

PREDICTING WHEN ADOLESCENT RISKY SEXUAL BEHAVIOR DOES NOT  
CO-OCCUR WITH OTHER PROBLEM BEHAVIORS: A PROSPECTIVE STUDY OF  
FAMILY, PEER, AND INDIVIDUAL FACTORS

by

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Risky sexual behavior (RSB) places adolescents at risk for unplanned pregnancy and sexually transmitted infection, and research is needed to understand the predictors of adolescent RSB and targets for future intervention. The current study used the social contextual model of problem behavior development to examine family, peer, and individual influences on adolescents' sexual behavior and the relationship between RSB and other problem behaviors. Data were previously collected from 998 adolescents and their families. First, I examined the level of agreement between adolescents' and parents' perceptions of family relationships, parental monitoring, and adolescents' friendships and which perceptions were more strongly related to adolescent problem behavior. Pearson bivariate correlations between parent and adolescent perceptions were small. Hierarchical multiple

regression analyses indicated that adolescent report was a better predictor of problem behavior than was parent report. Second, I assessed whether positive family relations, parental monitoring, family conflict, and parent-adolescent communication about sex in earlier adolescence were related to RSB in later adolescence. Structural equation modeling results suggested that the timing and frequency of parent-adolescent communication about sex and parent monitoring in earlier adolescence were related to RSB in later adolescence among the sample as a whole; results varied somewhat by gender. Third, I examined participants' membership in four risk behavior groups in late adolescence (low problem behavior, RSB only, substance use only, and RSB plus substance use), identified family, peer, and individual factors that differentiated teens in each group, and explored differences by sex and ethnicity. Females were more likely than males to report engaging in a combination of RSB and patterned substance use, and African Americans of both sexes were more likely than European Americans to report engaging in RSB in the absence of other behaviors. The variable that most reliably distinguished among risk groups for both males and females was friend drug use in late adolescence. Discussion considers reasons for these findings and highlights the roles of parent monitoring, parent-adolescent communication about sex, and gender and sociocultural factors in RSB prevention.

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## CHAPTER I

### INTRODUCTION

Adolescence is the most common time for onset of sexual activity in the U.S. The Centers for Disease Control (CDC; 2007) estimate that 47% of high school students have had heterosexual intercourse. Unfortunately, intercourse carries the risk of pregnancy and sexually transmitted infection (STI). A number of U.S. adolescents engage in sexual behavior that places them at risk for these outcomes. In 2005, among a nationally representative sample, 34% of sexually active adolescents did not use a condom at last intercourse and 11% had engaged in anal sex – a high-risk act for HIV transmission. In addition, adolescents accounted for almost 50% of new STI diagnoses and 13% of pregnancies that year (CDC, 2007). Adolescent infection and pregnancy can have detrimental, long-term effects on reproductive health, education, psychosocial well-being, and economic self-sufficiency. In addition, patterns of sexual activity begun in adolescence may continue into young adulthood, when likelihood of HIV infection becomes greater (CDC, 2007). Despite decades of prevention efforts, many adolescents are failing to enact safer sexual practices. Continuing work is needed to identify risk factors and effective interventions to reduce risky sexual behavior among this population.

Risky sexual behavior as defined in the current study includes young age at first intercourse, sex with multiple partners, frequent sexual intercourse, inconsistent or absent condom use, and inconsistent or absent other contraceptive use. These variables are reliable

predictors of STI and pregnancy risk. Adolescents who initiate sexual activity prior to age 16 are less likely to use condoms and more likely to have multiple sex partners in a given time frame than those who initiate sex at 16 or later (Abma et al., 2004). Multiple partners increase potential for exposure to sexually transmitted infection, as does frequency of sexual intercourse. The CDC (2007) estimates that 14% of sexually active adolescents have had 4 or more partners in their lifetime. Consistent condom use greatly reduces the risk of pregnancy and STI transmission, while inconsistent condom use places partners at risk for these outcomes (CDC, 2007).

Increasing understanding of the predictors of adolescent sexual risk behavior can inform intervention efforts to decrease occurrence. The current study examines a model of individual, family, and peer influences on the development of risky sexual behavior, and also aims to differentiate teens who engage in risky sexual behavior outside the context of other problem behaviors from those who engage in risky sex as well as other deviant behaviors. These two groups may require different types of prevention efforts.

#### *Overview of the Literature Review*

In the following literature review I first examine models of sexual risk behavior that have been tested among adolescents, with particular attention to the social contextual model of problem behavior development (Ary et al., 1999). Drawing on problem behavior theory (Jessor & Jessor, 1997), this model incorporates family relationships, parental monitoring of adolescents, and adolescent association with deviant peers in predicting the development of adolescent problem behaviors, including sexual risk behavior (Metzler et al., 1994). Next, literature is introduced describing adolescent sexual risk behavior outside the context of other problem behaviors, with the goal of identifying differences between adolescents who

engage in sexually risky behavior only and those who engage in diverse problem behaviors. Following the synthesis of existing literature, the current study is introduced.

Because adolescents are at high risk of HIV transmission via heterosexual activity (CDC, 2007), the current literature review focuses on heterosexual activity. This does not discount the ongoing HIV risk faced by non-heterosexual adolescents, particularly young men who have sex with men (CDC, 2006). More research certainly is needed to better understand the factors contributing to the high rates of HIV infection among this group. It is also important to acknowledge that many studies have assumed the heterosexuality of their samples without assessing whether sexual self-reports were related to same- or other-sex situations. The current review of the literature focuses on factors relating to heterosexual activity, while acknowledging that the sexual orientation of adolescent samples is sometimes presumed. Consideration of factors related to risky sexual behavior among non-heterosexual adolescents is outside the scope of the current study.

#### *Models of Adolescent Sexual Risk Behavior*

A variety of theoretical models have been applied to the understanding of adolescent sexual risk behavior. The most widely used models are briefly described and critiqued here, followed by a detailed description of the model that guides this study.

Several models describe *intrapersonal* beliefs and processes thought to influence sexual behavior. For example, the Health Beliefs Model (HBM; Cochran & Mays, 1993) suggests that the severity of a health threat and an individual's perceived susceptibility to the illness influence individuals' health behavior changes. This model has been of limited use in explaining sexual risk behavior, and its utility with some populations has been questioned

because of the assumptions of individually-initiated action and linear, rational thought (Cochran & Mays, 1993).

A second theory, the Theory of Reasoned Action (Fishbein, 2000), posits that individuals' behaviors are determined by behavioral intentions, which are in turn influenced by attitudes and perceptions of social norms about the behavior in question. Attitudes are informed by the perceived consequences and importance of engaging in the behavior (Cochran & Mays, 1993). This theory assumes a fairly strong and direct link between intention and behavior, and this may not always be the case for adolescents experiencing difficulty with self-assertion or relationships of unequal power.

A third common individual-level theory is self-efficacy theory, which suggests that an individual's belief in his or her ability to enact a behavior is related to behavioral attempt and perseverance (Bandura, 2004). Thus, persons with high self-efficacy for performing safer sex behaviors should be more likely to enact these behaviors, such as condom use or avoidance of sex with risky partners. Some research has indicated that self-efficacy may predict domain-specific behaviors such as sexual communication (Halpern-Felsher, Kropp, Boyer, Tschann, & Ellen, 2004). Other research, though, has found that condom use self-efficacy may not predict demonstrated condom use skill or decreased STD infection (Crosby et al., 2001). In addition to mixed findings on the clinical significance of self-efficacy for safer sex behaviors, Cochran and Mays (1993) again note that contextual constraints on behavioral enactment are not considered by self-efficacy theory.

*Interpersonal models of sexual risk behavior have considered gender and power in relationships and their impact on sexual negotiation (Amaro & Raj, 2000) and social and communication skills related to enacting safer sex (DeVisser & Smith, 2004; Hovell et al.,*

1998). Many models consider the influence of other people's attitudes toward sex – such as peer or family norms – on sexual behavior (e.g., East, Felice, & Morgan, 1993). Still others consider behavioral aspects of peers and families in explaining sexual behavior, such as the influences of deviant peers' behavior on adolescents' sexual behavior, or the influence of parental communication about sex (Metzler et al., 1994; Rodgers, 1999). These models are relevant to understanding adolescent sexual behavior, as they take into account the various relationships that must be managed by an adolescent in making and enacting sexual decisions. Interpersonal factors form one part of the larger model to be used in this study.

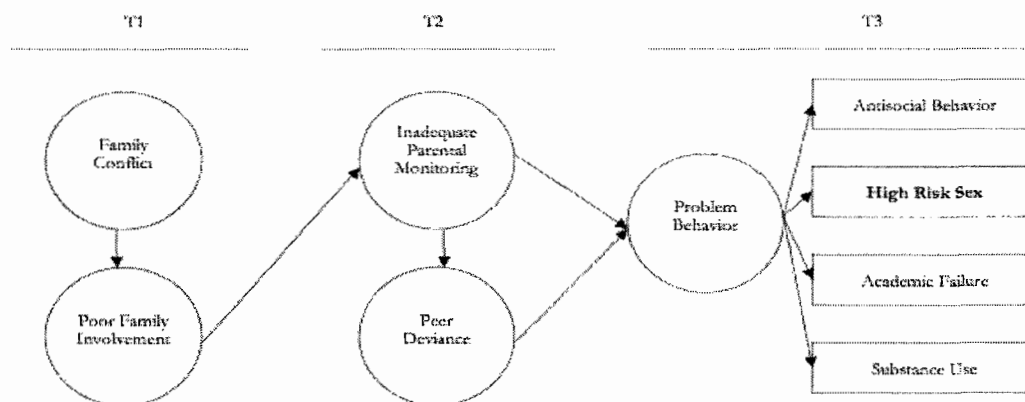
Other models take into account larger *contextual* factors such as neighborhood disadvantage, sociocultural influences, and economic factors (e.g., Teitler & Weiss, 2000). Bronfenbrenner's (1979) ecological model posits that development is shaped by multiple environmental influences, and that behavior cannot be understood without examining the ecological context. This may be especially true of adolescents, whose daily interactions with family, peers, school, community, and the larger popular culture help to guide the formation of identity. Therefore, the current research will examine a model of sexual risk behavior – the social contextual model – that takes into account a number of these interpersonal and larger contextual influences. This model is described below.

#### *The Social Contextual Model of the Development of Sexual Risk Behavior*

##### *Model Description.*

The social contextual model (SCM) of problem behavior development (Ary et al., 1999) is based on research by Patterson and colleagues (Patterson, 1986; Patterson, Dishion, & Bank, 1984). This model posits that coercive family interactions (a cycle of unpleasant behavior by children, harsh and inconsistent discipline by parents, escalating unpleasant

behavior by children, and parents' removing demands in order to stop children's unpleasant behavior) inhibit a child's development of appropriate social skills, among other outcomes. The child then develops a style of interacting that involves using coercive behavior to attain social goals and avoid punishment. This behavior at school leads to rejection by prosocial peers and the child's eventual association with other coercive and deviant children (Patterson, 2002). This peer group serves to teach and reinforce a variety of deviant behaviors, including sexual risk behavior in adolescence (Metzler et al., 1994). Coupled with inadequate parental monitoring of adolescents, this social environment can provide opportunity and reinforcement for unsafe sexual experimentation. Figure 1 illustrates the social contextual model of problem behavior development.



**Figure 1:** *The Social Contextual Model of the Development of Problem Behavior (Ary et al., 1999)*

The SCM has unique strengths in explaining the development of problem behavior. First, it does not place blame on either parents or children for the development of problem

behavior; rather, the interaction between parents' and children's behavior is the focus of attention. Second, the model is situated in an ecological context, in which the family's physical, social, and cultural environments are taken into account. Third, the model provides specific, family-based targets of intervention for improving family interactions and child and adolescent behavior. Principles such as monitoring and focusing on positive interactions can be incorporated into existing, culturally congruent parenting practices. Interventions stemming from this model have a behavioral focus on the management of parent-child interactions (Stormshak & Dishion, 2002). Parental stressors – such as financial concerns or problems in the extended family – are addressed when needed, but the model emphasizes basic principles of family management that can be implemented to some extent even by families under stress. Thus, the social contextual model posits that family interactions can be improved even in the midst of ongoing problems in other areas. This is relevant for many families, particularly those who experience poverty and other chronic stressors. Literature providing support for this model and its relation to sexual risk and problem behavior with adolescent samples is reviewed below.

*Support for the Social Contextual Model.*

The social contextual model of the development of problem behavior assesses the contribution of family interactions, parental monitoring, and association with deviant peers to adolescents' engagement in problem behavior (Ary et al., 1999). Biglan et al. (1990) tested this model with two adolescent samples in grades 8-12 (total  $n = 230$ ) from a mid-sized Northwestern U.S. city. Both samples included about 90% European American teens and about equal numbers of males and females. Sexual risk behavior was assessed with 6 items of acceptable internal consistency assessing number of sexual partners in the past year,

number of times respondents had sex with casual partners, intravenous drug users, or non-monogamous partners, frequency of sex without condoms, and whether respondents had ever had anal sex. Family factors measured were family availability, coercive exchanges, parental monitoring, parent support, and family problem-solving. Peer factors were friends' problem behavior, friends' drug use, and friends' drinking. Raw scores were transformed to z-scores and entered into hierarchical multiple regression analyses. Family variables were entered first, followed by peer variables. The data provided support for a model in which coercive family environments and inadequate parental monitoring increased the likelihood that an adolescent would become involved with peers who engaged in various problem behaviors, and these deviant peer associations in turn increased the likelihood that the adolescent would engage in risky sexual behavior (Biglan et al., 1990). The social contextual model explained 32% and 34% of the variance among these samples, and also supported the hypothesis that risky sexual behavior was related to engaging in other problem behaviors.

Metzler et al. (1992, 1994) replicated these findings with three separate adolescent samples, ages 14-18 (total  $n = 873$ ) using path analysis. These samples were composed of roughly 90% European American teens residing in U.S. Pacific Northwestern cities. Sexual risk behavior was measured using the Scale of Sexual Risk Taking (Metzler et al., 1992). This 13-item scale assessed multiple components of sexual risk, including number of sexual partners in the past year, number of times respondents had sex with casual partners, intravenous drug users, or non-monogamous partners, frequency of sex without condoms, and whether respondents had used drugs or alcohol during sex. Family support and interactions, parental monitoring, and deviant peer associations were included as predictors



of risky sexual behavior. The overall model explained 17-20% of the variance in sexual risk behavior for each of the samples (Metzler et al., 1994).

These two studies by Biglan and colleagues (1990) and Metzler and colleagues (1994) are particularly helpful in that (a) both measured similar family- and peer-related variables in assessing the social contextual model, (b) both used multidimensional, reliable measures of risky sexual behavior, and (c) both used similar data collection methods; e.g., paper-and-pencil surveys administered in small groups with a research assistant present. However, the samples in these studies were mostly European American, and results may not be generalizable to non-majority youth. Other researchers have measured family and peer factors in the development of risky sexual behavior among ethnically diverse youth, with slightly different results. These results are discussed next.

Doljanac and Zimmerman (1998) employed a sample of 679 African American and 145 European American adolescents in comparing the fit of the social contextual model (e.g., Ary et al., 1999) in explaining condom use and other sexual risk behaviors among European American and African American teens. The sample was recruited from public high schools in a Midwestern metropolitan area, had a mean age of 14.5, and approximately equal numbers of males and females. The researchers operationalized sexual risk outcomes two ways: (a) condom use (whether condoms were used at first intercourse and frequency of condom use since then), and (b) other sexual behaviors, assessed with 4 items including ever having had sexual intercourse, age at first intercourse, number of times respondents had sex in their lifetimes, and number of sex partners in respondents' lifetimes. Family and peer variables were similar to those measured by Biglan et al. (1990) and Metzler et al. (1994). A notable exception is that Doljanac and Zimmerman (1998) assessed parental monitoring

with only one item, whether students had a curfew, whereas this construct had previously been assessed with multiple items also assessing parents' knowledge of adolescents' whereabouts after school, friends, etc. Separate analyses were conducted for African American and Euro American teens. Family variables were entered first into multiple regression analyses, followed by peer variables. The social contextual model explained 13% of the variance in sexual behavior and 5% of the variance in condom use for African American teens, and 19% of the variance in sexual behavior and 33% of the variance in condom use for European American teens. Previous findings with this model (Biglan et al., 1990; Metzler et al., 1994) were partially replicated in this study; however the model did not fit as well for African American as for European American adolescents.

One main difference in the fit of the models in this study (Doljanac & Zimmerman, 1998) and that in previous work (Biglan et al., 1990; Metzler et al., 1994) is in the contribution of family factors in accounting for variance. Biglan et al. (1990), using the same analyses, found that family factors explained 14-19% of the variance in sexual risk behavior, whereas Doljanac and Zimmerman (1998) found that family factors contributed at most 3% of variance for African American teens. Friends' behavior was a stronger predictor of sexual risk behavior in the latter sample. These findings indicate that the social contextual model may fit better for European American than for African American adolescents in predicting sexual risk behavior. Other research supports this idea, finding differences between adolescent groups in the co-occurrence of sexual risk behavior and other forms of problem behavior, and in the family/peer predictors of such behavior.

### *Sexual Risk Behavior as Distinct from other Problem Behaviors*

All teens who engage in sexual risk behavior do not also engage in problem behavior, and vice versa. For some teens, sexual risk behavior occurs outside the context of other problem behaviors. These teens may be an important and overlooked group. They may not come to the attention of teachers or parents, and may not be targeted for prevention efforts, because of their relative lack of observed problem behavior or other risk factors. At the same time, these teens could be at risk for adverse sexual health outcomes and might benefit from additional intervention. The research findings reviewed in the following sections suggests that sexual risk does not always co-occur with deviant behavior, and identifies characteristics of adolescents and families that differentiate teens with distinct patterns of problem behavior.

#### *Ethnic Group Membership.*

Several researchers have examined the extent to which sexual behavior clusters with other problem behaviors among ethnically diverse adolescent groups. The bulk of these studies has compared African American to White teens. Though ethnic group may serve as a proxy for other characteristics, such as socioeconomic status, parental stress, or cultural norms, the studies reviewed in this section deserve attention as they point to the possibility that ethnic group membership or its associated factors are related to patterns of sexual risk.

In the first of these studies, Ensminger (1990) prospectively examined a cohort of 705 African-American families from Chicago's low-income Woodlawn area to examine whether an underlying set of variables predicted sexual activity, alcohol and marijuana use, and involvement in physical assault. Parents and children were surveyed during children's first grade year (1966-67) and again 10 years later (1975-76), at children's age 16-17. Sexual

activity was measured by asking how many times teens had engaged in sexual intercourse – never, once, twice, or three or more times. Other aspects of sexual risk were not assessed. Adolescents were divided into three categories based on their self-reported engagement in sexual activity and other problem behaviors – no problems, sex only, or sex and other problem behaviors. Only those adolescents who engaged in a behavior *frequently* were counted as engaging in that behavior. ('Frequent' referred to substance use 20 times or more in the past 2 months, scores in the top 25% of the assault scale, and lifetime sexual intercourse of 3 times or more.)

Among males, 22% engaged in no problem behavior at follow-up, 27% engaged in sex only, 5% in only behaviors other than sex, 20% in sex and substance use, and 26% in all problem behaviors (sex, substance use, and assault-related behavior). Among females, 57% engaged in no problem behaviors, 16% engaged in sex only, 11% in other problem behaviors but no sex, and 17% engaged in multiple problem behaviors including sex.

Ensminger's (1990) study is important in highlighting that sexual activity and other problem behavior overlap but may not constitute a unified construct. This study used a longitudinal design and a large sample with multiple raters; however, the entire sample was low-income and African-American, limiting generalizability of findings. The sample was surveyed in the 1960's and -70's, and differences in sexual norms between that period and the current day make comparison difficult. An additional limitation is that sexual behavior was measured with just one question assessing whether teens ages 16-17 had engaged in intercourse 3 times or more. By current standards, this alone does not indicate sexual risk. At the same time, Ensminger's study calls attention to a potential phenomenon whereby

sexual activity and problem behavior are largely unrelated for some teens. Additional research elaborates upon this finding.

Stanton and colleagues (1993) conducted a pair of studies with primarily African American youth ages 9-14 to assess the prevalence and relationships among early sexual activity and other problem behavior. Study 1 included 54 youth ages 10-14, 84% of whom were African American, recruited from a health clinic in a low-income, urban neighborhood in 1990-91. Youth completed a modified Youth Risk Behavioral Survey assessing sexual and substance use behaviors (smoking cigarettes, drinking alcohol, using marijuana, using other illicit drugs, selling drugs). These participants also completed a pile-sort task in which they were asked to group together cards listing various behaviors, based on perceived similarity in a number of domains (rewardingness, severity, possibility for self, and an open sort).

Study 1 results indicated that 44% of youth reported having sex, and one quarter of those reported not using a condom at last intercourse. Age-controlled Pearson correlation coefficients ranging in magnitude from .03 to .12 demonstrated no significant correlation between sexual activity and any of the substance use behaviors. The association of condom use to substance use behaviors was not measured. In the pile sort task, sexual activity items were not clustered with any drug activities in either forced-choice or open-choice sorts, indicating that participants did not see sex and drug behavior as being linked.

In Study 2, 300 youth ages 9-15, recruited from predominantly African-American housing projects in 1992, completed questionnaires about their engagement in sexual activity, substance use, drug sale and delivery, and school truancy. About 39% reported engaging in sexual activity, and of these 26% reported not using a condom at last intercourse. For this sample, age-corrected Pearson correlation coefficients indicated small

but statistically significant relationships between engaging in sexual activity and being truant, being suspended from school, using alcohol use and marijuana, and drug trafficking.

Correlation coefficients ranged from .10 to .19 (Stanton et al., 1993). The association of condom use to substance use behaviors was not measured.

Stanton and colleagues' (1993) findings are mixed, with the larger second sample showing stronger relationships between sexual activity and substance use, school suspension, and truancy. The overall magnitude of the relationships is small but statistically significant, and these findings are in contrast to those of Ensminger (1990). A notable difference between this and Ensminger's study is the age of participants – the participants in Stanton and colleagues' work are considerably younger than those surveyed in Ensminger. While the presence of sexual activity among the 16- and 17-year-olds in Ensminger's sample would be considered normative today, sexual activity among the 9-15-year-olds in Stanton and colleagues' study is associated with greater risk for adverse health outcomes (Planned Parenthood, 2001). Therefore, the teens surveyed by Stanton and colleagues may have engaged in riskier and less normative behavior than those surveyed by Ensminger, perhaps explaining the observed association between sexual activity and problem behaviors in the former study, and the lack of relationship in the latter.

Further exploring the relationship between age at first intercourse and problem behavior, Weden and Zabin (2005) specifically examined the relationship between early sexual initiation (prior to age 15) and problem behaviors. The researchers used data from the 1997 cohort of the National Longitudinal Study on Youth (NLSY) to examine the co-occurrence of four risk behaviors – early sexual initiation, substance use, truancy, and fighting – among European-American and African-American male and female adolescents.

This study assessed youth-reported risk behavior each year until participants were 18; the current sub-sample provided data from 1997 to 2000. Early sexual initiation was defined as intercourse prior to age 15. Substance use included regular use of tobacco, alcohol, and/or marijuana. Truancy and fighting were adolescent reports of the number of times they had skipped school or been involved in physical fights (Weden & Zabin, 2005).

Using latent class modeling, the authors determined four possible classes into which participants were likely to fall – Class 1, low probability of engaging in any risk behaviors; Class 2, high likelihood of substance use, fighting, and truancy and low likelihood of other behaviors; Class 3, high likelihood of fighting, truancy, and early sexual initiation and low likelihood of other behaviors; and Class 4, high likelihood of engaging in all risk behaviors. They found that European American and African American males and females had differing likelihoods of belonging to each class. Stated another way, gender and ethnic groups differed in their participation in multiple problem behaviors. African American women and European American men and women had roughly a 55% likelihood of belonging to Class 1, no risk behaviors. African American men had a 59% likelihood of belonging to Class 3, early sexual initiation, truancy, and fighting. African American women also had about a 33% chance of belonging to this class. Patterns of risk behavior differed for European American youth. European American men and women had a 33% likelihood of belonging to Class 2 – truancy, fighting, and substance use – but African American youth were very unlikely to belong to this group. Participation in all four types of risk behavior was unlikely for all gender and ethnic groups, and particularly unlikely for African American women (Weden & Zabin, 2005).

These findings indicate that risk behaviors may cluster differently for differing samples of adolescents, and early sexual initiation may not reliably cluster with all other risk behaviors. In Weden & Zabin (2005), African American youth differed from European American youth in patterns of risk behavior. African American youth who engaged in early sexual initiation were more likely to also be involved in truancy and fighting, but not substance use.

This study adds to those previously reviewed by explicitly comparing behavior patterns of African American and European American teens. Ensminger (1990) and Stanton and colleagues (1993) reported findings from predominantly African American samples, and indicated that the results differed from those previously obtained with European-American samples. Weden and Zabin, however, included both groups. Echoing some findings of Stanton and colleagues (1993), Weden and Zabin found that early sexual initiation did cluster with truancy and fighting for many African American teens. Unlike problem behavior theory (Jessor & Jessor, 1997), the predictions of the social contextual model (Biglan et al., 1990), and other findings by Stanton and colleagues, however, sexual risk behavior and substance use were not likely to cluster together for this African American sample (Weden & Zabin, 2005).

One salient difference between the studies by Ensminger (1990), Stanton and colleagues (1993), and Weden and Zabin (2005), and the research by Biglan and colleagues (1990) and Metzler and colleagues (1994) is the measurement of sexual behavior. Ensminger (1990) used a rough measure of lifetime frequency of sexual activity, while Stanton et al. (1993) and Weden & Zabin (2005) measured age at sexual initiation. Biglan et al. (1990) and Metzler et al. (1994) used multidimensional measures of sexual risk. Measurement of the



sexual risk construct may impact the observed relationship with other adolescent behaviors. Further studies shed light on this phenomenon.

Brookmeyer (2007) examined trajectories of sexual risk behavior, alcohol use, and delinquent behavior among adolescents who participated in the National Longitudinal Survey of Youth 1979 (NLSY79). NLSY79 employed a U.S. sample composed of 22% Hispanic, 38% African American, and 40% European American families. The data used here are from the children of the original participants, surveyed every two years from 1992 – 2004. Parent and child reports of risk and protective factors were gathered at ages 12-14, and adolescent reports of risk behavior were assessed at two-year intervals from ages 15-24. About 52% of the adolescent sample was female (Brookmeyer, 2007).

Sexual risk behavior was assessed with four dichotomous items – ever having had sex (yes/no), number of partners in the past year (less than two/two or more), condom use at last intercourse (yes/no), and relationship with last sexual partner (casual/non-casual). Scores ranged from 0 to 4, with 0 indicating no sexual risk, 1 indicating sexual activity with no other risk factors, and higher scores indicating increasing numbers of risk factors. Other risk behaviors assessed were alcohol use (frequency in past year) and delinquent acts in the past year (skipping school or work, fighting at school or work, stealing something worth >\$50, hitting or seriously threatening to hit someone, or being convicted of a charge; Brookmeyer, 2007).

Latent growth curve analysis was used to identify trajectories of individual risk behaviors over adolescence and young adulthood, and – of interest here – relationships among risk behaviors for adolescents exhibiting different trajectories. Brookmeyer (2007) identified six joint-trajectory groups, each defined by patterns of co-occurrence of risk

behaviors. The first three groups initiated sex in adolescence; the last three did not. The largest group, comprising 46.0% of the sample, was the “high alcohol, high sex” group. These teens initiated sex and alcohol use by age 15 and increased in sexual risk and alcohol use frequency over time. Delinquent behavior for this group was relatively low at age 15 and decreased over time. Next, the “moderate problem behavior” group comprised 22.2% of the sample, characterized by onset of sexual activity and alcohol use in mid-adolescence and an increase in risk over time. Delinquent behavior for this group was also relatively low and decreased over time. Third, 13.6% of the sample fell into the “problem behavior group,” characterized by engagement in sexual activity, alcohol use, and relatively high levels of delinquent behavior by age 15. Sexual risk and alcohol use increased, and delinquency decreased somewhat, over the course of adolescence for this group. This third group is closest to that suggested by problem behavior theory (Jessor & Jessor, 1997).

The last 3 groups were characterized by relative abstention from sex during the adolescent years. The fourth group, the “alcohol and delinquency experimental group” included 3.6% of the sample and involved initiating alcohol use mid-adolescence and engaging in low levels of delinquent behavior. The fifth group, “moderate alcohol use,” comprised 14.1% of the sample, and was characterized by alcohol use beginning mid-adolescence in the absence of sexual activity or delinquency. Finally, the sixth group, “high alcohol use,” made up 0.5% of the sample and involved moderate alcohol use by age 15 and increasing alcohol use over adolescence, also without sexual risk behavior or delinquency (Brookmeyer, 2007). Thus, in this nationally representative sample, a small proportion of youth engaged in a constellation of all 3 risk behaviors, but many more engaged in primarily sexual activity and alcohol use.

Brookmeyer (2007) also examined demographic, behavioral, and contextual factors differentiating adolescents within the risk groups. Multinomial logistic regression analyses were used to determine odds ratios of group membership based on demographic variables – gender, ethnicity, age, maternal education, and presence of father in the household; adolescent internalizing and externalizing behaviors; and contextual variables of perceived parental emotional support, school quality, and peer pressure. The “high sex, high alcohol” group was used as the point of reference. Group membership according to ethnicity will be discussed here, and the relations of other variables to group membership will be discussed in the next section. Compared to White teens, African-Americans were more likely to belong to the “moderate problem behavior” group than to the reference group, and also more likely to belong to the “alcohol only” group than to the reference group. This indicates that African American teens were less likely than White teens to engage in high levels of problem behavior, and were also more likely than White teens to engage in alcohol use in the absence of other problem behaviors.

Brookmeyer (2007) found that the most common pattern of multiple risk behaviors, exhibited by 46% of the sample, was early initiation of sexual risk behavior and alcohol use, with low levels of delinquent behavior. Less common (13.6% of the sample) was the presence of all three classes of problem behavior – sexual risk, alcohol use, and delinquency. Brookmeyer did not identify a sex-only group.

Brookmeyer’s results differ by gender and ethnicity, highlighting different patterns of risk behavior for males and females and for African American and White teens. This is similar to the results of several studies finding different patterns of risk for African American and White adolescents (Ensminger, 1990; Stanton et al., 1993; Weden & Zabin,

2005). Interpretation of this collection of results is complicated by the fact that many studies of ethnic group differences used less-comprehensive measures of sexual risk (Ensminger, 1990; Stanton et al., 1993; Weden & Zabin, 2005), and many studies with comprehensive sexual risk measures did not include sizable ethnic minority samples (Biglan et al., 1990; Metzler et al., 1994). Only Brookmeyer (2007) employed both a multidimensional measure of sexual risk and examined patterns of risk behavior by ethnicity. Her results indicated that ethnicity was indeed related to patterns of risk behavior. In the context of other research questioning whether patterns of sexual risk are similar for African American and White adolescents (Doljanac and Zimmerman, 1998; Ensminger 1990; Stanton et al., 1993; Weden & Zabin, 2005) and the paucity of studies comparing these groups using adequate measures of sexual risk, the issue bears reconsideration. Ethnic group membership and its correlates may be important factors in adolescents' patterns of risk behavior.

*Individual, Family, and Peer Influences.*

A few researchers have attempted to differentiate adolescents engaging in differing patterns of problem behavior, including risky sexual behavior, based on a variety of other individual, family, and peer characteristics. These studies have reported mixed results. First, Ensminger (1990) used logistic regression to determine the odds of belonging to one of three problem behavior categories based on family background, teacher report of early school behavior, and adolescent-reported school attachment and parental supervision. Results indicated no difference on these variables between males who engaged in sex only and those who engaged in no problem behaviors. In comparison to sex-only and no-problem males, multi-problem males were more likely to have been aggressive in first grade, frequently truant, and to have less parental supervision. Compared to no-problem males,

multi-problem males were more likely to have had a teen mother. For females, those engaging in sex only were more likely than no-problem females to have had teen mothers, mothers who did not finish high school, and to have less parental supervision. Multi-problem females were more likely than no-problem females to report weak school attachment and truancy. Sex-only females differed from multi-problem females only in reporting stronger school attachment; however, the author noted that statistical power to detect differences may have been limited for this comparison (Ensminger, 1990). Thus, for males, no predictor variables clearly differentiated those who engaged in sex only and those who engaged in no problem behaviors; however, family and school variables differentiated multi-problem males from the other groups. For females, family and school variables did differentiate all three groups. Parental monitoring, young maternal age, and truancy were differentiating factors for both males and females.

Brookmeyer (2007) also examined family, school, and peer variables in differentiating problem behavior groups. The “high sex, high alcohol” group described previously was used as a reference group for all comparisons. Age, maternal education, father presence, school quality, and peer pressure were not related to risk group membership. In contrast, gender, ethnicity, internalizing and externalizing behaviors, and perceived parental emotional support each predicted group membership. Compared to boys, girls were more likely to belong to the “moderate problem behavior” group than to the reference group, and less likely to belong to the “problem behavior” group than to the reference group. In other words, girls were less likely than boys to engage in high levels of problem behavior. In addition, adolescents’ report of internalizing or externalizing behaviors was related to group membership. Higher levels of externalizing behavior was related to

lower odds of belonging to the “alcohol and delinquency experimenting” group than the reference group. In contrast, a higher level of internalizing behavior was related to higher odds of belonging to the “alcohol and delinquency experimenting” group than the reference group. In other words, externalizing adolescents were more likely to exhibit higher levels of problem behavior, more consistently over time, than internalizing adolescents. Finally, perceived parental emotional support moderated the relationship between in/externalizing behavior and group membership. Externalizing adolescents with high emotional support were less likely to belong to the “alcohol only” group than to the reference group. This is somewhat surprising, indicating that higher emotional support was associated with engaging in more problem behaviors. For internalizing adolescents, higher emotional support was associated with greater odds of belonging to the “alcohol only” group than to the reference group. For these adolescents, higher parental emotional support was associated with engaging in fewer problem behaviors. Brookmeyer’s (2007) results hint at the complexity of relationships among individual, family, and peer variables and risky sexual behavior. Gender and in/externalizing tendencies were related to patterns of problem behavior. Parental support also moderated some of these relationships. Since Brookmeyer did not identify a “sex only” group, it is not possible from this study to differentiate teens who engaged in only risky sex from those engaging in a number of other behaviors. These results do indicate that some characteristics may differentiate those students engaging in relatively more or fewer problem behaviors over time.

Other studies of resilience and sexual behavior have corroborated this idea. Stoiber and Good (1998) considered a similar question, whether risk and resilience factors could differentiate adolescents involved in varying patterns of risk behavior. Their sample included

135 boys and 197 girls, mean age 14.48, from middle and high schools in a Midwestern city. Participants were 64% Hispanic, 10% African American, 17% other minority, and 9% White. Students completed questionnaires assessing the outcome variables of sexual activity in the past year, drug and alcohol use, and gang involvement. Risk factors assessed were poverty, peer problems, steady relationship status, delinquent behavior, and physical and sexual abuse. Resilience factors assessed were academic motivation and competence, family structure, family relationship quality, religiosity, and self-esteem. Results of discriminant function analyses differentiated four groups: (1) low problem behavior (no sex), (2) sexually active only, (3) gang involvement and/or substance use (but no sex), and (4) sexual activity plus gang involvement and/or substance use (high problem behavior). Groups primarily differed on the discriminating variables delinquency, steady relationship status, academic competence, and family structure (Stoiber & Good, 1998).

Adolescents involved in sexual activity only were more likely than low-problem youth to be involved in a steady relationship. Sex-only teens were less likely to be involved in delinquent behavior than the high-problem group, but more likely to be involved than the low-problem group (no sexual activity). Additionally, low-problem teens were more likely than high-problem teens to report greater academic competence (e.g., grades) and residing with two parents. Surprisingly, many proposed risk and resilience factors – including sexual abuse and family relationship quality – did not differentiate risk groups.

Stoiber and Good's (1998) results are unique in highlighting the importance of a steady romantic relationship in predicting early sexual initiation. However, their use of delinquent behavior as a predictor, rather than an outcome, makes it difficult to understand when sexual behavior occurred outside of the context of other deviant behavior.

Presumably, some of the teens in the “sex only” group did participate in delinquent behavior other than gang involvement or substance use (the other two measured outcomes). No other risk or resilience variables, including family structure, quality of family relationships, and past sexual abuse, differentiated adolescents engaging in sexual activity from those who were abstinent or those who engaged in a greater variety of problem behavior.

Taken together, the results of the research reviewed here indicate that patterns of sexual behavior and other problem behavior do tend to differ among teens, and distinct patterns of problem behavior are often identifiable. The main differentiating variables examined thus far fall into two broad classes – ethnic group membership and individual and contextual characteristics. Research on ethnic group differences in patterns of sex and problem behavior (Brookmeyer, 2007; Ensminger, 1990; Stanton et al., 1993; Weden & Zabin, 2005) has focused primarily in differences between African American and White teens. Studies have reported mixed findings, with some indicating that African American teens are more likely to engage in early sexual activity or other aspects of sexual risk behavior in the absence of other problem behaviors (e.g., Ensminger 1990; Stanton et al., 1993), and others reporting that sex and other problem behavior cluster together for African American teens as well (e.g., Brookmeyer, 2007). Interpretation of this body of literature is clouded by the differing measures of sexual activity used, ranging from dichotomous items assessing whether teens have initiated sex to somewhat more comprehensive measures of sexual risk. Further study with an ethnically diverse sample and a comprehensive measure of sexual risk could help to clarify these relationships.

In addition, some research has attempted to differentiate groups of adolescents engaging in various patterns of problem behavior based on individual, family, and school



characteristics. Among those factors identified as differentiating “sex only” from “multiple problem behavior” youth are being in a steady relationship (Stoiber & Good, 1998), parental monitoring, young maternal age, and truancy (Ensminger, 1990). Other factors differentiating youth engaging in varying levels of problem behavior include internalizing and externalizing tendencies and perceived parental support (Brookmeyer, 2007). The current body of literature provides a firm foundation for further exploration, but includes some gaps that can be addressed by the proposed research. First, while prior studies have assessed selected parenting constructs as predictors of adolescent behavior, none have used a comprehensive model of parenting including multiple aspects of parenting processes. The proposed study addresses this by using a multifaceted measure of parenting. Second, disparities in the measurement of sexual risk behavior have made interpretation and comparison of prior studies difficult. Researchers now recommend measuring multiple aspects of sexual risk, rather than a single indicator such as age of sexual initiation (Metzler et al., 1994). The present study includes the information necessary to do this. Third, the role of ethnic group membership in patterns of risk behavior is unclear. Many studies examining ethnic differences in patterns of risk behavior have included only minimal measures of sexual risk. The proposed study employs an ethnically diverse sample and a multifaceted measure of sexual risk behavior, as well as data on parenting practices. Inclusion of all this information may allow clearer conclusions about the relationship between ethnic group membership and patterns of risk behavior.

*Parent-Adolescent Communication about Sex.*

In contrast to other predictors of risky sexual behavior described here, parent-adolescent communication about sex has not often been used as a variable to differentiate

among adolescents engaging in various forms of problem behavior. This type of communication has, however, been examined for its contribution to explaining adolescent sexual attitudes and sexual activity. Findings have been mixed. Some research has linked parent-adolescent communication about sex with lower rates of sexual risk among adolescents. This type of communication has been associated with adolescents' intentions to delay intercourse (Fasula & Miller, 2006), ability to refuse unwanted sex (Sionean et al., 2002), condom use (Miller, Levin, Whitaker, & Xu, 1998; Whitaker & Miller, 2000), and lower frequency of sex and less unprotected sex among daughters (Hutchinson et al., 2003).

Other research has found the opposite. Clawson & Reese-Weber (2003) surveyed college students and found that more communication about sex with mothers and fathers was related to younger age at first intercourse, more sex partners, using more birth control methods, having been tested for HIV, and having been pregnant. Similarly, Bynum (2007) found among African American college women that when general mother-daughter communication was positive, greater communication about sex was related to more sexual experience for the daughters. Thus the literature is inconclusive with regard parent-adolescent communication about sex and its relationship to adolescent attitudes and behavior.

The existing research has several limitations that can be addressed by the current study. First, many of the previous studies examined parent-adolescent communication about sex without measuring other aspects of family functioning and family relationships. It could be that communication is related to generally proactive parenting, and this overall factor may contribute more to adolescent behavior than sex communication specifically. In the current study I will assess the relationship of timing and frequency of parent-adolescent

communication about sex on risky sexual behavior, in the context of other information about family relationships and parent monitoring. A second limitation of much of the existing research is the tendency to include only female adolescents. The small amount of research in this area with male adolescents has not found that parent-adolescent sex communication influences males' attitudes and behavior (DiIorio et al., 2007; McNeely et al., 2002). The current investigation includes a large sample of male adolescents and will examine parent-adolescent communication about sex among males as well as females.

#### *Introduction to the Current Study*

Empirical research on the social contextual model of the development of problem behavior has demonstrated a link between family conflict, low parental monitoring, deviant peer associations, and a constellation of adolescent problem behaviors including risky sexual behavior (e.g., Ary et al., 1999). However, not all adolescents who engage in risky sexual activity demonstrate this pattern of family and peer interactions and deviant behavior (Brookmeyer, 2007; Ensminger, 1990). The purpose of the current study was to examine (1) the concordance between parent and adolescent reports of family relationships, monitoring, and deviant peer associations, and whether parent or adolescent report is a better predictor of substance use, problem behavior, and RSB; (2) whether family conflict, positive family relations, monitoring, and parent-adolescent communication about sex in early adolescence predict risky sexual behavior (RSB) in later adolescence among a diverse sample of adolescents; and (3) whether there is a combination of individual, family, and other contextual predictors that distinguishes between adolescents who do not engage in problem behavior, who engage in RSB only, substance use only, and those who engage in RSB and

substance use, and whether these differ between African American and European American adolescents.

I hypothesize that (1) parent and adolescent reports of family relationships, monitoring, and deviant peer associations will be correlated, but that adolescent report will be a better predictor of substance use, problem behavior, and RSB; (2) family conflict, positive family relations, monitoring, and parent-adolescent communication about sex in early adolescence will predict risky sexual behavior (RSB) in later adolescence; and (3) some combination of individual, family, and other contextual predictors will distinguish among adolescents who do not engage in problem behavior, who engage in RSB only, substance use only, and those who engage in RSB and substance use, and that these will differ between African American and European American adolescents.

## CHAPTER II

### METHOD

#### *Research Design and Procedures*

The data for the current study are drawn from the Project Alliance (PAL) dataset (Dishion & Kavanagh, 2002). Project Alliance is a research study integrating the Adolescent Transitions Program (ATP) into public schools. The ATP is a preventive intervention for adolescents and families targeting parenting practices, family relationships, and adolescent behavior (Dishion & Kavanagh, 2003). The PAL study involved three levels of intervention. At the first (universal) level, all participating families completed 6 interactive classroom sessions designed to promote school success, healthy decisions, avoidance of negative peer pressure, respectful interactions, positive coping with strong feelings, and peaceful problem-solving. The sessions engaged adolescents in goal-setting and supported positive parenting practices, in addition to teaching new skills. As part of Project Alliance, family resource centers were established in each participating school for families' voluntary use (Dishion & Kavanagh, 2003).

Next, families were randomly assigned to intervention and comparison groups for the second (selected) level of intervention. At this level, intervention families completed the Family Check Up, a brief 3-session intervention designed to highlight family strengths and areas for growth. These families could then choose to participate in a variety of family counseling services, the third and final (targeted) level of intervention. Parents and

adolescents in both intervention and comparison conditions completed survey and interview assessments at pre-intervention and each year for six additional years. Surveys and interviews were conducted by trained research personnel, at school and/or in families' homes. Surveys were also sometimes distributed and collected by mail. Adolescents and families were paid for their participation. Project Alliance used an experimental nested design in which the ATP intervention was the independent variable and school the nesting variable (Dishion & Kavanagh, 2003).

### *Participants*

The PAL sample was recruited from sixth-grade classrooms at 3 public middle schools in a metropolitan area in the Pacific Northwest. All sixth-graders and their families at the selected schools were invited to participate. All participating families engaged in an ecological assessment of family functioning and adolescent behavior, relationships, and mental health upon entry into the study and at regular intervals over the next six years. The current study uses assessments collected at Waves 1, 2, 3, and 6, roughly corresponding to study entry and one, two, and five years after study entry. The majority of data are drawn from Waves 1, 2, and 6. Wave 3 included data on risky sexual behavior while Wave 2 did not; therefore, Wave 3 risky sexual behavior items were used in one of the analyses. These were the only data drawn from Wave 3. The measures used in the current study are adolescent and parent self-report questionnaires and interviews.

Project Alliance classified adolescents into one of three risk levels based on teacher assessment of characteristics at the beginning of the study, such as attention, aggression, social competence, and coping skills. Low-risk, at-risk, and high-risk families completed differing levels of assessment throughout the project. Low-risk families completed the most

minimal assessment battery, while more information was gathered from at-risk and high-risk families. The current study uses the entire PAL sample, 998 youth and their families. This represents recruitment of roughly 95% of the population of sixth-graders and their families at participating schools (Dishion & Kavanagh, 2002). Table 1 presents demographic information for the PAL families.

**Table 1:** *Target Child and Family Demographic Information*

TARGET CHILD					
	<i>n</i>	Mean	SD	Minimum	Maximum
Age in Years					
Wave 1	993	12.22	0.48	10.75	21.75
Wave 2	857	13.20	0.37	11.75	14.83
Wave 3*	211	14.15	0.44	12.67	15.83
Wave 6	792	16.99	0.77	14.75	19.00
	<i>n</i>	%			
Gender					
Female	471	47.2			
Male	526	52.7			
Ethnicity					
European American	423	42.4			
African American	291	29.2			
Latino or Hispanic	68	6.8			
Asian American	52	5.2			
Pacific Islander	9	0.9			
Other	22	2.2			
European/African American	35	3.5			
Other Ethnic Combination	77	7.7			
FAMILY					
Wave 1	<i>n</i>	%			
Risk Level					
No Risk	356	35.7			
At-Risk	369	37.0			
High Risk	272	27.3			
	<i>n</i>	%			
Annual Household Income					
\$4,999 or less	29	7.5			
\$5,000 – 9,999	20	5.2			
\$10,000 – 14,999	28	7.2			
\$15,000 – 19,999	38	9.8			
\$20,000 – 24,999	39	10.1			

Table 1 (continued)

\$25,000 – 29,999	28	7.2
\$30,000 – 39,999	50	12.9
\$40,000 – 49,999	50	12.9
\$50,000 – 59,999	37	9.5
\$60,000 – 69,999	18	4.6
\$70,000 – 79,999	15	3.9
\$80,000 – 89,999	6	1.5
\$90,000 or more	30	7.7
Total	388	
Family Receives Welfare (Aid to Families with Dependent Children)	<i>n</i>	%
Yes	32	8.2
No	357	91.8
Total	389	
Parent is Currently Married		
Mother		
Yes	196	54.0
No	167	46.0
Total	363	
Father		
Yes	157	76.6
No	48	23.4
Total	205	
Other Parent		
Yes	1	16.7
No	5	83.3
Total	6	
Parent Lives with Spouse/Partner		
Mother		
Yes	221	60.9
No	142	39.1
Total	363	
Father		
Yes	183	89.3
No	22	10.7
Total	205	
Other Parent		
Yes	3	50.0
No	3	50.0
Total	6	
Wave 2	<i>n</i>	% of Respondents
Annual Household Income		
\$4,999 or less	40	9.9
\$5,000 – 9,999	16	4.0
\$10,000 – 14,999	20	5.0
\$15,000 – 19,999	36	8.9
\$20,000 – 24,999	51	12.6
\$25,000 – 29,999	37	9.2



Table 1 (continued)

\$30,000 – 39,999	44	10.9
\$40,000 – 49,999	33	8.2
\$50,000 – 59,999	44	10.9
\$60,000 – 69,999	16	4.0
\$70,000 – 79,999	14	3.5
\$80,000 – 89,999	15	3.7
\$90,000 or more	38	9.4
Total	404	
Family Receives Welfare (Aid to Families with Dependent Children)		
Yes	28	6.9
No	376	93.1
Total	404	
Parent is Currently Married		
Mother		
Yes	214	55.7
No	170	44.3
Total	384	
Father		
Yes	172	80.8
No	41	19.2
Total	213	
Other Parent		
Yes	1	80.8
No	4	19.2
Total	5	
Parent Lives with Spouse/Partner		
Mother		
Yes	234	60.9
No	150	39.1
Total	384	
Father		
Yes	191	89.7
No	22	10.3
Total	213	
Other Parent		
Yes	2	40.0
No	3	60.0
Total	5	

\*Wave 3 data for the current study included only high-risk families.

## *Measures*

### *Outcome Variable.*

*Risky Sexual Behavior.* Adolescents' engagement in risky sexual behavior was assessed with an in-person interview asking about sexual experiences. This interview was included at Waves 1, 3, and 6. Questions were asked for both same-sex and opposite-sex partners; the current study focuses only on opposite-sex partnerships. The risky sexual behavior scale created from this interview is composed of 5 items assessing age at initiation of sexual intercourse, number of partners in the past year, frequency of sexual intercourse in the past year, frequency of condom use, and frequency of other contraceptive use. Responses for each item are coded 0 to 4, with higher scores indicating relatively greater risk for STD and pregnancy. Coding was as follows: age at sexual initiation (0=16 or older, 1=15, 2=14, 3=13, 4=12 or younger); number of partners in the past year (0=0 partners, 1=1 partner, 2=2 partners, 3=3 partners, 4=4 or more partners); frequency of sexual intercourse in the past year (0=0 times, 1=1-12 times, 2=13-24 times, 3=25-36 times, 4=more than 36 times); frequency of condom use (0=Always, 1=Most times, 2>About half the time, 3=Sometimes, 4=Never); and frequency of other contraceptive use (0=Always, 1=Most times, 2>About half the time, 3=Sometimes, 4=Never). Item scores were averaged to produce an overall scale score from 0 to 4. These five items demonstrated internal consistency (alpha) of .43 among the full sample. The items in the scale tap aspects of sexual risk that are not expected to correlate highly in all cases; thus internal consistency is expected to be somewhat low.

### *Predictor Variables – Youth Report.*

*Parent-Adolescent Communication about Sex – Youth Report.* Two items from the adolescent in-person interview assessed age at which adolescents first talked about sex with

their parents, and frequency of parent-adolescent discussions about sex. These items were included in the Wave 6 child interview and participants reported retrospectively. Frequency of parent-adolescent communication about sex was coded on a Likert-type scale of 0, 'often,' 1, 'sometimes,' 2, 'hardly ever,' and 3, 'never.' Interview items were not validated or assessed for reliability estimates in previous research. In the current sample the two items had a small but statistically significant correlation,  $r=.19$ ,  $p<.001$ . If families tended to talk about sex earlier they also tended to talk about it more frequently. These two facets of parent-adolescent communication about sex are not expected to be highly correlated. Parents often wait until they perceive adolescents are romantically involved before broaching the topic of sex (Eisenberger et al., 2006); therefore, discussions about sex may begin earlier or later in adolescence and still occur with any amount of frequency.

*Adolescent Substance Use – Youth Report.* Participants' self-reported substance use was assessed with 2 items from the Community Action for Successful Youth (CASEY) survey (Metzler, Biglan, Ary, & Li, 1998). The CASEY project was designed to measure the effects of a community-based intervention to prevent early adolescent problem behavior. The survey measures adolescent report of multiple parenting constructs and youth behaviors. Many survey items were adapted from prior empirically-supported measures, including Oregon Social Learning Center's Parent Interview (Capaldi & Patterson, 1989), the Family Environment Scale (Moos & Moos, 1986), and the Conflict Behavior Questionnaire (Prinz, Foster, Kent, & O'Leary, 1979). Other items were developed by the CASEY research group (Metzler et al., 1998). Metzler and colleagues assessed internal consistency for all constructs (parenting and adolescent behavior), and criterion-related, convergent, and discriminant validity for the parenting constructs. The validation sample included 174 adolescents in fifth,

sixth, and seventh grades with an ethnic composition of 74.2% White, 6.3% Native American, 2.3% Hispanic, 1.4% African American, 7.8% mixed ethnicities, and 8.1% not identified. Fifty-three percent were males, and 65% of the sample was identified as “at risk.”

The CASEY substance use items assessed participants’ frequency of cigarette and alcohol use in the past month. Responses were multiple choice and ranged from ‘0’ to ‘31 or more’ (packs of cigarettes) or ‘41 or more’ (alcoholic drinks). Participants marked a circle corresponding to the frequency of use in the past month. Raw scores were transformed to z-scores and averaged. The inter-item correlation between frequency of alcohol and cigarette use in the current sample was .51 at Wave 1 and .43 at Wave 2.

*Adolescent Delinquent Behavior – Youth Report.* Nine items from the CASEY assessed delinquent behavior. Participants reported the number of times in the past month they had engaged in various delinquent behaviors, such as skipping school, stealing, and lying to parents about whereabouts. Responses were multiple choice and ranged from 1, ‘never’ to 6, ‘more than 20 times.’ Scores were averaged and higher scores indicated greater youth-reported frequency of involvement in delinquent behavior. Coefficient alpha for these items was .83 at Wave 1 and .84 at Wave 2.

*Parental Monitoring of Adolescents – Youth Report.* Five items from the CASEY assessed parent monitoring. Participants reported how often parents knew their activities, whereabouts, and plans, in general and in the past two days. Items included, “how often does at least one of your parents know what you are doing when you are away from home?” and “in the last 2 days, how often did at least one of your parents know where you were and what you were doing?” Responses were on a 5-point Likert scale ranging from “never or almost never” to “always or almost always.” Scores were averaged, and higher scores

indicated greater adolescent-perceived parental monitoring. Coefficient alpha for these items was .85 at Wave 1 and .86 at Wave 2.

*Parental Use of Positive Reinforcement – Youth Report.* Six items from the CASEY asked participants to rate how often parents used praise or small items or privileges to reward participants for following rules or doing a good job. Sample items asked participants to mark how often parents “compliment you or give you a hug, kiss, pat, or handshake for being good” and “give you something extra, like money, special activities, or other things for something you did well.” Responses were on Likert-type scales indicating frequency of rewards in general and in the past two days. Scores were averaged and higher scores indicated greater perceived use of praise and rewards. Internal consistency for these items was  $\alpha = .85$  at Waves 1 and 2.

*Positive Family Relations – Youth Report.* Six items from the CASEY assessed participants’ enjoyment, trust, and feelings of togetherness in the parent-child relationship, in the past month and in the past 2 days. Items included, “I really enjoy being with my parents;” “the things that we did together were fun and interesting;” and “there was a feeling of togetherness in our family.” Responses were on Likert-type scales indicating respondents’ level of agreement with items. Scores were averaged and higher scores indicated more positive family relationships. Alpha for these items was .89 at Waves 1 and 2.

*Family Conflict – Youth Report.* Five items from the CASEY assessed family conflict in the past week. Items included, “we got angry at each other,” and “one of us got so mad, we hit the other person.” Responses are on Likert-type scales indicating frequency of conflict in the past week. Scores were averaged and higher scores indicated greater family conflict. Coefficient alpha for these items was .81 at Wave 1 and .79 at Wave 2.

*Deviant Peer Association – Youth Report.* Four items from the CASEY assessed association with deviant peers. Participants were asked to report how often in the last week they got together with friends who “get in trouble a lot,” “fight a lot,” “take things that don’t belong to them,” and “smoke cigarettes or chew tobacco.” Responses were on a Likert-type scale indicating frequency of contact with deviant peers in the past week. Scores were averaged and higher scores indicated greater frequency of contact. Alpha for these items was .80 at Wave 1 and .83 at Wave 2.

*Predictor Variables – Parent Report.*

*Adolescent Problem Behavior – Parent Report.* Parental report of adolescent delinquent behavior was assessed with 6 items from the Parent Self-Check (PARSC) survey. This survey was constructed to measure parents’ perceptions of their adolescents’ behavior, the parent-child relationship, and parents’ own parenting behaviors. Problem behavior items asked parents to indicate whether their child had in the past month engaged in lying, stealing, defiance with parents or teachers, purposeful destruction of property, and “tagging” or wearing gang clothes/using gang talk. Responses were on a 10-point scale from ‘frequent clear signs’ of these behaviors to ‘no problems’ with behaviors. Scores were averaged and higher scores indicated greater parental perception of problems with delinquent behavior. Mothers, fathers, and other parents from the same family completed separate measures and parents’ scores were averaged to create a single score. Mother and father mean scores for these items were correlated at  $r=.53$  ( $p<.001$ ) at Wave 1, and internal consistency for these items was  $\alpha=.78$  for mothers and .80 for fathers.

*Parental Monitoring of Adolescents – Parent Report.* Eleven items from the Project Alliance Parent Interview (PINT) assessed parental report of monitoring. This face-to-face

interview was part of the assessment battery for “high-risk” families and included items about monitoring, adolescent behavior, family routines, and adolescent confidence and decision-making. The monitoring items asked parents to report how often adolescents spent time away from home unsupervised, and how often they did not comply with limits about returning home on time or places they were not allowed to go. Items included, “How often did [adolescent] spend time at a friend’s house when there were no adults present?” and “How often did s/he go places that you have asked him/her not to go?” Responses were on Likert-type scales indicating frequency of monitoring behaviors and unsupervised activities. Items were reverse-coded as appropriate and scores were averaged. Higher scores indicated greater parent-reported amounts of time spent supervised and in compliance with limits on activities and whereabouts. Mothers and fathers from the same family completed separate measures and parents’ scores were averaged to create a single score. Mother and father mean scores for these items were correlated at  $r=.40$  ( $p<.001$ ) at Wave 1, and internal consistency for these items was  $\alpha=.56$  for mothers and  $.42$  for fathers.

*Quality of Parent-Adolescent Relationship – Parent Report.* Seven items from the Project Alliance Parent Interview asked parents to rate the amount and emotional valence of parent-child communication, consistency and emotional valence of limit-setting, sensitivity of supervision with peers and adolescents’ activities, and quality of problem-solving with adolescents. These dimensions were rated on continuous 10-point scales; for example, parent-child communication was rated from 1, “emotional” to 10, “calm.” Scores were averaged to create an overall score. Higher scores indicated more positive parent-child interactions and lower scores indicated more negative interactions and/or more conflict. Mothers and fathers from the same family completed separate measures and parents’ scores

were averaged to create a single score. Mother and father mean scores for these items were correlated at  $r=.44$  ( $p<.001$ ) at Wave 1, and internal consistency for these items was  $\alpha=.87$  for mothers and fathers.

*Deviant Peer Association – Parent Report.* Four items from the Parents' Beliefs and Peers (PPRSK) survey asked parents to estimate what percentage of their child's friends in the past 3 months misbehaved or broke rules, dressed or acted like a gang member, experimented with substances, or did not attend school. Responses were on a Likert-type scale from 'very few/less than 25%' to 'almost all/more than 75%.' Scores were averaged and higher scores indicated greater parent-reported proportions of friends who engaged in problem behavior. Mothers and fathers from the same family completed separate measures and parents' scores were averaged to create a single score. Mother and father mean scores for these items were correlated at  $r=.51$  ( $p<.001$ ) at Wave 1, and internal consistency for these items was  $\alpha=.73$  for mothers and .53 for fathers.



## CHAPTER III

### RESULTS

#### *Preliminary Data Analysis*

Data were screened for missing values and errors. As data were drawn from a well-managed and often-used dataset, data were free of detectable errors. For adolescent data, missing data were determined not to be missing at random (Little's MCAR test:  $\chi^2=1279.48$ ,  $df=305$ ,  $p<.001$ ) according to the missing values analysis on SPSS 13.0 for Mac OS X statistical software (SPSS, Inc., 2006). Missing adolescent data were imputed using maximum likelihood with the EM algorithm on SPSS. Table 2 displays the proportion of missing values for each adolescent-reported variable used in the analyses. Parent data were also used for some of the analyses. Because only a subset of parents completed certain measures, data were not collected from up to 49% of parents for some questionnaires. Cases with missing or uncollected parent data were deleted listwise for each analysis that included parent variables.

**Table 2:** *Adolescent-Reported Data: Mean, SD, and Proportion Missing*

	N	Mean	SD	Missing	
				Count	Percent
<b>WAVE 1</b>					
Family Conflict	990	.91	1.03	8	.8
Positive Family Relations	989	3.58	1.02	9	.9
Parent Monitoring	989	4.00	.96	9	.9
Deviant Peer Association	991	.75	1.11	7	.7
Antisocial Behavior	992	1.41	.59	6	.6
Substance Use	991	.00	.87	7	.7
Risky Sexual Behavior Mean Score*	139	.08	.39	133	48.9
<b>WAVE 2</b>					
Family Conflict	855	.90	.96	143	14.3
Positive Family Relations	855	3.45	.99	143	14.3
Parent Monitoring	856	3.97	.92	142	14.2
Deviant Peer Association	855	.84	1.22	143	14.3
Antisocial Behavior	855	1.40	.58	143	14.3
Substance Use	857	.00	.84	141	14.1
<b>WAVE 3</b>					
Risky Sexual Behavior Mean Score*	66	.36	.59	206	75.7
<b>WAVE 6</b>					
<b>Parent-Adolescent Communication</b>					
about Sex - Frequency	791	1.43	.93	207	20.7
<b>Parent-Adolescent Communication</b>					
about Sex - Age	650	11.86	2.60	348	34.9
Risky Sexual Behavior Mean Score	790	.63	.84	208	20.8
Tobacco Use Frequency	790	64.96	275.70	208	20.8
Alcohol Use Frequency	792	12.74	56.71	206	20.6
Cannabis Use Frequency	790	22.03	184.28	208	20.8
Friend Drug Use Frequency	792	1.28	1.43	206	20.6

\*Wave 1 and Wave 3 Risky Sexual Behavior data were collected only from high-risk families. Missing data for these variables were not imputed.

*Research Question 1: Concordance between Parent and Teen Report*

The first research question examined the concordance between parent and adolescent reports of family relationships, monitoring, and deviant peer associations, and whether parent or adolescent report was a better predictor of substance use, problem behavior, and RSB. Pearson bivariate correlation was used to examine association between parent and adolescent reports of family and peer variables. Bivariate correlation was used because parent and adolescent questionnaires contained different items and generated different scale scores (Green & Salkind, 2003). Next, parent- and teen-reported variables at Waves 1 and 2 were entered into separate regression equations to determine whether parent or teen report was more predictive of adolescent substance use, antisocial behavior, and risky sexual behavior.

*Research Question 1.a.: Parent-Teen Agreement.*

First, I examined the concordance between parent- and adolescent-reported family and peer relationships and adolescent behavior. Pearson bivariate correlation was used to measure the agreement between parent and adolescent perceptions of deviant peer associations, parental monitoring, problem behavior, family conflict, positive family relations, and use of positive reinforcement. Parents and teens reported on similar variables but were administered different questionnaires, so scale scores were transformed to z-scores for comparison. Missing values were deleted pairwise for each correlation.

Table 3 displays correlation coefficients,  $p$  values, and sample sizes for the correlations between parent and teen perceptions of social contextual variables. Parent data were available for only the at-risk and high-risk subset of the study sample, a total of 641 families. Families were classified into low-risk, at-risk, and high-risk based on teacher ratings

of adolescent behavior and coping skills. At-risk families completed a subset of the parent measures and high-risk families completed all parent measures. Low-risk families did not complete parent assessments. This tiered method of data collection resulted in differing sample sizes for various correlations. Mothers, fathers, and other caregivers provided data; mothers made up the majority of respondents. When data were available for more than one parent or caregiver, the scores were averaged to create an overall parent score. For families in which only one parent or caregiver responded to questionnaires, the single parent's scores were used.

**Table 3: Pearson Bivariate Correlations between Parent and Teen Report of Social Contextual Variables**

	Parent(s): Problem Behavior	Parent(s): Deviant Peers	Parent(s): Parental Monitoring	Parent(s): Positive Reinforce.	Parent(s): Family Relations	TC: Problem Behavior	TC: Deviant Peers	TC: Family Conflict	TC: Parental Monitoring	TC: Positive Family Relations	TC: Positive Reinforce.
	Parent Report: n=138 to 402					Adolescent Report: n=998					
Parent(s): Problem Behavior	1	.52**	-.30**	-.36**	-.47**	<b>.27**</b>	.16**	.30**	-.28**	-.30**	-.12*
Parent(s): Deviant Peers	.42**	1	-.32**	-.16**	-.22**	.33**	<b>.14**</b>	.18**	-.25**	-.18**	-.07
Parent(s): Parental Monitoring	-.06	-.24	1	.30**	.28**	-.19*	-.02	-.13	<b>.17*</b>	.16	.23**
Parent(s): Positive Reinforcement	-.35**	-.09	.17*	1	.58**	-.05	-.04	-.145**	.04	.14**	<b>.08</b>
Parent(s): Family Relations	-.51**	-.19**	.21*	.65**	1	-.11*	-.06	<b>-.18**</b>	.06	<b>.25**</b>	.14**
TC: Problem Behavior	<b>.23**</b>	.30**	-.20*	<.01	-.06	1	.61**	.41**	-.46**	-.25**	<.01
TC: Deviant Peers	.08	<b>.28**</b>	-.03	.04	.01	.59**	1	.46**	-.31**	-.20**	.05
TC: Family Conflict	.20**	.16**	-.05	-.05	-.12	.42**	.45**	1	-.24**	-.36**	-.08**
TC: Parental Monitoring	-.14**	-.24**	<b>.13</b>	.10*	.13**	-.45**	-.34**	-.24**	1	.45**	.26**
TC: Positive Family Relations	-.17**	-.15**	.14	.18**	<b>.20**</b>	-.26**	-.21**	-.35**	.42**	1	.54**
TC: Positive Reinforcement	-.13**	-.02	.06	<b>.22**</b>	.24**	.01	-.01	-.06	.21**	.54**	1

*Note.* Wave 1 correlations are above the diagonal. Wave 2 correlations are below the diagonal. Bolded values highlight correlations between parent and teen report of the same variable. \*\*  $p < .01$ , \*  $p < .05$  (2-tailed).

The relationships between parent and teen report were in expected directions (i.e., parent and teen perceptions tended to be associated), but the strength of most relationships was small to moderate, suggesting that parent and teen perceptions of social contextual variables differed somewhat. Two notable discrepancies between parent and teen perceptions emerged. First, the correlation between parent and teen report of teens' association with deviant peers was  $r=.14$  ( $p=.01$ ). Though statistically significant, this small relationship indicates parents may be unaware of teens' peer group and peer behavior, or that teens may not have reported their peer activities accurately. A second small correlation was between parent and teen reports of parental monitoring,  $r=.17$ ,  $p=.04$ . This again indicates relatively low concordance. Parents and teens may perceive the amount or extent of monitoring differently. Since parent data were available only for higher-risk families, the observed relationships may not hold for all families.

*Research Question 1.b.: Predicting Problem Behavior.*

A series of hierarchical multiple regression analyses tested whether adolescent-reported or parent-reported variables were better predictors of adolescent antisocial behavior at Waves 1 and 2. Again, these analyses were completed only for the at-risk and high-risk families since only these parents completed all the measures necessary for the analysis. The outcome variable was teen-reported antisocial behavior at Wave 1 and Wave 2. Prior to analysis, data were examined and most assumptions and conditions for multiple regression were met (Pedhazur, 1997), though the outcome variable, problem behavior, was not normally distributed. Multiple regression analysis is considered robust to violations of this assumption, particularly with large samples (Pedhazur, 1997), so I decided to conduct the analysis with the non-normally distributed variables. For adolescent-reported variables,

most missing data were imputed using the full information maximum likelihood estimation module by SPSS (SPSS, Inc., 2006). Data on risky sexual behavior were not imputed because of the low incidence of sexual activity among participants at Waves 1 and 2. Since data were collected from only a subset of parents for some questionnaires, cases with missing or uncollected parent data were deleted listwise for each analysis.

A total of four regression models were run, two with parent predictors of antisocial behavior at Wave 1 and Wave 2, and two with teen predictors of antisocial behavior at Waves 1 and 2. To avoid the increased probability of finding a significant result by chance with multiple tests, alpha was adjusted using the Bonferroni correction:  $\alpha=.05/4$ , or  $\alpha=.01$  for these four regression models. For teens, variables were entered in the following order: deviant peer association, monitoring, family conflict, positive family relations, and parents' use of positive reinforcement. For parents, variables were entered in the same order, except that parent report of family conflict and positive family relations was combined into one item because they were included as a single scale in the parent interview. This positive/negative family relations item was entered third into the models with parent-reported variables. Results are shown in Table 4.

**Table 4:** Relation of Parent- and Teen-Reported Predictors to Wave 1 and 2 Teen Antisocial Behavior

Variable	Un- standardized beta ( <i>b</i> )	Stan- dardized Beta ( $\beta$ )	<i>SE</i>	<i>t</i>	<i>p</i>	<i>r</i> <sup>2</sup> Change	<i>F</i> Change	Sig. <i>F</i> Change
W1 Antisocial Behavior – Teen Reported Predictors ( <i>n</i> =272)								
Deviant Peer Association	.26	.51	.03	9.44	<.001	.39	170.28	<.001
Parental Monitoring	-.18	-.26	.03	-5.24	<.001	.06	27.60	<.001
Family Conflict	.02	.04	.03	.79	.43	.001	.68	.41
Positive Family Relations	-.04	-.07	.04	-1.16	.25	<.001	.02	.90
Use of Positive Reinforcement	.06	.11	.03	1.95	.05	.01	3.78	.05
W1 Antisocial Behavior – Parent Reported Predictors ( <i>n</i> =138)								
Deviant Peer Association	.38	.34	.09	4.02	<.001	.14	22.57	<.001
Parental Monitoring	-.09	-.06	.13	-.73	.47	.01	.91	.34
Pos/Neg Fam Relations	-.01	-.30	.04	-.29	.77	.002	.36	.55
Use of Positive Reinforcement	-.01	-.03	.03	-.33	.74	.001	.11	.74
W2 Antisocial Behavior – Teen Reported Predictors ( <i>n</i> =272)								
Deviant Peer Association	.18	.41	.02	7.92	<.001	.32	127.80	<.001
Parental Monitoring	-.13	-.20	.03	-3.90	<.001	.04	17.74	<.001
Family Conflict	.12	.23	.03	4.42	<.001	.05	23.58	<.001
Positive Family Relations	-.05	-.08	.04	-1.33	.19	<.001	.05	.83
Use of Positive Reinforcement	.08	.16	.03	2.81	.005	.02	7.92	.005
W2 Antisocial Behavior – Parent Reported Predictors ( <i>n</i> =124)								
Deviant Peer Association	.12	.17	.07	1.79	.08	.04	4.72	.03
Parental Monitoring	-.11	-.09	.12	-.97	.33	.01	1.08	.30
Pos/Neg Fam Relations	-.04	-.13	.04	-1.01	.31	<.01	.43	.51
Use of Positive Reinforcement	.02	.10	.03	.78	.44	.01	.60	.44



The models compared the regression of teen-reported and parent-reported predictors onto Wave 1 antisocial behavior. For teen-reported variables, the full model was significant,  $F(5, 271)=44.06, p<.001$ , and explained 45.3% of the variance in antisocial behavior. Teen-reported deviant peer association and monitoring were significant predictors of antisocial behavior. The full model was also significant with the parent-reported variables,  $F(4, 137)=5.92, p<.001$ , but explained only 15.1% of variance in antisocial behavior. Parent-reported deviant peer association was the only significant predictor of antisocial behavior. Wave 2 results for antisocial behavior were similar. The full model with teen-reported variables was significant ( $F(5, 271)=40.42, p<.001$ ) and explained 43.2% of variance in antisocial behavior. Deviant peer association, parent monitoring, family conflict, and parental use of positive reinforcement were significant predictors of behavior. In contrast, the full model with parent-reported variables was not significant ( $F(4, 123)=1.70, p=.16$ ).

*Research Question 1.c.: Predicting Substance Use.*

A separate series of hierarchical multiple regression analyses tested whether adolescent-reported or parent-reported variables were better predictors of adolescent substance use at Waves 1 and 2. Again, these analyses were completed only for the at-risk and high-risk families since only these parents completed all the measures necessary for the analysis. As described previously, missing data were imputed for the adolescent-reported variables but missing cases were deleted for the parent-reported variables due to large amounts of missing data.

The outcome variable was teen-reported substance use at Wave 1 and Wave 2. A total of four regression models were run, two with parent predictors of substance use at Waves 1 and 2, and two with teen predictors of substance use at Waves 1 and 2. Alpha was

adjusted using the Bonferroni method:  $\alpha=.05/4$ , or  $\alpha=.01$  for these four regression models. For teens, variables were entered in the following order: deviant peer association, monitoring, family conflict, positive family relations, and parents' use of positive reinforcement. For parents, variables were entered in the same order, except that parent report of family conflict and positive family relations was combined into one item because they were included as a single scale in the parent interview. This positive/negative family relations item was entered third into the models with parent-reported variables. Results are shown in Table 5.

**Table 5:** *Relation of Parent- and Teen-Reported Variables to Wave 1 and Wave 2 Teen Substance Use*

Variable	Un- standardized beta ( <i>b</i> )	Stan- dardized Beta ( $\beta$ )	<i>SE</i>	<i>t</i>	<i>p</i>	$r^2$ Change	<i>F</i> Change	Sig. <i>F</i> Change
W1 Substance Use – Teen Reported Predictors ( <i>n</i> =272)								
Deviant Peer Association	.24	.31	.05	4.49	<.001	.11	33.37	<.01
Parental Monitoring	-.11	-.10	.07	-1.53	.13	.01	4.45	.04
Family Conflict	-.02	-.02	.06	-.33	.75	<.01	.01	.93
Positive Family Relations	-.07	-.07	.07	-.91	.36	.01	2.25	.14
Use of Positive Reinforcement	-.04	-.05	.06	-.64	.52	<.01	.41	.52
W1 Substance Use – Parent Reported Predictors ( <i>n</i> =138)								
Deviant Peer Association	.55	.26	.19	2.91	<.01	.07	10.79	<.01
Parental Monitoring	.02	.01	.26	.09	.93	<.01	.04	.85
Pos/Neg Fam Relations	.03	.04	.08	.37	.71	<.01	.16	.69
Use of Positive Reinforcement	-.07	-.13	.06	-1.20	.23	.01	1.44	.23
W2 Substance Use – Teen Reported Predictors ( <i>n</i> =272)								
Deviant Peer Association	.13	.17	.05	2.59	.01	.06	17.30	<.01
Parental Monitoring	-.16	-.15	.07	-2.35	.02	.03	8.34	<.01
Family Conflict	.02	.02	.06	.36	.72	<.01	.89	.35
Positive Family Relations	-.14	-.15	.08	-1.90	.06	.01	1.45	.23
Use of Positive Reinforcement	.10	.12	.06	1.65	.10	.01	2.71	.10
W2 Substance Use – Parent Reported Predictors ( <i>n</i> =124)								
Deviant Peer Association	.21	.15	.13	1.61	.11	.04	4.80	.03
Parental Monitoring	-.17	-.07	.22	-.79	.43	.01	1.20	.28
Pos/Neg Fam Relations	-.01	-.02	.07	-.16	.88	.02	2.92	.09
Use of Positive Reinforcement	-.08	-.19	.05	-1.53	.13	.02	2.34	.13

Similar to the results for antisocial behavior, teen-reported variables were stronger predictors of substance use than parent-reported variables. At Wave 1, the full model was significant for teen-reported, but not parent-reported, variables ( $F[5, 271]=8.17, p<.001$  and  $F[4, 137]=3.08, p=.02$ , respectively). The model with teen-reported variables explained 13.3% of the variance in substance use. For Wave 2 substance use, results were similar. Teen report ( $F[5, 271]=6.28, p<.001$ ) explained 10.6% of the variance in substance use, while parent report ( $F[4, 123]=2.87, p=.03$ ) was not statistically significant.

*Research question 1.d.: Predicting RSB.*

A third series of hierarchical multiple regression analyses tested whether adolescent-reported or parent-reported variables were better predictors of adolescent risky sexual behavior at Waves 1 and 3. Risky sexual behavior items were not available at Wave 2. Wave 3 data collection took place approximately one year after Wave 2. These analyses were completed only for the high-risk families since sexual risk behavior items were available only for high-risk adolescents at these waves of data collection. Missing data were imputed for the adolescent-reported variables regarding family relationships and monitoring, but not for adolescent-reported risky sexual behavior. I decided not to attempt imputation of missing RSB data due to the low number of adolescents engaging in sexual activity at Waves 1 and 3. Therefore, cases missing data for RSB and for the parent-reported variables were deleted listwise in the analyses.

The outcome variables were teen-reported risky sexual behavior at Wave 1 and Wave 3. A total of four regression models were run, two with parent predictors of RSB at Waves 1 and 2, and two with teen predictors of RSB at Waves 1 and 2. Alpha was adjusted using the Bonferroni method:  $\alpha=.05/4$ , or  $\alpha=.01$  for these four regression models. For

teens, variables were entered in the following order: deviant peer association, parent monitoring, family conflict, positive family relations, and parents' use of positive reinforcement. For parents, variables were entered in the same order, except that parent report of family conflict and positive family relations was combined into one item because they were included as a single scale in the parent interview. This positive/negative family relations item was entered third into the models with parent-reported variables. Results for each regression model are shown in Table 6.

At Wave 1, only 7 participants reported having had sexual intercourse. The regression model with teen-reported variables was significant,  $F(5, 138)=3.57, p<.01$ , but the model with parent-reported variables was not,  $F(4, 136)=.3.22, p=.02$ . These results should be interpreted with caution, since the small sample size of sexually active participants provided low power for detecting effects. At Wave 3, 20 participants reported having engaged in sexual intercourse. Again, adolescent-reported Wave 2 variables were significant predictors of RSB,  $F(5, 65)=3.57, p=.01$ , but parent-reported Wave 2 variables were not,  $F(4, 58)=1.74, p=.16$ . The small sample size of students who had engaged in sexual intercourse provided low power to detect relationships among the variables at Waves 2 and 3.

**Table 6:** *Relation of Parent- and Teen-Reported Variables to Wave 1 and Wave 3 Teen RSB*

Variable	Un- standardized beta ( <i>b</i> )	Stan- dardized Beta ( $\beta$ )	<i>SE</i>	<i>t</i>	<i>p</i>	$r^2$ Change	<i>F</i> Change	Sig. <i>F</i> Change
W1 RSB – W1 Teen Reported Predictors ( <i>n</i> =139)								
Deviant Peer Association	.06	.20	.03	1.86	.07	.07	10.42	<.01
Parental Monitoring	-.08	-.22	.03	-2.48	.01	.05	7.29	.01
Family Conflict	<.01	.01	.03	.08	.93	<.01	.02	.89
Positive Family Relations	-.01	-.22	.04	-.22	.83	<.01	.06	.82
Use of Positive Reinforcement	<.01	<.01	.03	.03	.98	<.01	<.01	.98
W1 RSB – W1 Parent Reported Predictors ( <i>n</i> =137)								
Deviant Peer Association	.11	.14	.07	1.62	.11	.05	6.76	.01
Parental Monitoring	-.15	-.15	.09	-1.69	.09	.03	4.46	.04
Pos/Neg Fam Relations	-.01	-.05	.03	-.50	.62	.01	1.14	.29
Use of Positive Reinforcement	-.01	-.07	.02	-.63	.53	<.01	.40	.53
W3 RSB – W2 Teen Reported Predictors ( <i>n</i> =66)								
Deviant Peer Association	.13	.33	.05	2.62	.01	.17	13.28	<.01
Parental Monitoring	-.11	-.18	.08	-1.51	.14	.02	1.81	.18
Family Conflict	.11	.19	.07	1.48	.14	.02	1.65	.20
Positive Family Relations	.06	.10	.09	.61	.55	.01	.98	.33
Use of Positive Reinforcement	.02	.05	.07	.30	.76	<.01	.09	.76
W3 RSB – W2 Parent Reported Predictors ( <i>n</i> =59)								
Deviant Peer Association	.30	.36	.12	2.47	.02	.08	4.68	.04
Parental Monitoring	.06	.04	.22	.26	.80	<.01	.10	.75
Pos/Neg Fam Relations	.09	.27	.07	1.41	.16	.03	1.90	.17
Use of Positive Reinforcement	-.03	-.11	.05	-.58	.56	.01	.34	.56

*Research Question 2: Family Predictors of RSB*

The second research question addressed whether family conflict, positive family relations, monitoring, and parent-adolescent communication about sex in early adolescence predict risky sexual behavior (RSB) in later adolescence. For this question, structural equation modeling (SEM) using MPlus Version 5 statistical software (Muthén & Muthén, 2007) was used to model early adolescent family conflict, positive family relationships, parent monitoring, and teen-reported timing and frequency of parent-adolescent discussions about sex and their relationships to the outcome of interest, Wave 6 risky sexual behavior. Structural equation modeling is an extension of the general linear model that allows for simultaneous testing of many regression equations that make up a hypothesized model of the relationships among variables (Kline, 2005). SEM is theoretically appropriate for this analysis because I seek to understand the relationships among several latent variables that are composed of multiple measured values, and want to look at relationships among these variables simultaneously.

*Data Screening and Preliminary Analyses.*

The data were examined for assumptions and conditions of SEM (Kline, 2005). An adequate sample size is the first requirement. The proposed model of the development of sexual risk behavior includes 9 measured variables and 998 participants, enough to comply with the general rule of a sample size of 5-20 times the number of measured variables (Kline, 2005). Next, dependent and mediating variables should be continuously and normally distributed. All dependent and mediating variables in the current analysis are continuous with the exception of one, RSB risk group. The distribution of scores generated by the RSB scale (described in the method section) was highly positively skewed, so I transformed these

scores to an ordinal scale by grouping participants into three categories based on their risky sexual behavior scale scores. Participants were assigned a risk group score of '0' if they had never experienced sexual intercourse. If their scores were 0.01 to 1.99 on the sexual risk behavior scale, they were assigned an RSB risk group score of '1'. A score of 2.00 or higher on the sexual risk scale corresponds to an RSB risk group score of '2'. This decreased the skew of the distribution and also reduced the amount of information available about the RSB variable. I decided to use the less-skewed RSB risk group scores since this is the primary outcome variable and since MPlus is able to analyze categorical outcome variables (Muthén & Muthén, 2007). The distribution of family conflict scores was also positively skewed, but less so, and the large sample size should decrease the importance of non-normality of these variables in the analysis (Lei & Wu, 2007). Next, missing data must be addressed before SEM analysis (Lei & Wu, 2007). Missing data in the current study were determined not to be missing at random (Little's MCAR test:  $\chi^2 = 1279.48$ ,  $df = 305$ ,  $p < .001$ ). Missing data were replaced using single imputation methods employing the EM algorithm (SPSS, 2006). Table 7 displays descriptive statistics for the predictor and dependent variables in the SEM model.

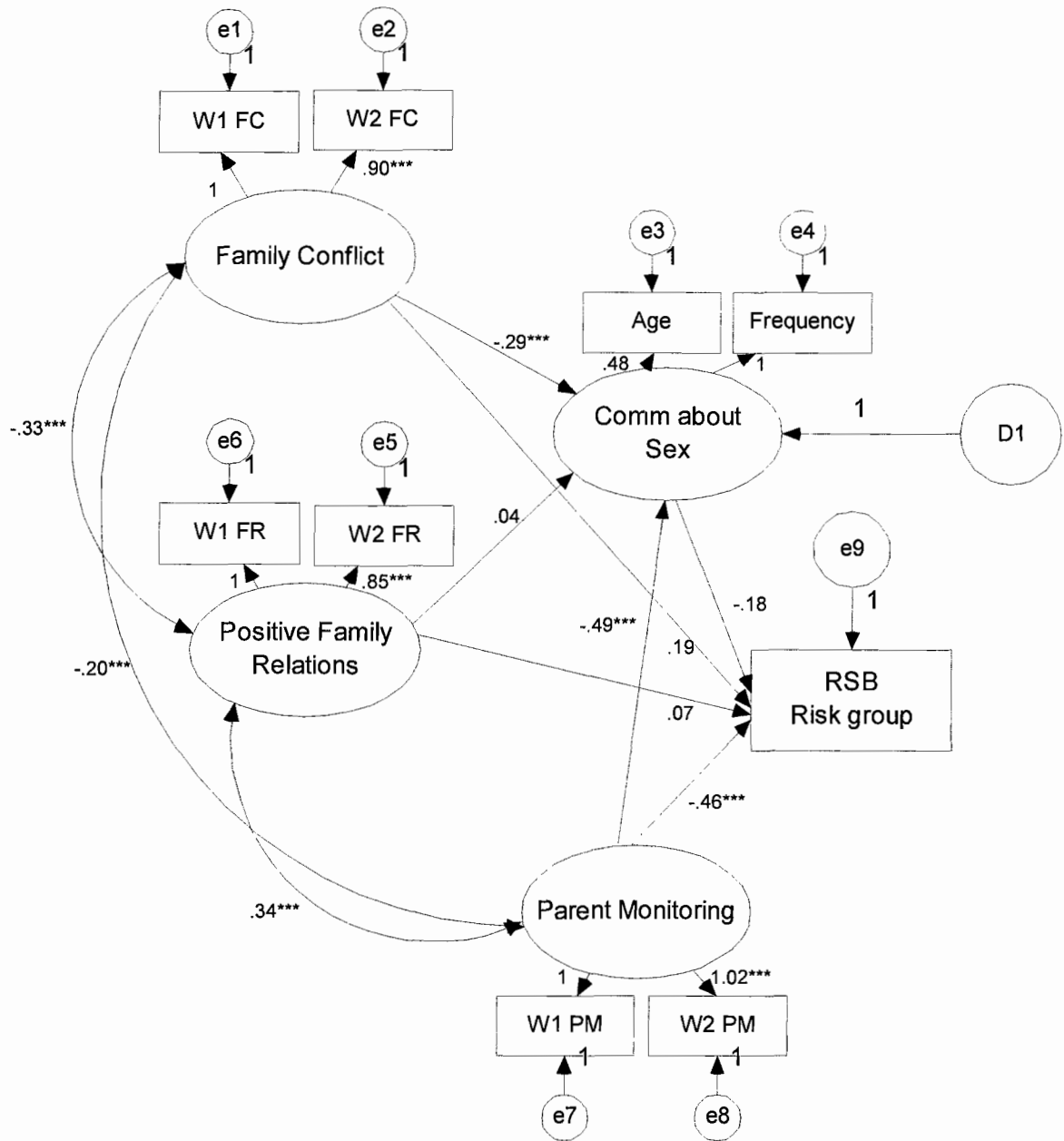


**Table 7:** Mean, Standard Deviation, Median, and Minimum and Maximum Scores for Predictor and Dependent Variables

	<i>n</i>	Mean	Standard Deviation	Median	Min.	Max.
<b>WAVE 1</b>						
Family Conflict	998	.917	1.025	.600	0	6
Positive Family Relations	998	3.579	1.106	3.667	1	5
Parent Monitoring	998	3.999	.954	4.200	1	5
<b>WAVE 2</b>						
Family Conflict	998	.905	.904	.600	0	6
Positive Family Relations	998	3.443	.946	3.500	1	5
Parent Monitoring	998	3.950	.882	4.200	1	5
<b>WAVE 6</b>						
Age first discussed sex w/parent	998	12.02	2.115	12.15	0	18
Frequency of parent-adolescent discussions about sex	998	1.59	.860	2.00	0	3
RSB Risk Score	998	.67	.625	1.00	0	2

Finally, a theoretical basis for model construction and causality is recommended for SEM analysis (Kline, 2005; Lei & Wu, 2007). The path model in this study was created based on the social contextual model of the development of problem behavior (Ary et al., 1999), described previously. Causal relationships among family relationships, parent monitoring, and adolescent risky sexual behavior have been supported in previous research with this model (e.g., Metzler et al., 1994). The current model expands on that research by examining the contribution of parent-adolescent communication about sex in addition to the other family variables.

The proposed path model is depicted in Figure 2. Four latent variables represent adolescent-reported family variables: family conflict, positive family relations, parent monitoring, and parent-adolescent communication about sex. The first three (family conflict, positive family relations, and parent monitoring) are composed of two sets of scale scores, measured at Wave 1 and Wave 2. The observed correlations among these latent family variables are represented by the double-headed arcs between the variables in the path diagram. The fourth latent variable, parent-adolescent communication about sex, is composed of two items: age at which participants first talked about sex with their parents, and frequency of parent-adolescent conversations about sex, reported retrospectively at Wave 6. The latent variable parent-adolescent communication about sex is hypothesized to be predicted by the other family variables, indicated by directed arcs from these variables to the communication latent variable in the path diagram. Finally, risky sexual behavior risk group is a measured outcome variable. I hypothesized that it would be predicted by the four latent family variables, as depicted by the directed arcs from the family variables to the RSB group variable.



**Figure 2:** Proposed Path Diagram

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Original Model Results.*

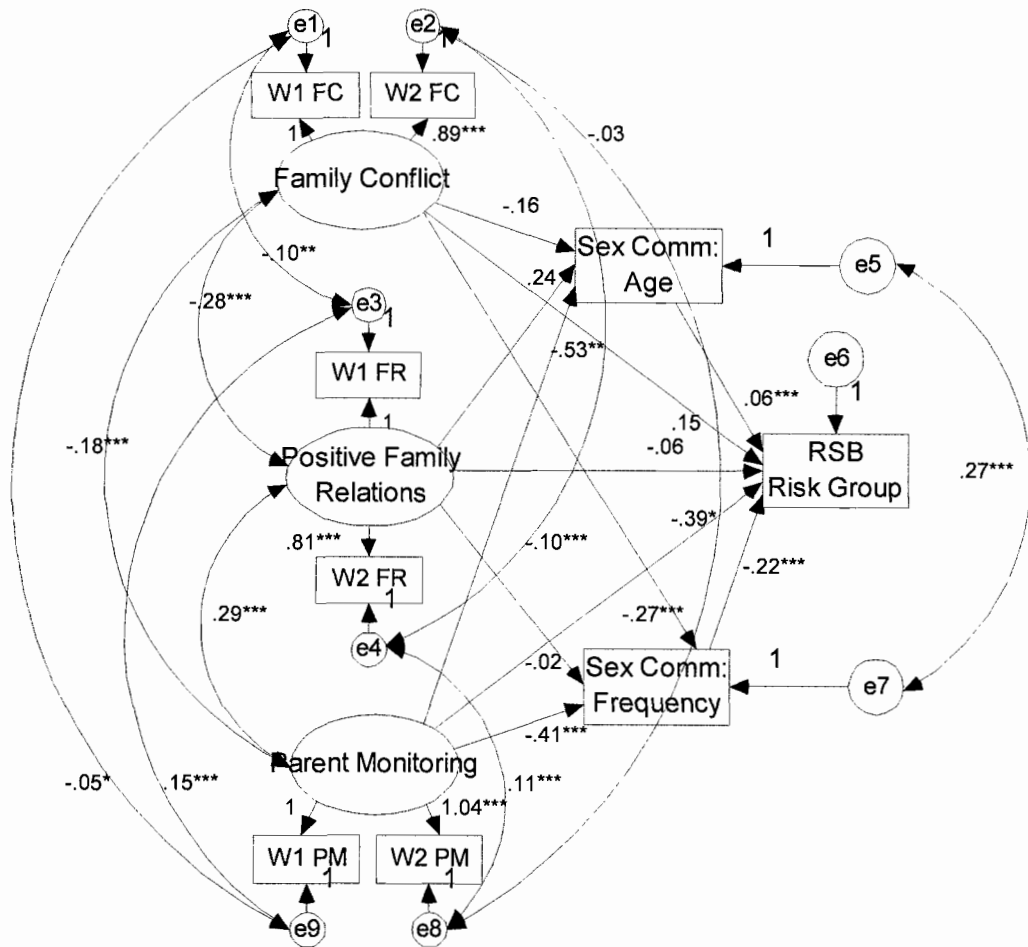
The proposed model was run using MPlus Version 5 statistical modeling software (Muthén & Muthén, 2007). Path coefficients are shown in Figure 2. The chi-square test of model fit for this initial model was somewhat large,  $\chi^2(11, n=998)=75.85, p<.001$ , suggesting that the proposed model did not provide a good fit to the data (Lei & Wu, 2007). I also examined the Root Mean Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI) to gain additional information on model fit. (While Hu and Bentler [1999] recommend reporting the standardized root mean squared residual [SRMR], this value was not able to be calculated with a categorical outcome variable.) The RMSEA was .08, slightly higher than the recommended cutoff of .06, and CFI was .93, slightly lower than the recommended value of .95 or higher. The combination of chi-square and these fit indices suggested that the original model did not fit the data well.

In addition, the results of this initial model indicated that the two measured variables creating the latent variable 'parent-adolescent communication about sex' did not form a unified factor. The paths from the measured variables to the latent variable were not statistically significant. The measured variables, frequency of parent-adolescent communication about sex and age at which participants first talked with parents about sex, were correlated,  $r=-.19, p<.001$ . (It is important to note that frequency of parent-adolescent communication about sex was coded such that lower scores indicated greater frequency of discussion.) Parents who talked about sex with adolescents at an earlier age also tended to talk about it more frequently, but the relationship was small. Given this, I decided to delete the latent communication variable and instead use only the measured sex communication

variables in the next model. These modifications were included in a second model, depicted in Figure 3.

*Modified Model.*

The new model was run, again using MPlus, and this modified version fit the data better. The chi-square test of model fit was smaller, though still statistically significant,  $\chi^2(7, n=998)=23.30, p=.002$ . The value of RMSEA was .05 and CFI was .98, both within the desired range for acceptable model fit. Lei and Wu (2007) noted that the chi-square test may falsely reject an accurately-fitting model when the sample size is large, so based on the RMSEA and CFI values I decided to interpret the results of this model. The modified model with all path coefficients and  $p$ -values is shown in Figure 3. (It is important to note in interpreting the path coefficients that lower scores on frequency of communication about sex indicated greater frequency: 0=Often, 1=Sometimes, 2=Hardly Ever, 3=Never.)



**Figure 3: Modified Path Diagram**

*Note:* Please recall that frequency of parent-adolescent communication about sex was coded such that lower scores indicated greater frequency of discussion.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Predicting Family Communication about Sex.* Family conflict, positive family relations, and parent monitoring were intercorrelated, as expected. Higher levels of family conflict predicted more frequent parent-adolescent communication about sex, but family conflict was not related to age at which participants first talked about sex with parents. Higher levels of parent monitoring also predicted more frequent parent-adolescent discussions about sex as well as younger age at the first sex discussion. Positive family relations were not related to timing or frequency of parent-adolescent discussions about sex.

*Predicting Risky Sexual Behavior.* Frequency and timing of parent-adolescent communication about sex were both related to risky sexual behavior. More frequent sex communication predicted greater sexual risk behavior, while younger age at first discussion predicted less sexual risk behavior. Of the other family variables, only parent monitoring was related to risky sexual behavior in later adolescence: higher monitoring predicted less sexual risk behavior. It is possible that parent-adolescent communication about sex mediated the relationship between family predictors and risky sexual behavior; however, this mediation was not explicitly tested in the current analyses.

I would like to note the major differences between the original and modified models. The original model provided a relatively poor fit to the data. The modified model fit well, but results must be interpreted with caution because post-hoc modifications can capitalize on chance relationships and decrease the generalizability of these results to other samples. I will clarify the substantive differences here and further address model modification in the discussion chapter. First, several relationships were similar between the two models. In both, more parent monitoring was associated with less RSB, but family conflict and positive family relations were not significantly related to RSB. The main differences between the two

models had to do with the parent-adolescent communication about sex variable. In the original model, this construct was represented as a latent variable encompassing age at first parent-adolescent discussion about sex and frequency of these discussions. In the original model, more family conflict and parent monitoring were associated with more frequent and later parent-adolescent communication about sex. The latent sex communication variable was not related to RSB.

The modified model included a revised version of parent-adolescent communication about sex – frequency and age at first discussion were included as measured variables, and the latent variable was eliminated. The modified model also included correlated residuals for family conflict, positive family relations, and parent monitoring, all from the same measure. In the modified results, greater family conflict was related to greater frequency of communication about sex, but was not related to age at first discussion. More parent monitoring was related to both greater frequency of discussions and younger age at first discussion. In turn, both younger age at first discussion and less frequent discussions were related to less RSB. In brief, the modified model for this sample, as compared to the original model, included changes in the relationships of communication about sex to other variables and several unknown relationships as embodied in the correlated paths among residuals.

*Modified Model – Males.*

Next, the modified model was run for males and females separately. For males the model fit relatively well, taking into account possible chi-square sensitivity to large samples:  $\chi^2(8, n=526)=18.56, p=.02$ ; RMSEA = .05 and CFI = .98. Results for males were similar to those for the full sample. Two exceptions were the relationships of family conflict and timing of discussions about sex to RSB. First, family conflict was a significant predictor of



risky sexual behavior for males, with higher conflict predicting greater sexual risk behavior (path coefficient=.39,  $p=.02$ ). Second, age at first sex discussion was not related to sexual risk behavior for males (path coefficient=.02,  $p=.38$ ). Complete results for males are displayed in Table 8.

**Table 8:** *Estimates, Standard Errors, and Significance Levels for Modified Model for Males*

Parameter	Standardized Estimate	SE	<i>p</i>
<b>Measurement Model</b>			
Family Conflict → W1 FC	1.00	.00	n/a
Family Conflict → W2 FC	.94	.19	<.01
Positive Family Relations → W1 FR	1.00	.00	n/a
Positive Family Relations → W2 FR	.71	.14	<.01
Parent Monitoring → W1 PM	1.00	.00	n/a
Parent Monitoring → W2 PM	1.09	.16	<.01
Covariance Family Conflict & Pos Family Relations	-.27	.06	<.01
Covariance Family Conflict & Parent Monitoring	-.15	.03	<.01
Covariance Pos Fam Relations & Parent Monitoring	.26	.05	<.01
Covariance e1 & e3	-.05	.05	.32
Covariance e1 & e9	-.05	.03	.12
Covariance e3 & e9	.19	.05	<.01
Covariance e2 & e4	-.03	.04	.43
Covariance e2 & e8	.01	.03	.88
Covariance e4 & e8	.09	.04	.01
Covariance e5 & e7	.18	.07	.01
<b>Structural Model</b>			
Family Conflict → Sex Comm: Age	-.19	.23	.40
Family Conflict → Sex Comm: Frequency	-.27	.09	<.01
Family Conflict → RSB Risk Group	.39	.17	.02
Positive Family Relations → Sex Comm: Age	.27	.18	.12
Positive Family Relations → Sex Comm: Frequency	-.03	.08	.75
Positive Family Relations → RSB Risk Group	.14	.11	.21

**Table 8 (continued)**

Parent Monitoring → Sex Comm: Age	-.37	.17	.04
Parent Monitoring → Sex Comm: Frequency	-.41	.08	<.01
Parent Monitoring → RSB Risk Group	-.46	.11	<.01
Sex Comm: Age → RSB Risk Group	.02	.02	.38
Sex Comm: Frequency → RSB Risk Group	-.17	.06	.01

*Modified Model – Females.*

The model also fit relatively well for females, again taking into account possible chi-square sensitivity to large samples:  $\chi^2(6, n=471)=13.00, p=.04$ ; RMSEA = .05 and CFI = .98. Results for females were similar to those for the full sample but for one exception. For females, positive family relationships were a significant predictor of risky sexual behavior, with more positive relationships predicting less sexual risk behavior (path coefficient = -.26,  $p=.03$ ). Complete results for females are displayed in Table 9.

**Table 9: Estimates, Standard Errors, and Significance Levels for Modified Model for Females**

Parameter	Standardized		
	Estimate	SE	<i>p</i>
<b>Measurement Model</b>			
Family Conflict → W1 FC	1.00	.00	n/a
Family Conflict → W2 FC	.84	.18	<.01
Positive Family Relations → W1 FR	1.00	.00	n/a
Positive Family Relations → W2 FR	.95	.16	<.01
Parent Monitoring → W1 PM	1.00	.00	n/a
Parent Monitoring → W2 PM	1.02	.16	<.01
Covariance Family Conflict & Pos Family Relations	-.28	.06	<.01
Covariance Family Conflict & Parent Monitoring	-.21	.05	<.01
Covariance Pos Fam Relations & Parent Monitoring	.30	.06	<.01
Covariance e1 & e3	-.16	.06	<.01

**Table 9 (continued)**

Covariance e1 & e9	-.06	.04	.17
Covariance e3 & e9	.10	.05	.03
Covariance e2 & e4	-.17	.04	<.01
Covariance e2 & e8	-.07	.04	.05
Covariance e4 & e8	.13	.05	.01
Covariance e5 & e7	.39	.09	<.01
<b>Structural Model</b>			
Family Conflict → Sex Comm: Age	-.12	.27	.64
Family Conflict → Sex Comm: Frequency	-.25	.10	.01
Family Conflict → RSB Risk Group	-.08	.12	.51
Positive Family Relations → Sex Comm: Age	.25	.23	.30
Positive Family Relations → Sex Comm: Frequency	-.02	.09	.80
Positive Family Relations → RSB Risk Group	-.26	.12	.03
Parent Monitoring → Sex Comm: Age	-.73	.31	.02
Parent Monitoring → Sex Comm: Frequency	-.36	.11	<.01
Parent Monitoring → RSB Risk Group	-.32	.12	.01
Sex Comm: Age → RSB Risk Group	.09	.02	<.01
Sex Comm: Frequency → RSB Risk Group	-.27	.05	<.01

*Research Question 3: Differentiating Patterns of Risk Behavior*

The third research question examined whether a combination of individual, family, and peer predictors at Wave 2 and Wave 6 could distinguish participants who engaged in no problem behavior, those who engaged in RSB only, those who engaged in substance use only, and those who engaged in RSB and substance use at Wave 6, and whether risk group membership and predictors of group membership differed by sex and ethnicity.

*Overview of Analyses.*

First, chi-square analysis was used to determine whether the proportions of teens in each risk category differed between males and females and between African American and European American participants. Chi-square analysis tests whether observed proportions of individuals in each category of a variable are equal to or different from hypothesized proportions (Green & Salkind, 2003). Based on prior research (e.g., Brookmeyer, 2007; Weden & Zabin, 2005), it was hypothesized that females and males and African American and European American students would differ in patterns of risk behavior, and thus in the proportions of youth belonging to each risk category.

Second, discriminant function analysis was conducted for males and females and for African American and European American sub-samples to determine whether a combination of family, peer, and individual predictors could differentiate participants' risk group membership, and whether these predictors varied across gender and ethnic groups. Descriptive discriminant analysis (DA) allows identification of variables that discriminate members of two or more groups (Silva & Stam, 1995). The current data are appropriate for descriptive DA, meeting the preliminary criteria presented by Silva and Stam (1995). First, four possible groups have been identified (no problem behavior, RSB only, substance use only, or RSB and substance use), and each participant should belong to one and only one group. Second, each DA group reflects true, rather than arbitrarily constructed, differences among participants – their reported behavior. Third, though DA groups were defined in this case *after* data collection, groups emerged not as a function of sample characteristics but as a result of reported behavior. Thus, DA is still a more appropriate technique to use than cluster analysis. Finally, the attributes describing participants (e.g., individual, family, and

peer variables) should be able to separate the groups without excessive overlap (Silva & Stam, 1995). This remains to be seen, though previous studies have demonstrated family differences between students with varying levels of problem behavior co-occurrence (e.g., Ensminger, 1990).

*Preliminary Analyses.*

First, teens were classified into risk groups based on their reported engagement in each risk behavior at Wave 6 – cannabis, tobacco, and alcohol use and sexual activity. For cannabis, tobacco, and alcohol use, teens were classified as “abstainers” if they had not used the substance at all in the past three months, “experimental users” if they had used it 1-20 times, and “patterned users” if they had used a substance 21 times or more in the past three months. Substance use categories were formed by considering the frequency per week of reported use. For example, using a substance 21 times in three months corresponds to monthly average use of twice a week, more weeks than not. It was also expected that these cutoffs would produce groups in which more participants were experimental users than patterned users. This was true of all substances except tobacco. For tobacco, 63.1% of participants were abstainers, 9.6% were experimental users, and 27.3% were patterned users according to these criteria. For alcohol, 48.2% were abstainers, 38.7% were experimental users, and 13.1% were patterned users. For cannabis, 65.5% were abstainers, 18.8% were patterned users, and 15.6% were patterned users.

The highest of these scores was used to create a general substance use scale. If a student was a patterned user on any one substance, s/he was recorded as a patterned user in the overall substance use scale. For sexual risk behavior, teens were classified as “abstainers” if they had never experienced sexual intercourse. They were “low risk” if their score was

0.01 to 1.99 on the sexual risk behavior scale described previously. “High risk” indicated a score of 2.00 or higher on the sexual risk scale. These scores were used to further classify teens into one of four risk categories:

- (1) RSB Only: “High risk” on RSB and “abstainer” or “experimental user” for all substances.
- (2) RSB and Substance Use: “High risk” on RSB and “patterned user” on at least one substance.
- (3) Substance Use Only: “Low risk” or “abstainer” on RSB and “patterned user” on at least one substance.
- (4) Low Problem Behavior: “Abstainer” or “low risk” on RSB and “abstainer” or “experimental user” for all substances. Table 10 lists proportions of teens in each risk category by gender and ethnicity.

**Table 10:** *Participants in Each Risk Category by Gender and Ethnicity*

Risk Group	RSB Only		RSB + Substance Use		Substance Use Only		Low Risk	
All	41	4.1%	12	1.2%	341	34.2%	604	60.5%
Females	20	4.2%	8	1.7%	151	32.1%	292	62.0%
African Am Females	10	7.5%	1	0.7%	28	20.9%	95	70.9%
European Am Females	5	2.6%	3	1.5%	70	35.7%	118	60.2%
Males	21	4.0%	3	0.6%	190	36.1%	312	59.3%
African Am Males	8	5.1%	1	0.6%	41	26.1%	107	68.2%
European Am Males	4	1.8%	0	0%	97	42.7%	126	55.5%

*Research Question 3.a.: Chi Square.*

Using SPSS (SPSS, 2006), I conducted a series of one-sample chi-square tests to compare proportions of teens in each risk behavior category by sex and ethnicity. For each analysis, expected cell values for one group were calculated based on observed proportions in each cell for the comparison group (Green & Salkind, 2003). For example, in comparing females to males, the observed proportions of males in each risk behavior cell were used to calculate expected proportions of females in each cell. I used chi-square to test the hypothesis that the proportions in each cell were the same for both groups. Three chi-square analyses were conducted, comparing (a) females to males, (b) African American females to European American females, and (c) African American males to European American males.

Table 11 shows chi-square values, degrees of freedom, and *p*-values for each comparison. Compared to males, females had higher proportions in the RSB and Substance Use group (males 0.6%, females 1.7%) and the Low Problem Behavior group (males 59.3%, females 62.0%), but lower proportions in the Substance Use Only group (males 36.1%, females 32.1%). Next, compared to European American females, African American females had higher proportions in the RSB Only group (White females 2.6%, Black females 7.5%) and the Low Problem Behavior group (White females 60.2%, Black females 70.9%) and lower proportions in the Substance Use Only group (White females 35.7%, Black females 20.9%). Finally, compared to European American males, African American males had higher proportions in the RSB Only group (White males 1.8%, Black males 5.1%) and the Low Problem Behavior group (White males 55.5%, Black males 68.2%) and lower proportions in the Substance Use Only group (White males 42.7%, Black males 26.1%).

**Table 11:** *Chi-Square Analyses Comparing Proportions of Teens in Risk Categories by Sex and Ethnicity*

Comparison	Chi-square	df	<i>p</i>
Females to Males	11.12	3	.01
African Am. Females to European Am. Females	27.59	3	<.001
African Am. Males to European Am. Males	23.16	3	<.001

*Research Question 3.b.: Discriminant Function Analysis.*

Next, discriminant function analyses were conducted to assess whether a combination of family, peer, and individual variables at Waves 2 and 6 could predict membership in one of the four risk groups at Wave 6: Low Problem Behavior, RSB Only, Substance Use Only, or RSB and Substance Use. Predictor variables were: family conflict, positive family relations, parental monitoring, deviant peer association, problem behavior, and substance use, reported at Wave 2, and age at which teens first discussed sex with their parents, frequency of parent-adolescent conversations about sex, and frequency of friends' drug use, reported at Wave 6. Based on differences observed in previous research (e.g., Ensminger, 1990) separate analyses were conducted for males and females, and for African American and European American participants. Results for each analysis are presented according to guidelines proposed in Green & Salkind (2003).

*Males.* For males the first Wilks's lambda was significant,  $\Lambda=.73$ ,  $\chi^2(30, n=526) = 165.78, p < .001$ , indicating that overall the predictors differentiated among the four risk groups. The second Wilks's lambda was significant ( $\Lambda=.91$ ,  $\chi^2(18, n=526) = 48.25, p < .001$ ) but the third was not ( $\Lambda=.98$ ,  $\chi^2(8, n=526) = 9.91, p = .27$ ) so only the first two functions



were interpreted. Table 12 presents the structure coefficients for the discriminant functions, and the standardized discriminant function coefficients for males. For this group, Wave 6 Friend Drug Use had the strongest relationship with the first discriminant function, and Wave 2 Antisocial Behavior had the strongest relationship with the second discriminant function. Means on both Friend Drug Use and Antisocial Behavior were highest among the RSB and Substance Use group ( $M=1.16$ ) and the Substance Use Only group ( $M=.61$ ), and means on Antisocial Behavior were highest among the RSB and Substance Use group ( $M=3.23$ ) and the RSB Only group ( $M=.51$ ).

**Table 12:** *Standardized Coefficients and Correlations of Predictor Variables with Two Discriminant Functions for Males (n=526)*

Predictors	Correlation Coefficients with Discriminant Functions		Standardized Coefficients for Discriminant Functions	
	Function 1	Function 2	Function 1	Function 2
WAVE 2				
Family conflict	.244	.402	-.091	.236
Positive family relations	-.214	.174	.024	.417
Parent monitoring	-.238	-.432	.047	-.288
Positive reinforcement	-.142	.164	-.036	-.079
Deviant peer association	.483	.523	.251	.157
Antisocial behavior	.529	<b>.619</b>	.235	<b>.417</b>
Substance use	.551	.349	.345	.145
WAVE 6				
How often discussed sex with parent(s)	.003	.211	.083	.100
Age first discussed sex with parent(s)	-.123	.299	-.010	.252
Frequency of friend drug use	<b>.809</b>	-.479	<b>.738</b>	-.487

*Note:* Bold type indicates predictors with strongest relationships to discriminant functions.

The discriminant functions correctly classified 66.3% of males into risk categories. Prediction accuracy varied among risk groups. For the RSB Only group, 14.3% of cases (3 of 21) were correctly classified; for RSB and Substance Use, 66.7% (2 of 3) were correctly classified; for Substance Use Only, 38.4% (73 of 190) were correctly classified, and for Low Problem Behavior, 86.9% (271 of 312) were correctly classified. The most common

misclassification for males was predicted membership in the low-risk group when actual membership was in one of the other three groups. Kappa was calculated to assess chance in classification accuracy. Kappa for this sample was .29,  $p < .001$ , indicating relatively low accuracy in classifying groups.

*Females.* For all females, the first Wilks's lambda was significant,  $\Lambda = .72$ ,  $\chi^2 (30, n=471) = 151.09$ ,  $p < .001$ , as was the second,  $\Lambda = .94$ ,  $\chi^2 (18, n=471) = 30.50$ ,  $p = .03$ , indicating that the predictors differentiated among the four risk groups overall and after partialling out the effect of the first discriminant function. The third function was not significant ( $\Lambda = .99$ ,  $\chi^2 (8, n=471) = 7.02$ ,  $p = .53$ ), so only the first two will be interpreted. Table 13 presents the structure coefficients for the discriminant functions and the standardized discriminant function coefficients for females.

**Table 13:** *Standardized Coefficients and Correlations of Predictor Variables with Two Discriminant Functions for Females (n=471)*

Predictors	Correlation Coefficients with Discriminant Functions		Standardized Coefficients for Discriminant Functions	
	Function 1	Function 2	Function 1	Function 2
WAVE 2				
Family conflict	.263	.205	-.154	-.087
Positive family relations	-.464	-.230	-.440	-.156
Parent monitoring	-.407	-.036	-.046	.315
Positive reinforcement	-.132	-.094	.171	-.180
Deviant peer association	.501	<b>.556</b>	.126	<b>.525</b>
Antisocial behavior	.478	.501	.069	.383
Substance use	.505	.373	.267	.110
WAVE 6				
How often discussed sex with parent(s)	.058	-.351	.088	-.453
Age first discussed sex with parent(s)	.113	.282	.136	.306
Frequency of friend drug use	<b>.812</b>	-.368	<b>.725</b>	-.561

*Note:* Bold type indicates predictors with strongest relationships to discriminant functions.

Based on these coefficients, frequency of friends' drug use at Wave 6 had the strongest relationship with the first discriminant function (named 'Friend Drug Use,') and deviant peer associations at Wave 2 had the strongest relationship with the second function (named 'Deviant Peers'). Group means on Friend Drug Use were highest for teens in the RSB and Substance Use group ( $M=1.01$ ) and the Substance Use Only group ( $M=0.72$ ).

Mean scores on Deviant Peers were also highest among teens in the RSB and Substance Use group ( $M=1.04$ ) and the RSB Only group ( $M=0.81$ ).

Seventy percent of females were correctly classified into risk categories with these discriminant functions; however, prediction accuracy varied among risk groups. For the RSB Only group, 20% of cases (4 of 20) were correctly classified; for RSB and Substance Use, 12.5% (1 of 8) were correctly classified; for Substance Use Only, 41.1% (62 of 151) were correctly classified, and for Low Problem Behavior, 89.4% (261 of 292) were correctly classified. The most common misclassification was predicted membership in the low-risk group when actual membership was in one of the other three groups. Finally, a kappa coefficient was calculated to assess chance agreement between predicted and actual group membership. Kappa for this sample was .34,  $p<.001$ , indicating a low to moderate level of accuracy in group prediction.

*African American Males and Females.* Discriminant function analyses were then performed for African American and European American teens separately. First, for African American males, the first Wilks' lambda was significant ( $\Lambda=.65$ ,  $\chi^2 [30, n=157]=63.93$ ,  $p<.001$ ), as was the second ( $\Lambda=.82$ ,  $\chi^2 [18, n=157]=29.65$ ,  $p=.04$ ). The third Wilks' lambda was not statistically significant ( $\Lambda=.93$ ,  $\chi^2 [8, n=157]=11.24$ ,  $p=.19$ ), so only the first two functions were interpreted. The first discriminant function was most closely associated with Wave 2 Antisocial Behavior (standardized discriminant function coefficient=.92; within-groups correlation=.78), and the second was most closely associated with Wave 2 Parent Monitoring (standardized discriminant function coefficient=.70; within-groups correlation=.63). Means on Antisocial Behavior were highest among the RSB and Substance

Use group ( $M=4.40$ ), though this group included only one person. The Substance Use Only group had the next highest mean on this function ( $M=.55$ ). Means on Parent Monitoring were lowest among the RSB Only group ( $M= -1.53$ ). The discriminant functions correctly classified 67.5% of African American males. For the RSB Only group, 25% (2 of 8) were classified correctly; for the RSB and Substance Use group, 0% (0 of 1); for the substance use only group, 19.5% (8 of 41); and for the low risk group, 89.7% (96 of 107) were correctly classified. Since zero participants were predicted to belong to the RSB and Substance Use group, kappa was unable to be calculated.

For African American females, the first Wilks' lambda was significant,  $\Lambda=.64$ ,  $\chi^2(30, n=134)=56.45$ ,  $p=.002$ , but neither of the other two functions was significant ( $\Lambda=.81$ ,  $\chi^2(18, n=134)=26.59$ ,  $p=.09$  and  $\Lambda=.93$ ,  $\chi^2(8, n=134)=8.58$ ,  $p=.38$ , respectively). The first discriminant function was most strongly associated with Wave 6 Friend Drug Use (standardized discriminant function coefficient=.86, within-groups correlation=.83). Mean scores on Friend Drug Use were highest among the Substance Use Only group ( $M=.97$ ). The discriminant functions correctly classified 77.6% of African American females: 40% of the RSB only group (4 of 10), 0% of the RSB and substance use group (0 of 1), 39.3% of the substance use only group (11 of 28), and 93.7% of the low risk group (89 of 95) were correctly classified. Kappa was not able to be calculated for this analysis because the number of predicted groups and the number of actual groups were different.

*European American Males and Females.* For European American males, only two discriminant functions were identified because none of this group belonged to the RSB and Substance Use group. There were only three risk groups and therefore two functions. The

first and second Wilks' lambdas were both significant, ( $\Lambda=.70$ ,  $\chi^2 [20, n=227]=79.34$ ,  $p<.001$  and  $\Lambda=.90$ ,  $\chi^2 [9, n=227]=22.88$ ,  $p=.006$ , respectively). The first discriminant function was most strongly associated with Wave 6 Friend Drug Use (standardized discriminant function coefficient=.83, within-groups correlation=.79), and the second function was mostly strongly associated with Wave 2 Antisocial Behavior (standardized discriminant function coefficient=.73, within-groups correlation=.69). Means on both functions were highest among the RSB Only group ( $M=.88$  for Friend Drug Use and  $M=2.40$  for Antisocial Behavior). Sixty-seven percent of European American males were correctly classified: 50% of the RSB only group (2 of 4), 44.3% of the substance use only group (43 of 97), and 84.9% of the low risk group (107 of 126). Kappa was calculated to assess classification accuracy relative to chance. Kappa for this analysis was .33,  $p<.001$  indicating a low to moderate level of accuracy.

Finally, for European American females, the overall Wilks' lambda was statistically significant ( $\Lambda=.50$ ,  $\chi^2 [30, n=196]=130.31$ ,  $p<.001$ ), as were both residual functions ( $\Lambda=.76$ ,  $\chi^2 [18, n=196]=51.54$ ,  $p<.001$  and  $\Lambda=.92$ ,  $\chi^2 [8, n=196]=15.52$ ,  $p=.05$ , respectively). Function 1 was most closely associated with Wave 6 Friend Drug Use (standardized discriminant function coefficient=.63, within-groups correlation=.67). Function 2 was most strongly associated with Wave 2 Antisocial Behavior (standardized discriminant function coefficient=1.13, within-groups correlation=.34). Function 3 was most closely associated with Wave 2 Family Conflict (standardized discriminant function coefficient= -.73, within-groups correlation= -.67). Means on Friend Drug Use ( $M=2.55$ ) and Antisocial Behavior ( $M=3.27$ ) were highest among the RSB and Substance Use group. Mean scores on Family

Conflict were lowest among the RSB Only group ( $M = -1.78$ ). The discriminant functions correctly classified 74.0% of European American females. In the RSB Only group, 40% (2 of 5) were classified correctly; in the RSB and Substance Use group, 33.3% (1 of 3); in the Substance Use Only group, 50% (35 of 70); and in the Low Problem Behavior group, 90.7% (107 of 118) were correctly classified. Kappa to assess classification accuracy was .443,  $p < .001$ , indicating a moderate level of accuracy in predicting group membership.

In summary, the chi-square and discriminant function analyses highlighted several patterns. First, comparing females to males, chi-square indicated that females were more likely than males to belong to the RSB and Substance Use and the Low Problem Behavior groups, and less likely to belong to the Substance Use Only group. When African American were compared to European American participants, African American participants of both sexes were more likely than their European American peers to belong to the RSB Only and Low Problem Behavior groups. European Americans of both sexes were more likely to belong to the Substance Use Only group.

Discriminant function analysis highlighted variables that differentiated between participants belonging to each of these risk groups. Wave 6 Friend Drug Use was associated with the primary discriminant function for males and females overall, as well as for African American females and European American males and females. Similarly, Wave 2 Antisocial Behavior was associated with the second discriminant function for many of the groups, including females overall and European American males and females. Other variables that were associated with discriminant functions were Wave 2 Deviant Peer Association (for females), Wave 2 Family Conflict (for European American females), and Wave 2 Parent Monitoring (for African American males). Kappas that were calculated to assess the



accuracy of the discriminant functions in classifying participants into groups, relative to chance, indicated low to moderate accuracy for all ethnic and gender groups. In particular, accuracy was somewhat low in differentiating which participants engaged in risky sexual behavior only rather than RSB in combination with substance use: for males, only 14% of the RSB Only group was correctly classified and for females, 20% of the group was correctly classified.

## CHAPTER IV

### DISCUSSION

This study addressed three main questions about risky sexual behavior in the context of family and peer influences in the lives of adolescents. First, I examined the level of agreement between adolescents' and parents' perceptions of family relationships and parental monitoring, and which perceptions were more strongly related to adolescent problem behavior. Second, I assessed whether positive family relations, parental monitoring, family conflict, and parent-adolescent communication about sex in earlier adolescence were related to risky sexual behavior in later adolescence. Third, I examined participants' membership in four risk behavior groups in late adolescence – low problem behavior, RSB only, substance use only, and RSB plus substance use – and identified family, peer, and individual factors that differentiated teens in each group, and explored differences by sex and ethnicity. The following discussion reviews the findings and places them in context of existing literature, and presents limitations and future directions for related research.

#### *Concordance between Parent and Teen Report of Problem Behavior*

First, I assessed the agreement between Wave 1 and 2 parent and teen perceptions of family processes, and their relationships to teen behavior at Waves 1, 2 and 3. The correlations between parent and teen report of deviant peer associations, parental monitoring, problem behavior, family conflict, positive family relations, and use of positive reinforcement were small in magnitude, and teen report was more strongly predictive of

antisocial behavior and substance use at Waves 1 and 2, and RSB at Wave 3, than was parent report. One possibility for this finding is that parents have incomplete information about teens' friends and activities, and may not be monitoring as effectively as they believe they are. Another possibility is that teens are reporting their engagement in problem behaviors inaccurately, perhaps exaggerating their involvement. In some adolescent circles, it is possible that engaging in problem behavior and having deviant peers is regarded positively, and subject to socially desirable responding.

Prior research supports the first possibility. In particular, Stanton and colleagues (Stanton, Li, Galbraith, Cornick, Feigelman, Kaljee, et al., 2000) conducted a randomized, controlled trial of a parent monitoring intervention with low-income families and measured parent and adolescent concordance on adolescent activities and whereabouts before and after the intervention. Pre-intervention, parents in both intervention and control groups perceived less teen problem behavior than the adolescents themselves reported. Post-intervention, parents and teens who had received the monitoring intervention were in agreement on the incidence of teen behavior more often than the control group (Stanton et al., 2000). In this case, teens' report of problem behavior did not decrease; rather, parent report increased to match teens'. This supports the possibility that parents in the current study were unaware of some of their adolescents' activities, and this contributed to the low concordance between parent and adolescent report.

It is important to note that the results both in the current study and in the study by Stanton and colleagues (2000) were obtained with at-risk and high-risk families. In the current study, family risk was identified by teachers' reports of adolescent behavior at school; in Stanton and colleagues' research, participants lived in a community with elevated

levels of crime and other risk factors. The same low correlations between parent and teen report may not hold true for other families in other contexts.

These findings underscore the importance of including monitoring skills in parenting interventions, particularly for families with elevated risk for negative outcomes. Parents may need additional instruction or modeling to transition from monitoring younger children to monitoring adolescents. Research consistently supports the protective effect of monitoring against problem behavior (e.g., Chilcoat, Dishion, & Anthony, 1995; Duncan, Duncan, Biglan, & Ary, 1998; Hoeve, Dubas, Eichelsheim, van der Laan, Smeenk, & Gerris, 2009; Pettit, Bates, Dodge, & Meece, 1999). Recent research suggests that monitoring is most effective in influencing concurrent behavior, rather than exerting effects over time (Kiesner, Dishion, Poulin, & Pastore, 2009); this underscores the necessity of encouraging ongoing and daily monitoring by parents. Some researchers have found evidence to support the idea that adolescents' disclosure to parents is more important than parents' surveillance of behavior in contributing to adolescent outcomes (Kerr & Stattin, 2000); these ideas may change the content of parenting interventions in the future. For now, research largely suggests that encouraging consistent daily efforts by parents to be aware of adolescents' activities will be helpful in decreasing adolescent problem behavior.

#### *Family Predictors of RSB*

For the second research question, I examined the relationships among family conflict, positive family relations, parent monitoring, and parent-adolescent communication about sex in early adolescence, and risky sexual behavior in later adolescence. Results of the structural equation model suggested that timing and frequency of parent-adolescent

communication about sex and parent monitoring in earlier adolescence were related to risky sexual behavior in later adolescence among the sample as a whole.

Parent monitoring was inversely associated with sexual risk behavior for both males and females. Based on theory and longitudinal research on monitoring and problem behavior (Kiesner et al., 2009), it is likely that the level of parent monitoring in early adolescence continued into later adolescence for most families. The level of monitoring at each time likely influenced adolescents' activities and friends, and consequently their opportunities for risky sexual behavior and other problem behaviors. Unfortunately, family management was not measured in the late adolescent surveys, so it was not possible to include late adolescent family variables in the statistical model.

Parent-adolescent discussions about sex were reported retrospectively. For males, more frequent discussions about sex were related to greater sexual risk behavior, but there was no relationship between age at which participants first talked about sex with parents and RSB. For females, frequency of discussions about sex were also related to increased sexual risk behavior, but conversations at an earlier age were associated with less sexual risk behavior.

The finding that frequency of parent-adolescent communication about sex was associated with more sexual activity among adolescents is not new. Prior research has been mixed with regard to the nature of the influence of parent-adolescent communication about sex on adolescent sexual behavior, but many recent studies have found positive associations between measures of parent-adolescent communication about sex and adolescent sexual activity. Clawson & Reese-Weber (2003) surveyed college students and found that more communication about sex with mothers and fathers was related to younger age at first

intercourse, more sex partners, using more birth control methods, having been tested for HIV, and having been pregnant. Similarly, Bynum (2007) found among African American college women that when general mother-daughter communication was positive, greater communication about sex was related to more sexual experience for the daughters.

More detailed measures of sexual communication may be needed to fully understand the relationship between parent-adolescent communication and adolescent sexual behavior. Clawson and Reese-Weber's (2003) research suggests that frequency of communication is associated not only with more sexual activity, but also with proactive sexual behaviors like using multiple methods of birth control and being tested for HIV. Other research suggests that the content of parents' messages matters, that parents' values about sex influence adolescent attitudes and behavior. Fingerson (2005), for example, noted that teens' perceptions of their mothers' liberal attitudes toward sex were related to having higher numbers of sex partners. Similarly, McNeely and colleagues (2002) examined a nationally representative sample of sexually inexperienced adolescents and followed them for a year, examining risk and protective factors for initiating intercourse during that year. They found that for females, mothers' communication that they strongly disapproved of their daughters having sex was associated with lower odds of having initiated sex (though this relationship was not found for males). So parents' communicated values about sexual activity may be as important as the timing or frequency of the discussions in influencing adolescent behavior.

Another important consideration is that some adolescents may initiate discussion with their parents when they begin to engage in sexual activity. Thus, the causal direction may be from adolescent sexual behavior to communication, rather than the other way around. Kerr and Stattin's (2000) finding that adolescent spontaneous disclosure to parents

was more predictive of outcomes than parent attempts at monitoring would seem to support this idea. It could be that adolescents who initiate discussion about sex with their parents when they then begin to engage in sexual activity do not represent a risky group at all, and perhaps more research needs to be done to investigate the association of age at first intercourse to other sexual risk behaviors, when parent-adolescent communication about sex is taken into account.

One drawback shared by much of the research on parent-adolescent communication about sex – including this investigation – is lack of specificity about the content and process of these discussions. The few studies that have examined details about the communication have found that parents' message, and the way in which adolescents perceive these conversations, are determinants of the effectiveness of these discussions in influencing teens' sexual choices (Fingerson, 2005; McNeely et al., 2002; Pluhar & Kurilov, 2004). Without specificity about details of the communication, it is possible that parental messages encouraging sex, parent-adolescent arguments about sex, and other disparate content are lumped together into the construct "discussions about sex." These discussions may have very different influences on adolescent sexual behavior. In the current investigation there was insufficient information about parents' messages or the process of the communication to draw a definitive conclusion about the impact of parent-adolescent communication about sex on teens' sexual behavior.

Additionally, interpretation of a modified structural equation model may cloud the interpretability of the results regarding parent-adolescent communication about sex. This variable was conceptualized in the original, proposed model as a latent construct made up of two measured variables. In a modified version of the model, the latent construct was

eliminated and the two measured variables were included in the model. Additionally, the second model included several correlated residuals. These changes in the modified model changed the way parent-adolescent communication about sex appeared to be related to other variables. It is possible that the original model provided the most accurate representation of the relationships among variables. In that model, higher family conflict and parent monitoring were associated with greater frequency and younger age of parent-adolescent communication about sex; these were the only significant relationships with these variables. These may be the most trustworthy and generalizable results. The changes observed with the modified model should be tested with an independent sample to assess their accuracy and generalizability (McDonald & Ho, 2002).

These caveats highlight some of the problems with post-hoc model modification. I did specify exactly what changes were made to the original model, and how the results were different, which is essential for ethical reporting of results. At the same time, a priori specification of competing models, and systematic testing of each, is the more scientifically rigorous and trustworthy way to conduct these analyses.

#### *Differentiating Patterns of Risk Behavior*

The third research question concerned whether (a) participants' patterns of risk behavior differed by sex and ethnicity, and whether (b) family, peer, and individual variables could be used to differentiate participants in each risk behavior group. First, chi-square analyses were conducted to determine whether proportions of participants belonging to each risk behavior group differed by sex and ethnicity. Distinct patterns emerged. Overall, males were more likely than females to report patterned substance use in the absence of other behaviors. Females were more likely than males to report engaging in a combination



of risky sexual behavior and patterned substance use. Females were also more likely than males to report low or no problem behavior. Comparisons between ethnic groups revealed that African Americans of both sexes were more likely than European Americans to report engaging in risky sexual behavior in the absence of other behaviors. African Americans were also more likely than European Americans to report low or no problem behavior. European Americans were more likely than African Americans to report patterned substance use in the absence of other problem behaviors.

These results highlighted differences in risk behavior patterns by gender and ethnicity. First, female participants were more likely than males to report engaging in RSB and substance use. Though the data did not contain enough information to explore this finding further, it is possible that substance use is directly related to risky sexual behavior for some of these participants. Drinking or using other substances prior to sex can affect sexual decision-making and the ability to provide consent to sexual activity, and it is possible that safer sex interventions should routinely address substance use and substance abuse as risk factors for females in particular.

Next, African American teens were more likely to engage in risky sexual behavior outside the context of other problem behaviors. The proportion of African American teens in the RSB Only group was almost 3 times greater than the proportion of European American teens in this group. This was true for both males and females. This has a number of implications. First, African American adolescents may be less likely to display a pattern of problem behavior that would alert parents and teachers to the need for more careful monitoring or other intervention. Thus, adults may miss opportunities for talking with these adolescents about sex, teaching skills for safer sex, and encouraging safer sex because teens'

behavior may not evidence any ‘warning signs’ that they are engaging in unsafe sexual behavior.

This finding also raises the question of why African American teens reported engaging in risky sexual behavior at higher rates than European American teens. Before exploring hypotheses, it is important to note that ethnicity and SES were likely confounded in the current study. Though my African American sample was not exclusively low-income, statistically African American families earn less and obtain less education than European American families. The data provided family income information only for a subset of participants so it is not possible to compare the entire African American and European American samples. However, since participants were not matched on SES, I acknowledge that these analyses likely confounded SES and ethnicity, and hypotheses regarding ethnicity should be interpreted with this consideration.

Bearing this in mind, authors of prior studies have offered some hypotheses about why African American teens reported engaging in risky sexual behavior at higher rates than European American teens. Based on findings with her sample, Ensminger (1990) postulated that teenage sexual activity was socially acceptable for young Black males in the community from which the study participants were drawn. Being acceptable, this behavior was more frequent than in communities in which it was less normative. She suggested that for females, low maternal education and early maternal childbearing served as social models for early sexual activity. Stanton and colleagues (1993) put forth a similar hypothesis. Since early adolescent sexual activity was not considered a problem behavior by youth in the community in which the research was conducted, a greater proportion of youth engaged in the behavior.

If indeed there is a more permissive attitude toward sex among youth in African American communities, another important question is why these norms exist. One possibility is that, since African American families in this study talked about sex less frequently than European American families, Black parents had fewer opportunities to communicate non-permissive sexual values to their children. Though the current study has shown that parent-adolescent conversations about sex can be associated with more adolescent sexual activity, parent-adolescent conversations about sex can also convey familial attitudes and expectations for adolescent sexual behavior and provide a forum for parents to teach safer sex skills and provide support for adolescent concerns (Bynum, 2007, Eisenberger et al., 2006). In the absence of these conversations, adolescents may rely more heavily on peer and societal norms for determining their own attitudes toward sex (Gordon, 2008). This is particularly risky for African American teens, because many aspects of popular culture convey to this group that casual sex, and sex with multiple partners, is common and desirable (hooks, 2001), and that sexual desirability and availability are highly valued, particularly for women (Conrad, Dixon, & Zhang, 2009; Gordon, 2008; Messineo, 2008). Media portrayal of European American young adults tends to depict a broader range of sexual norms. African American teens especially may need parents as cultural “mediators” between popular culture and peer messages and their own values.

A second possibility for views among African American teens that potentially risky sexual activity is normative may involve social context. Ensminger (1990) hypothesized that Black female adolescents may have been influenced by high rates of teen parenthood in both their mothers’ and their own generations. To broaden this, it is possible that Black youth, regardless of gender, are influenced by the norms of relationship modeled by adults in the

community. African American parents and caregivers in the current sample, especially mothers, were less likely to be living with a spouse or partner or to be married than European American parents. Though marriage and cohabitation are by no means ideal situations for every family, in some cases this family structure provides a model of relationship investment that adolescents may internalize and emulate. Adolescents seeking committed relationships in adulthood may be less likely to engage in romantic or sexual relationships with multiple partners; further research is needed to explore this possibility. bell hooks (2001) argued that African Americans' romantic and family relationships have been marred by intergenerational degradation of love and commitment, dating from regular and painful disruptions of family ties during slavery. This affects the kinds and the quality of relationships among Black adults that adolescents are likely to encounter (Harris, 2008; hooks, 2001). Coupled with modern depictions of African American hypersexuality (in music videos, for example; Conrad et al., 2009; Gordon, 2008), Black adolescents may have an abundance of models of sexual relationships in which commitment is lacking and sex with multiple partners is normative. These influences may contribute to the higher rates of risky sexual behavior among otherwise well-adjusted African American teens.

Finally, an additional contributor to African American teens' sexual risk behavior may be related to single parenthood within the community. Parent monitoring was related to lower rates of sexual risk behavior among the current sample and in other research (e.g., Ary et al., 1999), and monitoring adolescent activities is more difficult for one parent alone than for two or more parents or caregivers. Among the parents who provided data, the African American families in this sample were more likely than the European American families to be headed by a single parent or caregiver. Mothers provided the majority of the responses;

78% of the European American mothers reported living with a spouse or partner while only 44% of the African American mothers reported the same. It is possible that differences in monitoring abilities account for some of the observed difference in sexual risk behavior.

The findings of the current study regarding Black adolescents' involvement in risky sexual behavior in the absence of other problem behavior is consistent with prior research. Brookmeyer (2007), Ensminger (1990), Stanton and colleagues (1993), and Weden & Zabin (2005) all found that sexual risk behavior did not cluster with other problem behaviors for African American teens in the same ways it did for European American teens. This has implications for practice. Parenting interventions with African American families may need to focus attention on the possibility that adolescents might be engaging in sexual activity even if parents believe they are not, and encourage parents to talk with their children early about delaying sex or practicing safer sex. Eisenberg and colleagues (2006) reported that parents were likely to wait to talk with their adolescents about sex until they believed them to be in a romantic relationship. However, adolescent data from that study confirmed that parents were often unaware of when their adolescents entered romantic relationships and became sexually active. What's more, parent communication about sexual decisions and behavior had more influence on adolescent behavior when conversations were had prior to teens' initiating sexual activity. Thus, Eisenberg and colleagues (2006) concluded that many parents missed the optimal time to influence their children's sexual behavior by waiting too long to talk with them about sex. This phenomenon may be especially relevant for African American families, as the current findings indicate these teens may not engage in other behaviors that would lead parents to suspect they might be sexually active.

In the next part of this research question, discriminant function analysis was performed to ascertain whether family, peer, and individual factors could distinguish teens who engaged in differing patterns of risk behavior. First, analyses were run for males and females separately. Results for these two groups were quite similar. Friend drug use at Wave 6 was the variable most reliably associated with the primary discriminant function for both males and females, and was most prevalent among adolescents in the RSB and Substance Use and Substance Use Only groups. If friend drug use can be considered a proxy for deviant peer association, this finding suggests that deviant peer group continued to strongly influence behavior later in adolescence. The variable most commonly associated with the second discriminant function for males was Wave 2 Antisocial Behavior, and for females, Wave 2 Deviant Peer Association. For both males and females, mean scores on these variables were highest among the RSB and Substance Use and Substance Use Only groups. This finding suggests that problem behavior and negative peer associations begun in earlier adolescence persist into later adolescence for some teens and continue to influence behavior.

Discriminant function analyses were also run for African American and European American males and females. Results varied somewhat by ethnicity and gender. Friend Drug Use at Wave 6 was associated with the primary discriminant function for African American females and for European American males and females. However, it was associated with different problem behavior categories in each case. For Black females, means on Friend Drug Use were highest among the Substance Use Only group; for White females, means on this function were highest among the RSB and Substance Use and Substance Use Only groups; and for White males, means on this function were highest among the RSB Only

group. Black males were different altogether in that the variable associated with the primary discriminant function for this group was Wave 2 Antisocial Behavior, and means on this function were highest among the Substance Use Only group.

These findings seem consistent with the results of the chi-square analysis, that RSB more often occurs outside the context of problem behavior for African American than European American teens. Discriminant functions that were associated with problem behaviors for Black participants (friend drug use, antisocial behavior) were not related to being in either of the RSB risk groups. However, for White participants, discriminant functions associated with problem behaviors were in turn related to membership in one of the RSB risk groups.

The discriminant function analysis, overall and within ethnicity and gender groups, evidenced low to moderate accuracy in predicting risk group membership relative to chance. It is possible that the variables included in the analysis did not provide enough information about participants' lives at Wave 6 to paint a clear picture of late adolescent behavior. Other variables not assessed in the current study may have helped to distinguish between groups. Friends' attitudes about sex and friends' sexual activity (perceived and actual), history of sexual abuse or coercion, and relationship status may have been uniquely relevant to predicting RSB (East et al., 1993; French & Dishion, 2003; Koenig & Clark, 2004; Mizuno et al., 2000; Whitaker & Miller, 2000).

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

This study had a number of limitations. First, all data were self-reported, either by parents or by adolescents, and since parent and adolescent data were not highly correlated it was impossible to verify the accuracy of the report. Such lack of concordance is common,

especially with research regarding sexual activity and other private behaviors. Some researchers are able to corroborate sexual self-report with, for example, medical records of pregnancy or STI treatment. These methods are outside the scope of the current study, but are options for future research. Second, these students were all recruited from one metropolitan area in the Pacific Northwest, and their experiences may not generalize to other adolescents in other parts of the country due to differences in culture, shared experience, or other contextual factors.

A third limitation was reliance on retrospective reports of parent-adolescent communication about sex and adolescent sexual behavior. Adolescents were asked, at age 17 or 18, to report on when they had first talked with parents about sex and how frequently they had talked, on average, throughout adolescence. It is possible that participants did not remember or report accurately. Similarly, some of the sexual risk behavior items required adolescents to remember sexual behavior in the past year; e.g., number of partners in the past year. Again, for some participants this may have been difficult to recall; for example, if the number of sex partners was high or if substance use affected participants' memory of sexual events. For greater accuracy, future research should aim to ask participants to report on shorter, more proximal periods of time.

Fourth, the current study lacked the specificity needed to draw accurate conclusions about the impact of parent-adolescent communication about sex on teens' sexual activity. Age at first discussion about sex and frequency of such conversations were the only data available, but other or recent research has indicated that it is also necessary to assess content (e.g., parents' and adolescents' values communicated) and process (e.g., comfort, parent receptivity) of these conversations (Fingerson, 2005; McNeely et al., 2002; Pluhar & Kurilov,



2004). Assessing parent perceptions of this type of communication in addition to teen perceptions could also provide information about parent/teen agreement about aspects of the communication and could guide clinical intervention in this area. In the current study, frequency of parent-adolescent communication about sex was associated with greater adolescent sexual risk, but this could be because parents with liberal sexual attitudes were more likely to talk with their children about sex, or because adolescents were already engaging in sexual activity and this sparked conversation. Greater specificity is needed in future research, especially among African American teens, who reported the lowest levels of parent-adolescent communication about sex and relatively high levels of sexual risk behavior. In addition, more experimental research is needed in this area. An example is Brody and colleagues' longitudinal work in which families are assigned to parenting interventions that include parent-adolescent communication about sex as part of the protocol (e.g., Murry et al., 2007). Currently, most of the literature in this area describes cross-sectional or retrospectively-reported data.

Also, the analyses testing the relationship of parent-adolescent communication about sex to RSB were limited in a number of ways. The a priori structural equation model did not fit the data well; it was therefore difficult to interpret the results of this model. Modification of the first model did provide better fit to the data but introduced problems such as questionable generalizability of results and uncertainty about whether this model is the most accurate representation of relationships among variables. In future research I would like to test the model with a new sample, and develop competing models prior to analyses, to better understand how family variables and parent-adolescent communication about sex are related to RSB.

Another limitation is that the current data provided different individual, family, and peer information at different time points: data on family and peer variables were available from early adolescent report, and data on risky sexual behavior were available only in later adolescence. Therefore it was not possible to conduct a true longitudinal study, to understand the growth in risky sexual behavior over time, or to examine the family processes at work in late adolescence. This additional information could provide a fuller picture of the factors influencing the development of sexual risk behavior over the course of adolescence.

Finally, the numbers of participants who were categorized into the RSB Only and RSB + Substance Use groups were relatively low. It is fortunate that so few participants were engaging in risky sexual behavior. However, the low numbers decreased power for statistical operations with these groups, and make it difficult to generalize results to other groups of adolescents.

Though this investigation had limitations, it also makes a useful contribution to the current research on sexual risk behavior by examining the role of multiple family, peer, and individual factors in sexual behavior among a large, longitudinal, ethnically diverse sample of adolescents and their families. The large sample size provided adequate power for multivariate modeling and for comparisons between ethnic groups; in addition, it is reasonable to expect that results from a sample this large may generalize to other adolescents and their families. The ethnic diversity of the sample also allowed for comparison between ethnic groups, which highlighted meaningful differences between African American and European American families. A unique contribution was the inclusion of parent-adolescent communication about sex in the context of other data on

family relationship quality and parent monitoring. Parent-adolescent communication about sex has often been examined in the absence of other information on family relationships, clouding the significance of this variable. The current results suggest that parent-adolescent communication about sex influences sexual risk behavior above and beyond the effects of general family processes.

In summary, this study addressed three main questions about risky sexual behavior in the context of family and peer influences in the lives of adolescents. First, I found that parents' and adolescents' report of most family and peer variables were somewhat different, and that adolescent perceptions of these variables were more strongly related to problem behavior. I hypothesize that this discrepancy between parent and adolescent report results from ineffective monitoring of adolescents or, as some researchers have suggested, adolescents' disinclination to talk with parents about their activities (Kerr & Stattin, 2000; Kiesner et al., 2009). It is also possible that correlations among adolescent-reported variables are an artifact of the questionnaires; that adolescents tended to respond to items in a way that seemed consistent (e.g., if they reported high levels of friends' problem behavior they also reported high levels of their own problem behavior, either because they were primed to remember their own problem behavior or because this pattern told a consistent story.) The question of how best to monitor adolescents to decrease negative outcomes deserves further research. Second, I found that less positive family relations, lower parental monitoring, more family conflict, and more parent-adolescent communication about sex in earlier adolescence were related to higher risky sexual behavior in later adolescence. It is likely that family relationship variables and monitoring are related to RSB concurrently rather than over time. Family relationships and monitoring may affect some third variable (e.g., peer association or

initiation of problem behavior) that is stable over time (Kiesner et al., 2009), though further research is needed to understand the association between early adolescent family processes and later adolescent RSB. Some aspects of parent-adolescent communication about sex were also related to greater RSB among some participants; however, not enough information was present in the data about the content and process of this communication to draw firm conclusions about its effect on RSB. In addition, the model used in the current study needs to be replicated with an independent sample before these results can be accepted with confidence. The literature is mixed on the effect of parent-adolescent communication about sex, and additional longitudinal research is necessary to understand better the nature and effect of this communication in families. Third, I found that African American teens were more likely than European American teens to engage in RSB outside the context of other problem behavior, and that reported engagement in problem behavior more often distinguished among White participants who engaged in RSB than it did Black participants.

Collectively, these findings add to the literature by examining parent-adolescent communication about sex in the larger context of family relationships, and by examining differences in the prevalence and patterns of sexual risk behavior for African American and European American teens. This work opens the door for further research on the role of parents in preventing risky sexual behavior, particularly among African American families, and for investigation that aims to understand the reasons for higher rates of RSB among Black as compared to White teens. Since risky sexual activity has consequences that are life-changing or even life-threatening, understanding and preventing RSB are important goals for promoting the well-being of youth and their families. Ongoing research and intervention

are needed to promote healthy sexual development and decrease the number of youth who are adversely affected by risky sexual behavior.

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