporting inconsistent contraceptive use in young adulthood (frequent, uncomfortable AOR: 0.38; infrequent, uncomfortable AOR: 0.49) (Table 6l., Model X).

In this model, neither the socioemotional risk mediators nor the sexual knowledge risk mediators were associated with inconsistent use (Table 6l., Model X). Further, mother-daughter communication about sex was not associated with any other these variables and the addition of these variables did not attenuate or weaken the association between communication about sex and inconsistent contraceptive use. As such, it appears that mother-daughter communication about sex in adolescence had direct effects on adulthood inconsistent contraceptive use, and that this relationship could not be mediated by any of these variables.

*Covariates.* In this model, being Hispanic was associated with an increased likelihood of inconsistent contraceptive use (Table 6l., Model X). Having a mother with more than a high school education and having two or more sex partners in the previous year were associated with a decreased likelihood of inconsistent contraceptive use in young adulthood

*Goodness of fit.* Comparing Model X and Model V, which had a difference in degrees of freedom of four, the chi-square value of the change in -2 log likelihood (a change of 12.82) indicated that Model X was a better fit at the  $p < 0.02$  level. Comparing Model X and Model VIII (parenting style, communication about sex, and socioemotional mediators) and Model X and Model IX (parenting style, communication about sex, and sexual knowledge mediators), both of which had a differences in degrees of freedom of two, the chi-square values of the changes in -2 log likelihoods (changes of 6.51 and 3.75, respectively) indicated that Model X was a significantly better fit than Model VIII at the  $p < 0.05$  level, but that Model X was not a statistically better model than Model IX.

## **CHAPTER 7: DISCUSSION**

This chapter begins by describing the findings of this study in the context of the hypotheses of this study. This chapter then presents a discussion of the findings regarding the association between the mother-daughter relationship and both adolescent and young adult sexual risk taking. Specifically, this chapter will describe the conclusions that can be drawn based on unadjusted and adjusted analyses between both maternal parenting style and mother-daughter communication about sex (Wave I) and young women's sexual risk-taking behavior, including inconsistent condom and contraceptive use (Waves II and III) and multiple lifetime and past year partnerships (Wave III). This chapter will also provide a discussion of the relevant importance of different aspects of the mother-daughter relationship.

Additionally, this chapter will provide an overview of potential limitations to these analyses and to the interpretation of these analyses. Finally, this chapter will review the potential contribution of the results of this study. In particular, this chapter will discuss ways in which these finding might inform future research and ways in which these finding might best inform programmatic sexual risk prevention and intervention programs.

Table 7a. Maternal Effects on Adolescent Sexual Risk Taking Results

Hypotheses	Pathway	Waves	Results	Findings
<b>Independent Variables and Mediators</b>				
<i>Hypothesis 1:</i> Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of socioemotional risk (low sexual self-efficacy/high risk-taking behaviors).	Parenting Style ↓ Socioemotional Risk Mediators	I ↓ II	Not Supported  <i>Additional Finding</i>	* <u>Authoritarian</u> parenting associated with a <i>decreased</i> likelihood of low sexual self-efficacy and a <i>decreased</i> likelihood of high risk-taking behaviors, compared to authoritative.
<i>Hypothesis 2:</i> Mother child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of sexual knowledge risk (low sexual health knowledge/high perceived barriers to contraception).	Communication about Sex ↓ Sexual Knowledge Risk Mediators	I ↓ II	Not Supported  <i>Additional Finding</i>	* <u>Authoritarian</u> and <u>neglectful</u> parenting styles were both associated with a <i>decreased</i> likelihood of having high perceived barriers to contraception, compared to authoritative.
<b>Adolescent Sexual Risk-Taking Behaviors</b>				
<i>Hypothesis 3, Adolescence:</i> Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of adolescent sexual risk-taking behaviors.	Parenting Style ↓ Inconsistent Condom Use	I ↓ II	Supported	* <u>Authoritarian</u> and <u>permissive</u> parenting associated with an <i>increased</i> likelihood of inconsistent condom use, compared to authoritative.
	Parenting Style ↓ Inconsistent Contraceptive Use	I ↓ II	Supported	* <u>Authoritarian</u> parenting associated with an <i>increased</i> likelihood of inconsistent contraceptive use, compared to authoritative.
<i>Hypothesis 4, Adolescence:</i> Mother child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of adolescent sexual risk-taking behaviors.	Communication about Sex ↓ Inconsistent Condom Use	I ↓ II	Not Supported  <i>Additional Finding</i>	* <u>Infrequent, uncomfortable communication about sex</u> associated with a <i>decreased</i> likelihood of inconsistent condom use.
	Communication about Sex ↓ Inconsistent Condom Use	I ↓ II	Not Supported	
<i>Hypothesis 5, Adolescence:</i> Socioemotional mediators will be associated with a greater likelihood of adolescent sexual risk taking behaviors.	Socioemotional Mediators → Inconsistent Condom Use	II→II	Partially Supported	* <u>Low sexual self-efficacy</u> associated with an <i>increased</i> likelihood of inconsistent condom use.
	Socioemotional Mediators → Inconsistent Contraceptive Use	II→II	Supported	* <u>Low sexual self-efficacy</u> and <u>high risk-taking</u> behaviors associated with an <i>increased</i> likelihood of inconsistent contraceptive use.

Table 7a. Continued

<p><i>Hypothesis 6, Adolescence:</i> Sexual knowledge mediators will be associated with a greater likelihood of adolescent sexual risk taking behaviors.</p>	<p>Sexual Knowledge Mediators → Inconsistent Condom Use</p>	<p>II→II</p>	<p>Partially Supported</p>	<p>* <u>High perceived barriers to contraception</u> associated with an <i>increased</i> risk of inconsistent condom use.</p>
	<p>Sexual Knowledge Mediators → Inconsistent Contraceptive Use</p>	<p>II→II</p>	<p>Partially Supported</p>	<p>* <u>High perceived barriers to contraception</u> associated with an <i>increased</i> risk of inconsistent contraceptive use.</p>
<p><i>Hypothesis 7, Adolescence:</i> The addition of the socioemotional mediators will attenuate the association between maternal parenting style and adolescent sexual risk-taking behaviors implying mediation.</p>	<p>Parenting Style ↓ Inconsistent Condom Use [Through Socioemotional Mediators]</p>	<p>I ↓ II</p>	<p>Not Supported  <i>Additional Finding</i></p>	<p>* <u>Socioemotional variables</u> attenuated the association between <u>parenting style</u> and inconsistent condom use, but did not act as mediators, as the relationship between these variables and parenting style was in the unexpected direction.</p>
	<p>Parenting Style ↓ Inconsistent Contraceptive Use [Through Socioemotional Mediators]</p>	<p>I ↓ II</p>	<p>Not Supported  <i>Additional Finding</i></p>	<p>* <u>Socioemotional variables</u> attenuated the association between <u>parenting style</u> and inconsistent contraceptive use, but did not act as mediators, as the relationship between these variables and parenting style was in the unexpected direction.</p>
<p><i>Hypothesis 8, Adolescence:</i> The addition of the sexual knowledge mediators will attenuate the association between mother-daughter communication about sex and adolescent sexual risk-taking behaviors implying mediation.</p>	<p>Communication about Sex ↓ Inconsistent Condom Use [Through Sexual Knowledge Mediators]</p>	<p>I ↓ II</p>	<p>Not Supported  <i>Additional Finding</i></p>	<p>* <u>Sexual knowledge variables</u> attenuated the association between <u>parenting style</u> and inconsistent condom use, but did not act as mediators, as the relationship between these variables and communication about sex was in the unexpected direction.</p>
	<p>Communication about Sex ↓ Inconsistent Contraceptive Use [Through Sexual Knowledge Mediators]</p>	<p>I ↓ II</p>	<p>Not Supported  <i>Additional Finding</i></p>	<p>* <u>Sexual knowledge variables</u> attenuated the association between <u>parenting style</u> and inconsistent contraceptive use, but did not act as mediators, as the relationship between these variables and communication about sex was in the unexpected direction.</p>

Table 7b. Maternal Effects on Young Adulthood Sexual Risk Taking Results

Hypotheses	Pathway	Waves	Results	Findings
<b>Independent Variables and Mediators</b>				
<i>Hypothesis 1:</i> Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of socioemotional risk (low sexual self-efficacy/high risk-taking behaviors).	Parenting Style ↓ Socioemotional Risk Mediators	I ↓ II	Not Supported  <i>Additional Finding</i>	* <u>Authoritarian</u> parenting associated with a <i>decreased</i> likelihood of low sexual self-efficacy and a <i>decreased</i> likelihood of high risk-taking behaviors, compared to authoritative.
<i>Hypothesis 2:</i> Mother child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of sexual knowledge risk (low sexual health knowledge/high perceived barriers to contraception).	Communication about Sex ↓ Sexual Knowledge Risk Mediators	I ↓ II	Not Supported  <i>Additional Finding</i>	* <u>Authoritarian</u> and <u>neglectful</u> parenting styles were both associated with a <i>decreased</i> likelihood of having high perceived barriers to contraception, compared to authoritative.
<b>Young Adulthood Sexual Risk-Taking Behaviors</b>				
<i>Hypothesis 3, Young Adulthood:</i> Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of young adulthood sexual risk-taking behaviors.	Parenting Style ↓ Multiple Lifetime Partnerships	I ↓ III	Not Supported	
	Parenting Style ↓ Multiple Past Year Partnerships	I ↓ III	Supported	* <u>Neglectful</u> parenting associated with an <i>increased</i> likelihood of higher numbers of past year partners, compared to authoritative.
	Parenting Style ↓ Inconsistent Condom Use	I ↓ III	Not Supported	
	Parenting Style ↓ Inconsistent Contraceptive Use	I ↓ III	Not Supported	

Table 7b. Continued

<p><i>Hypothesis 4, Young Adulthood:</i> Mother child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of young adulthood sexual risk-taking behaviors.</p>	<p>Communication about Sex ↓ Multiple Lifetime Partnerships</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Parenting Style ↓ Multiple Past Year Partnerships</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Communication about Sex ↓ Inconsistent Condom Use</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Communication about Sex ↓ Inconsistent Contraceptive Use</p>	<p>I ↓ III</p>	<p>Not Supported <i>Additional Finding</i></p>	<p>* <u>Frequent, uncomfortable</u> and <u>infrequent, uncomfortable communication about sex</u> associated with <i>decreased</i> risk of inconsistent contraceptive use, compared to frequent, comfortable communication.</p>
<p><i>Hypothesis 5, Young Adulthood:</i> Socioemotional mediators will be associated with a greater likelihood of young adulthood sexual risk taking behaviors.</p>	<p>Socioemotional Mediators ↓ Multiple Lifetime Partnerships</p>	<p>II ↓ III</p>	<p>Partially Supported</p>	<p>* <u>High risk-taking behaviors</u> associated with an <i>increased</i> risk of higher numbers of lifetime partners.</p>
	<p>Socioemotional Mediators ↓ Multiple Past Year Partnerships</p>	<p>II ↓ III</p>	<p>Partially Supported</p>	<p>* <u>High risk-taking behaviors</u> associated with an <i>increased</i> risk of higher numbers of past year partners.</p>
	<p>Socioemotional Mediators ↓ Inconsistent Condom Use</p>	<p>II ↓ III</p>	<p>Not Supported</p>	
	<p>Socioemotional Mediators ↓ Inconsistent Contraceptive Use</p>	<p>II ↓ III</p>	<p>Not Supported</p>	
<p><i>Hypothesis 6 Young Adulthood:</i> Sexual knowledge mediators will be associated with a greater likelihood of young adulthood sexual risk taking behaviors.</p>	<p>Sexual Knowledge Mediators ↓ Multiple Lifetime Partnerships</p>	<p>II ↓ III</p>	<p>Not Supported</p>	
	<p>Sexual Knowledge Mediators ↓ Multiple Past Year Partnerships</p>	<p>II ↓ III</p>	<p>Not Supported</p>	
	<p>Sexual Knowledge Mediators ↓ Inconsistent Condom Use</p>	<p>II ↓ III</p>	<p>Not Supported</p>	
	<p>Sexual Knowledge Mediators ↓ Inconsistent Contraceptive Use</p>	<p>II ↓ III</p>	<p>Not Supported</p>	

Table 7b. Continued

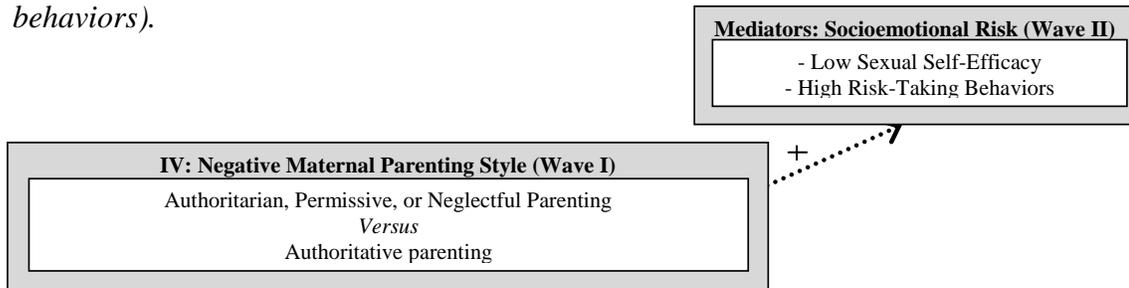
<p><i>Hypothesis 7, Young Adulthood:</i> The addition of the socioemotional mediators will attenuate the association between maternal parenting style and young adulthood sexual risk-taking behaviors implying mediation.</p>	<p>Parenting Style ↓ Multiple Lifetime Partnerships [Through Socioemotional Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Parenting Style ↓ Multiple Past Year Partnerships [Through Socioemotional Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported <i>Additional Finding</i></p>	<p>* The association between <u>parenting style</u> and past year partnerships <i>did not attenuate</i>, and remained significant.</p>
	<p>Parenting Style ↓ Inconsistent Condom Use [Through Socioemotional Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Parenting Style ↓ Inconsistent Contraceptive Use [Through Socioemotional Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
<p><i>Hypothesis 8, Young Adulthood:</i> The addition of the sexual knowledge mediators will attenuate the association between mother-daughter communication about sex and young adulthood sexual risk-taking behaviors implying mediation.</p>	<p>Communication about Sex ↓ Multiple Lifetime Partnerships [Through Sexual Knowledge Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Parenting Style ↓ Multiple Past Year Partnerships [Through Sexual Knowledge Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Communication about Sex ↓ Inconsistent Condom Use [Through Sexual Knowledge Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported</p>	
	<p>Communication about Sex ↓ Inconsistent Contraceptive Use [Through Sexual Knowledge Mediators]</p>	<p>I ↓ III</p>	<p>Not Supported <i>Additional Finding</i></p>	<p>* The association between <u>mother-daughter communication about sex</u> and past year partnerships <i>did not attenuate</i>, and remained significant.</p>
<p><i>Hypothesis 9:</i> Effects of mother-daughter characteristics will remain in adulthood, though lose strength.</p>			<p>Not Supported</p>	<p>* In adulthood, parenting style was no longer associated with condom or contraceptive use, but because associated with multiple past year partners. *In adulthood, communication about sex became associated with condom use.</p>

## 7.1. Review of Hypotheses

As a whole, the findings of this study support previous findings that mothers play an important role in young women's sexual activity and risky sexual behavior (Fox, 1981; Miller & Fox, 1987). The findings of this study also provide support for the use of parenting style measures in understanding the effect that mothers have on daughters' sexual risk-taking behaviors, despite the mixed findings of previous studies (Huebner & Howell, 2003; Pittman & Chase-Lansdale, 2001). Moreover, this study indicates that the influence of mothers on young women's sexual risk taking behavior last beyond adolescence into young adulthood. Below, the findings are discussed in the context of the central aims and hypotheses of this study.

### 7.1.1. Hypothesis 1

*Maternal parenting styles other than authoritative will be associated with a greater likelihood of socioemotional risk (low sexual self-efficacy and high risk-taking behaviors).*



The primary theory in this study was that maternal parenting style, as described by Baumrind (1971, 1978, 1991), would be linked to sexual risk-taking behaviors because parenting style would affect socioemotional development which, in turn, would lead to adolescents' sexual risk-taking or lack thereof. That is, socioemotional risk characteristics would mediate the relationship between parenting style and sexual risk

behaviors. As such, a first step in assessing this overarching theory, based on Baron and Kenny's (1986) model of assessing mediation, was to establish the association between parenting style and socioemotional risk. As such, the first hypothesis was that parenting styles would be associated with socioemotional risk.

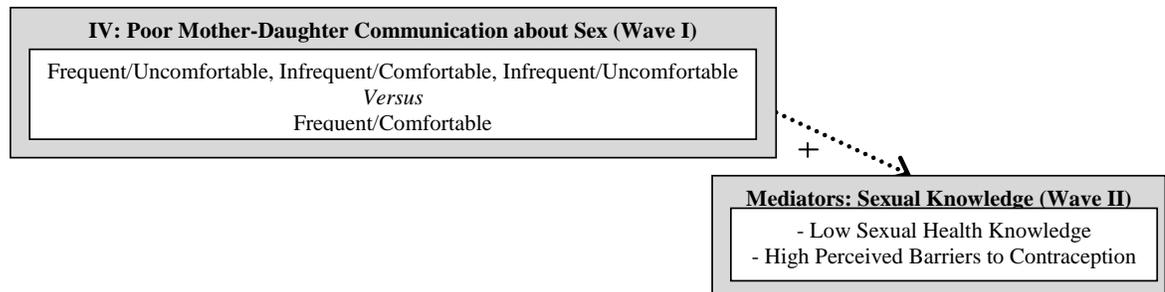
In examining these associations, it appears as though this hypothesis was not supported. An underlying principle of the theory of parenting style is that the best psychosocial and socioemotional outcomes are linked to authoritative parenting; thus it was hypothesized that any parenting style aside from authoritative would be associated with low sexual self-efficacy and high risk-taking behaviors. However, this was not this case in this study, and, in fact, there was an unexpected finding: girls with authoritarian mothers were less likely to report low sexual self-efficacy and high risk taking (meaning that those with authoritarian mothers were more likely to have higher sexual self-efficacy and lower risk-taking behaviors), compared to those with authoritative mothers. The latter finding, that girls with authoritarian mothers were less likely to exhibit high levels of risk-taking behaviors, makes sense, since these are the girls whose mothers tend to be highly monitoring and overly controlling of their behaviors. With such levels of monitoring and control, these girls may not have the opportunity to engage in risky behaviors.

The finding related to low sexual self-efficacy is less obvious, but may be explained in two ways. First, it is possible that the survey questions that were used to measure low sexual self-efficacy (which related to the adolescent's ability to resist sex without contraception or to plan ahead for contraception) might have been measuring high levels of motivation to avoid the negative outcomes associated with sex, such as

teen or unintended fertility. In this sense, it is understandable that those with the most controlling mothers (authoritarian mothers) would be the ones most motivated to avoid these outcomes, because they would be the ones that faced the highest sanctions, punishments, or repercussions and the least amount of warmth or support if they got pregnant or contracted an STI. Second, Baumrind (1985) noted that children with authoritarian parents were the most distrustful. Perhaps these adolescents develop a greater sense of sexual self-efficacy (and ability to plan for and use condoms or contraception) because they have greater levels of mistrust toward their sexual partners.

### 7.1.2. Hypothesis 2

*Mother-child communication about sex that is not frequent and comfortable will be associated with a greater likelihood of sexual knowledge risk (low sexual health knowledge and high perceived barriers to contraception).*



The alternative theory in this study was that, based on a social learning perspective, mother-daughter communication about sex would be linked to sexual risk-taking behaviors because the quality of this communication would be linked to one's level of general sexual knowledge or lack thereof. That is, sexual knowledge characteristics would mediate the relationship between mother-daughter communication about sex and sexual risk behaviors. Again, a first step in assessing this overarching theory, based on Baron and Kenny's (1986) model of assessing mediation, was to

establish the association between communication and sexual knowledge. As such, the second hypothesis was that mother-daughter communication about sex at Wave I would be associated with sexual knowledge characteristics (low sexual health knowledge and high perceived barriers to contraception) at Wave I.

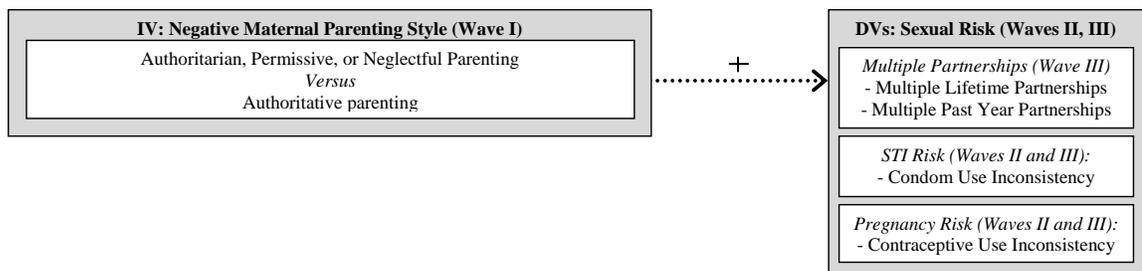
In examining these associations, it appears as though this hypothesis was not supported. No form of mother-daughter communication about sex was associated with either sexual knowledge characteristic. It is likely that the reason mother-daughter communication about sex is not associated with these measures is because girls are receiving the majority of their sexual health information from other sources, such as peers, school sex education programs, or media. Though they might be getting some information from their mothers, mother-child communication about sex may revolve more around a transmission of values than a transmission of knowledge. However, there was an unexpected finding, in that *parenting style* was associated with sexual knowledge. In particular, girls with mothers who exemplified authoritarian and neglectful parenting styles were less likely to report high perceived barriers to contraception a year later, compared to those with authoritative mothers. Just as with the findings from Hypothesis 1, it is unexpected that these two parenting styles would be associated with a decreased likelihood of these risky characteristics compared to authoritative parenting. However, as with the last example, in examining the survey questions that were used to measure perceived barriers to contraception (which related to an adolescent's ability to attain and utilize contraception), it seems that they might have, again, been measuring high levels of motivation to avoid the negative outcomes associated with sex, such as teen or unintended fertility. Therefore, it makes sense that those with the most controlling and

least warm mothers (authoritarian mothers) would be the ones most motivated to avoid these outcomes, due to their motivation to avoid sanctions or due to their high levels of distrust in their partners.

It is also possible to rationalize why those with neglectful mothers would be less likely to perceive high barriers to contraception. First, these girls might have been forced to develop greater levels of autonomy due to the lack of maternal involvement in their childhood and adolescent development. In this case, these girls might have been forced to take responsibility for their sexual actions and consequences in the past, thus allowing them to gain experience in accessing contraception. Second, neglectful mothers would likely be the ones least likely to provide daughters with any support or concern in the case of a negative outcome (such as an unintended pregnancy); so these girls would also be very motivated to avoid these outcomes, since they would not have a warm, supportive relationship to which they could turn in the case of a pregnancy or STI.

### 7.1.3. Hypothesis 3

*Maternal parenting styles other than authoritative parenting will be associated with a greater likelihood of adolescent and young adult sexual risk-taking behaviors.*



The primary aim of this study was to explore the effect of maternal characteristics on adolescent and young women’s sexual risk-taking behaviors. It was hypothesized that any form of maternal parenting style other than one which espouses a warm yet

controlling parenting style (authoritative) would be associated with increased sexual risk-taking, including risk-taking related to STI risk (inconsistent condom use), pregnancy risk (inconsistent contraceptive use), and a higher number of sexual partnerships.

*Adolescence.* The results of this study indicated that among adolescents, this hypothesis was supported, in that girls with mothers who exhibited authoritarian and permissive parenting were more likely to exhibit inconsistent condom use in adolescence, and those whose mothers exhibited authoritarian parenting were more likely to exhibit inconsistent contraceptive use in adolescence, compared to those with authoritative mothers. More importantly, these associations were significant when sociodemographic and peer factors were controlled, thus indicating the potentially predictive nature of these relationships. It may be that adolescents whose mothers are particularly controlling of their behavior (authoritarian) have less ability or opportunity to purchase or access condoms or other contraceptives, either because their activities and purchases are so highly controlled or monitored or because their mothers will not provide consent for prescription or physician administered birth control methods (such as the Depo Provera shot or an intrauterine device [IUD]). For the adolescents whose mothers are overly warm and close to their daughters and who fail to monitor or enforce rules over their actions (permissive), it may be the case that these relationships are representative of overly close, “peerified” relationships (Burton, 2007) between mothers and daughters. In these relationships, mothers may act more like a friend than a parent, and the mother might be more accepting of the child’s sexual behavior, thus creating an environment in which the daughter is less concerned about the negative outcomes of sexual risk-taking and reactions to the outcomes from her mother. Additionally, as Baumrind (1985) found,

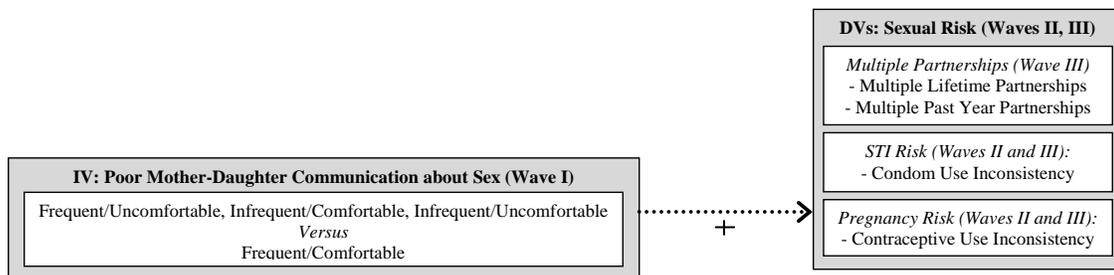
children with permissive parents were non-demanding and non-controlling; thus, the reason girls with permissive mothers might be more likely to exhibit inconsistent condom use is because they are not requiring or demanding that their male sex partners wear condoms.

*Young adulthood.* Additionally, the results of this study indicate that this hypothesis is also supported for young adults. Though parenting style ceased having direct effects on young adult condom and contraceptive use, parenting style was associated with having multiple partnerships. In particular, unadjusted analyses indicated that neglectful parenting was associated with higher numbers of lifetime partnerships and that both authoritarian and neglectful parenting styles were associated with a higher number of past year partnerships. More compellingly, the association between authoritarian and neglectful parenting and past year partnerships remained after controlling for covariates, and the association between neglectful parenting and past year partnerships remained in the full model. These findings, together, imply that these parenting styles may, in fact, be predictive of multiple sex partnerships in young adulthood. In particular the finding of the association between neglectful parenting and a higher number of past year partnerships is interesting, especially in the context of there being no association between parenting style and lifetime partnerships; it may be that the negative impact of this style of parenting has a “sleeper” effect. That is, the girls who were raised by neglectful mothers in adolescence may have been forced to develop some level of autonomy and forced adult-like responsibility, thus protecting them from engaging in some risk behaviors in adolescence. However, once these girls reach adulthood, they may turn towards romantic or sexual partnerships to fill a void left by

their rejecting, neglectful mothers. Additionally, it should be noted that although maternal parenting style was not associated with adult condom or contraceptive use, parenting style *was* associated with adolescent condom use (in particular, authoritarian parenting was significantly associated with inconsistent condom use in the full model). This is an important association to note, since the strongest and most significant adolescent characteristic that was associated with adult inconsistent condom use was adolescent inconsistent condom use. As such, there is some evidence that parenting style does have indirect effects on adult condom use, through the effect on adolescent use.

#### 7.1.4. Hypothesis 4

*Mother-daughter communication about sex that is not frequent and comfortable will be associated with a greater likelihood of adolescent and young adult sexual risk-taking behaviors.*



As stated in the review of the previous hypothesis, the primary aim of this study was to explore the effect of mother-daughter relationships on adolescent and young women’s sexual risk-taking behaviors. In addition to exploring the effect of maternal parenting style on sexual risk-taking, this study explored an alternative theory to parenting style: that of social learning and the effects of mother-daughter communication about sex on sexual risk behaviors, including those related to STI risk (inconsistent

condom use), pregnancy risk (inconsistent contraceptive use), and higher numbers of sex partnerships.

*Adolescence.* In adolescence, this hypothesis was not supported. However, there was an unexpected finding in the results of these analyses. Specifically, infrequent, uncomfortable mother-daughter communication about sex in was associated with a *decreased* likelihood of inconsistent condom use, compared to those who engaged in frequent, comfortable communication about sex. This finding may indicate that these girls are living in households in which the lack of conversation about sex and sexual health creates an environment that sends a message that “sex is not ok.” In this sense, adolescents may be more motivated to consistently use condoms, as opposed to *no method*, so as to avoid any “proof” of sexual activity that might result from a sex-related outcome like an STI or pregnancy. Additionally, they may be more motivated to use condoms, as opposed to *another method*, because condoms are relatively easy to access (and are typically considered the “responsibility” of the male partner in the relationship), thus negating the need to talk to one’s mother about gaining access to another contraceptive method. Alternatively, it may be that those who are *already* engaging in sexual risk behavior have mothers who attempt to engage in more frequent, comfortable communication (accounting for the diminished risk that appears to be linked with infrequent, comfortable communication), a possibility supported by Kirby’s (2002) findings.

*Young adulthood.* In young adulthood, this hypothesis, again, was not supported. However, there was another unexpected finding. Both frequent, uncomfortable and infrequent, uncomfortable mother-daughter communication about sex in adolescence

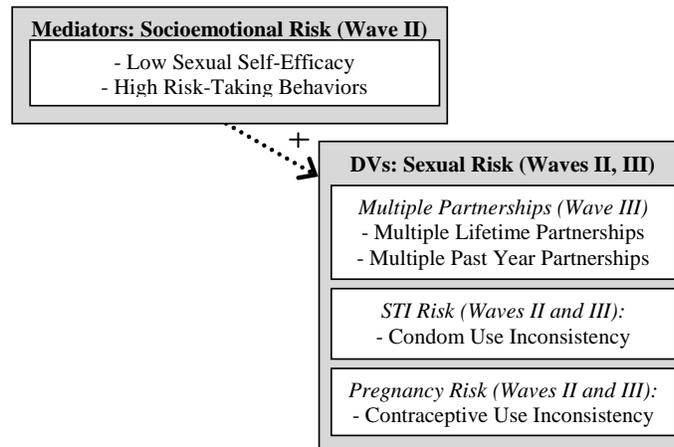
were associated with a *decreased* risk of inconsistent contraceptive use in young adulthood, compared to frequent, comfortable communication. It is possible that when mothers are too “comfortable” discussing sex with their daughters, they are inadvertently portraying a message that sex (and sex-related outcomes, such as STIs or pregnancy) is acceptable. This, in turn, might lead to adolescents and young adults being less vigilant in their use of condoms or contraception. By the same logic, it follows that mothers who don’t have such comfortable communication about sex with their daughters don’t portray this message. However this finding points to the difficulty of assessing causality; that is, uncomfortable mother-daughter communication about sex may be a result of evidence of condom or contraceptive use (for instance, mothers who find contraceptives in their daughters’ rooms might engage in uncomfortable communication with their daughters about their sexual activity – yet the fact that these girls have contraceptives to begin with evidences their use of these methods), or comfortable communication about sex may be a result of adolescents’ discussion of sexual activity, which may, in fact, be risky.

#### **7.1.5. Hypothesis 5**

*Socioemotional mediators will be associated with a greater likelihood of adolescent and young adulthood sexual risk taking behaviors.*

Because a key component of this study was to further explore the mechanisms through which maternal characteristics affect adolescent and young adult sexual risk taking, it was necessary to assess whether the socioemotional risk characteristics (which were hypothesized to be associated with parenting style) were associated with sexual risk behaviors. That is, this was another step in assessing whether socioemotional risk mediates the relationship between maternal parenting style and sexual risk-taking, as

outlined in Baron and Kenny's (1986) model of assessing mediation. It was hypothesized that these risk factors would be associated with increased likelihood of inconsistent condom and contraceptive use and multiple partnerships.



*Adolescence.* In adolescence, this hypothesis was partially supported in examining the effect of these variables on inconsistent condom use. That is, only low sexual self-efficacy was associated with an *increased* likelihood of inconsistent condom use. It makes sense that an adolescent who has low sexual self-efficacy would be more likely to exhibit inconsistent condom use, because these girls would have less efficacy in negotiated condom use. It is possible that the reason why having high risk-taking behaviors was not associated with inconsistent condom use is because high-risk adolescents might be more likely to be engaging in risky sex and sex with risky peer networks, and are more aware of their risk of STI, thus increasing their use of condoms.

This hypothesis was supported in examining the effect of these variables on inconsistent contraceptive use. Both low sexual self-efficacy and high risk-taking behaviors were associated with an *increased* likelihood of inconsistent contraceptive use. Both of these findings were to be expected. Again, it is likely that those with low sexual

self-efficacy would not be efficacious in their ability to access or utilize contraception. Unlike with inconsistent condom use, high risk-taking was associated with inconsistent contraceptive use. These adolescents, while aware of their participation in high risk activities (likely with high risk peers), might be less concerned about less tangible or conceivable risks, such as pregnancy, than with the salient risk of STI. It is also possible that condoms are easier to use without advanced planning; contraceptives, on the other hand, tend to require adherence to a pill, shot, or ring schedule or might require visits to physicians – behaviors that might be less likely to occur among risk-taking teens.

*Young adulthood.* In young adulthood, this hypothesis was partially supported in examining multiple partnerships. Having high risk-taking behaviors was associated with having higher levels of both lifetime and past year partnerships. These findings were to be expected. Those who engage in risky or delinquent behaviors in adolescence are more likely to engage in these behaviors in adulthood – and having multiple sex partnerships is a clear risk behavior. Low sexual self-efficacy was not associated with these outcomes, which might be attributable to the fact that having multiple partnerships is a risk behavior that can occur both in and out of the context of needing to negotiate contraception (an ability which is measured by the sexual self-efficacy variable).

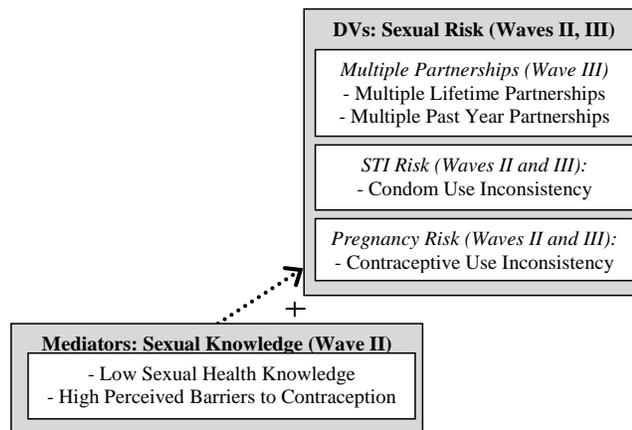
This hypothesis was not supported in terms of effects on inconsistent condom or contraceptive use; neither low sexual self-efficacy nor high risk-taking behaviors in adolescence were associated with inconsistent condom or contraceptive use in adulthood. However, it should be noted that these analyses controlled for inconsistent condom and contraceptive use in adolescence, and it is possible that adolescent socioemotional characteristics establish inconsistent condom or contraceptive use behaviors in

adolescence and it is these behaviors, not directly the socioemotional characteristics, that affect adulthood inconsistent condom and contraceptive use.

### 7.1.6. Hypothesis 6

*Sexual knowledge mediators will be associated with a greater likelihood of adolescent and young adulthood sexual risk taking behaviors.*

As with Hypothesis 5, because a key component of this study was to further explore the mechanisms through which maternal characteristics affect adolescent and young adult sexual risk taking, it was necessary to assess whether the sexual knowledge risk characteristics (which were hypothesized to be associated with mother-daughter communication about sex) were associated with sexual risk behaviors. That is, this was another step in assessing whether sexual knowledge risk mediates the relationship between communication about sex and sexual risk-taking, as outlined in Baron and Kenny's (1986) model of assessing mediation. Based on the principles of the Social Learning theory, it was hypothesized that poor communication about sex would be associated with an increased likelihood of inconsistent condom and contraceptive use and multiple partnerships.



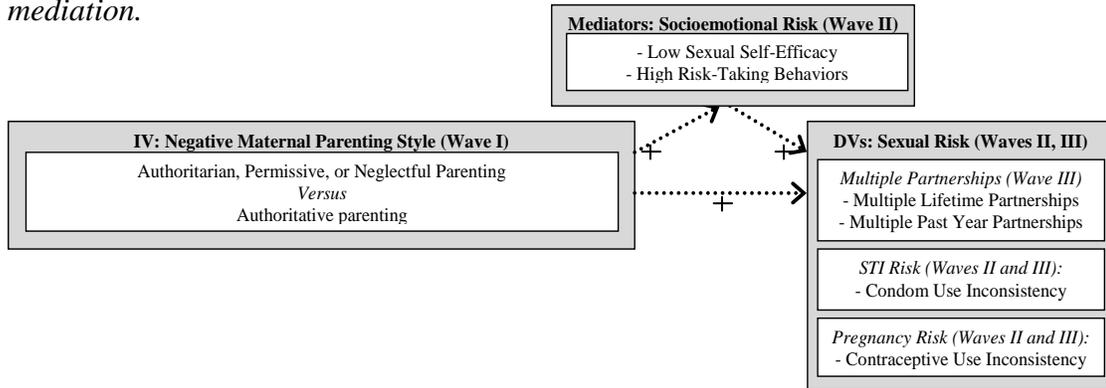
*Adolescence.* In adolescence, this hypothesis was partially supported in examining the effect of these variables on inconsistent condom and contraceptive use. That is, only having high perceived barriers to contraception was associated with an *increased* likelihood of inconsistent condom and contraceptive use. This finding was expected. Those who thought it would be more difficult to access condoms or contraceptives would, in turn, be more likely to exhibit inconsistent or non-use. Low sexual health knowledge was not significantly associated with either of these two risk behaviors. This finding was unexpected, however it may be due to the poor quality of the sexual health knowledge survey items (that is, the questions asked about sexual knowledge regarding topics such as lambskin condoms, which may not accurately assess low knowledge regarding the importance of using condoms, in general). Alternatively, it may be that those with low levels of sexual health knowledge are also those who are sexually inexperienced and are, thus, overly-cautious in their use of condoms or contraceptives when they do have sex (or, those who have high levels of sexual health knowledge have such high levels due to their high levels of sexual activity, which may or may not be protected via condoms or contraceptive methods).

*Young adulthood.* In young adulthood, this hypothesis was not supported in examining the effects on multiple partnerships or on inconsistent condom or contraceptive use. Though this was not expected, it is understandable. Both of these variables are based on adolescent knowledge and knowledge can be considered a modifiable state (as opposed to socioemotional characteristics which may be more driven by traits). As girls grow older and gain more sexual experience, it makes sense that their sexual health knowledge and perception of barriers to contraception would change. As

such, one might expect that their previous sexual knowledge would not have an effect on their adult behaviors when their levels of sexual knowledge would necessarily be disparate.

### 7.1.7. Hypothesis 7

*The addition of the socioemotional mediators will attenuate the association between maternal parenting style and young adulthood sexual risk-taking behaviors, implying mediation.*



*Adolescence.* In adolescence, the hypothesis that socioemotional risk characteristics would mediate the relationship between parenting style and sexual risk behaviors was not supported. Parenting style was associated with the socioemotional mediators and the socioemotional mediators were associated with the sexual risk behaviors. However, parenting style was associated with the socioemotional variables in the unexpected directions. Despite the fact that the addition of the socioemotional mediators weakened the association between authoritarian parenting and inconsistent condom use and completely attenuated the association between permissive parenting and inconsistent condom use and between authoritarian parenting and inconsistent contraceptive use, it is likely that this is due to the confounding nature of the socioemotional variables – not their mediating effects. Thus, it appears that, in

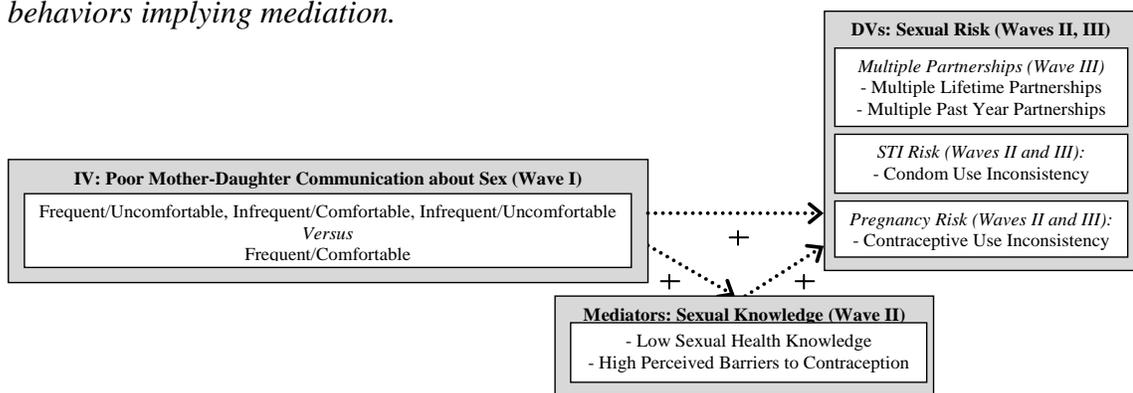
adolescence, parenting style has direct effects on these sexual risk behaviors, but that the effect of parenting is confounded by adolescent socioemotional risk (and, based on the unexpected finding of Hypothesis 8 discussed in the next section, by adolescent sexual knowledge). That is, even though authoritarian and permissive parenting lead to higher levels of sexual risk-taking, they also tend to lead to higher sexual self-efficacy and lower risk-taking behaviors, which are associated with *decreased* sexual risk-taking, thus attenuating the effects of parenting style. So, parenting may have direct effects on adolescent risk taking, but there may be an alternative or parallel pathway through which parenting style operates on sexual risk-taking that masks these direct effects. That is, it is possible that, for instance, authoritarian parenting leads to sexual risk-taking among daughters, but that, because authoritarian parenting leads to higher sexual self-efficacy and lower perceived barriers to contraception (characteristics that are associated with a decreased risk of sexual risk), the direct effects are attenuated and unseen. It is possible that this finding indicates that the effect of parenting style on sexual risk is moderated by socioemotional and sexual knowledge characteristics: hence, adolescents who have authoritarian or permissive mothers are likely to engage in sexual risk behaviors *unless* they develop a sense of sexual self-efficacy, they avoid risk-taking behaviors, and they perceive low barriers to accessing contraception. Future research should examine the interactive effects of these variables; moreover, future research should examine the factors that allow some adolescents to develop these characteristics (aside from parenting style) and not others. If some adolescents, regardless of their mothers' parenting styles, avoid risk-taking behaviors, for example, this may be due to some unmeasured

biopsychosocial characteristic, and it would be important to indentify these factors to understand the context in which parenting style leads to sexual risk.

*Young adulthood.* In adulthood, this hypothesis was not supported. For one, the socioemotional mediators were not associated with inconsistent condom or contraceptive use in adulthood. Second, even though parenting style was associated with the socioemotional mediators and the socioemotional mediators were associated with lifetime and past year partnerships, mediation was not indicated, since 1) the associations between parenting style and socioemotional mediators were in the unexpected direction, 2) parenting style was not associated with lifetime partnerships and 3) the association between parenting style and past year partnerships did not weaken when these variables were added to the model. Thus, it appears that parenting style has direct effects on past year partnerships, as discussed earlier when reviewing Hypothesis 3, only.

### 7.1.8. Hypothesis 8

*The addition of the sexual knowledge mediators will attenuate the association between mother-daughter communication about sex and young adulthood sexual risk-taking behaviors implying mediation.*



*Adolescence.* In adolescence, the hypothesis that sexual knowledge would mediate the relationship between mother-daughter communication about sex and sexual

risk behaviors was not supported. Mother-daughter communication about sex was not associated with the sexual knowledge mediators (as reviewed in Hypothesis 2), thus these variables could not have mediated the association between communication about sex and inconsistent condom or contraceptive use. However, as reviewed in Hypothesis 4, mother-daughter communication about sex does have a direct effect on adolescent condom use consistency.

*Young adulthood.* In adulthood, this hypothesis was not supported. For one, mother-daughter communication about sex was not associated with the sexual knowledge mediators (Hypothesis 2). Second, the sexual knowledge mediators were not associated with inconsistent condom or contraceptive use in adulthood (Hypothesis 6). Thus, there could not be a mediating relationship. Again, as reviewed in Hypothesis 4, mother-daughter communication about sex does have a direct effect on adulthood contraceptive use consistency.

#### **7.1.9. Hypothesis 9**

*Effects of mother-daughter characteristics will remain in young adulthood, though lose strength.*

The hypothesis that the mother-daughter relationship would not only be associated with adolescent sexual risk-taking behaviors but would also be associated with adult risk taking, but might lose strength in associations was not supported. A major finding of this study was that maternal influences on daughters' sexual risk-taking can be seen even in young adulthood (approximately seven years after Wave I). For the most part, though, the specific mother-daughter characteristics that were associated with adolescent sexual risk-taking (in particular, authoritarian parenting style) were not the

ones that had effects on young adult sexual risk-taking (in particular, neglectful parenting style and the two forms of uncomfortable communication about sex). As such, it cannot be said that the specific effects of mothers on adolescent sexual risk-taking continue into adulthood, per se; rather, it can be said that some maternal characteristics seem to have importance for daughters' in adolescence, while others have importance in adulthood.

In particular, it may be possible that some parenting styles have immediately apparent effects in adolescence, such as those seen with authoritarian or permissive mothers. Due to their developmental stage, the actions of adolescents that are being highly controlled (those with authoritarian mothers) would necessarily be affected (parents still have direct control over their minor children – especially if they are living in the same household). Yet by the time the girls reach young adulthood, they are no longer bound by their controlling mothers (at least not in an instrumental way), so this form of parenting may lose its effect over time. Similarly, those with permissive parents (who are not being controlled at all), may use adolescence as a period of exploration and experimentation – knowing that their mothers will not exert control over their behaviors – but grow out of this phase in adulthood (either because they suffered the consequences of risky sexual behaviors via an STI or unintended pregnancy or because they “sowed their wild oats” and outgrew their risky tendencies). Contrarily, neglectful parenting may be a parenting style that has more long-term consequences or consequences that do not emerge until adulthood. As was mentioned earlier, it is possible that those with neglectful mothers are forced to “grow up faster” in adolescence, thereby leading to less-risky adolescent behavior. Yet when these girls reach young adulthood, they may turn to sex and romantic partnership to fill the void left by their neglectful mothers in

adolescence. Future research should explore this association further in adulthood and in the context of partnership outcomes and contexts.

## **7.2. Comparing Theoretical Models: Parenting Style *versus* Mother-Daughter Communication about Sex**

One aim of this paper was to determine which of two competing models of maternal effects on daughters' sexual risk-taking better explained the associations between mother-child relationship characteristics and adolescent and young adult sexual risk-taking (see Markham, et al., 2010 for a review). Namely, this study examined whether the theory of parenting style or the theory of social learning better explained these associations. In order to assess these theories, indicators of each (parenting style measures for the parenting style theory and mother-daughter communication about sex measures for the social learning theory) were included in the analytical models.

Based on the significant associations between parenting style and adolescent inconsistent condom and contraceptive use and adulthood multiple partnerships, and based on the fact that mother-daughter communication about sex was only associated (in the unexpected direction) with adolescent inconsistent condom use and adulthood inconsistent contraceptive use, it appears that, overall, maternal parenting style is a better indicator of young women's sexual risk-taking. This provides support for accepting the primary theory of this study (that maternal parenting style has more relative importance for predicting sexual risk taking) and rejecting the alternate theory (that, based on a social learning approach, mother-daughter communication about sex has more relative importance for predicting sexual risk-taking).

Theoretically, it makes particular sense that parenting style and not communication about sex lead to the sexual risk behavior related to relationship formation – in this case, multiple partnerships. One might expect that mother-daughter communication would be associated with the sexual risk outcomes related to inconsistent sexual health behaviors – in this case, inconsistent condom and contraceptive use – because these are behaviors that can be learned. In contrast, the decision to expose oneself to multiple partners is clearly a psychosocial outcome that is likely influenced by one’s history of relationship quality, including one’s relationship with her mother. As such, it is understandable that a young woman’s likelihood of seeking multiple sex partners may be an outcome related to her mother’s parenting practices with her expressions of warmth and control – or lack thereof.

To further examine parenting style and mother-daughter communication about sex, additional analyses were run to assess whether one of the reasons communication about sex appeared to be so weakly linked to sexual risk-taking behaviors, as a whole, was because these two variables were actually measuring one underlying characteristic. That is, the type of mother-daughter communication about sex that a mother and daughter engage in might be a function of parenting style or of some unmeasured characteristics. However, after examining correlations between these two maternal characteristics, it appeared that this was not the case because the correlations were small (not shown).

To provide further support for the importance of parenting style, analyses were run to examine whether either dimension of parenting style (warmth or control) was individually responsible for the observed effects on sexual risk-taking behaviors in adolescence and adulthood. Results indicated that for the inconsistent condom and

contraceptive use outcomes, neither warmth nor control, individually, was independently associated with these outcomes in adjusted models (not shown). For the multiple partnership outcomes, both warmth and control were significantly associated with this sexual risk-taking behavior. These findings emphasize the interplay (and potential interactivity) of the two underlying characteristics of parenting style.

### **7.3. Additional Findings: Covariates**

Though unrelated to the hypotheses or aims of this study, it is worthwhile to mention some of the notable associations between covariates and sexual risk-outcomes.

#### **7.3.1. Adolescent Inconsistent Condom and Contraceptive Use**

In terms of adolescent inconsistent condom use, living in a single parent household, having best friends who use illicit substances, and having low sexual self-efficacy at Wave I represented risk factors. Of particular importance is the finding that having friends who used substances had the strongest effect on this outcome; this is worrisome because it indicates that involvement with a risky peer network increases one's likelihood of engaging in risky sex acts *in the context of an already-risky peer group* (which increases the likelihood of having sex with an infected partner). In terms of inconsistent contraceptive use, the only significant sociodemographic risk factor was being Hispanic. This finding has important programmatic implications for addressing the ethnic disparities that exist in the rate of teen pregnancy among Hispanics (despite this group's tendency to delay sex).

#### **7.3.2. Young Adulthood Inconsistent Condom and Contraceptive Use**

Being Hispanic was a risk factor for inconsistent contraceptive use, compared to being White; at the same time, being Black or Asian/Pacific Islander acted as protective

factors against inconsistent condom use, compared to being White. Aside from race/ethnicity, the only other protective characteristics were having a mother with more than a high school education and having two or more partnerships in the previous year, both of which acted as protective factors against inconsistent contraceptive use. Without question, the strongest risk factor in predicting inconsistent condom use in adulthood was inconsistent condom use in adolescence. Adolescents who exhibited inconsistent condom use were nearly two and a half times more likely to exhibit condom use in adulthood. This is an important finding, because it implicates the need for adolescent girls to learn to negotiate condom use strategies very early, in order to establish patterns of consistent condom use. Additionally, this finding is important in further interpreting the overall results of this study. Again, despite the fact that parenting style does not seem to be strongly associated with condom use in adulthood, and because parenting style is strongly associated with condom use in adolescence and condom use in adolescence is linked to condom use in adulthood, there is an indirect pathway from adolescent parenting style to adult condom use behaviors.

### **7.3.3. Young Adulthood Multiple Partnerships**

In examining protective factors for the number of multiple partnerships, it was to be expected that initiating sex at an older age was associated with a lower number of lifetime partnerships and past year partnerships. Interestingly, having low sexual health knowledge was also associated with a lower number of lifetime partnerships, a finding which could perhaps be explained by the fact that those with higher levels of sexual health knowledge at Wave I were those who were already sexually experienced (had a higher number of partnerships) in adolescence.

In examining risk factors for having a higher number of lifetime sex partners, the sociodemographic characteristics that seemed to matter were being older, having a mother with higher levels of education, living with no parents at Wave I, and exhibiting high risk-taking behaviors. The association between being older and having more sex partners makes sense, as does the association between engaging in higher risk-taking behaviors and having more partners. The idea that living with no parents at Wave I is associated with a higher number of partnership could be due to the fact that these individuals happen to be older (which is why they were not living with their parents at Wave I) or it may be because they lacked parental supervision in adolescence and engaged in sex with multiple partners during that time. The interesting finding is the relationship between maternal education and greater numbers of partnerships. This could be a function of the fact that if mothers went to college, their daughters are more likely to go to college (see Behrman, 1997 for a review) – an environment that often encourages or facilitates periods of sexual exploration – versus going straight into the workforce and/or starting families. Another interesting finding was that, in examining past year multiple partnerships, the only risk factor was being Black. This, again, has important implications for reducing disparities in rates of STIs and unintended pregnancies.

#### **7.4. Limitations**

Although this study fills a critical research gap in examining longitudinal, adjusted associations between mother-child relationship characteristics and adolescent and young adult sexual risk taking, several limitations must be noted. In particular, the results of this study should be considered in the context of the data, sample, independent and dependent variable selection, and time points at which data collection occurred.

### **7.4.1. Data**

The data used in this dissertation are limited by self-report. Though many of the questions that related to sensitive topics such as sexual activity and condom and contraceptive use were asked using Audio CASI technology, thus reducing the possibility of inaccurate or dishonest responses, it is possible that such responses biased the data in the analytic sample. For one, it is likely that adolescents and young adults would over-represent their healthy sexual behaviors (such as consistent condom and contraceptive use) and under-report their risky behaviors (such as a high number of sexual partners).

Second, it is possible that adolescents were dishonest about whether or not they had initiated sexual activity in order to provide more desirable responses. This would mean that there were girls who were omitted from the analytic sample, yet should have been included. For example, there were some who reported being sexually active at Wave I and who then reported that they had not had sex at Wave II. It is possible that these girls may have been reporting forced or unwanted sexual activity at Wave I, and subsequently did not report this sexual activity at Wave II. However, it is also possible that these girls were providing false reports at one of the Waves. This was taken into account by including girls who reported sexual activity at either Wave I or II in the sample. However, others who misreported sexual activity at both waves were not included and may have differed in some significant way from those who were included. In fact, it is possible that those who misreport sexual activity represent the girls who are most at risk for leaving themselves at risk for exposure to STIs or unintended pregnancy.

### **7.4.2. Sample**

Several decisions influenced the choice of this analytic sample, but also presented

limitations in the generalizability of this study's findings. For example, the choice to use only girls (not boys) was justified by the additional risk of STI and pregnancy that only young women experience, yet limits generalizability to all adolescents and young adults.

Similarly, though outside the scope of this study, this study is markedly limited in its examination of only mother-daughter dyads. It is possible that mother-son, father-daughter, or father-son influences have disparate effects on sexual activity. These associations need to be explored in future research, especially among boys, since father-son relationships and communication about sex may implicitly or explicitly condone or encourage sex (Hampton, Jeffery, McWatters, & Smith, 2005; Wight, Williamson, & Henderson, 2006), thereby leading to increased sexual risk-taking among boys.

Further, this sample was limited by including only those who were 15 or older at Wave I. This decision was made because many questions relating to sexual activity that were included in these analyses were only asked of adolescents aged 15 or older. However, this limits the generalizability of these findings, especially comparing groups that tend to initiate sex at later ages, *versus* very young ages (such as Blacks and Hispanics); these individuals may be differentially affected by mother-child relationships.

Additionally, this sample was limited by only including those who were sexually active by Wave II. This was a strategic decision, because Wave II outcome variables (inconsistent condom use and inconsistent contraceptive use) were conditional on being sexually active. However, this meant that those who were not yet sexually active at Wave II were also omitted from analyses examining Wave III outcomes. This decision kept the sample nested in the original analytic sample, thereby allowing for longitudinal examinations of these young women's behaviors, but limited sample size and omitted

those who became sexual active in the interim. This was compounded by the fact that Add Health did not interview those who had graduated from high school in between Waves I and II at Wave II, thereby further reducing the sample size and, thus, the power to detect significant associations.

### **7.4.3. Independent Variables**

This study is limited in its measures of mother-daughter relationship characteristics. Most importantly, parenting style was only assessed based on adolescents' reports and mother-daughter communication about sex was only assessed based on mothers' reports. This is a particular limitation in regards to the communication about sex measure, since it is possible that adolescents have differing perceptions of this communication and since adolescents' perceptions of family relations have a greater impact and meaning for adolescents. In addition, it must be noted that the parenting style measure was not one that was established in the Add Health survey. This was constructed based on Baumrind's (1971, 1978, 1991) conceptualization of parenting, based on warmth and control – yet neither of these two characteristics were explicitly measured in the survey design. That is, the dimension of “control” was based on measures of whether parents allowed the adolescents to make decisions for themselves. In actuality, whether a mother has control over her daughter's action might be better measured in another way, such as by determining whether the adolescent is, in fact, influenced or swayed by her mother's decisions or rules. Similarly, warmth was based on a measure of relationship satisfaction, closeness, and warm, loving relationships, yet warmth may be better measured in an instrumental way, such as quantity and quality of time spent together. Further, it is possible that other mother-child relationship characteristics, such as

maternal expectations of daughters' education attainment, or other maternal qualities, such as her age at first birth, are more important in predicting adolescents' sexual risk-taking behaviors, and future studies should assess these variables.

Additionally, it is important to consider which factors are endogenous or exogenous to a model. Parenting and familial influence, for example, cannot truly be assessed as a 1-time measurement. Parenting practices and adolescent behaviors are transactional in nature, and it is difficult to determine whether, for instance, parenting leads to adolescent risk-taking or if parenting practices are implemented in response to risk-taking. This study attempted to account for this by controlling for Wave I risk (low sexual self-efficacy, high risk-taking behaviors, low sexual health knowledge, and high perceived barriers to contraception, and adolescent sexual risk-taking behaviors when examining young adulthood outcomes), however, the nature of this dataset prevents a more rigorous examination of the lifespan influence of mothers on daughters' behaviors. This brings to light an additional limitation of this study: this study may underestimate the importance and endogeneity of developmental stages. That is, as children move towards adolescence (and into young adulthood), there is an intrinsic move towards greater autonomy and independence, and a greater reliance on peer, relationship, and contextual factors when making decisions about sex and other risk-behaviors. Though this study attempted to account for the latter by including a multitude of covariates, including peer measures, in analyses, it is important to note that the role of parenting and parenting style should be considered from a developmental perspective and must be considered as a cumulative and transactional factor in a young woman's life course.

Finally, it is possible that this study failed to include key confounding variables.

For example, it is possible that key factors in young women's decisions to engage in risky sexual behavior in adulthood are career opportunities. Macunovich (1996), for example, pointed to the significance of inclusion of female wages in models of fertility choices.

#### **7.4.4. Dependent Variables**

In adolescence, the choice of dependent variables was somewhat limited by the survey questions. That is to say, at Wave II, respondents were not asked about the number of sex partners they had had, thereby preventing examination of associations between mother-daughter characteristics and multiple partnerships in adolescence. Similarly, although Wave III included a question regarding past year use of condoms and contraceptives, Wave I only included questions about condoms and contraceptives at first and most recent sex. So, in this study, condom and contraceptive use at most recent sex served as a proxy for determining adolescent inconsistent condom and contraceptive use. Although use or non-use at most recent sex has been established as a valid proxy for consistent or inconsistent use (Younge, et al., 2008), the use of these proxies may have produced biased associations due to inaccurate reporting of use at last sex or due to the fact that they may have used condoms or contraceptives at their most recent sexual encounter, but did not use these methods consistently in all of their sexual encounters.

In young adulthood, the choice of inconsistent condom and contraceptive use measures was, again, limited by survey methodology. At Wave III, respondents were asked what proportion of the time in the previous year they had used condoms. This question provided a Likert scale option of five responses, ranging from never to always. These options were somewhat vague, though, and lacked true quantifiability. Also, this question lacked context or intent, so it is possible that, for example, a young woman

began the year in a committed relationship and had chosen not to use condoms, but then ended the relationship and spent the last half of the year consistently using condoms with her sex partners. This respondent's answer might, thus, imply inconsistent condom use (having only used condoms for half of her sexual encounters), when in fact her condom use behavior was appropriate and not particularly "risky."

Additionally, the choice of dependent variables in young adulthood limited both sample size (which limited power) and limited generalizability. That is to say, the lifetime and multiple partnership analyses included the entire analytic sample, but the analyses that examined inconsistent condom and contraceptive use included only those who had one or more partner in the previous year. This choice was based on the fact that the condom and contraceptive use measures were based on past year behaviors (and without at least one partner, these behaviors are inconsequential). However, this study did not take into account that some of these women may have been in committed, cohabitating, or married relationships, thus reducing the likelihood of new STI infection and reducing the stigma attached to an unexpected or unplanned pregnancy. Moreover, as these women were in their mid to late 20's, they may have been actively trying to conceive, thereby eliminating the need for condoms or contraceptive methods.

Finally, by not examining the relationship context in which young women have sex, this study neglects an important factor in condom and contraceptive use: the role of the partner. Especially considering condom use and fertility intentions, these behaviors should be considered in the context of both partners involved in sexual intercourse.

#### **7.4.5. Longitudinal Effects**

This study is limited by using only two time points in adolescence and one point

in young adulthood. In adolescence, by using measures that are close in time (approximately one year apart), it is possible that these findings underestimate the transactional nature of these associations. That is, it is possible that certain girls begin exhibiting risky sexual behaviors at a young age, thereby changing mothers' parenting styles in reaction to these behaviors. For example, it is possible that if mothers find out that their daughters are sexually active and not using condoms, they get angry with the daughters (reducing the warmth in the relationship), and they feel the need to increase their control over their daughters' behaviors. If this is the case, then, inconsistent condom use might lead to authoritarian parenting, not vice versa.

The study is less limited in understanding longitudinal associations between adolescence and young adulthood, because these measures are approximately seven years apart. The case is made stronger because, in analyses examining Wave I mother-daughter relationship and Wave III sexual risk behaviors, Wave II sexual risk behaviors were controlled. By so doing, it is possible to determine the influence of the mother on adult behaviors, as opposed to merely observing a pattern of behavior that began in adolescence. However, it must be noted that seven years is a large period of time (as is the six years between Wave II and Wave III), and a period of time that spans a critical developmental shift from adolescence to young adulthood. In this transition, young women are making decisions about college and jobs, about moving away from their family of origin, and about starting their own families. It is possible that this study ignored some of the mediating or moderating mechanisms that operate during this time period. For example, some maternal parenting characteristics might be associated with an increased likelihood of attending college, which might lead to an increased number of

lifetime sex partners and decreased inconsistent condom and contraceptive use. The fact that this time period is so broad and is reflective of so many diverse trajectories in the transition to adulthood means that these findings should be interpreted and generalized with some caution.

## **7.5. Implications**

### **7.5.1. Programmatic Implications**

**7.5.1.1. Adolescence.** In adolescence, it appears that authoritarian parenting (low warmth, high control) was linked with inconsistent condom use and, to a lesser degree, inconsistent contraceptive use. It is possible that this association exists because the lack of warmth in the relationship prevents an adolescent from feeling like she can ask her mother about condoms and because the mothers are so controlling of their daughters' activities that they do not allow a child easy access to obtaining condoms on their own. If this is the case, sexual risk prevention programs should focus on providing adolescent girls with strategies for accessing condoms. Programs should work to empower young women to voice their need for condoms and contraception to their mothers and to negotiate condom use with partners. Additionally, programs might work with mothers to increase the warmth and connectedness in the mother-daughter relationship so that, even if the mother does not approve of sexual activity, the daughter will know that she can go to the mother with sexual and reproductive health needs and concerns.

**7.5.1.2. Young adulthood.** Of particular note in examining the effect of maternal parenting in adolescence on sexual risk-taking in adulthood, was the fact that neglectful parenting (low warmth, low control) in adolescence was strongly associated with multiple past year sex partnerships in young adulthood. It is possible that the adolescent girls who

were neglected by their mothers (neither feeling loved /cared for nor feeling as though their mothers were invested enough in their lives to monitor or enforce control over their behaviors) turn towards romantic partners in adulthood to fill the void left by neglectful parenting in adolescence. In this sense, it is important to identify those who have had neglectful mothers when implementing sexual risk reduction programs. These young women may be particularly vulnerable to STIs or unintended fertility due to the high numbers of sex partners that have. Additionally, these young women may be more indiscriminate in choosing their sex partners, thus involving themselves in high-risk sexual networks. For these women, prevention programs in adolescence may involve providing parenting skills and relationship-building activities to mother and daughter dyads. Intervention programs in young adulthood may include individual and group psychotherapy that helps the young women identify sources of support and warmth in their current lives.

### **7.5.2. Policy**

Given the findings of this study, it is clear that parenting style and mother-daughter communication about sex may both represent modifiable indicators of sexual risk among adolescent and young adult women. Given the societal costs associated with STIs and unintended and teen fertility, there is a need to consider the policy implications of this study. However, it may not be wholly reasonable to assume that policies might be implemented that would impose parenting style or communication requirements on parents. Given the finding that uncomfortable communication about sex is associated with a *decreased* likelihood of sexual risk-taking, for example, it seems ridiculous to say

that one could implement a policy that mandates mothers must engage in uncomfortable communication about sex with their daughters.

At the same time, the findings of this study do have the ability to inform policies regarding access to condoms and contraceptives. For instance, since it was posited that the reason daughters with authoritarian mothers were inconsistent in their condom and contraceptive use was due to their inability to easily access condoms and contraceptives, it is likely that a policy that increases ease of access would reduce this risk. In particular, if adolescent girls need money or parental permission to obtain a prescription to access a contraceptive method – and if these girls have do not feel comfortable asking their mothers for money or permission (as may be the case with authoritarian parents) – they might be less likely to pursue any method. If national policies allotted increased funding for free clinics and wide distribution of condoms and if state policies were consistent in allowing minors to access contraceptives, sexually active young women might be more likely to be consistent in their use of condoms and contraceptives – regardless of their mothers' parenting styles.

### **7.5.3. Future Research**

**7.5.3.1. Alternate theories.** Though this study provided support for using Baumrind's (1971, 1978, 1991) theory of parenting style to understand the effects of mothers on young women's sexual risk-taking behaviors (and though this study indicated that the social learning theory might not best elucidate this relationship), it is possible that other theoretical models might provide additional insight into young women's decisions to engage in sexual risk-taking behaviors and into the impact of mother-daughter relationships. For example in a previous study, the author suggested that a rational

choice model could be used in order to determine the underlying processes behind sexual risk-taking choices. Such a model suggests that people make their decisions based upon the enhancement of positive outcomes and the reduction of negative outcomes. Thus, it can be assumed that perceived benefits – physical pleasure and social or relational acceptance, for example - underlie the decision to engage in sexual activity or to do so without condoms or contraceptives. However, it can also be assumed that individuals weigh those perceived benefits against certain perceived costs. For example, adolescents and young adults may consider the cost of pregnancy when making their decision to have sex with a new partner or to have sex without contraceptives. However, research indicates that fear of pregnancy is not a deterrent to sex for adolescents (Ott, et al., 2004), and that they may give more weight to the present – and to immediate gratification – than to future costs such as pregnancy (Kearney & Levine, 2007; O’Donahue & Rabin, 1999). For perceived costs to have enough relative weight compared to perceived benefits, the perceived costs of sexual risk-taking must be salient and tangible for adolescents – such as the risk of upsetting one’s mother. This alternate theory might be useful for future research designs for exploring the antecedents to sexual risk-taking that relate to mother-daughter relationships and to other inter- and intra-personal factors.

**7.5.3.2. Longitudinal associations and alternate methods.** Future research should continue exploring the longitudinal associations implicated in this study using alternate longitudinal data sources (such as the National Longitudinal Survey of Youth) and using the additional fourth wave of Add Health. By testing these models using several data sources, it may be possible to confirm hypothesized associations, thereby providing additional support for the need to address the critical areas of mother-child

relationships and sexual risk-taking behaviors. Further, by continuing to examine the long-term effects, it will be possible to understand the long-lasting impact of mothers on young women's sexual risk taking. Additionally, these associations should be examined using other statistic methods, such as structural equation modeling and latent path analysis, in order to better understand the true nature of these effects. Finally, future research should consider using qualitative or mixed methods designs in order to collect and analyze the rich, descriptive data that is produced from qualitative responses, thereby providing a better understanding of the nature of these relationships.

**7.5.3.3. Contraceptive choice and dual method use.** The aim of this study was to understand the influence of mother-daughter relationship characteristics on STI risk behavior (inconsistent condom use and/or multiple partnerships) and unintended pregnancy behavior (inconsistent contraceptive use and/or multiple partnerships). However, future research should explore the antecedents to inconsistent dual method use: that is, condom use *and* use of another effective birth control method (i.e., hormonal methods, sponge, film, foam, diaphragm, IUD). When adolescent and young adult use contraceptives, they may be less likely to use a condom as well. That is, they assume that they are protected against pregnancy, but they neglect to address the additional risk of STI. Thus, there is a need to understand the determinants of inconsistent dual method use in addition to the risk of either inconsistent condom use or inconsistent contraceptive use, individually. Additionally, future research should explore the reasons why young women choose to use certain contraceptive methods and not use others. For example, research should examine the underlying reasons behind why some women choose to use the more

effective, long acting, reversible contraceptive methods (LARCs) such as IUDs and injectables, versus other contraceptive methods.

**7.5.3.4. Gender-specific associations.** In future research, there is a need to expand this study to examine the effects on maternal and, more generally, parental, influences on boys in addition to girls. The first reason this need exists is because it is acknowledged that boys and girls are treated differently by society and by parents, and there are differential relationships in mother-son dyads and mother-daughter dyads; for instance, adolescents identify with and report higher levels of closeness with their same-sex parent (Starrels, 1994), and, in general, daughters are more sensitive to family affect than boys (Conger et al., 1993). The second reason this need exists is because significant differences exist in sexual risk behaviors and outcomes between groups. For example, condom use reports differ greatly by gender; in 2007, 69% of sexually active adolescent males reported that they used a condom at their most recent sexual intercourse, compared with only 55% of females (CDC, 2008). Data suggest that, regardless of racial/ethnic group, males are more than 10% more likely than females to report condom use at last sexual intercourse (Child Trends, 2010). On the other hand, adolescent males are more likely to report multiple partnerships (four or more people) during their lifetimes than females (18% *versus* 12%) (CDC, 2008); and young adult males (aged 20 to 24) are also more likely to report multiple partnerships (seven or more people) during their lifetime than women of the same age (30% *versus* 21%) (Lindberg, Jones, & Santelli, 2008). Of course, in addition to these differences, the fundamental difference in boys' and girls' sexual risk-taking – pregnancy – makes the risk of sexual behaviors discrepant for boys and girls. All of these reasons suggest the need to expand this research and to examine

maternal influences on sons and to compare these influences to those that mothers have on daughters.

**7.5.3.5. Race/ethnic-specific associations.** One area that must be addressed in future research is that of the effect of race/ethnicity on the relationship between mother-daughter relationships and sexual risk-taking behaviors. This is important for two reasons. First, the way that a mother parents and sexually socializes her children is influenced by culture, as determined by race/ethnicity (Goodnow, 1988). This indicates that maternal effects on sexual risk-taking should be explicitly examined by racial and ethnic subgroup. Second, there is a need to address the clear racial and ethnic disparities that exist in the incidence of STIs, unintended fertility, and the risk of sexual risk behaviors. Data suggest that, among sexually-active high school students, Black and Hispanic adolescents are more likely than White adolescents to report condom use at their more recent sexual intercourse (67% and 61% *versus* 60%, respectively) (CDC, 2008). However, data also indicate that Black and Hispanic adolescents are more likely to report multiple sex partnerships (four or more people) during their lifetime than Whites (28% and 16% *versus* 11%, respectively) (Eaton, et al, 2006). Blacks and Hispanics are also more likely to have an STI. For example, although the incidence of Chlamydia increased for all racial and ethnic groups between 1998 and 2008, the rate of Chlamydia among Blacks was more than eight times higher than among Whites, and the rate among Hispanics was nearly three times higher than among Whites (CDC, 2009). Although the rate of gonorrhea has decreased from 2004 to 2008 among Blacks, Whites, and Hispanics, the rate in 2008 was more than 20 times greater among Blacks than the rate among Whites and more than twice as high among Hispanics than Whites (CDC).

Similarly, Black and Hispanic teen birth rates are higher than the national average and considerably higher than those for White teens (CDC, 2002). In fact, comparing racial and ethnic groups, Black and Hispanic adolescents have the highest rates of teen pregnancy (126 and 127 per 1,000 females aged 15 to 19, respectively), whereas non-Hispanic White adolescents have the lowest rate (44 pregnancies per 1,000 females) (Guttmacher, 2010). As such, research that explores the pathways to sexual risk behavior should not merely look at adolescents as an aggregate, but should examine these associations by subpopulation and should consider the potential moderating effect of race and ethnicity.

**7.5.3.5. Interactive effects.** Finally, an area of research that needs to be further explored is whether the effect of parenting style differs due to various contextual factors. As Darling and Steinberg (1993) note, “despite the apparent strengths of Baumrind’s typology is that the inevitable intercorrelation of different parent characteristics makes it difficult to discern the mechanism that underlies differences among children from different types of families” (p. 490). Thus, it is important to consider the contextual factors or characteristics that moderate the effect of parenting style. Steinberg and Morris (2001) note that recent research on the effects of parenting has focused on the moderating effects of contexts, including those of race/ethnicity, neighborhood influence, family and household structure, and peer groups, to name a few. For example, given that the effects of parenting are mediated by culture (as discussed in the previous section), there is a need to examine the interactive effects of race/ethnicity and parenting. That is, research should examine whether race/ethnicity moderates the relationship between parenting and sexual risk-taking, thereby indicating that parenting may operate differently in the context

of race/ethnicity. This is especially important given that the effect of parenting style on children's outcomes, such as educational performance, differs by race and ethnicity (Dornbusch, et al., 1987). Further, Garbarino and Ebata (1983) note that cultural differences, including differences in racial and ethnic values that affect parenting practices, emerge in examining vulnerability to childhood neglect. As such, parenting style classification should be considered in the context of these cultural differences. It has also been found that children who grow up in more dangerous environments fare better with stricter or more controlling parents (Baldwin, Baldwin, & Cole, 1990), a finding that has important implications for studying the effects of parenting style on risk outcomes. Similarly, one might consider parenting style in the context of the daughter's age. Though the sample used in this study was relatively limited in age (15-20), it has been established that as adolescents get older, they become less close with their parents and gain more egalitarian roles in their mother-child relationships, thus having implications on parenting style and the effects of (see Steinberg & Morris for a review). As a whole, it is important to recognize that the effect of parenting on adolescents must be considered in context, and, more so than controlling for contextual factors, it is important that future research explore the interactive effects of these factors so as to better understand if and how parenting practices operate under various contextual circumstances.

## **7.6. Conclusion**

Sexually transmitted infections and unintended pregnancy among adolescents and young adults are associated with negative social and maternal and child health outcomes. Aside from abstinence, the most effective ways to avoid these consequences are to limit sexual partners and to use condoms and contraceptives. Yet many young women do not

use condoms or contraceptives or use them inconsistently. As such, this study provides important insight into the underlying factors that contribute to young women's sexual risk-taking behaviors.

The primary aim of this study was to determine whether parenting style was associated with sexual risk taking in adolescence and young adulthood. Namely, the goal was to determine whether any maternal parenting style aside from one which demonstrates both warmth and control (authoritative parenting) would lead to sexual risk taking in adolescence and young adulthood. Based on the results of these analyses, it appears that parenting style does, in fact, appear to have direct effects on sexual risk-taking, though not all parenting styles appear to have equal influence on certain risk behaviors. That is to say, the hypotheses that any parenting style aside from authoritative would lead to sexual risk-taking was not supported, but there was support for the idea that certain parenting styles aside from authoritative were linked to sexual risk-taking behaviors in both adolescence and young adulthood.

To summarize, it appears that, comparing two maternal characteristics (maternal parenting style and mother-daughter communication about sex), maternal parenting style appears to be a more consistent indicator of adolescent and young adulthood sexual risk-taking behaviors among girls. In particular, it appears that daughters with authoritative mothers (those who maintain balanced relationships with their daughters that are warm, yet controlling) are more likely to engage in less risky-sexual behavior. It seems that, conversely, those with authoritarian and permissive mothers (those who do not maintain balanced relationships, but relationships that are *either* warm or controlling – but not both) are more likely to exhibit risky behaviors, such as inconsistent condom and

contraceptive use in adolescence. Those with neglectful parents (those who reject their daughters and provide *neither* warmth nor control) do not seem to be significantly more likely to engage in risky sexual behaviors in adolescence, perhaps because they are forced to grow up too quickly and to assume more adult roles, thus developing the ability and know-how to access and negotiate condom and contraceptives. However, while the risk associated with authoritarian and permissive parenting seems to weaken and lose significance when daughters reach adulthood, the risk associated with neglectful parenting emerges. Specifically, it appears that when those with neglectful parents reach young adulthood, they represent the group most at risk for having high numbers of past year sexual partners, perhaps due to their desire to fill a socioemotional void left by the disengaged, rejecting, neglectful parenting they received earlier in their lives.

Overall, by providing evidence that maternal parenting style is not only associated with sexual risk-taking behaviors in adolescence and young adulthood but, in fact, may be predictive of these sexual risk-taking behaviors under certain circumstances, this study points to the potential success of adolescent and young adult sexual health programs that encourage mother-daughter relationships that are both warm and controlling. By implementing prevention and intervention programs in adolescence, it may be possible to prevent or reduce the risk of STIs and unintended pregnancy in adolescence and into young adulthood. Moreover, these programs might be most effective and have the most long-lasting effects when they include mothers *and* daughters in these programs – an important component, especially considering that fact that parents of adolescents often underestimate the degree to which *they* influence their children’s sexual behaviors (Albert, 2007).

## **APPENDIX A: SEXUALLY TRANSMITTED INFECTIONS**

The following section provides additional information about the prevalence and associated risks of the three most common sexually transmitted infections among adolescents and young adults – Human Papillomavirus (HPV), Chlamydia, and trichomoniasis. The risk of HPV is undergoing a transformation due to the recent approval of an HPV vaccine (Gardasil), which has been shown to prevent HPV strains 16 and 18, which are associated with 70% of cervical cancer cases, and strains 6 and 11, which are associated with 90% of genital warts cases (Merck & Co., Inc, 2008), yet HPV continues to warrant public health attention due to its prevalence and due to its health impact. Chlamydia and trichomoniasis are both bacterial infections and, thus, curable with an antibiotic treatment, yet they often remain undiagnosed or undetected, thereby leading to further STI transmission and long-term negative health impacts. Thus, this section will review these three STIs in greater depth.

### **Human Papillomavirus (HPV)**

Currently, more than one hundred strains of Human Papillomavirus (HPV) have been identified, and over thirty have been shown to cause cervical cancer and genital warts. According to the Centers for Disease Control and Prevention (2007a), HPV is generally transmitted through direct skin-to-skin contact; most commonly, this contact is penetrative genital contact (either vaginal or anal sex). Although other methods of transmission are possible, sexual intercourse is the most common. Specifically, less than 2% of reported cases of HPV occurred in females who were not sexually active (CDC, 2007a). As such, HPV is classified as a sexually transmitted disease.

Studies estimate that eight out of every ten women in the United States will be

infected with the HPV over their lifetime, and that more than one in four women ages 14 to 59 currently have HPV (Kaiser Family Foundation, 2008). That is, current estimates indicate that nearly 25 million women ages 14 to 59 (about 27%) have HPV, with an overall prevalence of 40% among adolescent and young adult females aged 14 to 24 years (Dunne, et al., 2007). Furthermore, Weinstock, Berman, and Cates (2004) estimate that 74% new infections occur among individuals are 15 to 24. Of course, men are also susceptible to HPV and genital warts, and some types of HPV can lead to cancer of the anus, penis, and throat; however, men are generally considered to be HPV “carriers,” since these cancers are rare in healthy men (CDC, 2008a). For many, HPV resolves itself on its own; for example, 70% of women who contract an HPV infection test negative for HPV within one year, and over 90% test negative after two years (CDC, 2007a). For others, though, it has been shown that certain strains of HPV can cause genital warts, and other strains can lead to anal, cervical, or throat cancer (CDC, 2008a). In fact, evidence indicates that HPV is responsible for over 99% of all cervical cancer (FDA, 2008). In addition, other vulvar, vaginal, anal, penile, and throat cancers are also associated with HPV, and more than 15 different types of HPV are oncogenic (related to cancer) (FDA, 2008). Further, the estimated treatment costs in the U.S. that are associated with HPV were estimated to be around 3 billion dollars in 2000 (Kaiser Family Foundation, 2008); as such, HPV represents a substantial public health concern.

### **Chlamydia**

Chlamydia represents the most commonly reported bacterial STI in the United States (CDC, 2010a). In 2008 alone, over 1.2 million cases were reported to the CDC; of these infections, it is estimated that nearly three-quarters (74%) occur among adolescents

and young adults aged 15 to 24. However, these estimates grossly underestimate the actual incidence of infection, as Chlamydia frequently occurs in the absence of symptoms, earning the designation of the “silent” STI (CDC). If symptoms are present, they usually appear within one to three weeks of exposure and include: abnormal vaginal discharge or a burning sensation when urinating and, if the infection spreads from the cervix to the fallopian tubes, lower abdominal pain, low back pain, nausea, fever, pain during intercourse, or bleeding between menstrual periods (for women); and discharge from the penis, a burning sensation when urinating, burning and itching around the opening of the penis, and pain and swelling in the testicles (for men) (CDC). Being infected with Chlamydia may also increase the chances of becoming infected with HIV (CDC).

Chlamydia can be transmitted via vaginal, anal, or oral sex and during vaginal childbirth, though it is most commonly transmitted during vaginal sex, and it has been established that the greater the number of sex partners, the greater the risk of infection (CDC, 2010a). Although any sexually-active person can be infected with Chlamydia, young women are especially at risk due to the fact that the cervix is not fully matured and, thus, are particularly susceptible to infection (CDC). In fact, the CDC recommends that any sexually-active women 25 years or younger be tested for Chlamydia annually. Additionally, women are at a higher risk for complications associated with untreated Chlamydial infections; about 10 - 15% of untreated infections among women spread into the uterus or fallopian tubes and cause pelvic inflammatory disease (PID) – a disease which can cause damage to the fallopian tubes, uterus, and surrounding tissues, and which can lead to chronic pelvic pain, infertility, and ectopic pregnancy (CDC).

## **Trichomoniasis**

According to CDC estimates, nearly seven and a half million new cases of trichomoniasis - or “trich”- occur each year (2007c). According to a 2007 study, approximately 3.1% of women aged 14 to 49 are infected with trichomoniasis at any given time (Sutton, et al., 2007). Trichomoniasis is transmitted primarily through vaginal contact, and infection is associated with absent or mild symptoms, which present between five days to four weeks of exposure. Symptoms include: frothy, odorous, yellow-green vaginal discharge, discomfort during intercourse and urination, and lower abdominal pain (among women); and irritation inside the penis, discharge from the penis, and burning during urination or ejaculation (among men) (CDC). Trichomoniasis also increase women’s susceptibility to HIV and increases the risk of transmission of HIV to partners (CDC).

## APPENDIX B: IRB APPROVAL

Initial Application Approval

[http://irbdatabase.umresearch.umd.edu/human/protocols/1917/initial\\_even](http://irbdatabase.umresearch.umd.edu/human/protocols/1917/initial_even).



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### Initial Application Approval

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To: Principal Investigator, Dr. Sandra L. Hofferth, Family Science  
Co-Investigator, Amanda Berger, Family Science  
From: James M. Hagberg  
IRB Co-Chair  
University of Maryland College Park  
Re: IRB Protocol: 09-0270 - The Effect of Parental Comfort with Sex Related Communication  
on Teenage Girls' Perceptions of Sex  
Approval Date: April 15, 2009  
Expiration Date: April 15, 2012  
Application: Initial  
Review Path: Exempt

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The University of Maryland, College Park Institutional Review Board (IRB) Office approved your Initial IRB Application. This transaction was approved in accordance with the University's IRB policies and procedures and 45 CFR 46, the Federal Policy for the Protection of Human Subjects. Please reference the above-cited IRB Protocol number in any future communications with our office regarding this research.

**Recruitment/Consent:** For research requiring written informed consent, the IRB-approved and stamped informed consent document will be sent via mail. The IRB approval expiration date has been stamped on the informed consent document. Please note that research participants must sign a stamped version of the informed consent form and receive a copy.

**Continuing Review:** If you intend to continue to collect data from human subjects or to analyze private, identifiable data collected from human subjects, beyond the expiration date of this protocol, you must submit a Renewal Application (<http://www.umresearch.umd.edu/IRB/renewal%20app.html>) to the IRB Office 45 days prior to the expiration date. If IRB Approval of your protocol expires, all human subject research activities including enrollment of new subjects, data collection and analysis of identifiable, private information must cease until the Renewal Application is approved. If work on the human subject portion of your project is complete and you wish to close the protocol, please submit a Closure Report (<http://www.umresearch.umd.edu/IRB/closure%20app.html>) to irb@umd.edu.

**Modifications:** Any changes to the approved protocol must be approved by the IRB before the change is implemented, except when a change is necessary to eliminate an apparent immediate hazard to the subjects. If you would like to modify an approved protocol, please submit an Addendum request (<http://www.umresearch.umd.edu/IRB/addendum%20app.html>) to the IRB Office.

**Unanticipated Problems Involving Risks:** You must promptly report any unanticipated problems involving risks to subjects or others to the IRB Manager at 301-405-0678 or [jsmith@umresearch.umd.edu](mailto:jsmith@umresearch.umd.edu)

**Additional Information:** Please contact the IRB Office at 301-405-4212 if you have any IRB-related questions or concerns. Email: [irb@umd.edu](mailto:irb@umd.edu)

The UMCP IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and operates under Federal Wide Assurance No. FWA00005856.

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