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UNIVERSITY OF CALIFORNIA  
RIVERSIDE

Parent-Adolescent Sexual Communication and Adolescent Cognitive Processes on  
Sexual Risk Among European American Female Adolescents

A Dissertation submitted in partial satisfaction  
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Nicole Melinda Stanoff

March 2010

Dissertation Committee:

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The Dissertation of Nicole Melinda Stanoff is approved:

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Committee Chairperson

University of California, Riverside



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All my love,

Nicole M. Stanoff, Ph.D.

## ABSTRACT OF THE DISSERTATION

Parent-Adolescent Sexual Communication and Adolescent Cognitive Processes on  
Sexual Risk Among European American Female Adolescents

by

Nicole Melinda Stanoff

Doctor of Philosophy, Graduate Program in Psychology  
University of California, Riverside, March 2010  
Dr. Ruth K. Chao, Chairperson

This study investigated the relationship between mother-adolescent sexual communication and adolescents' engagement of sexual behavior among a sample of 2,669 European American female adolescents, ages 13 to 18 years, and their mothers, from the first Wave of the National Longitudinal Study of Adolescent Health. Communication was assessed by the frequency that mothers discussed the negative consequences of intercourse with their daughters, one year prior to engagement of sexual risk. Additional family factors including mothers' knowledge of adolescent dating, family structure, and socioeconomic status were examined on the effectiveness of sexual communication and pregnancy risk. In addition to maternal influence, this study acknowledged the importance of adolescent predictors on sexual risk, including adolescents' dating experience, decision making, and awareness of the negative consequences of sexual intercourse. This study also determined if decision making/awareness of sexual consequences mediated the relationship between communication and pregnancy risk. Finally, the moderating effects of adolescents' age

and mother-daughter closeness were examined in the associations between communication and sexual risk, and between decision making/awareness and sexual risk. Sexual communication influenced engagement of sexual risk. However, contrary to the hypothesis, communication around sexual risk contributed to adolescents' increased engagement of intercourse, and was ineffective in increasing condom use. Regarding adolescent predictors, decision making and awareness of sexual consequences decreased the likelihood of sexual risk, and decision-making partially mediated the relationship between communication and intercourse. There was no moderation of age or mother-daughter relationship quality in the above associations, indicating that mother and adolescent predictors had similar effects for younger and older adolescents, and across groups of mothers/adolescents who reported low and high levels of closeness. These findings suggest that discussing the negative consequences of intercourse does not prevent adolescents' engagement in sexual behavior, and adolescents may interpret this style of communication as controlling and dramatic, and rebel against parents' advice by becoming sexually active. Furthermore, adolescents' cognitive skills and ability to recognize consequences of sex played an important role in deterring sexual engagement. Thus, adolescent predictors may be more of a protective factor against engagement in sexual risk above and beyond that of maternal influence.

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## INTRODUCTION

Adolescence is a time of sexual and romantic awakening that has multiple and social meanings (Christopher, 2001). During this period of development, adolescents redefine their identity from childhood to a developing adolescent and transform important interpersonal relationships with parents, peers, and sexual partners (DeLamater, 1981). For the first time, adolescents must deal with becoming comfortable with their own sexuality, cope with the pressures to have sex, and ultimately decide if, when, and with whom to engage in sexual intercourse (Roche, Mekos, Alexander, Aston, Bandeen-Roche, & Ensminger, 2005). Thus, an adolescent's decision to initiate intercourse places them in jeopardy for high-risk behaviors.

Risky sexual behavior has increased dramatically in the United States over the past 15 years (Hutchinson & Cooney, 1998; Rosenthal & Feldman, 1999), and it has been estimated that over 12 million adolescents in the United States are sexually active (Aved & Lobdell, 1984). In fact, nearly half of all high school students have had sexual intercourse and over 60 percent report having sex by the time they graduate from high school (Abma, Driscoll, & Moore, 1998). This estimate is similar for both high school senior girls (61%) and boys (61%) (Center for Disease Control and Prevention, 2002). Thus, by the end of adolescence, sexual intercourse has become a normative behavior (Upchurch, Levy-Storms, Sucoff, & Anseshensel, 1998; Roche et al., 2005).

Although there have been increases in sexual engagement, rates of condom use have also increased among sexually active adolescents over the past decade. In fact, it has been reported that condom use increased from 46 percent in 1991 to 63 percent in 2003,

and has remained relatively stable, with 62 percent in 2007 (YRBSS 2007; Center for Disease Control and Prevention, 2007). However, despite the recent increases in condom use as well recent decreases in adolescent pregnancy and parenthood (Alan Guttmacher Institute, 1994; Darroch & Singh, 1999), pregnancy rates in the United States are still much higher than in other industrialized countries (Singh & Darroch, 2000). On average, more than two thousand female adolescents in the United States become pregnant everyday (Center for Disease Control and Prevention, 2002), and approximately 40 percent become pregnant before age 20 (Center for Disease Control and Prevention, 2005). Additionally, 85 percent of teenage pregnancies are unintended, accounting for 25 percent of all unplanned pregnancies annually (SIECUS, 2000).

The prevalence of sexually transmitted diseases is also widespread among American youth, and among sexually active adolescents, about 1 in 4 contracts an STD every year (SIECUS, 2000). Additionally, the Center for Disease Control and Prevention (2005) estimated that nearly 19 million new infections occurred each year, with almost half of them among youth ages 15 to 24. American adolescents also account for a significant proportion of new HIV infections, and by adulthood, between 25 and 45 percent of young women will be infected with HIV (Center for Disease Control and Prevention, 2002).

These high pregnancy and STD/HIV rates indicate that U.S. adolescents are not consistent contraceptive users (Longmore, Manning, Giordano, & Rudolph, 2003). In fact, only 48 percent of adolescents reported using a condom during their last sexual experience (Kann et al., 2000). This inconsistency in condom use may be due to

adolescents being misinformed about the protection that condoms provide against STDs and HIV/AIDS (YRBSS, 2007; Center for Disease Control and Prevention, 2007).

According to the Center for Disease Control and Prevention (2007), condoms have been the surest way to prevent transmission of HIV and other STDs (CDC, HIV/AIDS Basic Information, 2007). When used correctly and consistently, condoms can greatly reduce, though not eliminate, the risk of both STDs and unintended pregnancy (Center for Disease Control and Prevention, 2007). Additionally, adolescents who use condoms at their first sexual experience also tend to use them more consistently (St. Lawrence & Scott, 1996).

However, there are gender and age differences in the rates of condom use among sexually active adolescents. According to the 2007 Youth Risk Behavior Surveillance System (YRBSS), 69 percent of sexually active male adolescents reported that they or their partner used a condom at most recent intercourse, compared with 55 percent of female adolescents (Center for Disease Control and Prevention, 2007). Additionally, the YRBSS (2007) also found grade differences in condom use, in which 69 percent of sexually active ninth graders reported using a condom at most recent intercourse compared to 62 percent of eleventh graders, and 54 percent of twelfth graders. This decline in condom use may be due to older adolescents using other methods of birth control (Youth Risk Behavior Survey, 2001). However, there is still reason for concern because condoms are the only effective agent against STDs for those who are sexually active.

Therefore, there are tremendous health and economic burdens related to adolescent sexual risk-taking, and it is essential for researchers to evaluate the risk and protective factors associated with sexual behavior. As a result of such trends, policy makers, researchers, and concerned citizens have sought to reduce high-risk behavior (e.g., Marin, Coyle, Gardner, & Cummings, 2007) by educating adolescents directly about the risk of sexual behavior (Coyle, Kirby, Robin, Banspach, Baumler, & Glassman, 2006). However, due to adolescents' decision-making skills as well as their inability to consider future consequences of their behavior, adolescents lack the maturity to make responsible decisions about high risk behavior (Montemayor, 1983). Thus, solely educating adolescents is not enough of protective factor from preventing them from engaging in high risk sexual behavior.

Adolescence is a transitional period of growth and change including the development of mature forms of thought and behavior (Montemayor, 1983). This transition from childhood to adolescence is filled with a combination of biological, environmental, and cognitive changes that can be disruptive (Zuckerman et al., 1978; Kirby, Lepore, & Ryan, 2005). Additionally, adolescents are characterized as impulsive decision-makers who are more likely to participate in high-risk sexual behaviors (Langer, Zimmerman, Warheit, & Duncan, 1993; Donohew et al., 1997; Zimmerman & Donohew, 1996; Zimmerman, Novak & Donohew, 1997). Generally, adolescents' decision to participate in high-risk behavior is based on their thinking of themselves as invulnerable and that bad consequences will never happen to them (Fischhoff, Crowell, & Kipke, 1999). Thus, adolescents lack the maturity to make responsible decisions about high risk

behavior (Montemayor, 1983). Therefore, there is a need to include alternative approaches that focus on other influential individuals, such as parents, that can help adolescents improve their decision making skills and recognize the consequences of high-risk behavior.

The purpose of this study is to first investigate the relationship between parenting behaviors (i.e., frequency of parent-adolescent sexual communication) and adolescent sexual risk-taking. The role of the family in adolescents' transition to dating and sexual activity has become increasingly emphasized in research on adolescent sexual behavior (e.g., Miller, Benson, & Galbraith, 2001). The context of the family is considered the primary source of influence for the introduction of risk and protective factors in adolescents' lives (Weinstein & Thorton, 1989). Families also provide the foundation in which adolescents' sexual values, expectations, and behaviors are initially formed (Weinstein & Thorton, 1989). Thus, family relationships still remain essential in influencing adolescents' decision-making to engage in sexual intercourse (Noller, 1995). Therefore, it is important to teach parents how to effectively communicate with their adolescents about sex, which in turn will deter adolescents from engaging in high-risk behavior (Jaccard, Dodge, & Dittus, 2002). In this approach, parents are viewed as change agents, who become valuable sources of information that help shape the sexual beliefs and behaviors of their children (Jaccard et al., 2002).

Research has shown that the most commonly examined familial influence on adolescents' decision to engage in sexual intercourse is parent-child sexual communication (e.g., Fox & Inazu, 1980). Yet research has produced unclear results

about the effectiveness of communication about sexuality. Two early reviews of the literature show that sexual communication is limited, indirect, and a source of discomfort for both parents and adolescents (Fox, 1981; Philliber, 1980). Adolescents also report that discussions with their parents about sexual issues are quite limited (Noller & Bagi, 1985), and when communication occurs, it focuses on biology rather than sexual decision-making (Baldwin & Baranoski, 1990).

While some studies show that the quality and quantity of parental communication reduces risky sexual behavior (Dilorio et al., 1999; Neapolitan, 1981; Whitaker et al., 1999), other studies indicate that communication is related to a greater likelihood of adolescents engaging in sexual intercourse (Darling & Hicks, 1982; Kahn et al., 1984; Widmer, 1997), or has no relationship between communication and adolescents' sexual behavior (Fisher, 1993; Newcomer & Udry, 1984). However, this inconsistency in the literature may be due to communication about sex being too general and parents not providing their adolescents with a clear enough message about how to avoid sexual risk. As a result, sexual communication should specifically focus on the negative consequences associated with risky behavior including the repercussions of unintended pregnancy, contracting a sexually transmitted disease, and having multiple sexual partners (Usher-Seriki, Smith Bbynum, & Callands, 2008; Hutchinson, Jemmott, Jemmott, Braverman, & Fong, 2003). Therefore, parents can educate their children about the consequences of their actions, helping them to plan ahead and make responsible choices about engaging in high risk behavior. However, the effectiveness of this type of communication may be dependent on additional family factors.

In order for communication about sexual risk to be effective in reducing adolescents' engagement in such behavior, it is critical that parents are able to accurately anticipate when adolescents first become involved in sexual activities (Longmore, Manning, & Girodano, 2001). It has been suggested that adolescent's involvement in dating relationships may be an indicator of their engagement of sexual intercourse (Longmore et al., 2001). Thus, if parents are knowledgeable about their adolescent's dating behavior, they will be more likely to engage adolescents in conversations about sexual risk and ensure that adolescents are well-informed of the consequences of engaging in such behavior (Eisenberg, Sieving, Bearing, Swain, & Resnick, 2006; Jaccard, Dittus, & Gordon, 1998). However, there may be other factors including family structure as well as socioeconomic status that are related to the effectiveness of parent-child sexual communication (Lefkowitz, Boone, Au, & Sigman, 2003). Typically, divorced or single parents tend to have more permissive sexual attitudes about adolescents' engagement of intercourse (Thorton & Camburn, 1987), and they are less likely to supervise and monitor their children's behavior (Whitbeck, Simons, & Kao, 1994). As a result, parents may be less likely to engage their adolescents in conversations that focus on the negative consequences of sexual risk. Additionally, parents of lower SES are less likely to discuss the negative consequences of intercourse than parents of high SES (Lefowitz, Boone, Au, & Sigman, 2003), because they lack the education to do so. This may in turn lead adolescents from single-parent and low-income families to be at greater risk for unintended pregnancy or contracting an STD (Miller et al., 2001). Therefore, in order for communication to serve as a protective factor against adolescents'



engagement in risky sexual behavior, parents should discuss the negative consequences associated with intercourse.

Another factor related to effective communication around sexual risk is the gender of parent and adolescent, in which parent-child sexual communication may be most effective in mother-daughter relationships. Generally, mothers are more likely to discuss sexual issues with their daughters because they have the closest and most intimate relationships (Dilorio et al., 1999; Miller et al., 1998; Noller & Bagi, 1999). Additionally, communication with mothers has a greater impact on female adolescents because it is generally believed that parents have a bigger influence on the behavior and development of their same-gendered children (Collins, Cassel, & Harper, 1975). Thus, this study only focuses on mother-daughter relationships.

However, adolescents' decision to engage in intercourse cannot be solely dependent on parenting factors. In order for adolescents to make responsible decisions about not engaging in risky sexual behavior at an early age, it is essential that adolescents not only develop competent decision making skills about engaging in risky behavior (Godfried, & Davidson, 1976), but recognize the negative consequences associated with intercourse (e.g., getting pregnant, an STD) (Michels et al., 2005). Therefore, in order to foster responsible decision making about sexual engagement, it is crucial for parents to openly discuss the consequences of sexual risk, which will ensure that adolescents develop responsible decision making skills, and recognize the consequences related to sexual intercourse.

There may, however, be important factors that moderate the relationship between parent-adolescent sexual communication and engagement of sexual behavior. Specifically, the age of the adolescent may moderate the effectiveness of communication and the degree to which the parents' message is internalized by the adolescent. It might be expected that communication about sexual risk may have greater influence on younger adolescents than older adolescents (Dittus et al., 1999). As adolescents progress in age, they are striving toward independence and are gradually becoming less dependent on the family (Collins & Repinski, 1994; Dittus et al., 1999; Grotevant & Cooper, 1986). Age may also moderate the association between adolescents' decision making skills/awareness of sexual consequences and their engagement of sexual risk. One might expect that adolescents' decision making and awareness of sexual consequences may have greater impact on older adolescents than on younger adolescents, because as adolescents get older, they have the ability to consider future consequences of their actions, as a result, are more likely to plan ahead (Flavell, 1977; Urberg & Rosen, 1987).

Additionally, parent-adolescent relationship quality may also moderate the relationship between parent-adolescent sexual communication and adolescents' engagement of sexual behavior. For sexual communication, it is crucial that parents and adolescents, specifically mothers and daughters, share a close relationship (Jaccard et al., 1998). Females who feel connected with their mothers are less likely to initiate sex at an early age (Miller, 1998) and more likely to use contraception (Dittus & Jaccard, 2000). Thus, without high levels of closeness, mothers' messages about avoiding risky sexual behavior is less likely to be internalized or accepted by adolescents (Weinstein, 1989;

Jaccard et al., 1996). Mother-daughter closeness may also moderate the association between adolescents' decision-making skills/awareness of sexual consequences and engagement of sexual behavior. Close parent-child relationships improve children's cognitive abilities to become autonomous and competent decision makers (Conger & Peterson, 1984). Parents teach their children the tools for making responsible decisions such as generating and evaluating alternative solutions to a problem, which helps improve their ability to recognize the consequences associated with risky behavior (Adams & Gullotta, 1983; Olson, McCubbin, Barnes, Larsen, Muxen, & Wilson, 1983).

Therefore, the present study extends past research on the relationship between mother-daughter sexual communication and adolescent sexual behavior by focusing specifically on the negative consequences of sexual intercourse. This study also examined the importance that parents' knowledge of adolescents' dating behavior has on parent-child sexual communication as well as the influence of family structure and socioeconomic status. In addition to these parenting influences on adolescent sexual behavior, it was also essential to examine adolescents' decision-making skills as well as what adolescents understand about the risks associated with sexual intercourse and condom use. Therefore, this study investigated the relationship between adolescents' awareness of the negative consequences associated with sexual intercourse and adolescents' decision to engage in sexual behavior. Additionally, this study also determined how adolescents' decision-making skills and awareness of sexual consequences mediated the relationship between mother-daughter sexual communication and engagement of sexual behavior and condom use. Finally, this study explored possible

moderating effects of adolescents' age and parent-child relationship quality in the associations between parent and adolescent predictors on sexual engagement and condom use.

### *The Importance of Parent-Adolescent Sexual Risk Communication*

Parent-child relationship quality is important for promoting healthy developmental outcomes. Behaviors including open communication, forming close parent-child relationships, and active involvement in the adolescents' daily life have been found to increase children's well-being (Barnes & Olsen, 1985; Choo, 2000; Gottfried, Fleming, & Gottfried, 1998). Many studies have shown that communication is positively related to adolescent social and psychological adjustment, and is negatively related to delinquent and aggressive behaviors (Anderson & Henry, 1994; Clark & Shields, 1997; Lambert & Cashwell, 2004; Peterson & Leigh, 1990). In order for communication to have an effect on reducing risky sexual behavior, parents need to openly discuss sexual issues to educate their children about avoiding risky sexual behavior. This relationship between parent-child sexual communication and adolescent pregnancy risk has been thoroughly examined in the literature. However, conclusions across these studies are complex, inconsistent, and less well understood. The simplest explanation is that parent-child communication around sexual behaviors has no simple, direct effect on adolescent pregnancy risk (Miller et al., 2001).

A common finding across the literature shows that the quality and quantity of parent-child sexual communication plays a crucial role in potentially reducing risky sexual behavior (Kirby et al., 2007; Miller et al., 2001; Neapolitan, 1981). Generally,

open, positive, and frequent communication about sex is related with adolescents not engaging in sexual intercourse, postponing their sexual debut, or having fewer sexual partners (Barnett, Papini, & Gbur, 1991; Blake, Simkin, Ledsky, Perkins, & Calabrese, 2001; Dilorio et al., 1999; East 1996; Fox & Inazu, 1980; Hotlzman & Rubinson, 1995; Hutchinson, 2002; Jaccard & Dittus, 1991; Jaccard et al., 1996; Karofsky, Zeng, & Korsorok, 2001; Leland & Barth, 1993; Pick & Palos, 1995; McBride, 1996; Rodgers, 1999; Ward & Wyatt, 1994; Werner-Wilson, 1998; Whitaker et al., 1999; Whitaker & Miller, 2000). Among sexually active youth, parent-child sexual communication is also related to more effective contraceptive use (Casper, 1990; DiClemente, et al., 2001; Fisher, 1986; Fox & Inazu, 1980; Furstenberg et al., 1984; Handelsman et al., 1987; Hutchinson, 2002; Leland & Barth, 1993; Levin & Robertson, 2002; Miller & Whitaker, 2001; Newcomer & Udry, 1985; Pick & Palos, 1995; Romer et al., 1999; Wilson et al., 1994). Thus, when parents inform their adolescents about the consequences of risky sexual activity (e.g., not using effective contraception, unplanned pregnancy, and STDs), it helps foster responsible decision-making (Rogers, 1999).

However, several studies have reported a positive relationship between communication and adolescent sexual behavior, such that the amount of communication is related to the greater likelihood of adolescents engaging in sexual intercourse (Bersamin et al, 2006; Clawson & Reese-Weber, 2003; Darling & Hicks, 1982; Jaccard, Dittus, & Gordon, 1996; Kahn et al., 1984; Miller, Benson, & Galbraith, 2001, Sucoff, Shwe, Beuhring, Blum, 1999, Widmer, 1997), greater frequency of sexual behavior (Somers & Paulson, 2000), and higher rates of pregnancy (Pistella & Bonati, 1998). To

make findings more complex, many studies report no association between sexual communication and adolescent sexual activity or contraceptive use (Casper, 1990; Chewing & Koningsveld, 1998; Clawson & Reese-Weber, 2003; Cvetkovich & Grote, 1983; Darling & Hicks, 1982; Fisher, 1993; Furstenberg et al., 1984; Guzman et al., 2003; Handelsman et al., 1987; Hovell et al., 1994; Inazu & Fox, 1980, 1985; Kastner, 1984; Loewenstein & Furstenberg, 1991; McNeely et al., 2002; Miller, Forehand, & Kotchik, 2001; Newcomer & Udry, 1985; Rodgers, 1999; Thomson & Spanier, 1978).

#### *Parent-Adolescent Sexual Communication in Mother-Daughter Relationships*

Adolescents' communication with their mothers is more open and intimate than with fathers (Noller & Bagi, 1985), and adolescents prefer going to their mothers for advice (Greene & Grimsely, 1990). Mothers are also more likely to discuss sexual issues with their children (Fisher, 1993; Dilorio et al., 1999; Downie & Coates, 1999; Fox, 1981; Hepburn, 1983; Jaccard & Dittus, 1991; Miller et al., 1998; Nolin & Peterson, 1992; Noller & Callan, 1990; Raffaelli, Bogenschneider, & Flood, 1998; Rosenthal & Feldman, 1999), because mothers are better overall communicators, and have closer and more intimate relationships with their children (Cooper et al., 1992; Noller & Bagi, 1985). This intimacy stems from mothers spending more time with their children, engaging them in conversations (Fitzpatrick & Vangelisti, 1995; Larson & Richards, 1991; Shearer, Crouter, & McHale, 2005; Stewart, Cooper, Stewart, & Friedly, 1996). Additionally, mother-child sexual communication tends to be more beneficial for reducing risky sexual behavior than father-child sexual communication (Dutra, Miller, & Forehand, 1999; Jaccard & Dittus, 1991).

Studies have also shown that sexual communication is also more frequent and extensive with daughters than with sons (Ballard & Morris, 1998; Noller & Callan, 1990; Nolin & Peterson, 1992; Pick & Palos, 1995; Raffaelli et al., 1998). Communication is also more frequent in same-sex relationships (i.e., mother-daughter, father-son), with girls feeling more comfortable talking to mothers, and boys feeling more comfortable talking to fathers (Balswick & Balkwell, 1977; Clark, & Snell, 1988; Noller & Callan, 1990; Singh & Singh, 1986). These findings suggest that adolescents may be more influenced by the same-sex parent. In addition, daughters tend to evaluate mothers more positively as sexual educators (Noller & Callan, 1991; Youniss & Smollar, 1985), and communication has more beneficial effects on reducing girls' sexual engagement (Roche et al., 2005). Thus, communication about sexual risk tends to be most beneficial in mother-daughter relationships.

#### *Explanation for Mixed Findings on Parent-Adolescent Communication*

As previously indicated, there have been inconsistent findings regarding the effects of parent-child sexual communication (i.e., positive, negative, and no association) on adolescent sexual activity. These inconsistencies in the literature can be explained by several factors. First, the level of sexual communication between parents and children are rather minimal (Noller & Bagi, 1985), and is a source of discomfort for both parties (Philliber, 1980). Communication is also rare because parents often believe it is the school's responsibility to educate children about sex (Kaiser Family Foundation, 2000; Byers et al., 2003). When communication does occur, it may not be effective in reducing adolescent sexual behavior because much of the communication is indirect and subtle,

with parents conveying messages about morality rather than providing their children with information about sexual risk (Fisher, 1986; King & Lorusso, 1997; Hepburn, 1983; Philliber, 1980; Fox, 1981).

Research has shown age differences in the frequency and content that takes place in parent-adolescent sexual communication (Eisenberg, Sieving, Bearinger, Swain, & Resnick, 2006). For example, Dittus and colleagues (1999) found that mothers of younger adolescents, ages 14 to 16 years, were more likely to discuss issues of sexual risk including the consequences of unintended pregnancy, contracting AIDS/STDs, and having a bad reputation among friends, than mothers of older adolescents, age 17 years. However, Eisenberg and colleagues (2006) found that mothers of younger adolescents, ages 13 to 15 years, were more likely to discuss issues of birth control and condoms if they perceived their adolescent to be in a romantic relationship than mothers of older adolescents, ages 16 to 17 years. Furthermore, Lefkowitz, et al. (2003) reported that mothers of younger adolescents were more likely to have discussions about abstinence, whereas mothers of older adolescents were more likely to discuss issues of safer sex, including birth control and condom use. These mixed findings suggest that mothers find certain sexual topics more age appropriate for younger adolescents and other topics more appropriate for older adolescents (Eisenberg et al., 2006; Lefkowitz et al., 2003).

The age of the adolescent may also determine the degree that communication can influence adolescents' engagement in risky sexual behavior (Dittus et al., 1999; Somers & Paulson, 2000; Sucoff et al., 1999). As adolescents get older, they strive for autonomy and become less dependent on the family (Collins & Repinski, 1994; Dittus et al., 1999;



Grotevant & Cooper, 1986). As a result, parent-adolescent sexual communication may have less of an effect on older adolescents' engagement of sexual intercourse compared to younger adolescents. Consistent with the finding, Lowenstein and Furstenberg (1991) found that parental discussions about birth control was positively related with contraception at most recent intercourse among youth ages 14 to 16 years, but not among older adolescents, age 18 years. Furthermore, as adolescents get older, parents may not always be the major source of information or support for discussions on contraceptives. For example, 59% of adolescents between the ages of 12 to 14 years reported that parents have the most influence on their decisions to engage in sexual intercourse, compared to 39% of adolescents, ages 15 to 19 years (Ikamullah, Manlove, Cui, & Moore, 2009). During adolescence, there is a shift in socialization from parents to peers, with adolescents disclosing more to peers (Furman & Buhrmester, 1992; Weibe & Williams, 1972). Finkel and Finkel (1985) showed that peers influenced contraceptive use by providing more information on sexual and contraceptive matters. Thus, compared to parents, peers may have a more powerful influence on older adolescent sexual and contraceptive behaviors (Thomson & Spanier, 1978). Parent-adolescent communication may therefore, have a greater effect in reducing engagement of sexual risk for younger adolescents compared to older adolescents.

Other factors contributing to the variations in findings for parent-adolescent communication are the inconsistencies in the measurement of sexual communication. Many studies on sexual communication have only provided a global assessment of communication by using dichotomous single predictors (e.g., occur/did not occur)

(Jaccard & Dittus, 1993). However, other studies use checklists for the specific content that parents and children have discussed (Noller & Bagi, 1985), or have measured the frequency of communication (Jaccard, Dittus, & Gordon, 2000; Lefkowitz, Romo, Corona, Au, & Sigman, 2000; Raymond & Silverberg, 1998; Sales, Milhausen, Wingood, DiClemente, Salazar, & Crosby, 2008). Additionally, sexual communication is often measured from only the adolescent's perspective (Nolin & Peterson, 1992; Noller & Callan, 1990). Even when both parent and adolescent perspectives are assessed, agreement is minimal on the amount of communication that occurs. For example, Furstenberg and colleagues (1984), and Jaccard, Dittus, and Gordon (1998) found that mothers believed they were communicating more about sex than daughters perceived them to be.

Additionally, the style of parent-adolescent sexual communication may also help to explain the mixed findings. For example, Mueller and Powers (1990) examined the relationship between adolescents' interpretation of parents' style of sexual communication and their engagement of sexual behavior. The study found that when adolescents reported that parents' communication style was friendly, attentive, and open, adolescents were less likely to engage in risky sexual behaviors and more likely to use contraception than when adolescents perceived parents' communication as dramatic, contentious, and dominant. Similarly, Dutra and colleagues (1999) also found that parent-adolescent sexual communication styles characterized as open and receptive were also related to lower sexual risk taking. These findings suggest that the "friendlier" styles of communication may be interpreted by the adolescent as more supportive.

Conversations about sexual issues tend to be more frequent and spontaneous between parent and adolescent, and thus, have a greater impact on adolescents' sexual behavior. On the other hand, adolescents may interpret the "negative" styles of communication as controlling, and therefore, may react by rebelling against their parents' wishes (Miller, McCoy, Olson, & Wallace, 1986).

The content of sexual communication may also be important in explaining inconsistencies of its effects on adolescent sexual and contraceptive behaviors. For example, Usher-Serkiki, Smith Bynum, and Callands (2008) examined two dimensions of parent-adolescent sexual communication: (1) communication about general sexual topics and (2) communication about sexual values. The general sexual topics measure included items asking parents how much they talk with their adolescent about sex, birth control, and the dangers of STDs. The sexual values measure included items addressing the negative consequences of premarital sex such as the consequences of pregnancy, the moral issues of not engaging in sexual intercourse, and negative impact on the adolescent's social reputation. Usher-Seriki and colleagues found that for each dimension of communication, there were different implications on adolescents' engagement of intercourse. That is, more frequent communication about issues related to the morality of premarital sex decreased engagement of sexual intercourse. Consistent with this finding, Hutchinson and colleagues (2003) also found that when mothers discussed the negative consequences of intercourse, adolescents were less likely to have multiple sexual partners. However, communication about general sexual topics (e.g., conversations about

birth control and condoms) is related to increases in engagement of intercourse (Chen & Thompson, 2007; Jaccard et al., 1996; Miller et al., 1999; Usher-Seriki et al., 2008).

One explanation for this finding is that sexual communication may result from parents' knowledge and increased concern about their adolescent's involvement in risky sexual behavior (Chen & Thompson, 2007). Fox and Inazu (1980) also argued that mothers attempt to prevent sexual engagement by "moralizing" and providing general information about sex, before adolescents engage in sexual intercourse. Once mothers suspect that their daughters are sexually active, mothers shift their role to offering "guidance," by focusing discussions on more practical issues such as birth control (Fox & Inazu, 1980). Thus, it may be that adolescents' participation in sexual behaviors drives parental communication involving birth control and contraceptives. An alternative explanation is that adolescents may simply interpret the detailed discussions about contraception and birth control as implicit approval for engagement of sexual intercourse, regardless of the parent's intention (Usher-Seriki et al., 2008). Thus, the specific content of communication has critical impact on adolescents' actual behavior.

Because few studies have examined the temporal order of communication and sexual behavior over time, it is difficult to capture the true direction of the effect (Miller et al., 2001). Research has shown that most parents initiate sexual discussions with their children during the preteen years, around age 13, before sexual intercourse has occurred (Dilorio, Kelly, & Hockenberry-Eaton, 1999; Wyckoff, Miller, Forehand, Bau, Fasula, Long, & Armistead, 2008). However, some parents wait until late adolescence (Warren, 1992), most likely after engagement of sex. However, when communication occurs prior

to onset of intercourse, adolescents are more likely to delay sexual initiation or else use contraception in their first sexual experience (Byers, Sears, & Weaver, 2008; Clawson & Reese-Weber, 2003; Hutchinson, 2002; Miller et al., 1998). Thus, communication may only be effective in reducing risky sexual behavior, if it occurs before youth have engaged in such behavior (Miller et al., 2001).

#### *What Makes Effective Communication?*

Due to these inconsistencies in the literature, researchers have tried to clarify the features of sexual communication that are most effective in reducing risky sexual behavior. Research has shown that the effectiveness of communication is dependent upon five dimensions of communication: 1) *frequency* of communication 2) *style* or way in which information is discussed, 3) *content* of information, 4) *timing* of communication, and 5) *general family environment* (i.e., the overall quality of parent-adolescent relationship) (Jaccard, et al., 1998; Miller, 1998; Sieving et al., 2000; Whitaker, Miller, May, & Levin, 1999). Some researchers have emphasized that the quality of communication, especially with parents' ability to be open and responsive, is a key dimension of communication (Whitaker et al., 1999). Communication should be conveyed in a way that adolescents not only understand but also accept parents' message about not engaging in risky sexual behaviors (Miller, Forehand, & Kotchik, 1999).

However, as previously mentioned, the effectiveness of parent-adolescent communication on adolescent sexual behavior depends on factors, such as the timing of communication (i.e., that it must occur before sexual intercourse in order to be effective) (Byers, Sears, & Weaver, 2008; Miller et al., 1998), and the content of discussions, (i.e.,

conversations only about birth control can actually increase use of contraception) (DiClemente et al., 2001). Therefore, parent-adolescent sexual communication does not necessarily serve as a protective factor for reducing adolescent pregnancy risk. In addition to these factors, there may be other aspects of parenting that are essential to reducing adolescents' sexual risk taking, and that may also enhance the effectiveness of sexual communication.

#### *Importance of Parental Knowledge of Precursors to Adolescent Sexual Behavior*

It is essential that parents have an awareness of their adolescents' sexual activities (e.g., whether or not the adolescent has dated) (Longmore, Manning, & Gordano, 2001). Research has shown that initiation of dating and romantic relationships is one of the most powerful predictors of engagement in sexual intercourse, less frequent contraceptive use, greater number of sexual partners, exposure to STDs, and overall pregnancy risk (Alan Guttmacher Institute, 1994; Blum, Beuhring, & Rinehart, 2000; Capaldi, Gorman, & Smith, 2003; Collins & Sroufe, 1999; Ford, Sohn, & Lepkowski, 2001; Halpern et al., 2000; Manlove et al., 2006; Miller et al., 1997; Rostosky, Regenerus, & Wright, 2003), especially among girls (Marin et al, 2006). Dating presents adolescents with easier access to a sexual partner, thereby creating an increased risk for sexual initiation (Longmore et al., 2001). Additionally, adolescents who begin dating at earlier ages are more likely to engage in first intercourse at younger ages (Dorius et al, 1993; Miller et al., 1986). Thorton (1990) examined the relationship between dating and first intercourse, and found that 30 percent of girls who began dating at age 13 or younger experienced first intercourse by age 15, as compared to *none* of the girls who started dating at age 16.

Research has shown that when parents are aware of their adolescents' dating behavior, they will be more likely to discuss sexual issues with their adolescents (Eisenberg et al., 2006). In fact, Eisenberg and colleagues found that parents who believed their adolescent was involved in a romantic relationship were 2.5 times more likely to discuss sexual topics including the impact on the adolescent's social life, sexually transmitted diseases, consequences of pregnancy, and birth control and condoms than parents who believed their adolescent was not involved in a dating relationship. Thus, when parents can accurately anticipate the onset of adolescents' dating and engagement in sexual behaviors, they can develop effective strategies for the timing of sexual discussions (Longmore et al., 2001), and the effectiveness of their sexual communication to the youth will be enhanced (Jaccard et al., 1998).

As previously indicated, the timing of sexual communication must occur before engagement of sexual intercourse to have any positive effect on reducing adolescent sexual behavior and increasing contraceptive use (Clawson & Reese-Weber, 2003; Hutchinson, 2002; Miller et al., 1998; Miller & Whitaker, 2001). Parents' awareness of such experiences prior to sexual initiation is essentially based on the accuracy of their monitoring of adolescent sexual behavior (Jaccard et al., 1998). These strategies to discuss sexual issues at an appropriate time provide a basic foundation for responsible decision-making when adolescents decide to engage in intercourse and use contraception (Longmore et al., 2001).

### *Importance of Family Structure and Socioeconomic Status*

Relatively little is known about the relationship between family structure and parent-adolescent sexual communication. However, it is generally known that adolescents from single parent families are severely disadvantaged when compared to adolescents from intact families (two parent homes). The most salient effect of single parent homes on children is the lack of physical presence of two parent homes (Mandara & Murray, 2000). Research has shown that when adolescents reside in single parent homes, parents tend to monitor adolescents' behavior less frequently (Whitbeck, Simons, & Kao, 1994), which may be due to the parent working multiple jobs (Burden, 1986) or being involved in their own dating relationship (Whitbeck et al., 1994). When adolescents are not closely monitored, they tend to spend more time away from direct parental supervision and have a greater likelihood of engaging in risky behaviors (French & Dishion, 2003). Furthermore, divorced or single parents may also display more permissive sexual attitudes about engaging in premarital sex (Thorton & Camburn, 1987), and parents may therefore, be less likely to engage their adolescent in conversations that focus on the negative consequences of sexual risk. As a result, adolescents from single-parent homes may be at greater risk for early initiation of sexual intercourse, unintended pregnancy, and contracting an STD (Dittus, et al., 1999; Flewelling & Bauman, 1990; Inazu & Fox, 1980; Miller & Bingham, 1989; Miller et al., 2001; Newcomer & Udry, 1987).

Research has also shown that socioeconomic status plays an important role on adolescents' engagement of sexual behavior. In the few studies examining the



relationship between SES and communication about sexual risk, Lefkowitz et al. (2000; 2003) found that mothers of higher SES were more likely to discuss issues of sexual risk with their adolescents compared to mothers of lower SES. Generally, mothers of higher SES are more educated, and thus, more knowledgeable about the negative consequences of sexual intercourse such as contracting HIV/AIDS (Sweat & Levin, 1995; Lefkowitz et al., 2000). As a result, adolescents from lower SES families may also be at risk for engaging in risky sexual behavior (Capaldi et al., 1996; Forte & Heaton, 1988; Hayward et al., 1992; Roosa et al., 1997; Upchurch et al., 1998; Zelnik et al., 1981). These findings suggest that communication about sexual risk can be most optimal only when adolescents live in intact families as well as have parents who are educated about the consequences of risky sexual behavior.

#### *Adolescent Sexual Decision Making*

Parent-adolescent sexual communication can only be beneficial when adolescents internalize and understand their parents' values about avoiding risky sexual behavior (Grusec & Goodnow, 1994). Without the proper understanding of sexual consequences, adolescents will not be able to internalize parents' message about avoiding risky sexual behavior, and communication will have little effect on changing their sexual behavior. Therefore, it is critical to investigate adolescents' cognitive and decision-making processes for engaging or not engaging in sexual intercourse.

During the transition to adolescence, adolescents deal with various biological (e.g., hormonal changes), social (e.g., peer pressure) and cognitive changes (e.g., decreases in self esteem, cognitive immaturity, and a need for high sensation seeking)

that can often be disruptive to their development (Zuckerman et al., 1978). Adolescents are also characterized as impulsive decision makers that lack maturity to make responsible decisions (Montemayor, 1983). Based on these findings, some researchers believe that adolescents intentionally seek out risky behaviors to fulfill a need for “high sensation seeking” (Zuckerman et al., 1964; Farley, & Sewell, 1976), while other researchers use adolescent egocentrism as an explanation for their behavior (Elkind, 1967; Elkind & Bowen, 1979; Vartanian, 2000). One aspect of egocentrism has been referred to as “the personal fable,” which is the belief that one is unique and immune to negative consequences (Elkind, 1967). Thus, adolescents are prevented from perceiving the severity of the behavior due to the belief they will not be harmed (Elkind, 1967). Based on these errors in perception and judgment, cognitive theorists, such as Piaget, have determined that adolescents’ decision-making process differs from adults, in that relative to adults, adolescents are deficient in decision-making skills (Piaget & Inhelder, 1969). However, these cognitive skills will continue to progress as children mature into adolescence and adulthood.

#### *The Importance of Decision Making and Awareness of Sexual Consequences*

There are clear improvements in reasoning abilities from early childhood through adolescence (Jacobs & Klaczynski, 2002). During the formal operational stage of development, adolescents progress through a series of important cognitive steps that are essential for making responsible sexual decisions. According to decision-making theory (Goldfried & Davidson, 1976; Maskay & Juhasz, 1983), the first step is *problem recognition and definition*, in which the individual perceives the situation as problematic

and analyzes the specific aspect that makes it so (Urberg & Rosen, 1987). In terms of sexual decision-making, adolescents must first recognize that engaging in sexual intercourse is associated with certain risks (e.g., pregnancy and contracting an STD) (Michels et al., 2005).

The second step of decision-making is *generation of alternatives* (Urberg & Rosen, 1987), in which the individual must determine the available alternatives to engaging in sexual intercourse and think of possible solutions. The ability to consider alternatives is the core part of the decision-making process (Steinlauf, 1979), and is essential for making both reproductive and contraceptive decisions (Gordon, 1990). For example, adolescents need to determine if they will postpone sexual initiation, or use contraception if they decide to engage in intercourse. The ability to generate solutions to a problem is one aspect of formal operational thought (Inhelder & Piaget, 1958), and this ability is more fully developed in later adolescence.

The third step in the decision-making process is *evaluation of alternatives*, in which the individual predicts the costs and rewards of each action (Baizerman, 1977; Dembo & Lundell, 1979; Urberg & Rosen, 1987). One result of this process is an increased capacity to plan ahead, thinking through the consequences of behavioral alternatives (Gordon, 1990). According to Friedman, Johnson, and Davidson (1976), the further into the future the costs and rewards are projected, the better the decision-making will be. This capability tends to be more developed by late adolescence. According to Piaget, adolescents only become capable of considering the future consequences of their actions once they have achieved formal operational thought (Flavell, 1977). For example,

Michels et al. (2005) reported that it was not until eleventh grade that adolescents decided not to engage in intercourse due to the negative consequences of becoming pregnant, contracting an STD, earning a negative reputation, and embarrassing or shaming the family. Adolescents also decided to delay intercourse due to feeling unprepared if they got pregnant and wanted to be old enough to take care of the baby (Michels et al., 2005).

The fourth step of decision-making theory is *choice of an alternative*, which occurs when the adolescent considers the least costly or most rewarding alternative based on the previous evaluation (Urberg & Rosen, 1987). The final step of the decision-making theory is *implementation of the choice and evaluation of the outcome* (Urberg & Rosen, 1987), which occurs when the individual considers the most practical choice of action implements the action (Maskay & Juhasz, 1983). Thus, according to decision making theory, adolescents' formal operational skills are fully developed by the end of adolescence, and therefore, older adolescents have more competent decision making skills than younger adolescents. Older adolescents are better able to think about future consequences of their sexual behaviors, generate solutions to the problem by planning ahead, and spontaneously use the skill when faced with a problem (Flavell, 1999; Inhelder & Piaget, 1958; Urberg & Rosen, 1987) than younger adolescents.

#### *Importance of Parent-Adolescent Closeness*

Parent-child relationship quality is not only important for promoting healthy child outcomes, but may also moderate the relationship between parent and adolescent predictors of engagement of sexual behavior and condom use. Parent-child closeness has been defined as warmth, support, attachment, and feelings of affection, acceptance, and

responsiveness (Blum, 2002; Miller, 1998; Regnerus & Luchies, 2006; Markham et al., 2003; Miller, Forehand, & Kortcik, 1999; Rodgers, 1999; Whitaker et al., 1999; Jaccard, Dittus, & Gordon, 1996; Hovell et al., 1994; Small & Luster, 1994; Markham et al., 2003). Closeness has also been characterized by quality of communication, a positive, stable, emotional bond, and parents' enjoyment of being with the child (Blum, 2002; Lezin, Rolleri, Bean, & Taylor, 2004). When closeness is high, it promotes healthy behavioral and psychological outcomes including increases in cognitive development, academic achievement, and a healthy self-concept (Baumrind, 1991; Demo, 1992; Peterson & Rollins, 1987). Children also learn to trust others, initiate social interactions outside the home, and make responsible choices (Lezin, et al., 2004). The relationship between parent-child connectedness and adolescent sexual activity has also been thoroughly examined in the literature with the fairly consistent finding that close relationships between parents and adolescents are associated with remaining sexually abstinent, postponing intercourse, and having fewer sexual partners (Blum, 2002; Browning, Leventhal, & Brooks-Gunn, 2004; Chewing & Koningsveld, 1998; Davis & Friel, 2001; Danziger, 1995; Dittus & Jaccard, 2000; Inazu & Fox, 1980; Jaccard et al., 1996; Jessor, Costa, Jessor, & Donovan, 1983; Jessor & Jessor, 1975; Lammers, Ireland, Resnick, & Blum, 2000; Markham et al., 2003; Miller et al, 1996; Miller et al., 1997; Miller et al., 1998; Resnick et al., 1997; Upchurch et al., 1999). Additionally, higher relationship quality is also related to increased use of contraception among sexually active youth (Jaccard et al., 1996; Kerrigan et al., 2006; Markham et al., 2003).

Most of the studies mentioned above are based on adolescent reports. However, several studies have shown that relationship quality reported by mothers also serves as a protective role in reducing risky sexual behavior, and increasing use of contraception (Davis & Friel, 2001; Dittus, Jaccard, & Gordon, 1999; Dittus & Jaccard, 2000; Jaccard & Dittus, 2000; McNeely et al., 2002). In fact, most of the literature on parent-child closeness has focused on mother-child relationships (Jaccard et al, 1996; Weinstein & Thornton, 1989), because mothers share a closer relationship with their children than fathers (Youniss & Smollar, 1985). Specifically, a few studies have used mother-daughter relationships (Fox & Inazu, 1980), because mothers and daughters report the greatest relationship quality (Russell & Saebel, 1997; Reiss & Youniss, 2004; Shearer, Crouter, & McHale, 2005). These studies show that close mother-daughter relationships were related to daughters delaying sexual initiation (Inazu & Fox, 1980; Fox, 1980; Gispert, Brinich, Wheeler, & Krieger, 1984). However, there are important age differences in the effect of mother-child connectedness on adolescent sexual behavior. In fact, Sieving, McNeely, and Blum (2000) found that high levels of mother-child connectedness were related to delays in sexual intercourse among younger adolescent girls (8<sup>th</sup> and 9<sup>th</sup> graders). However, connectedness was not a significant predictor among older adolescent girls (10<sup>th</sup> and 11<sup>th</sup> graders).

#### *Parent-Adolescent Closeness: Effects on Parent-Adolescent Sexual Communication*

Although parents may discuss sexual issues with their children based on their awareness of dating or initial sexual activity, parental communication may have little effect on changing adolescents' sexual behaviors if they do not share a close relationship

with their parent (Jaccard et al., 1998; Jaccard, Dodge, & Dittus, 2003; Meschke et al., 2002; Miller, 2002; Perrino et al., 2000). Adolescents may also be less likely to listen to or even care about their parents' message of avoiding sexual behavior. Therefore, it is important that adolescents perceive their parents as trustworthy in their sexual conversations to have any effect on their sexual behavior (Jaccard et al., 2002; Rosenthal & Smith, 1995). For example, Fox and Inazu (1980), and Gispert, Brrinich, Wheeler, and Krieger (1984) found that an open and supportive mother-daughter relationship was related to better quality sexual discussions which in turn was related to increases in responsible sexual behaviors. Thus, without a close bond, parents' values about avoiding risky sexual behavior, no matter how strong, has less likelihood of being accepted by the adolescent (Jaccard & Dittus, 1991; 1993; Jaccard et al., 1996; Weinstein, 1989).

Parent-child closeness is also important for increasing the accuracy of parents' awareness about their children's sexual behaviors. Jaccard and colleagues (1998) found that parents who felt more connected with their adolescents were more in tuned and more aware of the adolescents' sexual behaviors that led up to sexual intercourse. Therefore, in order for sexual communication to be truly effective, it is not only essential that parents monitor their children's sexuality activities, but more importantly, share a close relationship with their adolescents (Jaccard et al., 1998; Meschke et al., 2004).

#### *Parent-Adolescent Closeness: Effects on Decision Making and Awareness of Sexual Consequences*

Adolescents' decision making skills and knowledge of negative sexual consequences may also not be sufficient to reduce risky sexual activity (Crisp & Baber,

1995; Dudley, O'Sullivan, & Moreau, 2002; Kotchick, Shaffer, Forehand, & Miller, 2001). That is, although adolescents may have the ability to anticipate future consequences, they may fail to act accordingly by using contraception, and avoiding pregnancy or contracting an STD (Coblner, 1974; Emans, 1983; Gordon, 1990, Smith, Nenny, Weinman & Mumford, 1982; Steinlauf, 1979). In order for adolescents to become competent in their decision-making abilities, it is important that the family provides the initial foundation to build and guide competent decision-making skills. Research has shown that close parent-child relationships improve children's cognitive abilities to become autonomous and competent decision makers (Conger & Peterson, 1984). A cohesive family environment provides children with the initial opportunity to assist in making important family decisions and engage in interpersonal communication (Adams & Gullotta, 1983; Olson et al., 1983). Parents teach their children important skills for making responsible decisions such as generating and evaluating alternative solutions to a problem and perspective taking. Parents also provide assistance in development of interpersonal skills that are essential to a healthy sexual and romantic relationship such as being able to listen, make their needs and desires known, and to negotiate when conflicts arise. These interactions provide a basic foundation for building competent skills in future decision-making.

Parents can also influence adolescents' awareness of sexual consequences by direct communication about the sexual issues that are relevant to the adolescents' awareness about engaging in such behavior (Dittus et al., 1999). It is often believed that the more a parent discusses a belief with their adolescent, the more likely the message



will impact the adolescent's decision to engage in such behavior. However, the relationship quality between parents and adolescents may also moderate the impact of the parent's message. Parent-adolescent communication should positively influence adolescents' awareness of sexual on adolescents' awareness of sexual consequences more for those who perceive high levels of closeness with their mothers than those who perceive low levels of closeness (Dittus et al., 1999). If relationship quality is high, adolescents may be more likely to pay attention to and process information relating to their mother's communication about the consequences of sexual engagement. Furthermore, if the adolescent respects their mothers' views, they may adopt these views for themselves. However, if relationship quality is low, adolescents may be more likely to ignore any recommendations or advice offered by their mothers regarding sexual matters. Thus, when parents and adolescents share close relationships, adolescents should have better developed decision-making making skills as well as greater awareness of the negative consequences associated with sexual intercourse, which in turn should be related to less engagement in risky sexual behavior, than those who do not share close relationships.

When parents and adolescents share a close relationship, have knowledge about their adolescents' sexual activities, and have an open line of communication, adolescents are more likely to internalize parents' message about avoiding risky sexual behaviors and influence adolescents' decision- making process. Research has shown that quality parent-child communication enables adolescents to discuss their options with their parents and act upon the advice that parents provide (White, 1996). However, when communication

is poor, adolescents are less likely to discuss options with their parents and are also less likely to accept the advice that is offered (Adams & Gullotta, 1983; Olson et al., 1983; Brown & Mann, 1990; White, 1996). Thus, parent-child connectedness and open parent-child communication fosters responsible decision making which in turn is related to not engaging in sexual intercourse.

### *The Current Study*

The purpose of this study was to first investigate the association between degree of parent-adolescent communication around pregnancy risk and adolescents' engagement in such risk (sexual intercourse and lack of condom use), after accounting for adolescents' prior dating experience, mother's knowledge about adolescents' dating experience, single-parent status, and mother's education. This study also examined if adolescent predictors, adolescents' decision-making skills and awareness of negative sexual consequences, would be related to sexual risk taking. In addition, the study determined if the effects of parent-adolescent sexual communication on adolescents' sexual risk were mediated through adolescents' decision-making skills and awareness of negative consequences of sexual intercourse.

Hypothesis 1: Greater parent-adolescent communication about sexual risk would decrease the likelihood of adolescent pregnancy risk (i.e., decrease engagement of sexual intercourse and increase condom use).

Hypothesis 2: Adolescents' decision making skills and their awareness of the negative consequences of sexual intercourse would decrease the likelihood of

adolescents' engagement in sexual risk (i.e., decrease engagement of sexual intercourse and increase condom use).

Hypothesis 3: Adolescents' decision making skills/awareness of the sexual consequences would mediate the associations between parent-adolescent sexual communication and adolescents' engagement in sexual risk taking.

Finally, the study determined if there were moderating effects of adolescents' age and mother-daughter relationship quality in the above associations. However, there will be no moderation for age differences proposed for the association between awareness of sexual consequences and engagement in sexual risk taking, because the former variable was only collected for adolescents who were 15 years and above.

Hypothesis 3A: The negative association between parent-adolescent communication and adolescent pregnancy risk would be stronger for younger adolescents compared to older adolescents, whereas the negative association between decision-making and adolescent pregnancy risk, would be stronger for older adolescents compared to younger adolescents.

Hypothesis 3B: The negative association between parent-adolescent communication and adolescents' engagement in sexual risk, and between adolescents' decision-making/awareness and engagement in sexual risk, would be stronger for adolescents/mothers who reported higher levels of closeness than those who reported lower levels of closeness.

## METHODS

### Data

The data for this study comes from the National Longitudinal Study of Adolescent Health (Add Health), a longitudinal study involving a nationally representative sample of adolescents and their parents (Harris, 2008). The Add Health study was funded by the National Institute of Child Health and Human Development and 17 other federal agencies, and was approved by the Institutional Review Board for the Protection of Human Subjects at the School of Public Health, University of North Carolina at Chapel Hill. Add Health is the largest, most comprehensive survey of adolescents ever undertaken and was designed to examine the determinants of health-related behaviors of adolescents enrolled in grades 7 to 12.

Data was collected in two waves between 1994 and 1996 (about 18 months apart) at the individual, family, school, and community level. The original wave 1 sample consisted of 80 high schools and 52 middle schools and was representative of all US schools with respect to region, school size, school type, and ethnicity. In 2001 and 2002, Add Health participants, ages 18 to 26 years old, were re-interviewed in a third wave to investigate the influence that factors assessed in adolescence have on young adulthood.

### Sample

The analytic sample consisted of European American female adolescents and their mothers who were participants of the core in-home sample at Wave 1. Adolescents were between the ages of 13 to 18 years who (1) reported being a virgin in the Wave 1 survey, (2) completed both Wave 1 and Wave 2 in-home surveys, and (3) had a resident mother

who completed a Wave 1 in-home survey. To obtain the sample for this study, a sample of 5,305 European American females were first selected. A sub-sample of 3,328 (62.7%) European American females who were virgins at Wave 1 were then selected. Next, a sub-sample of 3,139 (94.3%) females was then selected between the ages of 13 to 18 years. Thus, the final analytic sample consisted of 2,669 mother-adolescent dyads. Adolescents' average age was 14.96 years old ( $SD = 1.51$ , range, 13 to 18). The sample consisted of 1,739 adolescents between the ages of 13 to 15 years (consisting of 65.2%, respectively) and 930 adolescents between the ages of 16 to 18 years (consisting of 34.8%, respectively).

Of those who participated at Wave 1, 81.4% ( $N=2,172$ ) also participated at Wave 2. Comparisons of those who remained in the study with those who dropped out after Wave 1 on all variables revealed differences in adolescents' prior dating experience, mothers' knowledge of adolescent dating experience, and adolescents' decision-making skills. That is, those who dropped out of the study were less likely to have gone out on a date,  $t(2667)=-2.82$ ,  $p = 0.068$ , have mothers who were less knowledgeable about their dating experience,  $t(2649)=-6.57$ ,  $p = 0.00$ , and have lower levels of decision making skills,  $t(2663)=-3.54$ ,  $p = 0.00$ , than those who remained in the study.

### Procedures

The adolescent interviews were conducted in their homes between April and December of 1995. The adolescents responded to questions posed orally by an interviewer, and the data were recorded on laptop computers using the computer-assisted personal interview (CAPI). During the more sensitive portions of the interview,

adolescents listened to questions through earphones and directly entered their responses into a laptop computer, thereby reducing the potential for interviewer or parent influences on their responses. The interviews took 1 to 2 hours to complete. The mothers completed 40-minute interviewer-assisted written questionnaires at the same time their adolescents completed the CAPI portion of their interviews.

## Measures

### *Dependent Variables*

*Engagement of sexual intercourse.* The first outcome of interest in this study was the dichotomous virginity status of the adolescent at Wave 2, one year after the first wave of data collection. Adolescents were asked at Wave 1 and 2, “Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a man inserts his penis into a female’s vagina.”

*Condom use.* The second outcome of interest in this study was condom use measured using one dichotomous variable at Wave 2, one year after the first year of data collection. Adolescents were first asked, “Did you or your partner use any method of birth control when you had sexual intercourse most recently?” Adolescents were then asked what method of contraception was used at most recent intercourse. Adolescents who reported using contraception at most recent intercourse were coded as “1,” and those who reported using no contraception were coded as “0.” In addition, of those adolescents who reported using contraception, those who reported using the specific method of using a condom were also coded as “1.”

*Independent Variables.*

*Parent-adolescent sexual communication.* The frequency of parent-adolescent sexual communication was measured using 3 items measuring the frequency of communication about the negative consequences about sexual behaviors between mother and child at Wave 1. Questions asked mothers how often they and their adolescent discussed (1) the dangers of acquiring a sexually transmitted disease, (2) the negative effect on one's social reputation, and (3) the negative implications of early pregnancy. Responses were coded on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*a great deal*).

*Adolescents' decision-making skills.* Adolescents' decision making skills were measured using a 4 item scale based on adolescent report at Wave 1. Questions asked adolescents (1) when solving a problem, one of the first things done is get as many facts about the problem as possible, (2), when attempting to find a solution, try to think of as many different ways to approach the problem, (3), when making decisions, generally use a systematic method for judging and comparing alternatives, and (4), after carrying out a solution to a problem, try to analyze what went right and what went wrong. Responses were coded on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with a midpoint of 3 (*neither agree nor disagree*).

*Adolescents' awareness of negative sexual consequences.* Adolescents' awareness about negative sexual consequences was measured using a 3 item scale based on adolescent report at Wave 1. Questions asked adolescents if they got pregnant (1) ...it would embarrass their family, (2) ...it would embarrass them, and (3) ...they might be

forced to grow up too fast. Responses were coded on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with a midpoint of 3 (*neither agree nor disagree*). These questions were only administered to adolescents who were at least 15 years of age.

*Adolescents' prior dating experience.* Adolescents' prior dating experience (i.e., whether they had gone out on a date in the last 18 months) was measured using a dichotomous variable based on adolescent report at Wave 1 and was used as a control variable in the analyses describe below.

*Mothers' knowledge of adolescent dating.* Mothers' knowledge of adolescents' prior dating behavior (i.e., whether they thought their daughter had ever gone out on a date) was measured using a dichotomous variable based on mother report at Wave 1 and was used as a control variable in the analyses described below.

### *Moderating Variables*

*Parent-adolescent closeness.* The quality of parent-adolescent closeness was measured using a 3 item scale based on adolescent report at Wave 1. Questions asked adolescents how (1) warm and loving they perceived their mother to be, (2) how satisfied they were with the communication, and (3) the quality of their relationship with their mother. Responses were coded on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with a midpoint of 3 (*neither agree nor disagree*). Mother-child closeness was assessed using a 3 item scale based on mother report. Questions asked mothers (1) how well they get along with their adolescent, (2) how they felt about trusting their adolescent, and (3) how satisfied they were with their relationship



with their adolescent. Responses were coded on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with a midpoint of 3 (*neither agree nor disagree*).

## Overview of Data Analysis

### *Exploratory Factor Analyses*

All parent and child items were run together to determine if they formed separate scales. Next, exploratory factor analyses (EFA) were conducted separately for parent and adolescent items. Scale scores for parent-adolescent sexual communication, adolescents' decision making skills, adolescents' awareness of sexual consequences, and adolescent and mother report of closeness were then created based on the factor structures derived from the factor analyses. EFAs were conducted using the Promax oblique rotation that allows items to correlate (Tabachnick & Fidell, 2007). The cut-off Eigen value was 1.0 for determining the number of factors and the cut-off value of 0.40 was used for factor loadings.

Based on the whole sample and separately for each age group, all items had loadings greater than .40. All of the items on parent-adolescent sexual communication, adolescents' decision-making skills, adolescents' awareness of negative sexual consequences, and parent-adolescent closeness based on adolescent and mother report loaded on the predicted factor structure with no double loadings on another factor.

### *Confirmatory Factor Analyses*

Next, measurement invariance across the two age groups, younger (ages 13 to 15 years) and older adolescents (ages 16 to 18 years), were assessed using the multiple

group approach to confirmatory factor analysis (CFA) using Muthén and Muthén's (2007) weighted least squares estimator. First, a constrained model was tested by setting the factor loadings of the items to be the same across the two groups, followed by a test of an unconstrained model with the factor loadings allowed to be free across groups (See Table 1). To detect measurement invariance, modification indices and fully standardized expected factor loading differences ( $> 0.25$ ) were examined to determine if factor loadings differed across the groups. The Mplus software 5.1 (Muthén & Muthén, 2007) was used for these analyses. For assessment of model fit, the Root mean square error of approximation (RMSEA), the Comparative fit index (CFI), and the Tucker–Lewis index (TLI) were examined. RMSEA values lower than 0.05 and CFI and TLI values of 0.9 or greater are regarded as indications of good model fit (Browne & Cudeck, 1993; Tabachnick & Fidell, 2007). The chi square difference test was also examined to determine if there were significant differences between the constrained model and unconstrained model. However, it should be noted that this test is very sensitive to large sample sizes (Powell & Shafer, 2001), often resulting in significant differences. Thus, it may not be reliable. Items for adolescents' awareness of negative sexual consequences were not included in the multiple group CFA analyses for testing measurement invariance across groups because these items were only administered to participants at least 15 years of age.

Based on the test of chi-square differences, model fit improved when the factor loadings for the items on parent-adolescent sexual communication, adolescent decision making skills, and adolescent and mother report of closeness were allowed to vary across

age group [ $\Delta X^2(9)=21.056, p < .05$ ]. However, CFI, TLI, and RMSEA showed very little improvement in model fit when factor loadings were freed (CFI=0.99, TLI=0.99, RMSEA=0.03) compared to when they were constrained to be equal across groups (CFI=0.99, TLI=0.99, RMSEA=0.03). Thus, the measures of parent-adolescent sexual communication, adolescents' decision-making skills, and parent-adolescent closeness based on adolescent and mother report were equivalent across age groups.

Finally, high and low levels of the latent variable of mother-adolescent closeness were created by conducting Principle Axis Factoring (PAF) analyses separately for adolescent and mother report of closeness in SPSS version 17.0 (SPSS, 2007). Principal Axis Factoring (PAF) is a type of factor analysis that seeks the least number of factors which can account for common variance (correlation) on a set of variables (Garson, 2010). Based on the factor scores created by PAF analyses, a median split was then conducted to create low and high levels of adolescent and mother report of closeness for the overall sample. Participants who scored below the median had low levels of closeness and were coded as "0." Those who scored above the median had high levels of closeness and were coded as "1."

#### *Reliability Analyses*

Internal consistency estimates of reliability of the derived scales were calculated using Cronbach's alpha for each age group and for the whole sample. Scale scores were created for each set of items by computing the mean of the items for each set. For parent-child sexual communication, the items had excellent internal consistencies (Cronbach's  $\alpha$ ) with 0.83 for the overall sample (0.84 for younger adolescents and 0.81 for older

adolescents). Adolescents' decision making skills also had good internal consistencies with 0.76 for the overall sample, (0.76 for younger adolescents and 0.74 for older adolescents). For adolescents' awareness of the negative sexual consequences, the Cronbach's  $\alpha$  was 0.73 for older adolescents between the ages of 16 to 18 years. For adolescent report of closeness, the items had excellent internal consistencies with 0.86 for the overall sample (0.87 for younger adolescents and 0.86 for older adolescents). The Cronbach's  $\alpha$  for mother report of closeness was 0.70 for the overall sample (0.72 for younger adolescents and 0.64 for older adolescents).

## RESULTS

### *Descriptive Statistics*

Sample background characteristics are presented in Tables 2-4 for the overall sample and separately for each age group. For the overall sample (N=2,669), 19.7% of female adolescents reported having engaged in sexual intercourse at Wave 2 of data collection (with 18.8% of missing data). Younger adolescents, ages 13 to 15 years, were also less likely to have engaged in sexual intercourse (15.9%) compared to older adolescents, ages 16 to 18 years (28.1%),  $t(2,165) = -6.60, p = 0.00$ . Furthermore, 18.0% of adolescents ages 16 years and younger engaged in intercourse. A further breakdown by age indicated that 9.9% of 13 year olds, 16.7% of 14 year olds, 21.1% of 15 year olds, 25.7% of 16 year olds, 28.8% of 17 year olds, and 40.0% of 18 year olds were sexually active at Wave 2 of data collection.

Of the adolescents who reported being sexually active at Wave 2 (N=426), 70.4% reported using a condom at most recent intercourse of Wave 2 of data collection (with 32.4% of missing data) (See Table 2). In addition, younger adolescents (64.8%) were less likely to use a condom compared to older adolescents (77.6%),  $t(285) = -2.367, p = 0.02$ . In addition, 70.9% of adolescents ages 16 years and younger using condoms. A further breakdown by age indicated that 59.4% of 13 year olds, 62.5% of 14 year olds, 68.9% of 15 year olds, 85.5% of 16 year olds, 70.3% of 17 year olds, and 63.2% of 18 year olds reported using condoms.

In terms of adolescents' prior dating experience, based on the first wave of data, there were significant differences between younger and older adolescents in their

involvement in a dating relationship in the past 18 months,  $t, (2,667) = -6.81, p = 0.00$ . Forty-three percent of younger adolescents were less likely to have dated someone in the past 18 months compared to 57 percent of older adolescents. A further breakdown by age indicated that 34.8% of 13 year olds, 41.2% of 14 year olds, 52.3% of 15 year olds, 52.3% of 16 year olds, 62.0% of 17 year olds, and 58.4% of 18 year olds reported dating someone in the past 18 months. In addition, there were significant age differences in mother's knowledge of adolescent dating between younger and older adolescents,  $t, (2,649) = -23.53, p = 0.00$ . Specifically, mothers of younger adolescents (32%) were less knowledge about their adolescents' dating behavior compared to mothers of older adolescents (75%).

In terms of mother's education level, there were no significant age differences between younger and older adolescents,  $t, (2654) = -0.525, p = 0.60$ . Mothers of younger ( $M = 5.93, SD = 2.12$ ) and older adolescents ( $M = 5.98, SD = 2.16$ ) had similar levels of education (with a score of 5 representing "completed high school or a GED," and 6 for "went to a business, trade or vocational school after high school).” However, there were significant differences in the proportion of single parent households among younger and older adolescents,  $\chi^2 (1, N = 2,666) = 4.15, p = 0.04$ . A smaller proportion of younger adolescents (15.9%) were from single-parent families, compared to older adolescents (19.1%).

Bivariate correlations for the overall sample and separately for each age group are presented in tables 5-10. As shown in Table 5, parent-adolescent sexual communication was positively related with adolescents' engagement of sexual intercourse, while

adolescents' decision-making skills showed no association with engagement of intercourse for the overall sample. Furthermore, among younger adolescents, sexual communication was positively related with sexual debut, while decision-making was negatively related with engagement of intercourse (See Table 6). Sexual communication was also positively associated with engagement of intercourse among older adolescents, although at trend level, yet decision making showed no association with such behavior. Additionally, older adolescents' awareness of sexual consequences was also negatively related with their engagement in sex (See Table 7). Regarding socioeconomic status, mother's education was negatively related with engagement of sexual for both younger and older adolescents, while single parent status was positively associated with engagement in such risk for younger adolescents. In terms of adolescents' involvement in dating relationships, adolescents' prior dating experience as well as mother's knowledge of such experience was positively associated with engagement in sex for both younger and older adolescents (See Tables 6-7).

As shown in Table 8, for those youth who used a condom at most recent intercourse, parent-child adolescent communication as well as decision-making skills showed no association with condom use for the overall sample, and for both younger and older adolescents (See Tables 9-10). However, among older adolescents, awareness of sexual consequences was positively related with condom use (See Table 10). Regarding socioeconomic status, mother's education was positively associated with condom use, although it was only marginally significant for the overall sample, while single parent status showed no association for both age groups. In terms of adolescents' involvement in

dating relationships, adolescents' prior dating experience was positively related with condom use for the overall sample and for younger adolescents, although at trend level. In addition, mother's knowledge of adolescent's dating was also positively related with condom use for the overall sample, although at trend level (See Tables 8-10).

### *Analyses for Structural Model*

#### *Description of Theoretical Model and Overview of Data Analysis*

Structural equation models (SEM) were used to examine mother and adolescent predictors (latent variables), measured at Wave 1, on two outcomes of sexual risk: engagement of sexual intercourse and condom use (observed variables), measured at Wave 2 (See Figure 1). SEM was used because it minimizes measurement error and is useful when testing multiple predictors that make up latent variables (Tabachnick & Fidell, 2007). The theoretical model controlled for mother's knowledge of adolescents' dating, adolescents' dating experience, single-parent status, and mother's education, which were all observed variables and were measured at Wave 1. Separate models were tested for each outcome of sexual risk, mediator variable (adolescents' decision-making skills and awareness of negative sexual consequences), and moderating variable (adolescents' age and parent-adolescent relationship quality). In addition, due to the binary nature of the adolescent sexual risk outcomes, both probit and logit regression coefficients (Allison, 1999; Cox, 1970) (i.e., odds ratios and 95% Confidence Intervals) were examined in the SEM analyses. All analyses were conducted using maximum likelihood estimation in Mplus Version 5.1 (Muthén & Muthén, 2007).



The relationship between parent-adolescent sexual communication (*Variable A*), measured at Wave 1, and engagement of sexual intercourse/condom use (*Variable C*), one year later, was first estimated. Next, the association between adolescents' decision-making skills/awareness of negative sexual consequences (*Variable B*), at Wave 1, and engagement of intercourse/condom use at Wave 2 was examined. The association between A→C was tested by constraining paths A→B and B→C to zero. The path between B→C was examined by constraining paths A→C and A→B to zero.

Mediation analyses were then conducted to determine if adolescents' decision-making/awareness of sexual consequences mediated the relationship between communication and engagement of intercourse/condom use. In order to test for mediation, the paths between predictor and outcome, predictor and mediator, and mediator and outcome all need to be significant (Holmbeck, 1997). Partial mediation was first tested by comparing the coefficients of the path between predictor and outcome before and after the path from the predictor and mediator, and mediator and outcome, were controlled for in the model. If the coefficient between predictor and outcome reduced in size, but was still significantly different from zero once these paths were accounted for, then partial mediation has occurred (Baron & Kenny, 1986). This significance in reduction was assessed by the Sobel test (Sobel, 1982), which tests the indirect association between predictor, mediator, and outcome (Baron & Kenny, 1986).

Full mediation was then tested by adopting Holmbeck's (1997) multi-step approach for testing mediation via SEM. The goodness of fit of the predictor-mediator-outcome model is first assessed under two conditions: (1) when A→C path is constrained

to zero (i.e., constrained model), and (b) when the A→C path is not constrained (i.e., unconstrained model). The model fit between the constrained and unconstrained model is then compared to determine if the unconstrained model provides significant improvement in fit over the constrained model.

The goodness of model fit when comparing the constrained model (i.e., when A→C path is constrained to zero) to the unconstrained model (i.e., when the A→C path is not constrained) was assessed using the *Akaike Information Criterion (AIC; Akaike, 1973)* and *Bayesian Information Criterion (BIC; Schwarz, 1978)*. Models with smaller *AIC* or *BIC* indicate better model fit (Singer & Willett, 2003), and for full mediation to occur, the constrained model should have smaller *AIC* and *BIC* values compared to the unconstrained model. If mediation has occurred, then the direct path between A→C is fully explained by the indirect paths of A→B and B→C (Holmbeck, 1997).

Finally, the moderating effects of adolescents' age and parent-adolescent relationship quality, at Wave 1, were examined on the association between (1) communication and engagement in intercourse/condom use and (2) decision making/awareness of sexual consequences and engagement in intercourse/condom use. The moderating effects of age on the association between awareness and engagement in sexual risk taking was not tested because this variable only collected for adolescents who were 15 years and above.

The moderating effects of age were first estimated in the association between communication and engagement in sexual risk, and between decision-making and engagement in sexual risk by conducting multiple group SEM analyses among younger

(ages 13 to 15 years) and older adolescents (ages 16 to 18 years). To determine if age differences occurred, the overall fit of the model was assessed under two conditions: (1) when the association between predictor and outcome was freed up across younger and older adolescents (i.e., an unconstrained model), and (2) when the association was constrained to be equal across the two age groups (i.e., a constrained model) (Holmbeck, 1997). The purpose of the constrained model is to test a model where no Predictor X Age interaction is present. Model fit is then compared between the constrained and unconstrained models by examining the *AIC* and *BIC*. Parallel analyses were then conducted to test for the moderating effects of parent-adolescent relationship quality in the associations described above. As previously described, factor scores were created for low and high levels of the latent variable mother-adolescent closeness. Multiple group SEM analyses were then conducted across low and high levels of mother and adolescent report of closeness. Low levels of closeness were based on adolescents/mothers who scored below the median and high levels of closeness were based on those who scored above the median.

### ***Testing Engagement of Intercourse Hypotheses***

#### *Effects of Communication and Decision Making on Engagement of Intercourse*

The effect of parent-adolescent sexual communication on adolescents' engagement of sexual intercourse was first examined. For the overall sample, communication was a significant predictor, in that greater levels of sexual communication increased the likelihood of adolescents' engagement of sexual intercourse (N=2636;  $b=0.239$ ,  $SE=.083$ ,  $p=0.012$ ; odds ratio: 1.232; 95% Confidence Intervals:

0.994-1.527). Next, the association between adolescents' decision-making and their engagement of intercourse was tested. Adolescents' decision-making decreased the likelihood of sexual engagement for the sample overall ( $N=2636$ ,  $b= -0.242$ ,  $SE=.113$ ,  $p=0.033$ ; odds ratio: 0.785; 95% Confidence Intervals: 0.587-1.051).

*Hypotheses about Mediation: Adolescents' Decision Making*

Next, it was determined if adolescents' decision-making skills mediated the relationship between communication and engagement of intercourse. The association between A→B was significant ( $N = 2636$ ,  $b= 0.053$ ,  $SE = .018$ ,  $p = 0.003$ ), and partial mediation analyses were conducted due to meeting the initial requirements for testing mediation (Holmbeck, 1996). When the paths A→B and B→C were not constrained to zero, the path between communication and engagement of sexual intercourse was reduced from  $b=0.239$  ( $SE = 0.083$ ,  $p = 0.012$ ; odds ratio: 1.232; 95% Confidence Intervals: 0.994-1.527) to  $b = 0.220$  ( $SE = 0.084$ ,  $p = 0.003$ ; odds ratio: 1.246; 95% Confidence Intervals: 1.003-1.546). There was an eight percent reduction in the path coefficient between communication and engagement of intercourse when decision making was in the model. Furthermore, the Sobel test (Baron & Kenny, 1986; Sobel, 1982) was marginally significant (Sobel's  $SE = -1.78$ ,  $SE = .001$ ,  $p = 0.074$ ), indicating a partial mediating effect between communication and engagement of intercourse through decision-making. As shown in Figure 2, communication was related to increases in adolescents' decision making skills ( $b=0.053$ ,  $SE=.018$ ,  $p = 0.003$ ), which in turn was related to decreases in sexual engagement ( $b= -0.256$ ,  $SE = .114$ ,  $p= 0.025$ ; odds ratio: 0.774; 95% Confidence Intervals: 0.578-1.038).

Full mediation was then examined. As previously indicated, Holmbeck's (1997) approach for testing mediation was used by comparing the model fit of the predictor-mediator-outcome model under two conditions (a) constrained model: when A→C path is constrained to zero; (b) unconstrained model: when the A→C path is not constrained. The constrained model (N=2636;  $AIC= 42779.075$ ,  $BIC = 42978.894$ ) did not show improvement in model fit compared to the unconstrained model (N=2636;  $AIC= 42715.977$ ,  $BIC = 42933.427$ ) (i.e., the unconstrained model had smaller  $AIC$  and  $BIC$ ). This indicates that adolescents' decision-making skills did not fully mediate the relationship between communication and engagement of sexual intercourse.

*Moderation of Age: Association of Parent-child Sexual Communication, Decision Making, and Engagement of Sexual Intercourse*

The moderating effects of adolescents' age were first examined on the association between communication and sexual engagement. As previously indicated, an unconstrained model which freed up the association across younger and older adolescents was first estimated (N=2636,  $AIC=46111.969$ ,  $BIC=46417.574$ ), followed by a model that constrained the association to be equal across the two age groups (N=2636,  $AIC=46106.929$ ,  $BIC=46336.133$ ). There was better model fit for the constrained model compared to the unconstrained model, indicating no age differences in the association. That is, for both younger and older adolescents, communication increased the likelihood of sexual engagement ( $b= 0.218$ ,  $SE=.084$ ,  $p = 0.009$ ; odds ratio= 1.244; 95% Confidence Interval: 1.003-1.543).

Next, age differences were assessed in the relationship between decision making and engagement of sex. The model fit indices were better for the constrained model (N=2636,  $AIC=46107.841$ ,  $BIC=46337.045$ ) than the unconstrained model (N=2636,  $AIC=46114.316$ ,  $BIC=46419.921$ ). Thus, decision-making decreased the likelihood of engagement of intercourse for both age groups ( $b= -0.282$ ,  $SE = .115$ ,  $p = 0.014$ ; odds ratio= 0.754; 95% CI: 0.561-1.015).

*Moderation of Parent-Adolescent Closeness: Association of Communication, Decision Making Skills, and Engagement of Sexual Intercourse*

The moderating effect of mother-adolescent closeness was first tested in the association between communication and engagement in sexual intercourse. As previously described, low levels of closeness were mothers/adolescents who scored below the median and high levels of closeness were those who scored above the median. For adolescents' reports of closeness, the model fit of an unconstrained model, which freed up the association across low and high levels of closeness, (N=2636,  $AIC=46111.969$ ,  $BIC=46417.574$ ) was compared to a model that constrained the association to be equal across the two groups (N=2636,  $AIC=46106.929$ ,  $BIC=46336.133$ ). There was better model fit for the constrained model, indicating no moderating effects of closeness. That is, for both groups of high and low closeness, communication increased the likelihood of engagement of intercourse ( $b= 0.254$ ,  $SE=.087$ ,  $p= 0.003$ ; odds ratio=1.290; 95% CI: 1.032-1.612). Then in turning to mothers' reports of closeness, an unconstrained model that freed up low and high levels of closeness (N=2625,  $AIC=46088.534$ ,  $BIC=46393.921$ ) was compared to a constrained model (N=2625,  $AIC=46073.035$ ,

$BIC=46302.076$ ). Similar to adolescents' reports of closeness, the constrained model had better fit, showing no moderation. Specifically, communication was positively related with sexual engagement for both groups of mothers who reported high and low levels of closeness ( $b= 0.263$ ,  $SE=0.86$ ,  $p= 0.002$ ; odds ratio=1.301; 95% CI: 1.044-1.623).

Next, the moderation of mother-daughter relationship quality was tested in the association between decision-making and sexual engagement. Based on adolescents' reports of closeness with their mothers, model fit of an unconstrained model that freed up the association across low and high levels closeness ( $N=2609$ ,  $AIC=45747.210$ ,  $BIC=45976.012$ ) was compared to a constrained model ( $N=2609$ ,  $AIC=47654.262$ ,  $BIC=46069.331$ ). There was better model fit for the constrained model, which indicated no differences in levels of closeness. However, for both levels of closeness, decision-making was not related with engagement of intercourse ( $b= -0.184$ ,  $SE=.118$ ,  $p= 0.120$ ; odds ratio=0.832; 95% Confidence Interval: 0.613-1.128). Then in turning to mothers' reports of closeness with their adolescents, the model fit of the constrained model ( $N=2625$ ,  $AIC=46079.086$ ,  $BIC=46308.127$ ) was better than the fit of unconstrained model ( $N=2625$ ,  $AIC=46094.734$ ,  $BIC=46400.121$ ). However, unlike adolescents' report of closeness, decision making was negatively related to engagement of in intercourse for both groups of mothers ( $b= -0.216$ ,  $SE=.113$ ,  $p= 0.056$ ; odds ratio=0.805 0.601-1.079), although at trend level.

#### *Effects of Communication and Adolescents' Awareness of Sexual Consequences*

The next set of analyses examine adolescents' awareness of negative sexual consequences as the mediator (*variable B*), and is based on the same theoretical model

previously described (Figure 1). However, the sample is constricted to older adolescents, ages 16 to 18, because, as mentioned above, this was not assessed for those less than 16 years of age. Thus, analyses examining the moderating effects of age were also not conducted.

The effect of parent-adolescent sexual communication on adolescents' engagement in sexual intercourse was first examined. For older adolescents, communication was not related to engagement in sexual intercourse ( $N=915$ ;  $b=0.113$ ,  $SE=.131$ ,  $p=0.388$ ; odds ratio: 1.120; 95% Confidence Interval: 0.799-1.570). The association between adolescents' awareness of sexual consequences and engagement in intercourse was then estimated. Adolescents' awareness of sexual consequences was a significant predictor, indicating that greater levels of awareness decreased the likelihood of sexual engagement for older adolescents ( $N=915$ ;  $b=-0.289$ ,  $SE=.101$ ,  $p=0.011$ ; odds ratio= 0.761 95% Confidence Interval: 0.578-1.003).

#### *Hypotheses about Mediation: Adolescents' Awareness of Sexual Consequences*

It was determined if awareness of sexual consequences mediated the relationship between communication and engagement of intercourse (See Figure 3). However, because path A→C was not significant, this model did not meet the initial requirements for testing mediation. As shown in Figure 3 with the full mediation model, parental communication was unrelated to engagement in intercourse and was only related to adolescents' awareness of consequences at trend level, whereas the latter was significantly related to engagement in intercourse.



*Moderation of Parent-child Closeness: Association of Communication, Awareness of Sexual Consequences, and Engagement of Sexual Intercourse*

Differences in levels of mother-daughter relationship quality were first tested in the association between communication and engagement in intercourse. Based on adolescents' reports of closeness with their mothers, model fit of an unconstrained model which freed up low and high levels of closeness (N=899, AIC=15145.680, BIC=15380.943) was compared to a constrained model (N=899, AIC=15131.608, BIC=15304.454). Model fit was better for the constrained model showing no moderating effects, and communication was not associated with adolescents' sexual debut for both groups (b= 0.130, SE=.138, p= 0.344; odds ratio=1.139; 95% CI: 0.799-1.624). Then in turning to mothers' reports of closeness with their adolescents, the model fit of the constrained model (N=912, AIC=15351.501, BIC=15524.864) was better than that of the unconstrained model (N=912, AIC=15366.135, BIC=15602.101), suggesting no moderation. Similar to the findings based on adolescents' reports, with mothers' reports of closeness, communication was also not related to adolescents' engagement of intercourse for mothers reporting either high or low levels of closeness (b= 0.137, SE=.134, p= 0.308; odds ratio=1.147; 95% CI: 0.811-1.621).

Differences in mother-adolescent closeness were then estimated on the relationship between awareness of sexual consequences and engagement of sex. Based on adolescents' reports of closeness, model fit of an unconstrained model (N=899, AIC=15141.394, BIC=15376.657) did not show improvement in comparison to a constrained model (N=899, AIC=15125.185, BIC=15298.031), showing no moderation.

That is, for both levels of closeness, awareness decreased the likelihood of sexual engagement ( $b = -0.294$ ,  $SE = .110$ ,  $p = 0.007$ ; odds ratio = 0.745; 95% CI: 0.561-0.989). Next with mothers' reports of closeness, model fit of an unconstrained model ( $N = 912$ ,  $AIC = 15360.009$ ,  $BIC = 15595.975$ ) was compared to the constrained model ( $N = 912$ ,  $AIC = 15345.142$ ,  $BIC = 15518.505$ ). Similar to the findings with adolescents' reports, there was no moderation found based on mothers' reports, and awareness was negatively related to adolescents' sexual debut among both groups of mothers ( $b = -0.296$ ,  $SE = .110$ ,  $p = 0.007$ ; odds ratio = 0.7445; 95% CI: 0.560-0.989).

### ***Testing Condom Use Hypotheses***

#### *Effects of Communication and Decision Making on Condom Use*

The following analyses were based on the sample of adolescents who had engaged in sexual intercourse at Wave 2 of data collection ( $N = 426$ ) (See Figure 1), and reported using condoms at most recent intercourse.

The relationship between sexual communication and condom use at most recent intercourse was first estimated. Communication, however, was not a significant predictor of condom use among youth who had engaged in intercourse ( $N = 415$ ,  $b = 0.224$ ,  $SE = .200$ ,  $p = 0.263$ ; odds ratio = 1.251; 95% CI: 0.747-2.096). Next, the association between decision-making and condom use was tested. Decision making, however, was not related to condom use ( $N = 415$ ,  $b = 0.136$ ,  $SE = .250$ ,  $p = 0.588$ ; odds ratio: 1.145, 95% CI: 0.601-2.182).

### *Hypotheses about Mediation: Adolescents' Decision Making*

Mediation of decision making was then tested in the association between communication and condom use (See Figure 4). However, because the associations between A→C and B→C were not significant, mediation could not be tested. As seen in Figure 4 with the full mediation model, sexual communication and decision making were not associated with condom use. However, communication was positively related with adolescents' decision making skills.

### *Moderation of Age: Association of Communication, Decision Making, and Condom Use*

The moderating effects of age were first examined on the association between communication and condom use. The model fit of an unconstrained model which freed up the two age groups (N=415,  $AIC=7192.697$ ,  $BIC=7402.167$ ) showed no improvement compared to a constrained model that constrained the groups to be equal (N=415,  $AIC=7191.447$ ,  $BIC=7376.747$ ). This suggests no age differences, and for both groups, communication was not associated with condom use ( $b= 0.290$ ,  $SE=.204$ ,  $p= 0.155$ ; odds ratio=1.337; 95% CI: 0.790-2.261).

Next, age differences in the association between decision-making and condom use were examined. Model fit of the unconstrained model (N=2636,  $AIC=46114.316$ ,  $BIC=46419.921$ ) was compared to the constrained model (N=2636,  $AIC=46107.841$ ,  $BIC=46337.045$ ), and there was better fit for the constrained model. Thus, there were no age differences and decision-making was not associated with condom use for both groups ( $b= 0.071$ ,  $SE=.254$ ,  $p= 0.780$ ; odds ratio= 1.074; 95% CI: 0.558-2.065).

*Moderation of Parent-Adolescent Closeness: Association of Communication, Decision Making, and Condom Use*

The moderation of parent-adolescent closeness was first tested in the association between communication and condom use. Based on adolescents' reports of closeness, there was no improvement in model fit of an unconstrained model that freed up both levels of closeness (N=408,  $AIC=7086.529$ ,  $BIC=7295.115$ ) compared to a constrained model (N=408,  $AIC=7075.266$ ,  $BIC=7231.706$ ). Thus, for both adolescents who reported high and low levels of closeness, communication was not related to condom use ( $b=0.169$ ,  $SE=.206$ ,  $p=0.411$ ; odds ratio=1.185; 95% CI: 0.697-2.013). With mothers' reports of closeness, in addition, the model fit of an unconstrained model was worse (N=415,  $AIC=7208.143$ ,  $BIC=7393.444$ ) compared to a constrained model (N=415,  $AIC=7203.047$ ,  $BIC=7412.517$ ). This showed no moderation of mother closeness, and similar to adolescent closeness, communication was not associated with condom use for both groups of mothers who reported high and low levels of closeness ( $b=0.227$ ,  $SE=.203$ ,  $p=0.264$ ; odds ratio=1.255; 95% CI: 0.744-2.119).

Next, the moderating effects of relationship quality were tested in the path between decision-making and condom use. Based on adolescents' report of closeness, model fit of a constrained model (N=408,  $AIC=7075.424$ ,  $BIC=7231.863$ ) showed improvement in fit compared to an unconstrained model (N=408,  $AIC=7087.252$ ,  $BIC=7295.838$ ), showing no moderation. That is for both levels of closeness, decision making was not related with condom use ( $b=0.183$ ,  $SE=.253$ ,  $p=0.470$ ; odds ratio=1.200; 95% CI: 0.626-2.300). Next, with mother's report of closeness, the model fit

of the constrained model ( $N=415$ ,  $AIC=7192.434$ ,  $BIC=7349.536$ ) was better compared to the unconstrained model ( $N=415$ ,  $AIC=7204.912$ ,  $BIC=7414.383$ ). Similar to adolescents' reports, decision was not associated with condom use among both groups of mothers ( $b= 0.136$ ,  $SE=.250$ ,  $p= 0.586$ ; odds ratio=1.146; 95% CI: 0.629-2.235).

#### *Effects of Communication and Awareness of Sexual Consequences on Condom Use*

The sample for these analyses consisted of older adolescents between the ages of 16 to 18 years who engaged in sexual intercourse at Wave 2 of data collection ( $N=287$ ).

The relationship between sexual communication and condom use was first tested. However, communication was not associated with condom use for older adolescents ( $N=181$ ;  $b=0.289$ ,  $SE=.341$ ,  $p= 0.396$ ; odds ratio: 1.336; 95% CI: 0.555-3.215). Next, the association between awareness of sexual consequences and condom use was estimated. Awareness of sexual consequences was a significant predictor of condom use, although at trend level. That is, greater levels of awareness increased condom use among older adolescents who engaged in sex ( $N=181$ ,  $b = 0.511$ ,  $SE=.269$ ,  $p = 0.058$ ; odds ratio: 1.666, 95% CI: 0.832-3.335).

#### *Hypotheses about Mediation: Adolescents' Awareness of Sexual Consequences*

The model testing the mediation of awareness of sexual consequences in the relationship between communication and condom use could not be tested (See Figure 5). This model did not meet the requirements for testing mediation because path  $A \rightarrow C$  was not significant. As shown in Figure 5 with the full mediation model, parent-adolescent sexual communication was unrelated with condom use and awareness of sexual consequences. Awareness, however, was associated with increases in condom use.

Because the sample consisted of older adolescents, analyses examining age differences were not conducted. Additionally, based on the small sample of older adolescents who engaged in sexual intercourse (N=185), the moderating effects of mother-adolescent closeness could not be tested. Specifically, the models examining the moderating effects of low (N=92) and high levels (N=87) of closeness based on adolescent report, as well as low (N=87) and high levels (N=98) of closeness based on mother report could not be conducted when all variables were present in the model based on the small sample.

## DISCUSSION

The main purpose of this study was to investigate the relationship between mother-adolescent sexual communication and adolescents' engagement in sexual risk. Previous research on sexual communication has been inconclusive. Some studies have found that high levels of communication were related to low levels of sexual risk (Jaccard & Dittus, 1991; Usher-Seriki et al., 2008), whereas others have suggested that communication is related to a greater likelihood of sexual intercourse (Clawson & Reese-Weber, 2003; Fox & Inazu, 1980; Somers & Paulson, 2000), or has no relationship with adolescent sexuality (Guzman et al., 2003; McNeely et al., 2003) or condom use (Chewning & Koningsveld, 1998). Many of these findings were due to the inconsistency in measurement such as using global assessments of communication by using dichotomous single predictors (occurred/didn't occur) (Jaccard & Dittus, 1993) or using checklists on topics of sexual discussions (Noller & Bagi, 1985).

This study, however, specifically focused on mothers discussing the negative consequences of intercourse with their adolescent daughters. The importance of additional family factors including mothers' knowledge of adolescent dating, family structure, and socioeconomic status on the effectiveness of communication and sexual risk were also examined. Adolescents' decision to engage in intercourse, however, is not entirely based on maternal influence, and this study acknowledged the importance of adolescents' involvement in dating relationships on sexual communication and pregnancy risk. Furthermore, the role of adolescents' decision-making skills about engaging in sexual risk was also assessed as well as their ability to recognize the negative

consequences of sexual intercourse. Finally, this study determined if adolescent decision making and awareness of sexual consequences mediated the relationship between sexual communication and engagement of sexual behavior.

#### *Parent-Adolescent Sexual Communication*

The study first showed that mothers' amount of communication around sexual risk was an important factor in predicting female adolescents' engagement of intercourse. However, contrary to the hypothesis, the study found that more sexual communication increased the likelihood of engagement of intercourse for the sample overall. This association, however, was not significant among older adolescents. Regarding adolescents' condom use at recent intercourse, sexual communication was not a significant predictor.

Although this hypothesis was not supported, the positive association between communication and engagement of sex is consistent with previous research (Clawson & Reese-Weber, 2003; Sucoff et al., 1999). However, many of these findings have shown that the content of sexual communication generally focuses on issues of birth control and condom use when a positive relationship occurs (Chen & Thompson, 2007; Jaccard et al., 1996; Miller et al., 1999; Usher-Seriki et al., 2008). As a result of this communication, adolescents may interpret these conversations about contraception as implicit approval for becoming sexually active (Usher-Seriki et al., 2008). However, due to the nature of the items specifically focusing on the negative consequences of sex in this study, such an explanation seems improbable.



One possible explanation is that the positive association between communication and engagement of sex may be due to the frequency of the conversations surrounding sexual risk, especially among younger adolescents. This study showed that the most frequent sexual conversations in which mothers reported talking “a moderate amount” were about the repercussions of a negative social reputation and the negative implications of early pregnancy. Mothers also reported talking “a great deal” about the dangers of acquiring an STD. Consistent with these findings, Sucoff and colleagues (1999), who also examined Add Health data (Harris, 2008), reported that the frequency of discussions surrounding sexual risk were associated with an increased rate of initiation of sex, particularly among younger adolescents. Among fourteen-year-old females, when mothers reported talking about sexual consequences “a great deal,” adolescents’ sexual debut increased 76 percent between Wave 1 and Wave 2. The elevation in risk also increased 35 percent among fifteen year-old girls. However, there was no association between communication and initiation of sex among older adolescents, aged sixteen years (Sucoff et al., 1999). These findings suggest that the more mothers discuss the consequences of sex, the more likely younger adolescents engage in such behavior. However, discussing sexual issues may have little effect on older adolescents (Sucoff et al., 1999). As they get older, adolescents become less dependent on the family (Collins & Repinski, 1994) and may be more likely to depend on peers for sources of sexual information than parents (Finekl & Finkel, 1985; Ikamullah et al., 2009).

These finding also showed that mothers’ knowledge of adolescents’ dating behavior as well as adolescents’ involvement in a prior dating relationship were

positively related with sexual communication and engagement of sexual intercourse (Eisenberg et al., 2006). However, the increases in sexual communication may have been related to adolescents' dating behavior (Somers & Paulson, 2000). As past research has indicated, adolescents who begin dating at earlier ages are more likely to engage in first intercourse at younger ages (Dorius et al, 1993; Miller et al., 1986). Thus, when adolescents are involved in dating relationships, mothers may be more aware of the dating behavior and, recognize the need to speak with their daughters, especially those in early adolescence, more frequently about the negative consequences of sex (Eisenberg et al., 2006; Longmore et al., 2001).

However, the content and style of sexual communication may also be responsible for increasing younger adolescents' sexual engagement, in addition to the frequency of communication. That is, when mothers frequently discuss sexual issues, yet only focus on the negative consequences of intercourse, younger adolescents may interpret this style of communication as dramatic and overbearing (Mueller & Powers, 1990). Past research has shown that overprotective parents contribute to adolescent sexuality (Miller et al., 1986) and to increases in teenage pregnancy (Horn & Rudolph, 1987). Thus, when parents frequently discuss sexual issues in a controlling matter, by only emphasizing the negative repercussions of intercourse, younger adolescents may ignore parents' advice and rebel by becoming sexually active (Miller et al., 1986).

Furthermore, mothers more restrictive styles of communication are predicted by their level of education and socioeconomic status. This study found that communication was positively related to being a single parent ( $r = 0.08$ ,  $p < 0.05$ ) and negatively related

with their level of education ( $r = -0.11, p < 0.05$ ). This indicates that mothers who were single parents and less educated were more likely to discuss the consequences of sex. Additionally, rather than focusing on the negative consequences of sexual intercourse, mothers who are more educated and of higher SES tend to focus on issues of practicing safer sex. Mothers with higher levels of education discuss more practical issues including using condoms, having adolescents' sexual partner tested for HIV, limiting number of sexual partners, and not having sex with individuals known to be HIV-positive (Lefkowitz et al., 2003). These findings suggest that less educated mothers may lack the education to properly discuss health-protective behaviors. As a result, mothers who have lower levels of education may convey sexual messages that only focus on the consequences of sex. Adolescents may then perceive these messages as negative and dramatic, which have little effect on reducing their engagement of risk.

#### *Adolescents' Decision Making and Awareness of Sexual Consequences*

In addition to the parenting influences, this study also examined the role of adolescent predictors: decision making and awareness of sexual consequences on adolescents' engagement of sexual risk. However, the sample was constricted to older adolescents for awareness of sexual consequences. The study partially supported the hypothesis that decision making decreased the likelihood of engagement of intercourse. However, no association was found with condom use. In addition, the study showed that older adolescents' awareness of sexual consequences decreased sexual intercourse and increased condom use. These findings suggest that when adolescents have the maturity to recognize the responsibilities associated with engaging in sexual intercourse, they are

more likely to delay engagement of intercourse. Furthermore, when choosing to have sex, adolescents, especially those who are older, have the ability to recognize the consequences of their actions (i.e., risk of pregnancy and contracting an STD) (Flavell, 1999; Michels et al., 2005) and generate alternative solutions to risk such as using effective contraception (Flavell, 1999; Maskay & Juhasz, 1983; Urberg & Rosen, 1987).

#### *Mediating Effects of Decision Making and Awareness of Sexual Consequences*

This study also examined how decision-making/awareness of sexual consequences mediated the relationship between communication and sexual risk. This hypothesis was partially supported in that decision making partially mediated the relationship between communication and engagement of intercourse. One possible explanation is that although discussing the negative consequences of intercourse did not prevent adolescents from engaging in sex, this type of communication may be beneficial for adolescents' decision-making skills (White, 1996). That is, hearing about the consequences of intercourse may help adolescents to recognize that engaging in sex is problematic, and as a result, should generate alternative solutions to engaging in risky behavior. When parents provide information about the consequences of sexual risk, adolescents can internalize this information and weigh the costs and benefits of engaging in the behavior. Thus, adolescents can then make responsible decisions about delaying sexual engagement.

For condom use at recent intercourse, mediation could not be tested in the association between communication and condom use because the initial criteria for testing mediation were not met (See Figure 4: the associations between communication

and condom use and decision making and condom were not significant). Although communication and decision making were not related with condom use, adolescents' dating behavior was positively related with condom use. These findings suggest that adolescents' involvement in a dating relationship is the driving factor to using condoms (Ford et al., 2001; Manning et al., 2000) and that dating experience provides adolescents with the knowledge about the need to practice safe sex.

Regarding older adolescents' awareness of sexual intercourse, mediation could not be tested in the association between communication and engagement of intercourse/condom use because the initial requirements were not met (See Figure 3 and 5: the paths between communication and sex, and communication and condom use were not significant). Although communication was not associated with intercourse or condom use, adolescents' involvement in dating relationships and mothers' knowledge of such behaviors were also positively related with sexual engagement. These findings suggest that when mothers are aware of their adolescents' dating behavior, adolescents may be likely to have sex because they interpret their mother's knowledge of dating as approval to engage in intercourse. Furthermore, adolescents' dating behavior was also related with increases in condom use, and as previously indicated, dating increases their likelihood of using condoms (Manning et al., 2000).

The study also found that communication was negatively related with awareness of sexual consequences, although at trend level, as seen in Figure 3. Although this relationship may seem counterintuitive, when mothers continuously discuss sexual issues by only focusing on the negative consequences of risk, adolescents may interpret this

style of communication as overbearing and dramatic (Miller et al., 1986; Mueller & Powers, 1990). As a result, adolescents may be less likely to internalize their mother's sexual values and beliefs as their own. An alternative explanation is that sexual communication may not influence adolescents' awareness of sexual risk as past research has suggested (Dittus et al., 1999). Although parents provide the initial foundation for adolescents' sexual beliefs and values, they become less influential as adolescents progress in age (Ikamullah et al., 2009) and assert their independence (Grotevant & Cooper, 1986). Furthermore, parents may not be essential for educating adolescents about the consequences of sex because adolescents are continuously exposed to sources outside the family that provide information about sexual risk including sexual education classes in school (Kirby, 2002), sexual discussions with peers (Holtzman, & Rubinson, 1995; Thomson & Spanier, 1978), and the media (Escobar-Chaves et al., 2005).

#### *Moderating Effects of Age and Mother-Adolescent Closeness*

The study also assessed the moderating effects of adolescents' age on the associations between communication and sexual risk, and between decision-making and sexual risk. It was hypothesized that communication would have greater influence on younger adolescents' engagement of sexual risk, while decision-making would have more influence on older adolescents' engagement of such behavior. Although communication was not a significant predictor for engagement of sex when the sample was constricted to older adolescents, no moderating effects of age were found in the association between communication and sexual risk, and between decision making and sexual risk when both variables were present in the model. That is for both younger and

older adolescents, communication increased engagement of intercourse, whereas decision making decreased engagement in such risk. These findings indicate that mother-daughter sexual communication and decision making were roughly comparable for both age groups when both variables were present for in the model.

Additionally, this study examined the moderation of mother-daughter relationship quality in the associations between communication and sexual risk, and between decision making/awareness of sexual consequences and sexual risk. However, no moderating effects of adolescent and mother report of closeness were found in either association. That is, among both low and high levels of adolescent/mother report of closeness, communication increased engagement of sex, whereas awareness decreased engagement in such risk. However, the association between decision-making and intercourse was only significant among mothers' report of closeness. One explanation for this finding is that a majority of mothers and adolescents reported a high degree of closeness in their relationships with their mothers/daughters, indicating similarity across low and high levels (Dittus et al., 1999). Nevertheless, this data suggests both mother and adolescent predictors are robust and can operate across different ages as well as groups of mothers/adolescents who report low and high levels of closeness.

#### *Strengths, Limitations, and Future Directions*

This study was unique because it focused on a specific aspect of sexual communication by examining the frequency that mothers discussed the negative consequences of intercourse with their daughters one year prior to sexual engagement. Examining two waves of data was an additional strength of this study because the timing

of sexual discussions plays an important role on adolescents' engagement of risk, specifically those that occur prior to initiation of intercourse (Miller et al., 2001). In addition, the study tried to determine the importance of additional parenting factors by examining mothers' knowledge of their daughter's dating behavior, family structure, and socioeconomic status on mother and adolescent predictors and outcomes of sexual risk. Furthermore, the influence of adolescents' dating experience was also examined.

One important finding was that mothers' knowledge of adolescents' involvement in a dating relationship increased the frequency of communication about the consequences of intercourse for the sample overall (Eisenberg et al., 2006). However, the frequency that mothers discussed sexual issues with their daughters was also dependent on adolescents' dating behavior. Specifically, when adolescents are involved in a dating relationship, mothers become more aware that their daughters are on the verge of engaging in sexual behavior, and recognize the need to increase the amount of communication about sexual risk (Longmore et al., 2001). Another unique finding was that mother's knowledge of adolescent dating behavior as well as adolescents' dating were positively related with sexual engagement, and adolescent dating was also associated with condom use. These findings suggest that adolescents' involvement in a dating relationship is the driving factor for engagement of sexual behavior, and that dating experience gives adolescents the knowledge of the need to practice safe sex by using contraception. Furthermore, when mothers are aware of their adolescents' involvement in dating, adolescents may interpret their mothers' knowledge as tacit



approval for engagement in sexual intercourse, and thus, be more likely to engage in such behavior.

Another important contribution was the examination of adolescents' decision making skills and awareness of sexual consequences on pregnancy risk as well as how these factors mediated the relationship between communication and engagement in sexual behavior. This study showed that adolescents' decision making skills and knowledge of sexual risk deterred sexual engagement, and awareness increased condom use among older adolescents who were sexually active. Decision making also partially mediated the relationship between communication and sexual intercourse. These findings suggest the importance of adolescents' cognitive processes in their involvement in sexual engagement. Further, adolescent predictors may be more of a protective factor against engagement in sexual risk above and beyond that of maternal influence.

A final contribution was examining age differences in the associations between communication, decision-making, and sexual risk. Although no differences were found, it was important to determine that mother and adolescent predictors had similar effects for younger and older adolescents. In addition, the study assessed the moderating effects of parent-adolescent closeness by using reports from both mothers and daughters. Although no moderating effects of closeness were found, using multiple informants is important to obtain an accurate representation of relationship quality from the perspective of the mother and the adolescent.

This study, however, also had some limitations. One limitation is the use of mother only report on parent-child sexual communication. Future research should assess

sexual communication through mother and adolescent report. Using multiple informants will provide a clearer picture of the nature of sexual communication that occurs between parent and adolescent. Another limitation was the measure of sexual communication and that it was limited to frequencies. Rather than focusing on the amount of sexual discussions, future research should focus on the perceptions of communication to determine how conversations about sexual risk are internalized by both parent and adolescent. Perceptions vary depending on who reports the communication, and perceptions of communication are important because they provide information about what the parent or adolescent remembers and takes away from the conversation (Somers & Paulson, 2000).

An additional limitation was the dichotomous nature of the outcomes of sexual risk. Although the study assessed two outcomes of sexual risk and the sample was constricted to adolescents who were virgins at Wave 1, the measure of sexual behavior does not provide information about the timing of sexual engagement. Furthermore, the measure of condom use was also limiting, and only asked adolescents if they reported using condoms at most recent intercourse. Future studies should assess adolescent sexual behavior by assessing the timing of sexual engagement as well as the consistency of condom use. This type of measure will be more informative about adolescents' patterns of contraceptive use. In addition, the sample of adolescents who reported using a condom at recent intercourse was also relatively small, which limited the analyses examining the moderation of parent-child relationship quality on this sample.

Another limitation was the missing data patterns in the Add Health Data, in which certain items (awareness of sexual consequences) were age restrictive. As a result, age differences in the association between adolescents' awareness of sexual consequences and engagement of sexual risk could not be conducted. One final limitation was that the Add Health data only measured mother predictors at Wave 1 of data collection. Therefore, changes in the frequency of communication as well as relationship quality based on mother report could not be measured overtime. Future research should examine multiple waves of communication to determine how sexual discussions change in content and nature as adolescents initiate sexual behaviors.

As previously indicated, this study found that communication about sexual risk contributed to adolescents' increased engagement of intercourse, and was ineffective in increasing their use of condoms. Therefore, this type of communication conveys the wrong type of message to adolescents. As an alternative to focusing conversations on the negative consequences of intercourse, programs aimed at educating parents how to talk about sexual issues with their adolescents should primarily focus on discussing the benefits of being involved in a romantic relationship prior to sexual engagement. Parents should convey the importance of the quality of the romantic relationship that adolescents share with their partner, consisting of friendship, intimacy, and mutual respect. In addition, parents can help adolescents clarify misperceptions of norms about the sequencing of romantic relationships such as when to have sex in a relationship (Coyle et al., 2006). Lastly, parents can help their adolescents learn when it is time to end unhealthy relationships. Thus, sexual communication will be more effective in deterring

adolescents from engaging in sex when parents first discuss the importance of developing healthy romantic relationships.

However, many adolescents will engage in intercourse before being involved in a healthy dating relationship. As an alternative to discussing the negative consequences of intercourse, conversations should focus on the responsibility of practicing safe sex including the importance of using condoms consistently, emphasizing they are the most effective type of contraception that prevents HIV/AIDS, STDs, and unintended pregnancy, the importance of having adolescents as well as their sexual partner tested for STDs and HIV, limiting the number of multiple or concurrent sexual partners, partner spacing, and not having sex with individuals known to be HIV-positive (Coyle et al., 2006; Lefkowitz et al., 2002). Although the content is important in communication around sexual risk, it is more critical to focus on the perception, quality, and style that communication is interpreted by the adolescent. It has previously been emphasized that sexual communication can only be effective when the adolescent perceives the communication to be conveyed in an open, friendly, and supportive manner (Dutra et al., 1999). Thus, more research needs to focus on the style, affect, and mutuality of communication, rather than just focusing on the frequency and number of topics being discussed.

In summary, this study indicates the complex relationship between parent-adolescent sexual communication and adolescents' engagement in pregnancy risk. Communication about the negative sexual consequences does not prevent adolescents' engagement in sexual risk, and adolescents may interpret this style of communication as

controlling and dramatic, and rebel against parents' intent by becoming sexually active. Rather than focus on the frequency of sexual discussions, future studies should focus on the quality, style, and perception of mother-daughter sexual communication which may be more important predictors of engagement of intercourse and condom use. In addition, this study acknowledges the important role of adolescents' involvement in dating relationships as well as mothers' knowledge of adolescent dating. Future studies should assess the quality and duration of adolescent dating relationships to determine the effect on the engagement of sexual intercourse and consistency in condom use. Lastly, this study addresses the need for more research on the role of adolescents' cognitive processes on engagement of sexual risk and how these factors mediate the relationship between communication and engagement of intercourse. An important next step is to better understand the optimal family context for adolescents to accurately understand and internalize parental messages about the consequences of sexual intercourse and birth control, and how these factors can lead adolescents to make healthy and responsible choices about engaging in sexual behavior.

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Table 1. Unstandardized Loadings (Standard Errors) and Standardized Loadings for Parent-Adolescent Sexual Communication, Adolescent Decision Making, Adolescent Awareness of Sexual Consequences, and Parent-child Closeness for Overall Sample and Younger and Older Adolescents

| <b>Parent-Adolescent Sexual Communication</b>      |                                     |              |                                       |              |                                     |              |
|--|-------------------------------------|--------------|---------------------------------------|--------------|-------------------------------------|--------------|
|  | <b>Overall Sample<br/>(N=2,699)</b> |              | <b>Ages 13-15 Years<br/>(N=1,739)</b> |              | <b>Ages 16-18 Years<br/>(N=930)</b> |              |
| Item   | Unstandardized                      | Standardized | Unstandardized                        | Standardized | Unstandardized                      | Standardized |
| Pregnancy  | 1.00 (--)                           | 0.92 (.01)   | 1.00 (--)                             | 0.92 (.01)   | 1.00 (--)                           | 0.92 (.01)   |
| STD  | 0.77 (.06)                          | 0.88 (.01)   | 0.80 (.06)                            | 0.88 (.01)   | 0.76 (.06)                          | 0.88 (.01)   |
| Reputation   | 0.50 (.03)                          | 0.76 (.01)   | 0.52 (.04)                            | 0.77 (.01)   | 0.47 (.04)                          | 0.70 (.02)   |
| <b>Adolescent Decision-Making</b>                  |                                     |              |                                       |              |                                     |              |
| Get many facts about problem                       | 1.00 (--)                           | 0.78 (.01)   | 1.00 (--)                             | 0.79 (.01)   | 1.00 (--)                           | 0.76 (.02)   |
| Think of approach to problem                       | 1.09 (.06)                          | 0.80 (.01)   | 1.03 (.06)                            | 0.80 (.02)   | 1.18 (.07)                          | 0.82 (.02)   |
| Use systematic method                              | 0.87 (.04)                          | 0.73 (.01)   | 0.79 (.04)                            | 0.72 (.01)   | 0.98 (.06)                          | 0.77 (.02)   |
| Analyze what when right and wrong                  | 0.75 (.03)                          | 0.68 (.01)   | 0.71 (.04)                            | 0.78 (.02)   | 0.82 (.05)                          | 0.66 (.01)   |
| <b>Adolescent Awareness of Sexual Consequences</b> |                                     |              |                                       |              |                                     |              |
| If pregnant, embarrass family                      | --                                  | --           | --                                    | --           | 1.00 (--)                           | 0.87 (.02)   |
| If pregnant, embarrass self                        | --                                  | --           | --                                    | --           | 1.38 (.37)                          | 0.93 (.02)   |
| If pregnant, forced to grow up too fast            | --                                  | --           | --                                    | --           | 0.33 (.04)                          | 0.51 (.03)   |
| <b>Adolescent Report of Closeness</b>              |                                     |              |                                       |              |                                     |              |
| Mother is warm and loving                          | 1.00 (--)                           | 0.81 (.01)   | 1.00 (--)                             | 0.81 (.01)   | 1.00 (--)                           | 0.79 (.02)   |
| Satisfied with communication                       | 1.90 (.09)                          | 0.93 (.01)   | 1.88 (.09)                            | 0.93 (.01)   | 1.96 (.12)                          | 0.94 (.01)   |
| Satisfied with relationship                        | 2.84 (.26)                          | 0.97 (.01)   | 2.77 (.26)                            | 0.97 (.01)   | 2.98 (.29)                          | 0.97 (.01)   |
| <b>Mother Report of Closeness</b>                  |                                     |              |                                       |              |                                     |              |
| Gets along well with child                         | 1.00 (--)                           | 0.83 (.01)   | 1.00 (--)                             | 0.82 (.02)   | 1.00 (--)                           | 0.83 (.02)   |
| Trusts child                                       | 0.66 (.05)                          | 0.70 (.02)   | 0.70 (.06)                            | 0.71 (.02)   | 0.62 (.05)                          | 0.68 (.03)   |
| Satisfied with relationship                        | 0.83 (.07)                          | 0.78 (.02)   | 0.87 (.08)                            | 0.78 (.02)   | 0.79 (.07)                          | 0.74 (.03)   |

Table 2. Background Characteristics for Overall Sample and Across Age Group

|  | <b>Overall Sample</b><br><i>M (SD)</i><br>( <i>N=2669</i> ) | <b>Ages 13-15 years</b><br><i>M (SD)</i><br>( <i>N=1739</i> ) | <b>Ages 16-18 years</b><br><i>M (SD)</i><br>( <i>N=930</i> ) |
|--|---|---|--|
| <b>Mother Education</b>                        | 5.96 (.13)<br>(2656)  | 5.93 (.12)<br>(1731)  | 5.98 (.16)<br>(925)  |
| <b>Single Parent Household</b>                 | 0.18 (.38)<br>(2666)  | 0.19 (.39) <sup>A</sup><br>(1737)                             | 0.16 (.37)<br>(929)  |
| <b>Adolescent Dating</b>                       | 0.48 (.50)<br>(2662)  | 0.43 (.49) <sup>A</sup><br>(1735)                             | 0.57 (.50)<br>(927)  |
| <b>Mother's Knowledge of Adolescent Dating</b> | 0.48 (.50)<br>(2662)  | 0.32 (.47) <sup>A</sup><br>(1731)                             | 0.76 (.43)<br>(920)  |
| <b>Engagement of Sexual Intercourse</b>        | 0.20 (.39)<br>(2167)  | 0.16 (.37) <sup>A</sup><br>(1509)                             | 0.28 (.45)<br>(658)  |
| <b>Condom Use</b>                              | 0.70 (.45)<br>(287)   | 0.65 (.48) <sup>A</sup><br>(162)                              | 0.78 (.42)<br>(125)  |

Note: <sup>A</sup> Mean levels for younger adolescents significantly different from older adolescents ( $p < .05$ )  
 Condom use is for those who engaged in sexual intercourse at Wave 2

Table 3. Descriptive Statistics of Parent-Adolescent Communication about Sexual Consequences, Adolescent Awareness of Sexual Consequences, Adolescent Decision Making, Adolescent Report of Closeness, and Mother Report of Closeness for Overall Sample and Across Age Group

|  | <b>Overall Sample</b><br><i>M (SD)</i><br><i>(N=2669)</i> | <b>Ages 13-15 years</b><br><i>M (SD)</i><br><i>(N=1739)</i> | <b>Ages 16-18 years</b><br><i>M (SD)</i><br><i>(N=930)</i> |
|--|---|---|--|
| <b>Parent-child Sexual Communication</b> | 2.90 (.82)<br>(2648)                                      | 2.88 (.83)<br>(1728)  | 2.92 (.79)<br>(920)  |
| <b>Awareness of Sexual Consequences</b>  | ---   | ---   | 4.18 (.84)<br>(924)  |
| <b>Decision Making</b>                   | 3.78 (.61)<br>(2665)                                      | 3.73 (.61) <sup>A</sup><br>(1738)                           | 3.87 (.58)<br>(927)  |
| <b>Adolescent Report of Closeness</b>    | 4.39(.56)<br>(2642)                                       | 4.32 (.76)<br>(1728)  | 4.28 (.76)<br>(914)  |
| <b>Mother Report of Closeness</b>        | 4.39 (.57)<br>(2658)                                      | 4.36 (.59) <sup>A</sup><br>(1736)                           | 4.45 (.51)<br>(922)  |

Note: <sup>A</sup> Mean levels for younger adolescents significantly different from older adolescents ( $p < .05$ )

Table 4. Descriptive Statistics of Parent-Adolescent Communication about Sexual Consequences, Adolescent Awareness of Sexual Consequences, Adolescent Decision Making, Adolescent Report of Closeness, and Mother Report of Closeness for Adolescents who Engaged in Sexual Intercourse and Across Age Group

|   | <b>Youth who<br/>engaged in sexual<br/>intercourse<br/><i>M (SD)</i><br/>(<i>N=426</i>)</b> | <b>Ages 13-15 years<br/><i>M (SD)</i><br/>(<i>N=241</i>)</b> | <b>Ages 16-18 years<br/><i>M (SD)</i><br/>(<i>N=185</i>)</b> |
|---|---|--|--|
| <b>Parent-child Sexual<br/>Communication</b>    | 3.07 (.79)<br>(425)   | 3.11 (.77)<br>(240)  | 3.02 (.80)<br>(185)  |
| <b>Awareness of<br/>Sexual<br/>Consequences</b> | ---   | ---  | 4.00 (.94)<br>(185)  |
| <b>Decision Making</b>                          | 3.73 (.64)<br>(426)   | 3.64 (.64) <sup>A</sup><br>(241)                             | 3.84 (.62)<br>(185)  |
| <b>Adolescent Report<br/>of Closeness</b>       | 4.11(.86)<br>(419)  | 4.04 (.88) <sup>A</sup><br>(240)                             | 4.20 (.83)<br>(179)  |
| <b>Mother Report of<br/>Closeness</b>           | 4.22 (.67)<br>(425)   | 4.15 (.73) <sup>A</sup><br>(240)                             | 4.33 (.57)<br>(185)  |

Note: <sup>A</sup> Mean levels for younger adolescents significantly different from older adolescents ( $p < .05$ )

Table 5. Bivariate Correlations of Parent and Adolescent Variables on Engagement of Adolescent Sexual Intercourse for Overall Sample ( $N=2669$ )

| Variable                               | 1                 | 2                | 3                | 4                | 5                | 6               | 7  |
|--|-------------------|------------------|------------------|------------------|------------------|-----------------|----|
| 1. Mother Education                    | --                |                  |                  |                  |                  |                 |    |
| 2. Single Parent                       | -0.05*<br>(2654)  | --               |                  |                  |                  |                 |    |
| 3. Adolescent Date                     | 0.06**<br>(2656)  | -0.02<br>(2666)  | --               |                  |                  |                 |    |
| 4. Mother Knowledge of Adolescent Date | 0.07**<br>(2638)  | 0.02<br>(2648)   | 0.37**<br>(2651) | --               |                  |                 |    |
| 5. Parent-child Communication          | -0.11**<br>(2635) | 0.08**<br>(2646) | 0.11**<br>(2648) | 0.12**<br>(2642) | --               |                 |    |
| 6. Decision Making                     | -0.02<br>(2652)   | -0.01<br>(2662)  | 0.03<br>(2665)   | 0.05**<br>(2649) | 0.07**<br>(2644) | --              |    |
| 7. Engagement of Sex                   | -0.12**<br>(2156) | 0.05*<br>(2166)  | 0.21**<br>(2167) | 0.24**<br>(2152) | 0.11**<br>(2151) | -0.02<br>(2163) | -- |

Note. \* $p < .05$ . \*\* $p < .01$ .

Table 6. Bivariate Correlations of Parent and Adolescent Variables on Engagement of Adolescent Sexual Intercourse for Younger Adolescents ( $N=1739$ )

| Variable                               | 1                 | 2                | 3                | 4                | 5                | 6                | 7 |
|--|-------------------|------------------|------------------|------------------|------------------|------------------|---|
| 1. Mother Education                    | --                |                  |                  |                  |                  |                  |   |
| 2. Single Parent                       | -0.06*<br>(1729)  | --               |                  |                  |                  |                  |   |
| 3. Adolescent Date                     | 0.05**<br>(1730)  | -0.01<br>(1737)  | --               |                  |                  |                  |   |
| 4. Mother Knowledge of Adolescent Date | 0.03<br>(1722)    | 0.05*<br>(1729)  | 0.33**<br>(1731) | --               |                  |                  |   |
| 5. Parent-child Communication          | -0.15**<br>(1719) | 0.11**<br>(1726) | 0.12**<br>(1728) | 0.14**<br>(1724) | --               |                  |   |
| 6. Decision Making                     | -0.02<br>(1729)   | -0.02<br>(1736)  | -0.01<br>(1738)  | 0.01<br>(1730)   | 0.06*<br>(1727)  | --               |   |
| 7. Engagement of Sex                   | -0.12**<br>(1502) | 0.06*<br>(1508)  | 0.22**<br>(1509) | 0.20**<br>(1501) | 0.12**<br>(1498) | -0.05*<br>(1508) | - |

Note. \* $p < .05$ . \*\* $p < .01$ .

Table 7. Bivariate Correlations of Parent and Adolescent Variables on Engagement of Adolescent Sexual Intercourse for Older Adolescents ( $N=930$ )

| Variable                               | 1                | 2               | 3               | 4               | 5               | 6                | 7              | 8  |
|--|------------------|-----------------|-----------------|-----------------|-----------------|------------------|----------------|----|
| 1. Mother Education                    | --               |                 |                 |                 |                 |                  |                |    |
| 2. Single Parent                       | -0.02<br>(925)   | --              |                 |                 |                 |                  |                |    |
| 3. Adolescent Date                     | 0.08*<br>(926)   | -0.01<br>(929)  | --              |                 |                 |                  |                |    |
| 4. Mother Knowledge of Adolescent Date | 0.15**<br>(916)  | 0.03<br>(919)   | 0.40**<br>(920) | --              |                 |                  |                |    |
| 5. Parent-child Communication          | -0.03<br>(916)   | 0.03<br>(920)   | 0.11**<br>(920) | 0.08*<br>(918)  | --              |                  |                |    |
| 6. Awareness of Sexual Consequences    | 0.17**<br>(920)  | -0.08*<br>(923) | 0.01<br>(924)   | 0.02<br>(914)   | -0.03<br>(914)  | --               |                |    |
| 7. Decision Making                     | -0.03<br>(923)   | 0.01<br>(926)   | 0.04<br>(927)   | 0.01<br>(917)   | 0.09**<br>(917) | 0.11**<br>(924)  | --             |    |
| 8. Engagement of Sex                   | -0.13**<br>(654) | 0.04<br>(658)   | 0.17**<br>(658) | 0.20**<br>(651) | 0.07†<br>(653)  | -0.14**<br>(653) | -0.02<br>(565) | -- |

Note. † $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .



Table 8. Bivariate Correlations of Parent and Adolescent Variables on Condom Use for Those Who Engaged in Sexual Intercourse ( $N=426$ )

| Variable                               | 1               | 2              | 3               | 4              | 5               | 6             | 7  |
|--|-----------------|----------------|-----------------|----------------|-----------------|---------------|----|
| 1. Mother Education                    | --              |                |                 |                |                 |               |    |
| 2. Single Parent                       | -0.12*<br>(418) | --             |                 |                |                 |               |    |
| 3. Adolescent Date                     | 0.14**<br>(418) | -0.07<br>(426) | --              |                |                 |               |    |
| 4. Mother Knowledge of Adolescent Date | 0.09†<br>(415)  | -0.01<br>(423) | 0.27**<br>(423) | --             |                 |               |    |
| 5. Parent-child Communication          | -0.09†<br>(417) | 0.10*<br>(425) | 0.08<br>(425)   | 0.09†<br>(423) | --              |               |    |
| 6. Decision Making                     | -0.08<br>(413)  | 0.05<br>(426)  | 0.13**<br>(426) | 0.11*<br>(423) | 0.14**<br>(425) | --            |    |
| 7. Condom Use                          | 0.11†<br>(282)  | -0.02<br>(287) | 0.11†<br>(287)  | 0.11†<br>(284) | 0.06<br>(286)   | 0.04<br>(287) | -- |

Note. † $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Table 9. Bivariate Correlations of Parent and Adolescent Variables on Condom Use for Younger Adolescents Who Engaged in Sexual Intercourse ( $N=241$ )

| Variable                               | 1                           | 2              | 3                          | 4               | 5              | 6             | 7  |
|--|-----------------------------|----------------|----------------------------|-----------------|----------------|---------------|----|
| 1. Mother Education                    | --                          |                |                            |                 |                |               |    |
| 2. Single Parent                       | -0.13 <sup>†</sup><br>(236) | --             |                            |                 |                |               |    |
| 3. Adolescent Date                     | 0.21**<br>(236)             | -0.08<br>(241) | --                         |                 |                |               |    |
| 4. Mother Knowledge of Adolescent Date | 0.09<br>(234)               | 0.01<br>(239)  | 0.27**<br>(239)            | --              |                |               |    |
| 5. Parent-child Communication          | -0.16*<br>(236)             | 0.06<br>(240)  | 0.06<br>(240)              | 0.19**<br>(239) | --             |               |    |
| 6. Decision Making Skills              | -0.12 <sup>†</sup><br>(236) | 0.02<br>(241)  | 0.10<br>(241)              | 0.06<br>(239)   | 0.16*<br>(240) | --            |    |
| 7. Condom Use                          | 0.10<br>(159)               | 0.04<br>(162)  | 0.13 <sup>†</sup><br>(162) | 0.08<br>(160)   | 0.09<br>(161)  | 0.07<br>(162) | -- |

Note. <sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$

Table 10. Bivariate Correlations of Parent and Adolescent Variables on Condom Use for Older Adolescents who Engaged in Sexual Intercourse ( $N=185$ )

| Variable                               | 1              | 2              | 3               | 4              | 5              | 6               | 7              | 8  |
|--|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----|
| 1. Mother Education                    | --             |                |                 |                |                |                 |                |    |
| 2. Single Parent                       | -0.12<br>(182) | --             |                 |                |                |                 |                |    |
| 3. Adolescent Date                     | 0.06<br>(182)  | -0.04<br>(185) | --              |                |                |                 |                |    |
| 4. Mother Knowledge of Adolescent Date | 0.13†<br>(181) | 0.02<br>(184)  | 0.32**<br>(184) | --             |                |                 |                |    |
| 5. Parent-child Communication          | 0.01<br>(182)  | 0.15*<br>(185) | 0.10<br>(185)   | -0.03<br>(184) | --             |                 |                |    |
| 6. Awareness of Sexual Consequences    | 0.14†<br>(182) | -0.01<br>(185) | -0.01<br>(185)  | 0.13†<br>(184) | -0.04<br>(185) | --              |                |    |
| 7. Decision Making                     | -0.02<br>(182) | 0.12<br>(185)  | 0.16*<br>(185)  | 0.07<br>(184)  | 0.15*<br>(185) | 0.17**<br>(185) | --             |    |
| 8. Condom Use                          | 0.12<br>(123)  | -0.07<br>(125) | 0.21**<br>(125) | 0.05<br>(124)  | 0.06<br>(125)  | 0.22**<br>(125) | -0.09<br>(125) | -- |

Note. † $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Figure 1. Theoretical model of mother and adolescent predictors on engagement of sexual risk and condom use.

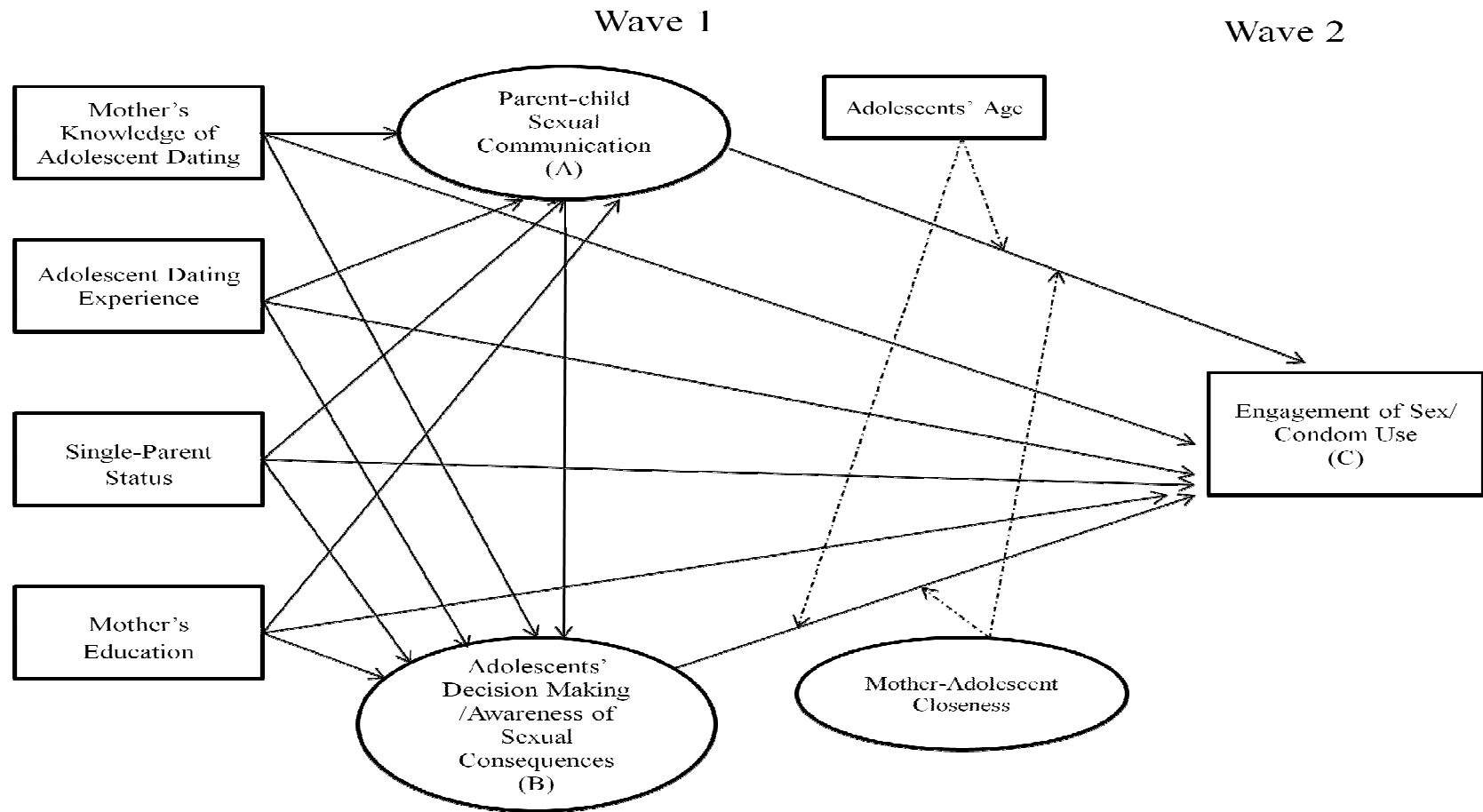
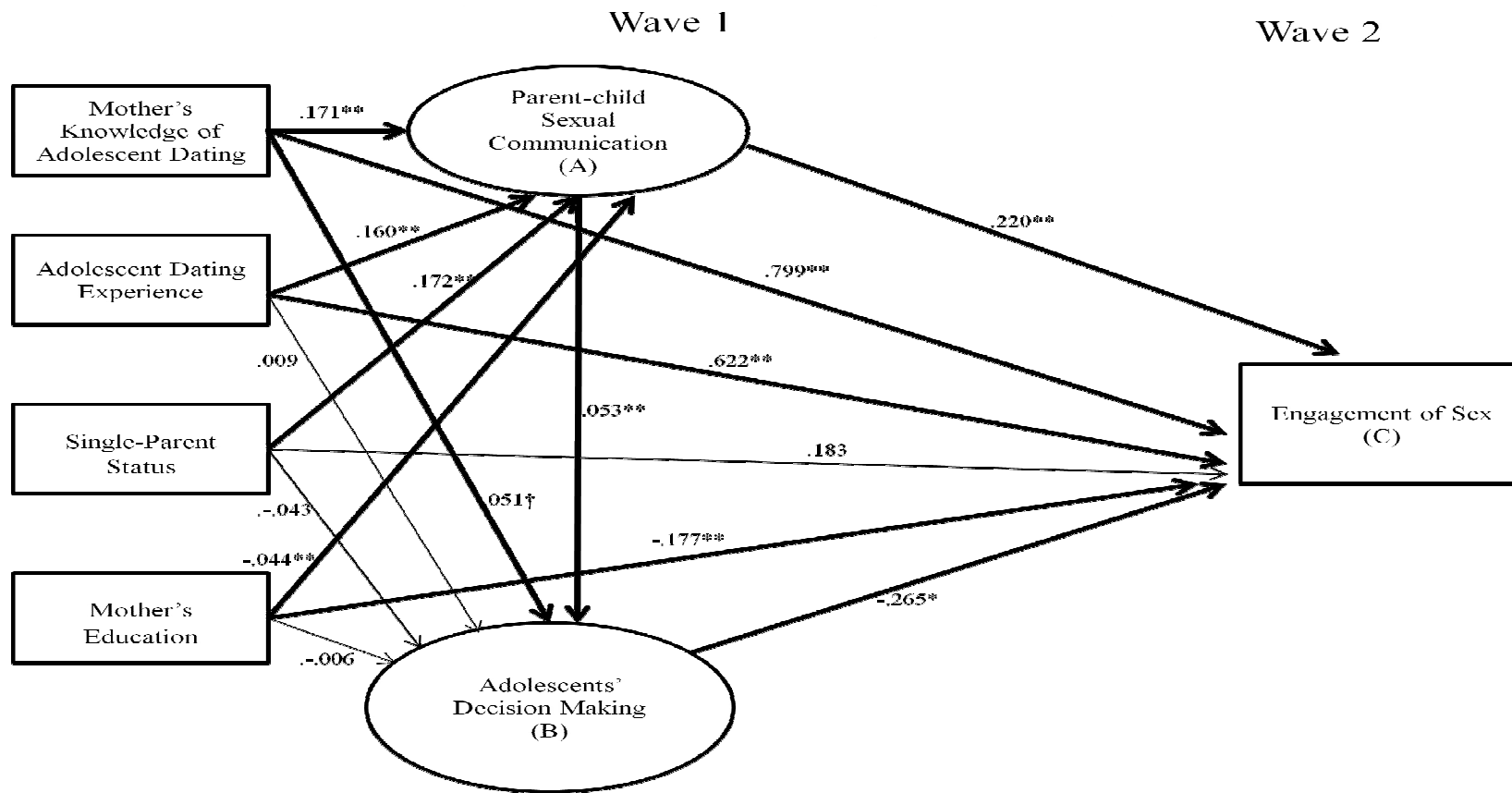


Figure 2. Overall sample with probit coefficients for parent-adolescent sexual communication, adolescents' decision making, and engagement of sexual intercourse.

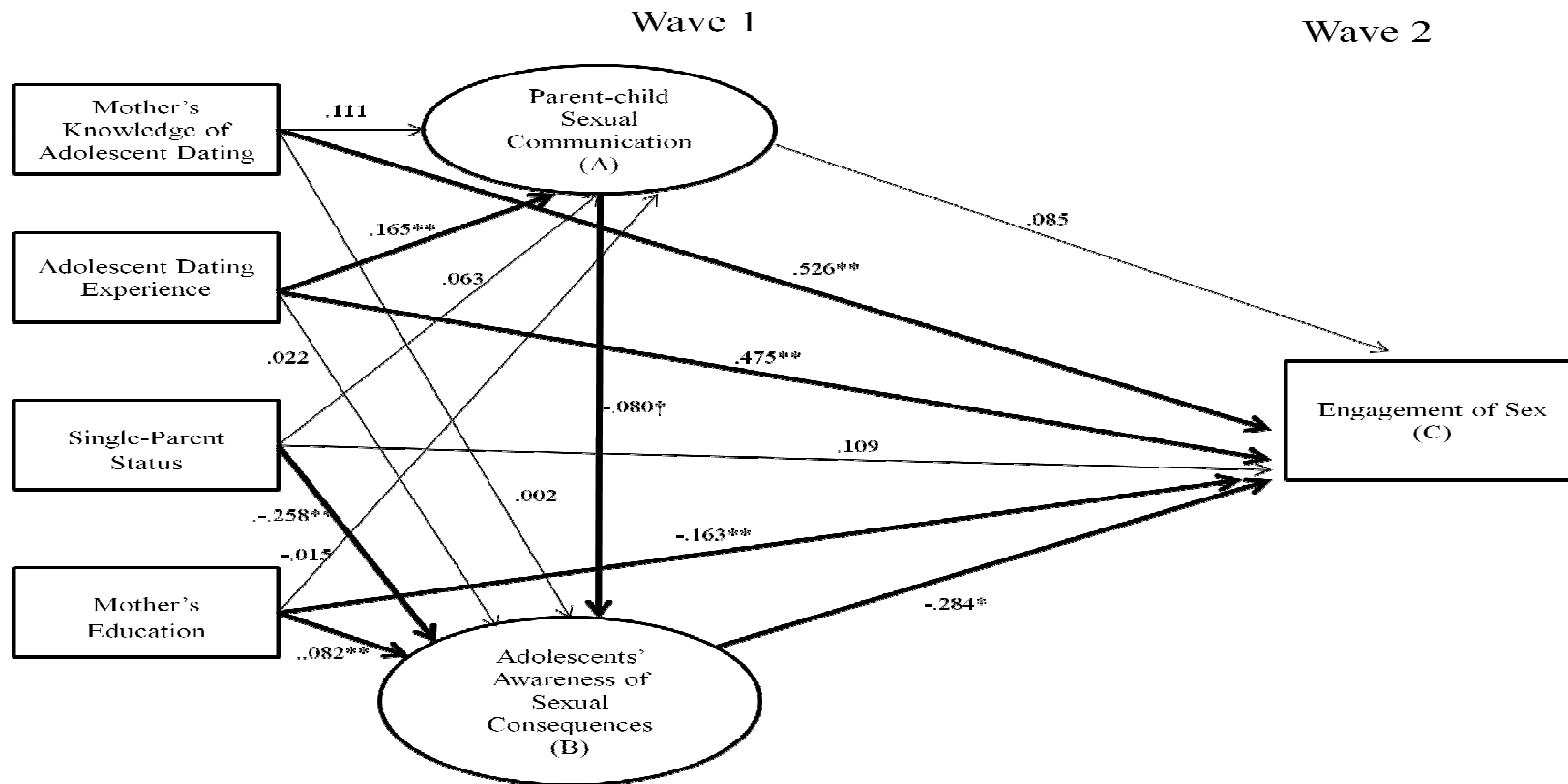


Overall Sample (N=2636), Model Fit Indices: *AIC* = 42715.977, *BIC*= 42933.427

Note 1. Model met criteria for partial mediation

Note 2. Bold paths are significant; † p < .10, \* p < .05, \*\* p < .01

Figure 3. Older Adolescents ages 16-18 years with probit coefficients for parent-adolescent sexual communication, adolescents' awareness of sexual consequences, and engagement of sexual intercourse.



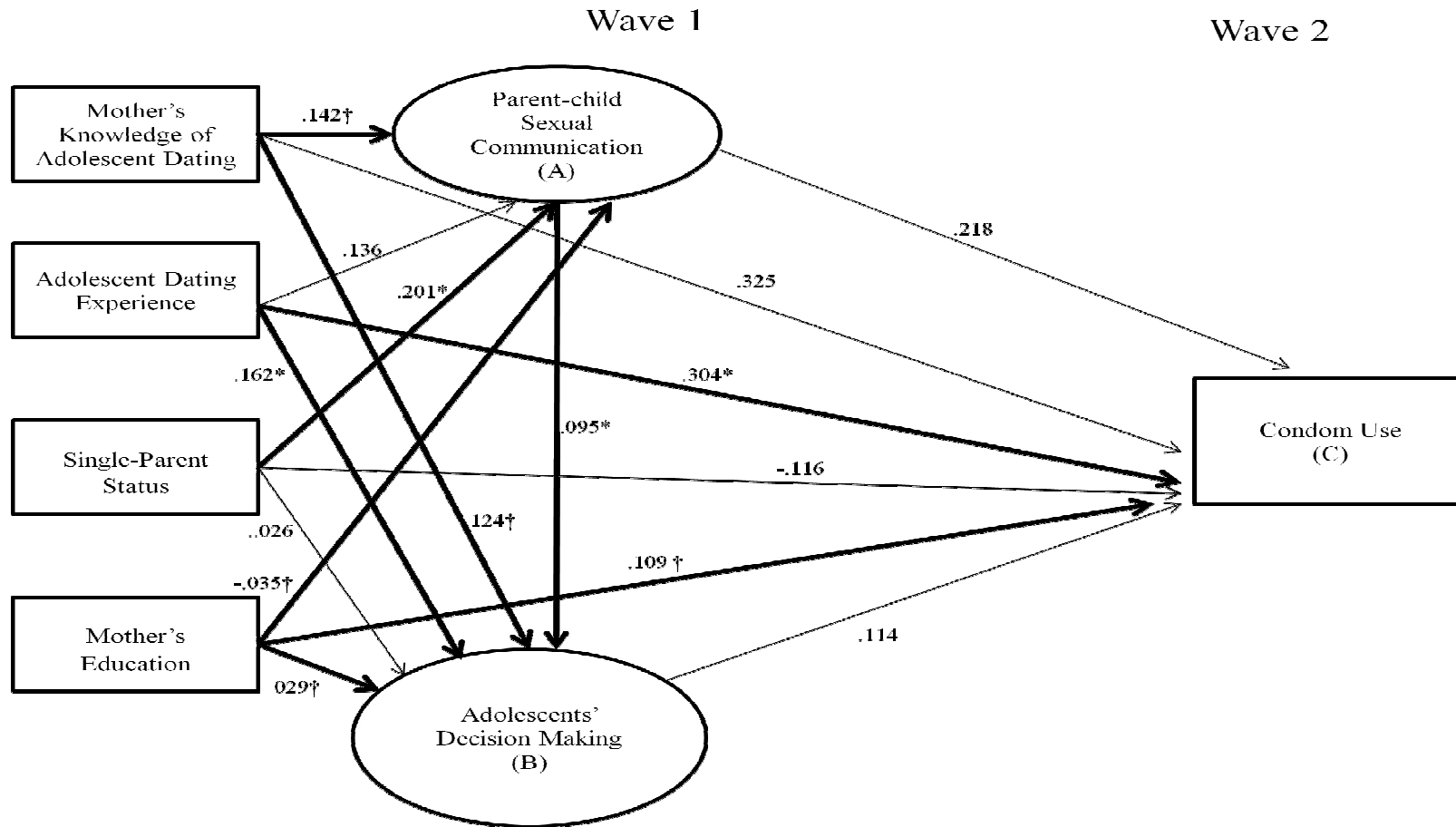
Older Adolescents (N=915), Model Fit Indices: AIC = 14154.386, BIC= 14318.230

Note 1. Model did not meet criteria for testing mediation

Note 2. Bold paths are significant; †  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ .

Figure 4. Model of adolescents who had intercourse with probit coefficients for parent-adolescent sexual communication, adolescents' decision making, and condom use.

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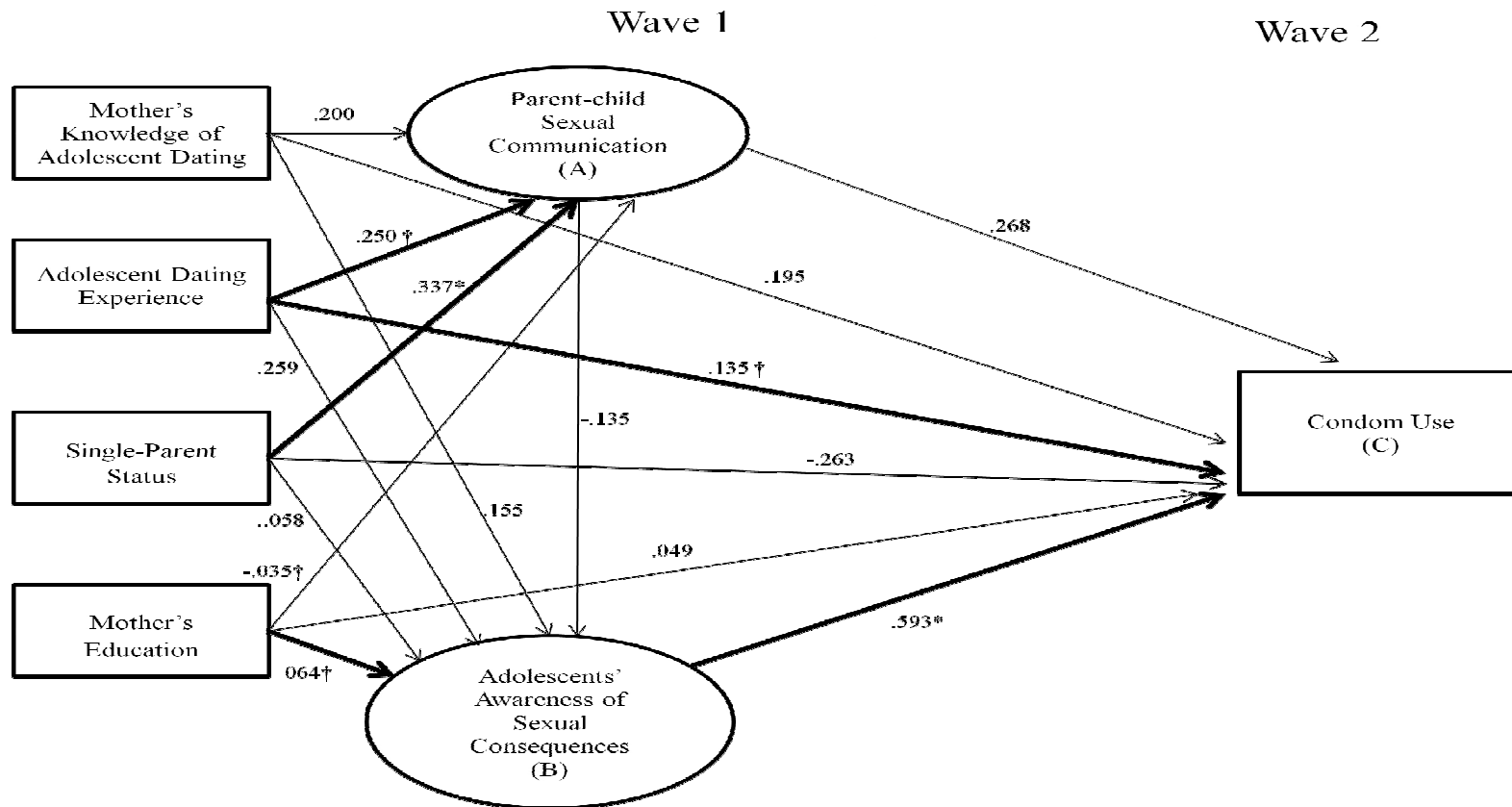


Sample of adolescents who had intercourse at Wave 2 and used condom (N=415), Model Fit Indices:  $AIC = 6622.465$ ,  $BIC = 6771.512$

Note 1. Model did not meet criteria for testing mediation

Note 2. Bold paths are significant; † p < .10, \* p < .05, \*\* p < .01.

Figure 5. Model of older adolescents who had intercourse with probit coefficients for parent-adolescent sexual communication, adolescents' awareness of sexual consequences, and condom use.



Sample of older adolescents who had intercourse and used condoms at Wave 2 (N=181), Model Fit Indices:  $AIC = 2892.378$ ,  $BIC = 3001.127$

Note 1. Model did not meet criteria for testing mediation

Note 2. Bold paths are significant; † p < .10, \* p < .05, \*\* p < .01.



## Appendix I

### **Dependent Variables**

#### **Engagement of Sexual Intercourse**

1. Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a man inserts his penis into a female's vagina.

#### **Condom Use at Recent Intercourse**

1. Did you and your partner use any method of birth control when you had sexual intercourse most recently?
2. What method of birth control did you or your partner use?

## Appendix II

### Independent Variables

#### **Parent-Adolescent Sexual Communication Scale**

Stem question:

How much have you and (child's name) talked about her having sexual intercourse and.....

Rating scale:

1. Not at all; 2. Somewhat; 3. A moderate amount; 4. A great deal
1. The negative or bad things that would happen if she got pregnant.
2. The dangers of getting a sexually transmitted disease.
3. The negative or bad impact on her social life because she would lose the respect of others.

#### **Adolescents' Decision Making Scale**

Rating scale:

1. Strongly disagree; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Strongly Agree
1. When you have a problem to solve, one of the first things you do is get as many facts about the problem as possible.
2. When you are attempting to find a solution to a problem, you usually try to think of as many different ways to approach the problem as possible.
3. When making decisions, you generally use a systematic method for judging and comparing alternatives.
4. After carrying out a solution to a problem, you usually try to analyze what went wrong and what went right.

#### **Adolescents' Awareness of Negative Sexual Consequences Scale**

Stem question:

If you got pregnant...

Rating scale:

2. Strongly disagree; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Strongly Agree
1. It would be embarrassing to your family.
2. It would be embarrassing for you.
3. You would be forced to group up too fast.

## Appendix III

### **Moderating Variables**

#### **Parent-Adolescent Closeness Scale**

##### **Adolescent Report of Closeness**

Rating Scale:

1. Strongly disagree; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Strongly agree
1. Most of the time, your mother is warm and loving toward you.
2. You are satisfied with the way you and your mother communicate with each other.
3. Overall, you are satisfied with your relationship with your mother.

##### **Mother Report of Closeness**

Rating Scale:

1. Strongly disagree; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Strongly agree
1. You get along well with her.
2. You feel you can really trust her.
3. Overall, you are satisfied with your relationship with (child's name).