The Pennsylvania State University

The Graduate School

College of Health and Human Development

SIBLING DYNAMICS IN CHILDHOOD AND ADOLESCENCE AND THEIR IMPLICATIONS FOR YOUTHS' ADJUSTMENT

A Dissertation in

Human Development and Family Studies

by

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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

May 2012

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ABSTRACT

Three studies examined sibling dynamics and their links with adjustment in childhood and adolescence. Study 1 examined the associations between sibling relationship qualities and youths' reports of risky behaviors in a sample of adolescents aged 11 to 20. Participants were mothers, fathers, and sibling dyads from 393 families who were interviewed annually for 3, 4, or 5 years. Multilevel models tested longitudinal associations between sibling intimacy and conflict and youths' risky behaviors and whether these associations varied by birth order or sex. Results showed positive covariation between sibling conflict and risky behavior for everyone except firstborns with younger brothers. Intimacy was positively linked with risky behavior in brother-brother pairs. Building on the idea that sibling intimacy may act as a risk factor under certain conditions, Study 2 assessed siblings' collusion, or tendency to act as "partners in crime," in a sample of school-aged sibling pairs from 174 families. Collusion was measured through child-report and videotaped observations. Analyses tested children's and parents' adjustment and parenting dynamics as predictors of sibling collusion. Positive links between collusion and children's externalizing behavior, parenting stress, parent-child conflict, and parents' authoritarian control emerged, as did negative links for children's social competence and parental responsiveness, but links varied by sex and dyad sex constellation. Study 3 examined the longitudinal associations between parents' differential treatment and youths' adjustment and tested adolescent sex, birth order, and parents' financial stress as moderators of these associations. Mothers, fathers, and two adolescent siblings in 179 African American families were interviewed on 3 annual occasions. Multilevel models revealed that decreases in youths' experiences of parental warmth, *relative to a sibling*, were associated with increases in youths' risky behavior and depressive symptoms, particularly in boys. Negative links emerged for differential parental conflict. These links were evident, however, in families under low but not under high financial stress. Taken together, these studies contribute to our understanding of siblings' role in youths' development and well-being, situate sibling effects within the broader family context, and provide information to inform prevention programs aimed at promoting positive development and reducing behavior problems by targeting sibling and related family dynamics.

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ACKNOWLEDGMENTS

I am grateful to the National Institute of Child Health and Human Development for its support for the Penn State Family Relationships Project through grants R01-HD32336 and R01-HD29409 to Ann C. Crouter and Susan M. McHale, and the National Institute of Drug Abuse for funding the Siblings Are Special project through grant DA025035 to Mark E. Feinberg. This work would not have been possible without the generous funding from these institutions.

I would like to thank my committee members, who have been tremendously supportive and encouraging of my work. I am honored to collaborate with such an extraordinary group of scholars. Susan, your mentorship over the past six years has shaped me as a researcher and as a person. Your intellectual curiosity, energy, and grace amaze me, and I can only hope to emulate these qualities in my own life. Thank you for giving me the freedom to explore my interests and for supporting me in my professional journey. Mark, thank you for the incredible opportunities you have given me to expand my horizons and gain experiences that will prove invaluable as I begin my career. Your expertise and passion for family-based intervention research has helped to deepen my thinking about family processes. Wayne, I am endlessly grateful for your feedback on my statistical models and for your patience and clarity. I also appreciate your support in helping me obtain an internship, an experience that has been integral in shaping my career goals. Doug, I have learned so much from you, both in class and through your insights about my dissertation research. I appreciate your careful attention to measurement, and your helpful observations that have greatly improved my work and sharpened my writing.

I would also like to thank my family for their unfailing confidence in me. I am grateful to my parents for believing in me through my 22 years of school and showing a genuine interest in my work. To my own siblings, Meg and Jon, thank you for sparking my fascination with sibling relationships in the first place and always being there to share a laugh and cheer me on. Finally, to Neal, I could not have made it to this point without your companionship, kindness, and humor. You are always willing to listen, even though you probably never want to hear another word about multilevel modeling again! I am fortunate to have you as my partner and look forward to everything the future holds for us.

CHAPTER 1

Introduction

Introduction

Sisters and brothers are constant companions in childhood and adolescence and are key agents of socialization for both antisocial and prosocial outcomes (East, 2009). Currently in the United States, the vast majority of children live with at least one sibling (Hernandez, 1997; U. S. Census Bureau, 2011), and more children live in homes with a sibling than with a father (McHale, Updegraff, & Whiteman, in press). Other work reveals that children spend more of their out-of-school time with siblings than with any other individual (McHale & Crouter, 1996), and that siblings in minority groups spend an even greater portion of their free time together (Updegraff, McHale, Whiteman, Thayer, & Delgado, 2005). Most research on family influences on children's development, however, focuses on parenting and marital dynamics. Scholars have long recognized sibling relationships as a context for individual development (Bank & Kahn, 1982; Dunn, 1983; Furman & Buhrmester, 1985), and more recent work has shown links with a variety of outcomes ranging from empathy to delinquency and substance use (e.g., Compton, Snyder, Schrepferman, Bank, & Shortt, 2003; Rende, Slomkowski, Lloyd-Richardson, & Niaura, 2005; Tucker, Updegraff, McHale, & Crouter, 1999). In short, siblings have great potential to shape one another's outcomes, and this dissertation examines the implications of sibling dynamics and their links with other family relationships in childhood and adolescence.

Many of the ideas explored in this dissertation are grounded in a family systems perspective (P. Minuchin, 1985; S. Minuchin 1974) which holds that families are comprised of interdependent individuals and subsystems, each with their own unique characteristics. The smallest unit is the individual, whose personal qualities shape his or her behaviors within the larger family system (P. Minuchin, 1985). Some subsystems involve two family members (e.g.,

marital and sibling relationships), others involve three or more (e.g., parental differential treatment of two siblings, mothers' and fathers' coparenting of a child), and all subsystems are nested within the broader, whole-family system. As such, an understanding of family processes must go beyond the experiences of a single individual and include the perspectives of different family members. These tenets provided the basis for my use of assessments from multiple family members and measures that captured broader family processes like parental differential treatment and parents' involvement in sibling relationships. Papers 1 and 2 explored dyadic sibling dynamics, focusing on sibling intimacy, conflict, and collusion. Paper 3 considered parental differential treatment, a sibling dynamic that, as noted, involves both parents and siblings.

Dyadic sibling influences have to do with the everyday interactions, exchanges, and activities that siblings share with one another. Links between dyadic sibling relationship qualities, such as intimacy and conflict, and youths' adjustment often are explained by social learning mechanisms such as modeling and reinforcement (Bandura, 1977). Because of their proximity and similarity, siblings are salient models for one another and they may observe and imitate one another's (mis)behavior (e.g., Compton et al., 2003; Rende et al., 2005; Whiteman, McHale, & Crouter, 2007).

Sisters and brothers also reinforce behavior patterns as they engage in everyday interactions such as playing together, fighting, or sharing secrets and advice. Children carry what they learn in the sibling context about how to interact with a social partner into other relationships outside the family with peers, friends, and teachers (Criss & Shaw, 2005; Patterson, DeBaryshe, & Ramsey, 1989). If the sibling relationship is mostly hostile or

aggressive, this can lead to the development of a negative interpersonal style, affiliation with similarly socially inept peers, and eventual problem behaviors. This sequence has been described by Patterson and colleagues in their work on coercive processes (Patterson, 1986; Patterson, Dishion, & Bank, 1984). Conversely, if the relationship is warm and supportive, youths may reap the benefits of what they learn with their sibling in other social relationships and be protected from low self-worth and a propensity for engaging in antisocial activities (East & Khoo, 2005; Tucker et al., 1999).

Reinforcement and modeling often operate together, as modeling is most likely to take place when the siblings share a warm and intimate relationship (McHale, Bissell, & Kim, 2009; Slomkowski, Rende, Conger, Simons, & Conger, 2001). Thus, in dyads within which at least one child has antisocial tendencies, a close sibling relationship might actually have negative implications if it encourages modeling of antisocial behavior. For example, an older sibling might procure illegal substances and offer to share them with a younger sibling (Forster, Chen, Blaine, Perry, & Toomey, 2003; Needle et al., 1986), or introduce the younger sibling to a group of older, deviant peers (Snyder, Bank, & Burraston, 2005).

Paper 1 used longitudinal analyses to explore the role of sibling intimacy and conflict in adolescents' risky behaviors such as substance use, truancy, and delinquency. The available research on this topic has been mostly cross-sectional (for an exception, see Buist, 2010) and the present analysis expanded on this work by testing the links between within-person changes in sibling relationship qualities and within-person changes in risky behavior over time, and also investigated potential variations by birth order and sex.

Paper 2 built on a growing body of research that implicates siblings as "partners in

crime" who encourage each other's risky behaviors (Bullock & Dishion, 2002; Slomkowski et al., 2001). This work draws attention to sibling collusion as an understudied sibling relationship dynamic that is distinct from the more commonly measured intimacy and conflict (Stormshak, Comeau, & Shepard, 2004). Collusion occurs when siblings talk about, plan for, or engage in secret or covert activities together. Although cooperation between siblings is not inherently deviant (for example, siblings could collude together to plan a surprise party for their parent), all scholarly research to date has focused on collusion around risky activities such as breaking family rules, using substances, or hanging out with delinquent peers. Collusion involves both reinforcement (as siblings laugh at or encourage one another's deviant talk or behaviors) and modeling (as siblings watch and learn from each other's antisocial behaviors). Few studies have measured collusion directly; rather, most (including Paper 1) infer it from reports of sibling intimacy and conflict (Rowe & Gulley, 1992; Slomkowski et al., 2001).

Paper 2 advanced the literature by directly measuring sibling collusion through both self-report and observation. As suggested by a family systems perspective (P. Minuchin, 1985; S. Minuchin, 1974), sibling collusion is embedded in larger family systems, and Paper 2 shed light on the links between collusion and the characteristics of individuals and subsystems within the family. Existing research suggests that ineffective parenting and affiliation with deviant peers are risk factors for sibling collusion (Criss & Shaw, 2005; Snyder et al., 2005), but these studies primarily used samples of at-risk youths and their families, and sibling collusion in non-clinical samples is not well-understood. I explored the family context of collusion by testing its associations with children's and parents' individual adjustment, dyadic parent-child relationships, and parenting of the sibling dyad in a sample of normative, school-aged siblings

and their families. I also examined the roles of youths' sex, dyad sex constellation, and birth order in sibling collusion.

Paper 3 focused on the implications of parents' differential treatment (PDT) of their children, a triadic sibling influence dynamic that involves two siblings and a parent. Social comparison theory (Festinger, 1954) suggests that individuals evaluate themselves based on comparisons with others. Siblings may be especially prone to social comparison because they are often together, they share similar family and individual characteristics, and they are frequently compared to one another by other people. As Alfred Adler described in his theory of individual psychology (Ansbacher & Ansbacher, 1956), sibling comparisons have unique implications for individual development, as feeling that a parent unfairly favors a sibling over oneself may lead to negative adjustment outcomes such as low self-worth or acting out. Differential treatment does not necessarily require direct interaction between siblings; rather, its implications are indirect and involve youths' perceptions of how parents act toward themselves and toward their sibling, and their reactions to perceived (possibly unfair) discrepancies.

A limitation of social comparison theory and individual psychology is that neither specifies how contextual factors could mitigate or exacerbate the effects of PDT; rather, both assume that the negative consequences of differential treatment are universal. There is some evidence, however, to suggest that PDT may vary depending on elements of the family ecology, such as sibling dyad characteristics like sex constellation and birth order (Shanahan, McHale, Crouter, & Osgood, 2008; Tamrouti-Makkink, Dubas, Gerris, & van Aken, 2004), marital discord (Richmond & Stocker, 2008), and socioeconomic status (Asbury, Dunn, & Plomin, 2006).

I extended this work by examining parents' financial stress as a potential moderator of PDT in a sample of African American families, a group for whom financial stress may be particularly salient because of racial/ethnic disparities in accumulated wealth (Orzechowski & Sepielli, 2003). Specifically, I used a multilevel modeling framework to test the longitudinal associations between mothers' and fathers' differential treatment and youths' depressive symptoms and risky behavior, and explored sibling dyad characteristics and parents' financial stress as moderators of these linkages. This paper contributes to knowledge about indirect sibling influences and whether/how they work differently under conditions of financial stress African American families.

The overarching goal of this dissertation was to probe into the question of how siblings influence one another's adjustment including how sibling influences operate within the broader family system. The three studies shared some commonalities, including the use of multilevel modeling to account for nonindependent data and the exploration of sibling dyad characteristics such as birth order, sex, and dyad sex constellation. I made use of three datasets that had a number of unique strengths, including longitudinal data collected from multiple family members, multi-method data sources, samples that included minority families, and novel measures of sibling dynamics. Taken together, the three papers advance our understanding of sisters and brothers as socialization agents and provide information that can be applied to efforts aimed at promoting positive development and reducing behavior problems by targeting sibling and related family dynamics.

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CHAPTER 2

Longitudinal Associations Between Sibling Relationship Qualities

and Adolescents' Risky Behavior

We thank Megan Baril, Matt Bumpus, Kelly Davis, Aryn Dotterer, Melissa Fortner, Melissa Head, Heather Helms, Julia Jackson-Newsom, Corinna Jenkins Tucker, Marni Kan, Ji-Yeon Kim, Mary Maguire, Lilly Shanahan, Cindy Shearer, Jennifer Tanner, Kimberly Updegraff, and Shawn Whiteman for their help in conducting this research, and Damon Jones, Ian Lam, and Wayne Osgood for their insights on the analysis approach. We are grateful to the participating families for their time and cooperation. This work was funded by grants from the National Institute of Child Health and Human Development, R01-HD32336 and R01-HD29409, Ann C. Crouter and Susan M. McHale, Principal Investigators. Portions of this paper were presented at the biennial meeting for the Society for Research on Adolescence, March 2010, Philadelphia, PA.

Abstract

This study examined the associations between sibling intimacy and conflict and youths' reports of risky behaviors in a sample of adolescents aged 11 to 20. Participants were mothers, fathers, and sibling dyads in 393 families who were interviewed annually for 3, 4, or 5 years. Multivariate multilevel models tested longitudinal associations between sibling intimacy and conflict and youths' risky behaviors and whether these associations varied by birth order or sex. All models controlled for parent-child relationship qualities. Results showed positive covariation between sibling conflict and risky behavior for all youths except firstborns with younger brothers. Sibling intimacy was positively linked with risky behavior in brother-brother pairs. The discussion focuses on sibling relationships as a context for adolescents' individual development and the roles of sex, dyad sex constellation, and birth order.

Longitudinal Associations Between Sibling Relationship Qualities and Adolescents' Risky Behavior

Siblings are a fixture in adolescents' daily lives and a growing body of evidence suggests that they play a unique role in youths' individual development (East, 2009; McHale, Kim, & Whiteman, 2006). The sibling bond is unlike any other because it is lifelong, non-elective, and often characterized by an emotionally intense "love-hate" dynamic. For these reasons, siblings have the potential to significantly impact one another's development. The most widely studied sibling influence mechanisms fall under the umbrella of social learning theories (Bandura, 1977), which hold that sisters and brothers influence one another both through positive and negative reinforcement patterns in their everyday interactions and through direct observation and modeling. Such sibling effects have been documented for a range of externalizing behaviors (e.g., Compton, Snyder, Schrepferman, Bank, & Shortt, 2003; Rende, Slomkowski, Lloyd-Richardson, & Niaura 2005; Stocker, Burwell, & Briggs, 2002), and these influence processes may be particularly salient in adolescence as youths begin to engage in risky behavior like substance use and delinquent activities (Bullock & Dishion, 2002; Slomkowski, Rende, Conger, Simons, & Conger, 2001). Sibling characteristics, such as birth order and sex, have been identified as key factors in sibling influences (e.g., Branje, van Lieshout, van Aken, & Haselager, 2004). The present study builds on primarily cross-sectional research to address two goals: (1) to test time-varying links between sibling conflict and intimacy and adolescents' risky behavior, and (2) to examine birth order, sex, and dyad sex constellation as moderators of these associations.

Sibling Influences on Risky Behavior

A number of studies have found that sibling relationship qualities, such as the level of intimacy, conflict, or coercion between two siblings, are linked with adolescents' risky behavior. Youths who engage in conflict and negative exchanges with their brothers or sisters are more likely to take part in criminal activities and exhibit higher rates of externalizing behavior problems (Bank, Patterson, & Reid, 1996; Compton et al., 2003; Natsuaki, Ge, Reiss, & Neiderhiser, 2009; Stocker et al., 2002). A more a supportive or intimate relationship, on the other hand, may protect against involvement in delinquent activities (Branje et al., 2004; Buist, 2010; East & Khoo, 2005; East & Shi, 1997). Patterson's (1986) coercive process model suggests that the sibling context serves as a "training ground" where children learn how to interact with a social partner. If sibling exchanges are predominantly hostile, then negative interaction patterns are reinforced and the child develops a generalized coercive interpersonal style that may include poor self-regulation skills and an inability to communicate and solve problems calmly and effectively. That style then carries over into other social contexts, leading youths to become friends with peers who have similarly poor social skills and trouble at school, and eventually to develop behavior problems (Criss & Shaw, 2005; Patterson, DeBaryshe, & Ramsey, 1989). The coercive process model has received empirical support across a ten year span for at-risk boys and their younger siblings (Bank, Burraston, & Snyder, 2004; Snyder, Bank, & Burraston, 2005).

Although conflictual sibling relationships are clearly a risk factor for later problem behaviors, the role of sibling warmth and intimacy in youths' externalizing behavior is less straightforward. On one hand, the same mechanisms at work in the coercive process model

might apply to warm and supportive sibling relationships. For example, siblings can serve as models for one another and reinforce adaptive social skills such as negotiation, compromise, and empathy (Howe, Aquan-Assee, Bukowski, Lehoux, & Rinaldi, 2001; Tucker, Updegraff, McHale, & Crouter, 1999; Yeh & Lempers, 2004). Children might then apply these skills to peer interactions, develop healthy relationships with friends and teachers, and avoid getting involved in risky activities. Although it has not been as studied as extensively as the coercive process model, some findings are consistent with the idea that positive sibling relationships are associated with fewer risky behaviors (East & Khoo, 2005; East & Shi, 1997; Tucker et al., 1999).

The peer-like nature of sibling dynamics, however, creates a further layer of complexity, as intimate sibling relationships may also give rise to a "partners in crime" dynamic, or what has been termed "collusion" (Bullock & Dishion, 2002; Slomkowski et al., 2001; Snyder et al., 2005). Siblings who are close may encourage each other to undertake reckless or illegal activities like smoking, drinking, and engaging in criminal acts together (Bullock & Dishion, 2002). In this case, high sibling intimacy would be associated with *more* risky behavior, in contrast to the typically expected protective effects. Sibling intimacy in itself does not necessarily promote delinquent behavior; rather, it is having an imitate relationship *with a sibling who engages in risky behavior* (Rowe & Gulley, 1992). For example, Slomkowski and colleagues (2001) found that warmth and closeness with an older brother predicted younger brothers' delinquency four years later, but only when the older brother reported a high level of delinquency.

The mechanisms underlying collusion involve both modeling and reinforcement processes. Consistent with social learning theory predictions (Bandura, 1977), sibling intimacy has been shown to moderate the influence of adolescents' substance use, risky sexual behavior,

and delinquency on their sibling's behavior, with the strongest degree of similarity found in pairs characterized by a high level of warmth (McHale, Bissell, & Kim, 2009; Rende et al., 2005; Rowe & Gulley, 1992). When delinquent adolescents have warm relationships with their sibling, they may be more likely to encourage their siblings' risky behavior, for instance, by introducing them to a circle of deviant friends or providing illegal substances. Indeed, siblings who share mutual friends are more likely to report similar levels of delinquency and substance use (Rende et al., 2005; Rowe & Gulley, 1992), and siblings are a direct source for cigarettes, alcohol, and marijuana for some adolescents (Forster, Chen, Blaine, Perry, & Toomey, 2003; Needle et al., 1986).

Birth order and sex. Sibling dyad characteristics, including birth order, sex, and dyad sex constellation, moderate sibling influences. Birth order creates unique family roles for siblings. Social learning theory (Bandura, 1977) suggests that, by virtue of their maturity, older siblings often act as teachers or role models for their younger siblings (Rowe & Gulley, 1992; Slomkowski et al., 2001) and may initiate their younger siblings into involvement with older, delinquent adolescents (Snyder et al., 2005). Most sibling analyses are framed to test how older siblings influence their younger siblings, but not vice versa. Studies that have tested both directions, however, suggest that the associations between sibling relationship qualities like warmth and conflict and youths' adjustment *do not* differ for older and younger siblings (Branje et al., 2004; Kim , McHale, Crouter, & Osgood, 2007; Lauritsen, 1993) or, in some cases, are stronger for older siblings (Buist, 2010). A limitation of past work is that older and younger siblings are often tested in separate models, making it difficult to assess birth order differences statistically. The current study uses a multivariate multilevel modeling approach, which allows

both siblings to be included in the same model and for statistical tests of birth order differences.

Sex and dyad sex constellation have also been identified as key factors in sibling influences, though not all findings are consistent. For example, some studies suggest that low sibling warmth and high coercion are more strongly linked to internalizing problems for girls than boys (Compton et al., 2003; Kim et al., 2007). Branje et al. (2004) found that sibling support had a protective effect against externalizing problems, but only for girls with older brothers. A longitudinal study by Buist (2010) found that improvements in sibling quality (a measure that combined both positive and negative dimensions of the sibling relationship) were associated with slower increases in delinquent behavior for boys with younger brothers.

Some studies have found evidence for collusion only among same-sex dyads (Buist, 2010; Rowe and Gulley, 1992), and particularly among pairs of brothers (Slomkowski et al., 2001). A caveat of the study by Slomkowski and colleagues is that boys reported much higher rates of serious delinquent behaviors than girls, allowing for more opportunities for two brothers to collude. The authors suggested that a stereotypically masculine culture may be more conducive to exchanges wherein brothers enjoy their own and others' delinquent behaviors by recalling stories of previous deeds or laughing about friends' transgressions. Clearly, more work is needed to understand the complex dynamics of sex and birth order in sibling influences.

Study Goals

The current study explored the role of sibling conflict and intimacy in youths' delinquent behaviors using data from a longitudinal study that followed siblings across the course of

adolescence. I built on previous research first, by testing the time-varying associations between sibling intimacy and conflict and risky behavior, controlling for parent-youth relationship qualities. This is an essential step in isolating sibling effects because parenting may act as a third variable in these associations, for example, if parent-youth conflict predicts both sibling conflict and youths' risky behavior. I expected to find negative associations between intimacy and risky behavior and positive associations between conflict and risky behavior. Second, I examined sibling and dyad characteristics, including birth order, sex, and dyad sex constellation, as moderators of sibling relationship-risky behavior linkages. Consistent with prior research and social learning theory tenets, I expected that sibling effects would be stronger for younger siblings than for older siblings. I also hypothesized that sibling influences would be more prevalent in same-sex dyads, and possibly most evident among pairs of brothers as demonstrated by previous research (Buist, 2010; Rowe & Gulley, 1992; Slomkowski et al., 2001).

Method

Participants

Data came from a sample of 400 mothers, fathers, and two target siblings who participated a longitudinal study of family relationships. About half of the sample (*n* = 197) was recruited when the firstborn sibling was in 8th, 9th, or 10th grade, and participated in three annual waves of data collection. The remaining 203 families were recruited when the firstborn sibling was in 4th or 5th grade, and participated in as many as 10 annual waves of data collection. For the current analyses, I combined these two cohorts in the years when the siblings were approximately the same ages, namely, Years 1, 2, and 3 from the adolescent-age cohort and

Years 6, 7, 8, 9, and 10 from the middle childhood-age cohort (termed Times 1, 2, 3, 4, and 5 here). In the middle childhood cohort, data were collected from families until the firstborn sibling left home for college, which happened for the majority of families after Time 3 (39%) or Time 4 (47%). For the remaining families in the middle childhood cohort, we continued to collect data through Time 5, resulting in diminishing sample sizes after Time 3. Combining the two cohorts resulted in 400 families that contributed between 3 and 5 data points.

Families were recruited via letters sent home through 18 rural and small urban school districts in a northeastern state. Interested families returned a self-addressed postcard, and project staff completed a follow-up telephone interview to determine eligibility. Criteria for participation included (1) having a firstborn child in grades 4 or 5 (for the middle childhood cohort) or grades 8, 9, or 10 (for the adolescent cohort); (2) having a second-born child one to four years younger than the first; and (3) having always-married parents.

In the middle childhood cohort by Year 6 (Time 1 in this study), seven families had withdrawn, reducing the sample size to 393 at Time 1. Over the course of data collection points used in this study, eight additional families declined to participate, an attrition rate of 4%. A small amount of data were missing because a handful of family members declined participation at certain phases and because some parents stopped participating as a result of divorce or death. Because multilevel modeling is designed to make use of all of the available data, the eight families who dropped out between Times 1 and 5 and the families who were missing data at some time points were retained in the current analyses. The final sample included 393 families that provided data for at least one measurement point.

Firstborn siblings averaged 15.69 years of age (*SD* = 1.06) and second-born siblings

averaged 13.17 years of age (*SD* = 1.28) at Time 1. The sample was approximately evenly divided by dyad sex constellation (94 older sister-younger sister, 96 older sister-younger brother, 102 older brother-younger sister, and 101 older brother-younger brother pairs). Almost all families were White and working or middle class, as reflected by parents' education levels (at Time 1, *M* = 14.56 years, *SD* = 2.17 for mothers, *M* = 14.54 years, *SD* = 2.39 for fathers, where 14 years was equivalent to some college and 16 years was equivalent to a college degree) and family income (at Time 1, *M* = $72,962, *SD* = $41,265). Average family size was 4.56 (*SD* = 0.85, range 3-9 family members) at Time 1.

Although the sample is not representative of U.S. families, it approximates the racial background of families from the area from which the sample was drawn (> 85% White). Further, data from the U.S. Census Bureau (2002) indicate that the average family income in the state was $49,184 in 1999. In 1998, average family income in this sample was $62,000. This number is higher than average for the state, but this may be because this sample included two-parent, mostly dual-earner families, with older parents who had been in the labor force for many years.

Procedures

Home interviews were conducted separately with mothers, fathers, and the two siblings each year. After receiving a general introduction to the study, families completed informed consent/assent forms and were paid for their participation (ranging from $50 to $200, depending on the year of the study). Family members reported on their family relationships and personal adjustment in interviews lasting between 2 and 3 hours.

Measures

Both siblings reported on *sibling intimacy* using an eight-item (e.g., "How much do you go to your brother/sister for support?"), 5-point scale (1 = *not at all,* 5 = *very much*) adapted from Blyth, Hill, and Thiel (1982). Cronbach's alphas ranged from .84 to .87 across the study waves. *Sibling conflict* was measured with five items (e.g., "How often do you feel mad or angry at your sister/brother?") on a 5-point scale (1 = *not at all,* 5 = *very much*) from the Sibling Relationship Inventory (Stocker & McHale, 1992). Reliabilities ranged from .75 to .83. For both intimacy and conflict, ratings were averaged and higher scores indicated more intimacy or more conflict.

Parent-youth intimacy was assessed with first- and second-born siblings' reports of intimacy with their mother and father on the same scale used to measure sibling intimacy (Blyth et al., 1982). Youths answered eight items (e.g., "How much do you go to your mother/father for support?") about their experiences with each parent during the past year using a 5-point scale (1 = *not at all,* 5 = *very much*). Cronbach's alphas ranged from .79 to .89. *Parent-youth conflict* was measured with a scale adapted from Smetana (1988) on which youths rated the frequency of their conflict with each parent in ten domains (e.g., appearance, social life, chores) ranging from 1 (*not at all*) to 6 (*several times a day*). Cronbach's alphas ranged from .71 to .87. Correlations between youths' reports of mother and father intimacy were moderate (r ranged from .47 to .64, with the exception of second-born siblings' reports of mother and father intimacy at Time 5, r = .25) and correlations between mother and father conflict were high (r ranged from .64 to .87). Because I did not have hypotheses about different effects for mothers vs. fathers and because indices of parent-youth relationships were control variables in

the current analysis, I averaged across mother- and father-youth intimacy and mother- and father-youth conflict to create single scores for parent-youth intimacy and parent-youth conflict at each data collection point.

Siblings reported on how often they had participation in 18 *risky behaviors* (e.g., smoked cigarettes, skipped a day of school, disobeyed parents on an important issue) in the past year using a 4-point scale (1 = *never,* 4 = *more than 10 times*; Eccles & Barber, 1990). Items were summed, with higher values indicating more risky behavior. Cronbach's alphas ranged from .86 to .91. A log transformation was applied to correct for positive skew.

Results

Analysis Plan

Given the nonindependence inherent in the data structure (i.e., individuals over time, firstborn and second-born siblings in the same family), I used a multivariate multilevel modeling (MLM) approach to test the longitudinal associations between sibling relationship qualities and youths' risky behavior. The MLM framework allowed me to focus on within-person changes over time by treating each individual as his/her own control and isolating effects that co-varied over time and that were net of stable individual and contextual differences, whether measured or not (Horney, Osgood, & Marshall, 1995; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002).

All models were tested in SAS 9.2 using the MIXED procedure. I estimated a series of three-level multivariate models in which firstborn and second-born siblings' reports of risky behavior were treated as two time-varying dependent variables. Separate random effects and residual variances were estimated for each sibling and were allowed to co-vary. Youths' age was used as the metric of time. A minimum of 36 youths provided reports of risky behavior for

each chronological age from 11 through 20 years (*n*s at each chronological age ranged from 36 to 504). Age was centered at 15 because (1) this was the average age across all times of measurement, and (2) there is substantial variability in risky behavior by middle adolescence, whereas centering at the youngest age would mean that the fixed effects would capture primarily early starters.

Sibling intimacy and conflict were tested as independent variables in separate models. I included two versions of sibling intimacy and conflict as predictors: the cross-time (i.e., time-invariant) version was centered at the sample mean and reflected between-person effects, and the time-varying version was centered at each individual's cross-time mean and reflected within-person effects. Including both the between-person and the within-person time-varying variables allowed me to focus on *changes* in sibling relationship qualities predicting *changes* in risky behavior, net of stable individual differences in these variables and in the control variables. This analysis tests, for example, whether youths who report higher sibling conflict *than their average level of conflict* also report more risky behaviors at the same occasion. Time-varying parent-youth intimacy and conflict were treated as control variables and centered at their sample means. Additional time-invariant predictors included firstborn and second-born siblings' sex, dyad sex constellation, and parent education at Time 1 (average of mother and father).

I first estimated a growth curve model for risky behavior, with separate intercepts and slopes for firstborn and second-born siblings (see Laurenceau & Bolger, 2005) and tested whether the slope was conditioned by firstborn sex, second-born sex, or dyad sex constellation. I then added the between- and within-person sibling relationship qualities as predictors of

change in risky behavior, controlling for the corresponding parent-youth relationship quality and parent education. Finally, I tested whether adolescent sex and/or dyad sex constellation moderated sibling relationship-risky behavior associations. Only statistically significant interactions were retained in the final models (Aiken & West, 1991).

Because separate growth curves were estimated for firstborn and second-born siblings, I also tested a series of models to determine whether the associations between each predictor and the dependent variable were significantly different for firstborns and second-borns. The process involved first testing a model that was parameterized so that the main effects represented the effects for firstborns and included interactions with a dummy-coded birth order variable (0 = firstborn, 1 = second-born). These interaction terms represented the difference in effect for firstborns and second-borns. If the difference was significant, separate effects were estimated for each sibling; if the difference was not significant, the effect was pooled across both siblings' reports.

Growth Curve of Risky Behavior

On average, youths engaged in relatively few risky activities, scoring on the low end of the risky behavior scale which had a range of possible scores from 18 to 72 (at Time 1, M = 24.78, SD = 6.75; see Appendix A for all means and standard deviations). Bivariate correlations (see Appendix B) showed strong cross-time stability for risky behavior (rs ranged from .40 to .86 across all waves), sibling intimacy (rs ranged from .34 to .86), and sibling conflict (rs ranged from .23 to .79).

I tested a series of preliminary MLMs and conducted deviance tests to examine the growth curve for risky behavior and to determine whether the coefficients should be treated as

random or fixed effects (see Raudenbush & Bryk, 2002 and Snijders & Bosker, 1999). The most appropriate model included separate fixed and random intercepts and linear slopes for firstborns and second-borns and a single fixed quadratic term that was pooled across both siblings. Although the quadratic fixed effect was not significant in the unconditional model, it became significant in the conditional models and therefore was retained. Parameter estimates for the unconditional model can be found in columns 2 and 3 of Table 2.1.

The next step was to test whether the growth curve for risky behavior varied by firstborn sex, second-born sex, or dyad sex constellation. By including firstborn and second-born sex as separate predictors, I was able to test whether each youth's *own sex* predicted their self-reports of risky behavior (indicated for firstborns by the effect of firstborn sex, and for second-borns by the effect of second-born sex) and whether their *sibling's sex* predicted their self-reports of risky behavior (indicated for firstborns by the effect of second-born sex, and for second-borns by the effect of firstborn sex). I also tested for birth order differences in these effects, which would indicate, for example, whether firstborn sex predicted firstborns' self-reports of risky behavior, but not second-borns' reports of risky behavior.

Results are presented in columns 4 and 5 of Table 2.1. There was a main effect for firstborn sex, which varied significantly by birth order, $\gamma = -0.10$, $SE = 0.03$, $p < .001$. The effect labeled "FB sex – FB" indicated differences in firstborns' risky behavior by their own sex and the coefficient labeled "FB sex – SB" indicated the effect of firstborn sex on *second-borns'* risky behavior. The coefficients indicated that firstborn sex was predictive of both firstborn and second-born siblings' risky behavior, but that the effect was significantly stronger for firstborns. Second-born sex ("SB sex") was also a significant predictor but did not differ by birth order,

indicating that second-born sex was linked with both firstborns' and second-borns' reports of risky behavior.

These sex effects were followed up by changing the reference group (in Table 2.1 the reference group was girls) and noting the intercept for firstborns and second-borns in each of these models. At age 15, risky behavior was higher among boys (firstborns: $\gamma = 3.27$, $SE = 0.02$; second-borns: $\gamma = 3.21$, $SE = 0.02$) than girls (firstborns: $\gamma = 3.10$, $SE = 0.02$; second-borns: $\gamma = 3.16$, $SE = 0.02$). In addition, youths with a brother reported more risky behavior (firstborns: $\gamma = 3.15$, $SE = 0.02$; second borns: $\gamma = 3.22$, $SE = 0.02$) than those with a sister (firstborns: $\gamma = 3.10$, $SE = 0.02$; second-borns: $\gamma = 3.16$, $SE = 0.02$) at age 15. The effects for dyad sex constellation (the four combinations of firstborn and second-born siblings' sex) were tested by including the interaction between firstborn and second-born sex, but no significant effects emerged.

Significant interactions between age and sex indicated that the sex effects varied across adolescence. Girls started off with lower risky behavior scores than boys in early and mid-adolescence, but girls' risky behavior increased at a faster rate over time and by age 18 for firstborns and age 16 for second-borns, girls had "caught up" with boys and the sex differences were no longer statistically significant as revealed by a series of follow-up tests (Figure 2.1, top panel). The effects for sibling's sex indicated that firstborns with younger brothers reported more risky behavior from age 14 to 15, and that second-borns with older brothers reported more risky behavior than second-borns with older sisters from age 12 to 15 (Figure 2.1, bottom panel).

Links Between Sibling Conflict and Risky Behavior

Significant main effects for sibling conflict emerged indicating that youths who reported

more sibling conflict, both across time and relative to themselves at other occasions, also reported engaging in more risky behavior (Table 2.2). Both the between-person and within-person sibling conflict effects were qualified by interactions with second-born siblings' sex, and these interaction effects differed significantly by birth order, between-person conflict X second-born sex X birth order: $\gamma = 0.06$, $SE = 0.03$, $p = .03$; within-person conflict X second-born sex X birth order: $\gamma = 0.06$, $SE = 0.02$, $p < .001$. The interactions with second-born sex were significant for firstborns but not second-borns. Figure 2.2 shows that for firstborns with younger sisters, sibling conflict was positively linked with risky behavior at the between-person level, $\gamma = 0.06$, $SE = 0.02$, $p < .001$, meaning that firstborns who experienced more conflict with sisters as compared to other firstborns also exhibited more risky behavior. There was no link for firstborns with younger brothers, $\gamma = -0.02$, $SE = 0.03$, $p = .41$. The same pattern was observed for within-person conflict (not pictured). The latter effect indicated that, on occasions when firstborn siblings reported more conflict with their younger sisters than average, they also reported more risky behavior than their own average at that same point in time, $\gamma = 0.03$, $SE = 0.01$, $p = .001$; for firstborns with younger brothers, this effect was not significant, $\gamma = -0.01$, $SE = 0.01$, $p = .38$. The main effects were significant for second-born siblings at both the within- and between-person levels, but there were no significant interactions with firstborn or second-born sex.

Links Between Sibling Intimacy and Risky Behavior

The model predicting risky behavior with sibling intimacy revealed no significant between- or within-person main effects for sibling intimacy, however, a significant interaction between dyad sex constellation and intimacy emerged at the between-person level (Table 2.2).

As show in Figure 2.3, follow up tests revealed that there was a significant positive association between sibling intimacy and risky behavior *only* for brother-brother pairs, $\gamma = 0.08$, $SE = 0.03$, $p = .003$. There was no link for sister-sister, $\gamma = 0.004$, $SE = 0.02$, $p = .86$, sister-brother, $\gamma = -0.02$, $SE = 0.02$, $p = .34$, or brother-sister dyads, $\gamma = 0.01$, $SE = 0.02$, $p = .79$. This between-person level interaction effect showed that, pooled across all time points, boys who reported higher levels of sibling intimacy with their brothers also reported more risky behavior.

Discussion

In this study, I estimated the growth curve of risky behavior across adolescence and tested how changes in sibling conflict and intimacy were associated with changes in risky behavior. I used a multivariate MLM approach that included two siblings in one statistical model and allowed me to extend prior research by testing time-varying covariates of risky behavior and examining birth order and sex differences in these effects. By controlling for parent-youth relationship qualities and stable, individual differences – in sibling relationship qualities, but also in unmeasured stable qualities such as personality or family circumstances – I was able to rule out potential third variable explanations and identify within-person sibling relationship-risky behavior linkages. My findings showed that changes in sibling conflict were associated with changes in adolescents' risky behavior, even after accounting for mother-youth and father-youth conflict and the average level of sibling conflict across time. Within-person effects did not emerge for sibling intimacy, but between-person findings revealed that for brother pairs, intimacy was positively associated with risky behavior.

Changes in Risky Behavior Across Adolescence

Although charting the developmental course of adolescents' risky behavior was not a

primary goal of the present study, our findings provide an illustration of how risky behavior changes from early to late adolescence. Consistent with previous research, youths reported increasing levels for delinquent activities as they got older (see Farrington, 2009 for a review). I found evidence of distinct trajectories for girls and boys: Girls reported lower risky behavior in early adolescence, but increased more rapidly over time to catch up with boys by their mid- to late teens. Expanding on previous findings about adolescent sex, I also explored *siblings'* sex as a correlate of growth in risky behavior. In early and mid-adolescence, having a brother was associated with higher levels of risky behavior for both firstborn and second-born siblings. This is consistent with other research showing that having a brother versus a sister may be a risk factor for adolescents (Updegraff & Umaña-Taylor, 2010).

Links Between Sibling Relationship Qualities and Risky Behavior

The main goals of this study were to test the time-varying associations between sibling intimacy and conflict and youths' risky behavior, to examine birth order differences in these links, and to test and sex and dyad sex constellation as moderators. The findings were generally consistent with previous research and suggest that sibling conflict is a risk factor for problem behaviors (Bank et al., 1996; Compton et al., 2003; Natsuaki et al., 2009; Stocker et al., 2002). Further, among brother-brother pairs, my findings suggest that intimacy may reflect or promote sibling collusion around risky behavior (Rowe & Gulley, 1992; Slomkowski et al., 2001). Importantly, these effects emerged even after controlling for parent-child relationship quality, and therefore represent the unique contribution of sibling relationships, net of other family-level dynamics. I also found a number of birth order, sex, and dyad sex constellation effects, as discussed below.

Sibling conflict. Findings for sibling conflict revealed strong between-person and within-person effects on risky behavior. The within-person effect indicated that, controlling for stable individual differences in sibling conflict, on occasions when youths reported relatively more sibling conflict than usual, they also reported more risky behavior at the same point in time. This pattern is consistent with Patterson's (1986) coercive process model and suggests that sibling conflict may be a risk factor for problem behaviors. Youths who engage in excessive arguing or deliberate acts designed to bother or harm a sibling may apply this interpersonal approach in other relationships, making it more likely that they will be involved with peers with similar coercive styles that may evoke negative reactions from authority figures (Criss & Shaw, 2005; Patterson et al., 1989).

For firstborn siblings, the link between conflict and risky behavior was qualified by an interaction with second-born siblings' sex. Sibling conflict was positively linked to risky behavior at the within-person level for all adolescents *except* firstborns with younger brothers. Although firstborns with younger brothers may engage in the same *amount* of conflict as those with younger sisters (Kim et al., 2006), the meaning and implications of conflict with a younger sister vs. a younger brother may be different for the firstborn sibling. For example, it may be normative to argue or fight with a younger brother. Studies of sex differences in temperament suggest that, compared to girls, boys exhibit more surgency and a tendency to seek high-intensity pleasure such as through rough-and-tumble play (Else-Quest, Hyde, Goldsmith, & van Hulle, 2006). As such, conflict with a younger brother might not penetrate youths' general interpersonal interaction style to the same extent as conflict with a younger sister. Youths who have conflictual relationships with a younger brother may view that dynamic as specific to the

sibling context and fail to generalize it to their relationships with peers or adults.

Sibling intimacy. I did not find main effects of sibling intimacy on risky behavior, but there was a significant interaction with dyad sex constellation showing that higher levels of sibling intimacy were associated with more risky behavior only among brother-brother pairs. This finding suggests that sibling intimacy may not function as a protective factor for risky behavior the same way it does for depressive symptoms and self-esteem (Branje et al., 2004; Kim et al., 2007). Instead, these findings are consistent with research on sibling collusion which suggests that an intimate bond with a sibling might encourage deviance training through shared delinquent activities or mutual antisocial friend groups (Rowe & Gulley, 1992; Slomkowski et al., 2001). Like most previous studies, I did not measure sibling collusion directly, but rather infer its operation from the observed pattern of results. Work that measures collusion directly, such as through videotaped observations (e.g., Bullock & Dishion, 2002), would help to illuminate the nature of sibling exchanges and how collusion fits in with more commonly measured sibling relationship characteristics like warmth and conflict.

The unique implications of sibling intimacy for brother pairs underscore the role of gender dynamics in family processes. Maccoby (1998) argued that boys and girls grow up in different worlds and that boys' culture is more accepting of shared risk-taking and aggression than is girls'. As suggested by Slomkowski et al. (2001), two brothers who have a warm relationship may be more likely to bond over each other's antisocial behaviors, talk about future or past exploits, or plot to break family rules together. When one (or both) of the siblings is a girl, however, the same enjoyment over risk-taking behaviors may be less common. An important step for future research is to establish the causal direction of this effect, parsing out

whether brothers who are more intimate subsequently engage in delinquent behaviors together, or whether antisocial boys are more likely to recruit their brothers as "partners in crime."

Birth order. My multivariate MLM approach allowed me to expand on past research, which has primarily focused on sibling effects on younger siblings, by estimating the effects of intimacy and conflict separately for firstborn and second-born siblings and testing for birth order differences. Significant birth order differences emerged for the link between sibling conflict and youths' risky behavior (as discussed above), but not for sibling intimacy. The findings suggest that birth order dynamics are complex and that they vary depending on the relationship dimension and dyad sex composition. Although social learning theories (Bandura, 1977) suggest that younger siblings are more susceptible to influences from their older siblings than vice versa, I found that the effects of intimacy on brothers' risky behavior did not vary by birth order. The lack of evidence for birth order differences is consistent with previous work that has tested both older – to – younger and younger – to – older effects and found similar results for both directions of influence (Branje et al., 2004; Lauritsen, 1993). The findings for conflict, in contrast, indicate that the effects of sibling conflict differed for firstborns and second-borns: Conflict appeared to have universal implications for second-borns, whereas the effects for firstborns were conditioned by their younger sibling's sex such that conflict with younger sisters was associated with more risky behavior, but conflict with younger brothers was not.

Limitations and Implications

This study provides a number of new insights into sibling influences on adolescents'

risky behavior, but also has limitations. First, although our sample shared many characteristics with the population in the area from which it was drawn, it was not nationally representative and the findings should be replicated in more diverse samples. Research suggests that Mexican American siblings spend even more time together than European American siblings (Updegraff, McHale, Whiteman, Thayer, & Delgado, 2005), and minority adolescents have more siblings than majority adolescents on average (Hernandez, 2004), making the potential for sibling influences even greater in these groups. Cultural values about gender and family roles could have further implications for sibling effects, for example, to the extent that stronger orientation to family enhances the links between sibling relationships and youths' adjustment (Soli, McHale, & Feinberg, 2009). In addition to racial/ethnic diversity, it is important to explore sibling dynamics in diverse family structures, such as in single-parent and step-families. My results suggest that sibling intimacy may be a risk factor in some sibling pairs, but other work has demonstrated that a warm sibling relationship can act as a buffer under difficult circumstances like marital hostility (Jenkins & Smith, 1990). Future work should replicate the findings on potential collusion between brothers across family structures and under conditions of adversity.

The attention to within- and between-person effects helped to eliminate third variable explanations of sibling relationship-risky behavior associations because I controlled for stable individual differences – including both stable characteristics of youths such as temperament, personality, or even response bias, and stable contextual factors such as family, neighborhood, or community effects. My results document that changes in sibling conflict were linked with changes in risky behavior over time. Nonetheless, causal inferences are not possible because I

studied concurrent co-variations. A direction for future research is to explore in more detail the sequencing of these effects using a lagged design to test whether particular experiences in the sibling relationship lead to later risky behavior, or whether youths' participation in risky behavior leads to later sibling dynamics. Experimental data, for example, from an intervention aimed at shaping sibling influences, would provide for the best test of siblings' causal role in one another's risky behavior.

In sum, this study illustrates the important role that siblings play in adolescents' development and sheds light on birth order and sex dynamics. Our results are relevant to recent calls (e.g., Feinberg, Solmeyer, & McHale, in press; Kramer, 2004; Stormshak, Bullock, & Falkenstein, 2009) to apply sibling research to a prevention framework by working with families around sibling issues, such as conflict and rivalry, with the ultimate goal of reducing youths' adjustment problems. Although our findings do not provide for causal inferences, they suggest that such programs may be quite useful, particularly if programs are able to successfully reduce sibling arguments. At the same, we need to learn more about the role of brothers' intimacy in the development risky behavior, lest programs designed to build positive sibling relationships create iatrogenic effects.

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Table 2.1

Model Parameters and (Standard Errors) for the Unconditional and Conditional Risky Behavior Growth Curves

	Unconditional Model		Conditional Model	
Parameter	Estimate	*(SE)*	Estimate	*(SE)*
	Fixed effects			
Intercept – FB	3.200**	(0.015)	3.103**	(0.022)
Intercept – SB	3.209**	(0.012)	3.163**	(0.021)
Linear – FB	0.038**	(0.007)	0.053**	(0.007)
Linear – SB	0.051**	(0.005)	0.069**	(0.006)
Quadratic [a]	0.002	(0.001)	0.006**	(0.001)
FB sex – FB			0.163**	(0.030)
FB sex – SB			0.059*	(0.029)
SB sex [a]			0.047*	(0.024)
FB sex X SB sex [a]			-0.030	(0.032)
Linear X FB sex [a]			-0.016*	(0.006)
Linear X SB sex [a]			-0.020**	(0.005)
Quadratic X FB sex [a]			-0.006**	(0.002)
	Variance components			
Residual variance – FB	0.016**	(0.001)	0.016**	(0.001)
Residual variance – SB	0.017**	(0.001)	0.017**	(0.001)
Residual covariance	-0.0002	(0.001)	-0.0002	(0.001)
Intercept variance – FB	0.056**	(0.006)	0.051**	(0.005)
Intercept variance – SB	0.046**	(0.004)	0.045**	(0.004)
Intercept covariance	0.020**	(0.004)	0.019**	(0.003)
Linear variance – FB	0.003**	(0.001)	0.002**	(0.001)
Linear variance – SB	0.002**	(0.0005)	0.002**	(0.0005)
Linear covariance	0.001*	(0.0004)	0.001†	(0.0004)

Note. FB = firstborn; SB= second-born. Female = 0; male = 1.

[a] Effect was pooled across both siblings' reports of risky behavior. All other effects were

estimated separately for each sibling and followed by "– FB" (firstborn effect) or "– SB" (second-born effect).

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

Table 2.2

Model Parameters and (Standard Errors) for Sibling Conflict and Intimacy at the Within-Person (W-P) and Between-Person (B-P) Levels, and Moderated by Adolescent Sex and Dyad Sex Constellation Predicting Risky Behavior

	Sibling Conflict		Sibling Intimacy	
Parameter	Estimate	*(SE)*	Estimate	*(SE)*
	Fixed effects			
B-P sib. relationship [a]	0.058**	(0.015)	0.004	(0.021)
W-P sib. relationship [a]	0.031**	(0.009)	0.011	(0.008)
B-P sib. relationship X FB sex [a]	---	---	0.002	(0.029)
B-P sib. relationship X SB sex – FB [b]	-0.078**	(0.029)	-0.025	(0.030)
B-P sib. relationship X SB sex – SB [b]	-0.018	(0.023)	---	---
B-P sib. relationship X FB sex X SB sex [a]	---	---	0.096*	(0.045)
W-P sib. relationship X SB sex – FB	-0.044**	(0.017)	---	---
W-P sib. relationship X SB sex – SB	0.017	(0.015)	---	---
Parent education [a]	-0.012**	(0.004)	-0.012**	(0.004)
Parent-child relationship [a]	0.071**	(0.007)	-0.090**	(0.008)
	Variance components			
Residual variance – FB	0.016**	(0.001)	0.016**	(0.001)
Residual variance – SB	0.016**	(0.001)	0.017**	(0.001)
Residual covariance	-0.0001	(0.001)	-0.0001	(0.001)
Intercept variance – FB	0.041**	(0.005)	0.042**	(0.005)
Intercept variance – SB	0.039**	(0.004)	0.038**	(0.003)
Intercept covariance	0.017**	(0.003)	0.015**	(0.003)
Linear variance – FB	0.002**	(0.001)	0.002**	(0.001)
Linear variance – SB	0.002**	(0.0005)	0.002**	(0.0004)
Linear covariance	0.001†	(0.0004)	0.0005	(0.0004)

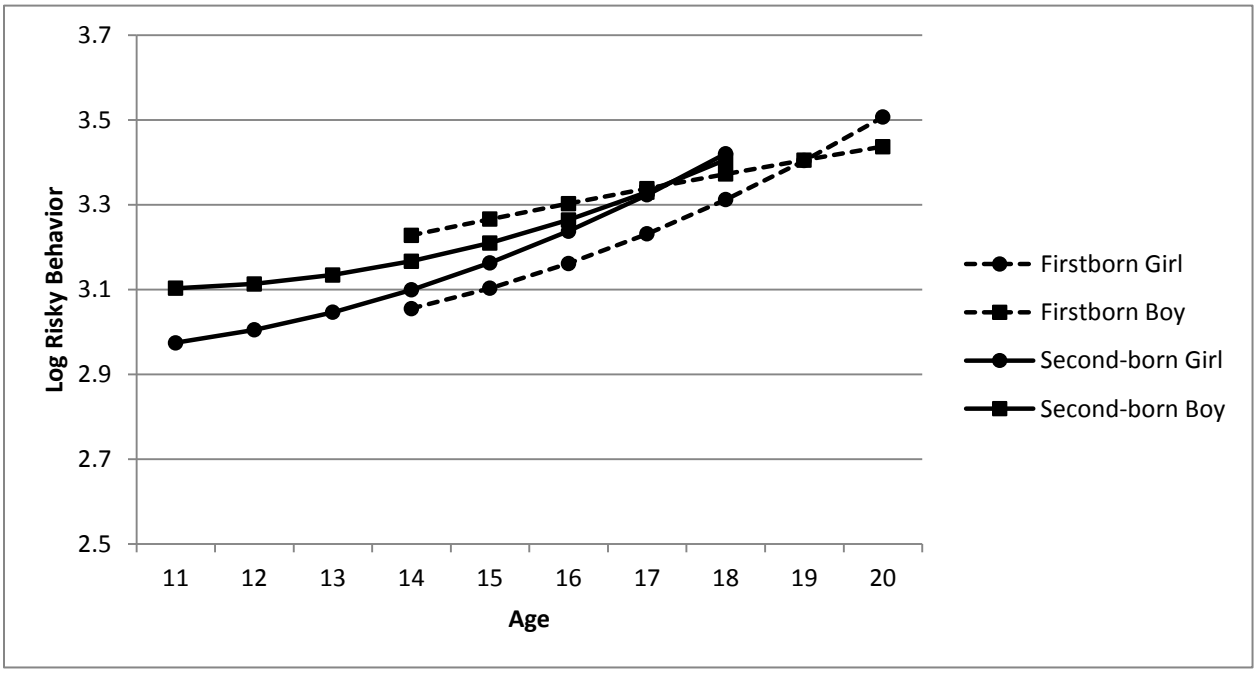
Note. FB = firstborn; SB = second-born. Female = 0; male = 1. Sib. = Sibling.

[a] Effect was pooled across both siblings' reports of risky behavior. All other effects were

estimated separately for each sibling and followed by "– FB" (firstborn effect) or "– SB" (second-born effect). [b] For intimacy model, B-P sibling intimacy X second-born sex was pooled across both siblings; for conflict model, B-P sibling conflict X second-born sex was estimated separately for firstborns and second-borns.

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

Figure 2.1. The growth curve for risky behavior as a function of age, adolescent sex (top panel), and sibling's sex (bottom panel).



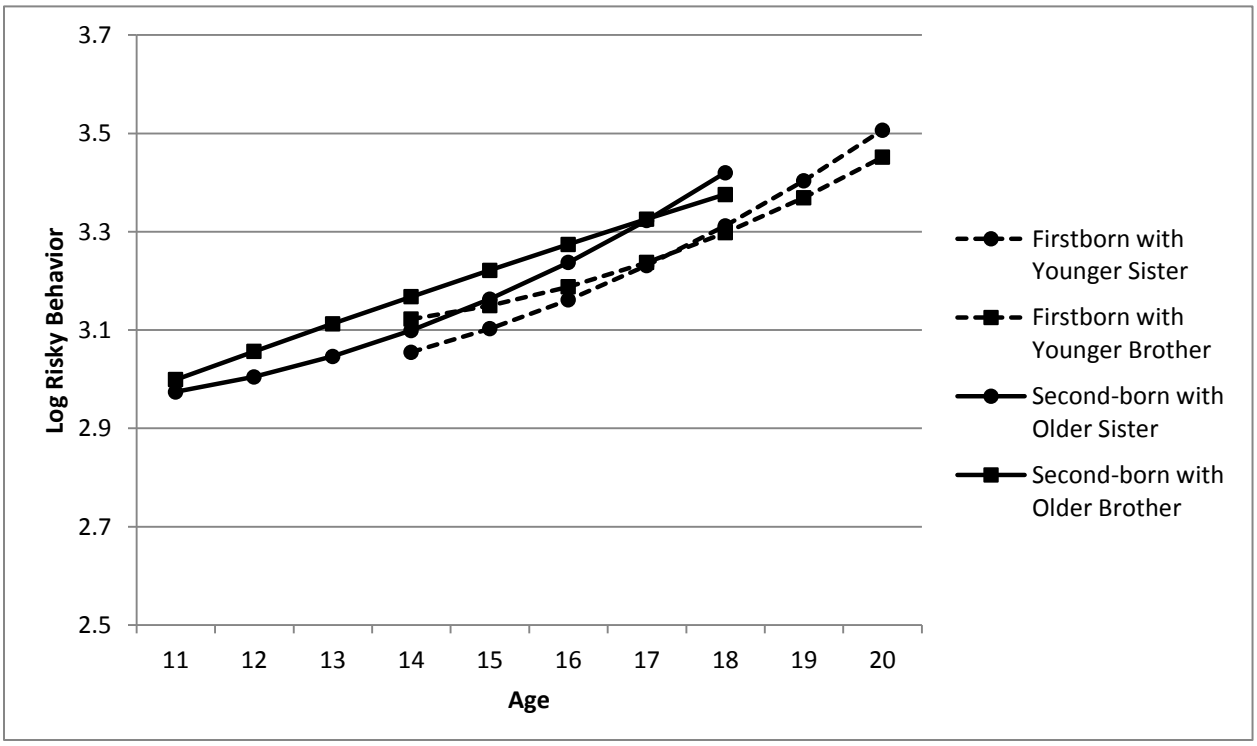
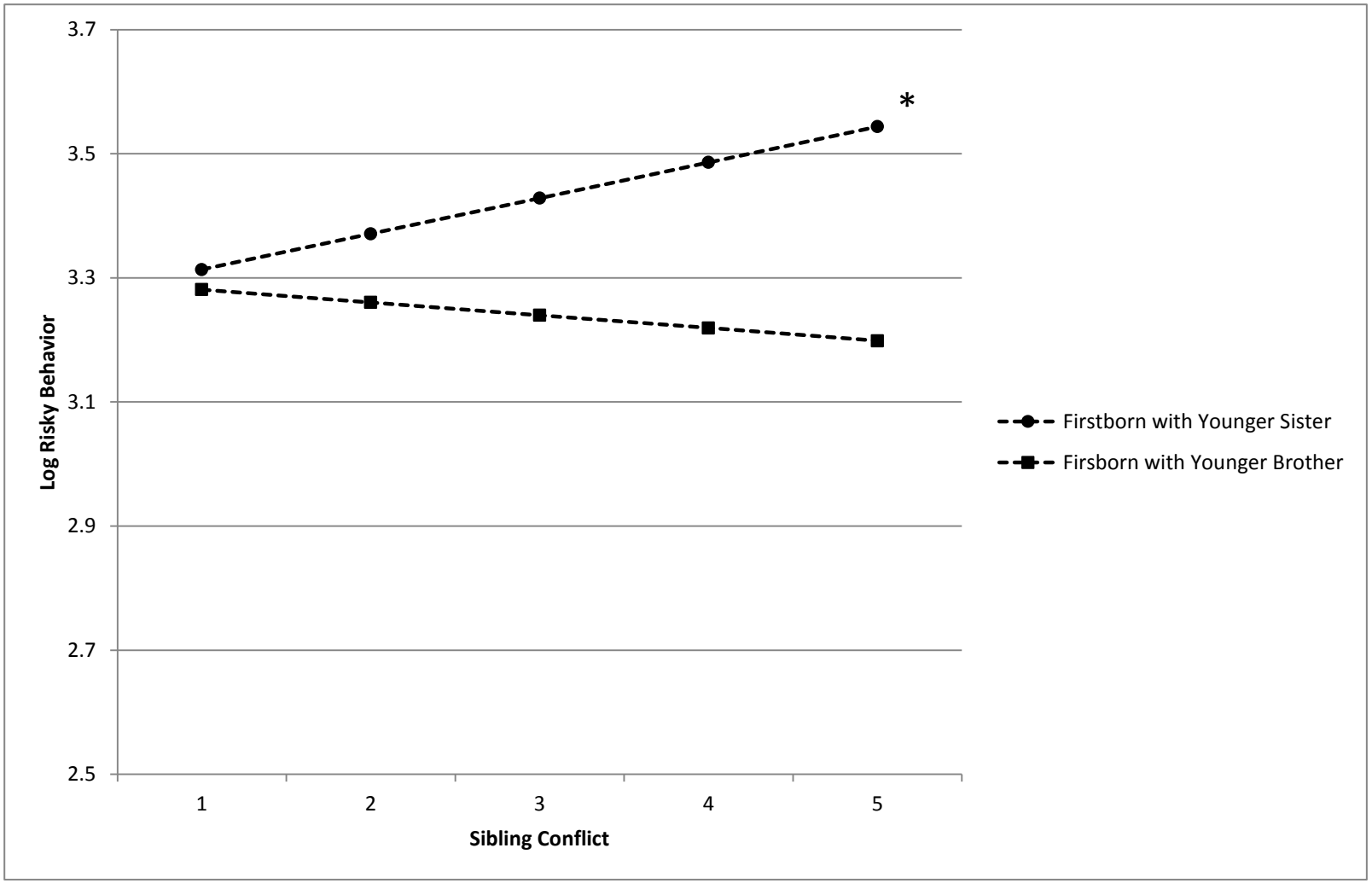
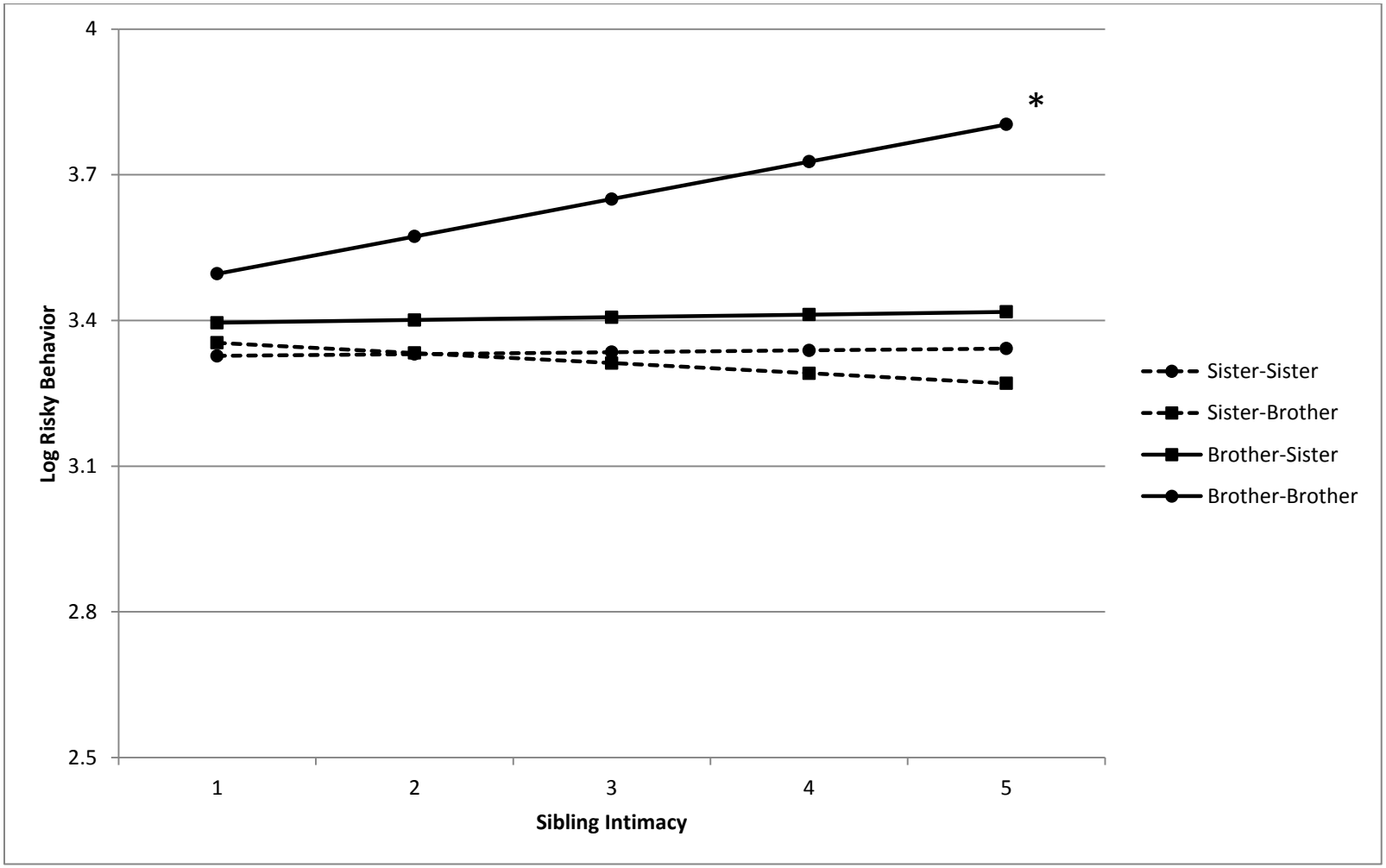


Figure 2.2. Interaction between between-person sibling conflict and second-born sibling sex predicting firstborns' risky behavior.



Note. Asterisks indicate effects that were significantly different from zero, $p < .001$.

Figure 2.3. Interaction between between-person sibling intimacy and dyad sex constellation predicting youths' risky behavior.



Note. Asterisks indicate effects that were significantly different from zero, $p < .05$.

CHAPTER 3

The Family Context of Sibling Collusion

We thank Susie Doughty, Barbi Emel, Michelle Hostetler, Damon Jones, Kari-Lyn Sakuma, Celina Stewart-Smith, Jill Zeruth, and Penn State University's Survey Research Center for their assistance in conducting this study and the families who participated for their time and insights into family life. This work was funded by a grant from the National Institute of Drug Abuse (DA025035), Mark E. Feinberg, principal investigator.

Abstract

This study assessed siblings' collusion, or tendency to act as "partners in crime," through child-report and videotaped observations and its associations with children's and parents' adjustment and parenting dynamics. Participants were mothers, fathers, and two school-aged siblings in 174 families. Multilevel models and logistic regressions revealed positive links between collusion and children's externalizing behavior, parenting stress, parent-child conflict, and parents' authoritarian control, and negative links between collusion and children's social competence and parental responsiveness. Associations varied by sex and dyad sex constellation. The discussion focuses on considering sibling collusion in the context of broader family systems and implications for family-based interventions targeting sibling and parenting dynamics.

The Family Context of Sibling Collusion

A substantial body of research on peer relationships had documented a process termed "deviancy training," or collusion, wherein friends mutually reinforce and encourage one another's delinquent behaviors. This type of peer dynamic has been linked to subsequent escalations in delinquency, substance use, and violence (Dishion, Capaldi, Spracklen, & Li, 1995; Dishion & Owen, 2002). Given their close proximity, shared experiences, and similarity in age, siblings also may engage in such collusion processes as they bond over breaking family rules, and encourage and reinforce delinquent behavior by laughing at one another's stories about deviant activities and plans (Bullock & Dishion, 2002). Siblings often resemble each other in terms of their substance use and delinquent behavior (Duncan, Duncan, & Hops, 1996; Rende, Slomkowski, Lloyd-Richardson, & Niaura, 2005; Rowe & Gulley, 1992), and collusion may partially explain these similarities. Despite the evidence showing that sisters and brothers have powerful influences on one another, siblings have been largely ignored in family research to date (Feinberg, Solmeyer, & McHale, in press).

A limitation of much of the initial research on sibling collusion is that few researchers have measured it directly. Instead, many have inferred collusion processes based on more commonly measured sibling relationship dimensions like intimacy and conflict (Rowe & Gulley, 1992; Slomkowski, Rende, Conger, Simons, & Conger, 2001) or mutual friendships (Rende et al., 2005). More recently, researchers have begun to measure collusion directly, such as through observational coding or collecting self-report data on siblings' joint participation in deviant activities. This work shows that sibling collusion is linked with adolescents' antisocial behavior and substance use (Bullock & Dishion, 2002; Snyder, Bank, & Burraston, 2005; Stormshak,

Comeau, & Shepard, 2004).

These findings suggest that a better understanding of the contexts in which sibling collusion develops is an important topic for research, with potential implications for prevention. Some work suggests that ineffective parental monitoring and poor family management (Bank, Burraston, & Snyder, 2004) as well as affiliation with delinquent peers (Bullock & Dishion, 2002; Criss & Shaw, 2005) are antecedents for sibling collusion. These studies primarily used samples of at-risk youths and their families, however, and sibling collusion in non-clinical families is not well-understood. The purpose of the current study was to explore conditions that facilitate or discourage sibling collusion in a community sample of families with school-aged children. Using both child-report and observational measures of collusion and building on a family systems perspective (P. Minuchin, 1974; S. Minuchin, 1985), I studied children's and parents' individual adjustment and parenting dynamics as predictors of sibling collusion, and examined youths' sex, dyad sex constellation, age spacing, and birth order as moderators of these associations.

Measuring Sibling Collusion

Collusion occurs when two siblings encourage each other's antisocial behaviors, scheme together without their parents' knowledge, or reinforce misbehavior by laughing about past or future deviant acts. Although it is possible to imagine non-deviant forms of cooperation between siblings, for example two siblings plotting a surprise party for a parent, collusion is typically conceptualized as collaboration around antisocial behaviors, and empirical work thus far has focused on problematic forms of collusion. For instance, Stormshak et al. (2004) asked siblings about their joint participation in illegal behaviors and substance use and coded videotapes for siblings' laughter during deviant talk. Bullock and Dishion (2002) observed two

siblings interacting with a parent and coded the siblings' tendency to conspire against parental direction and share stories about antisocial behaviors.

Collusion, like other interpersonal dynamics, can be measured at the level of the individual or the dyad (Thompson & Walker, 1982). Measures at the individual level distinguish the specific role of each sibling, such as which child initiates conversations about deviant activities or incites his or her sibling's misbehavior. In contrast, measurement at the dyad level taps into the overall extent of collusion in the relationship, regardless of which sibling instigates it. To date, most empirical work has conceptualized collusion at the dyad level (Bullock & Dishion, 2002; Snyder et al., 2005; Stormshak et al., 2004), leaving questions about how collusion unfolds and each sibling's role in it. Theories about other sibling processes, such as modeling, identify older siblings as the role models or leaders in sibling dynamics and younger siblings as the followers (Bandura, 1977; Whiteman, McHale, & Crouter, 2007). Indeed, research on some aspects of collusion, like introducing a sibling to a network of older, deviant peers, suggests that older siblings do take the lead role (Snyder et al., 2005). It is not clear, however, whether the role of leader and follower so clearly fall along birth order lines in other forms of collusion like deviant talk and laughing at misbehavior.

My first goal was to describe sibling collusion in a non-clinical sample using two different measures. The first was a new child-report scale designed to tap into dyad-level collusion between school-aged siblings around less extreme behaviors than have been studies in the past, such as lying to parents and privately joking about "adult" topics. The second, individual-level indicator was collected through videotaped observation and measured whether younger siblings broke any rules, and if so, whether their older siblings responded with approval or

disapproval. This measure assessed older siblings' tendency either to reinforce their younger sibling's misbehavior and create a sense of shared deviance, or to discourage it and any attempts at collusion.

Families as Contexts for Sibling Collusion

My second and third research questions were grounded in a family systems framework (P. Minuchin, 1985; S. Minuchin, 1974). A key tenet of this perspective is that families are comprised of interdependent subsystems that exert reciprocal influences on one another. The smallest unit is the individual, whose personal qualities shape his or her behaviors within the larger family system (P. Minuchin, 1985). The most commonly studied family subsystems involve dyads, such as marital and parent-child relationships. Other dynamics include larger subsystems, such as coparenting, which involves two parents and at least one child. One approach to understanding how families operate is to examine how these subsystems work together. The focus of the current paper was on sibling collusion, which occurs between two siblings but is nested within the family context. As part of the broader system, sibling collusion both influences and is influenced by other family processes, as shown in the conceptual model in Figure 3.1. For example, familial risk factors, such as parent depression and ineffective parenting, have implications for children's development, but also impact sibling relationships (Stormshak, Bullock, & Falkenstein, 2009). My second goal was to apply a family systems framework to sibling collusion by examining links between collusion and individual family members' personal adjustment, dyadic relationships (i.e., parenting of each child), and triadic relationships (i.e., parenting of the sibling dyad).

Individual family members' adjustment. As illustrated in Figure 3.1, I hypothesize that both children's and parents' personal qualities are linked to sibling collusion. Prior work suggests that collusion around antisocial behaviors and substance use occurs only when one sibling (typically the older sibling) engages in such behaviors in the first place (Slomkowski et al., 2001; Snyder et al., 2005). If neither sibling participates in risky behaviors, it is unlikely that they will collude together to encourage one another's delinquency. This is consistent with a study which found that sibling collusion was more prevalent in families with one sibling who was at high risk for delinquency compared to families with a target sibling who was rated as low-risk (Bullock & Dishion, 2002). Collusion was seen in 58% of at-risk sibling pairs compared to 20% of normative pairs. Using the same dataset, Snyder et al. (2005) found that younger siblings with adjustment problems were more likely to hang out with a deviant older brother compared to younger siblings with few adjustment problems. Youths' antisocial behaviors also may be a consequence of sibling collusion. For instance, using longitudinal data, Stormshak et al. (2004) found that sibling collusion predicted growth in substance use, even after controlling for peer collusion. In the current cross-sectional analysis, I conceptualized youths' externalizing problems as a precursor to collusion, but recognize that externalizing problems and collusion are interdependent.

In addition to youths' problem behaviors, their social competence is hypothesized to be a key component of sibling collusion. Patterson's coercive process model suggests that children learn how to interact with peers by first interacting with a sibling and then carrying over their interpersonal style into peer relationships (Patterson, 1986; Patterson, Dishion, & Bank, 1984). Children who have difficulties cooperating and showing empathy are more likely to have

problematic sibling relationships. If they develop a coercive interpersonal style in the sibling context, they may subsequently associate with peers who also have poor social skills, further hampering their development of social competencies (Criss & Shaw, 2005; Patterson, DeBaryshe, & Ramsey, 1989; Stormshak, Bellanti, & Bierman, 1996). Further, youths who have difficulty forming friendships with peers may turn to a sibling and enlist him or her as a collaborator in antisocial activities. As such, I expected that less socially competent children would be more likely to engage in sibling collusion.

Parents' individual adjustment, like each sibling's personal qualities, may also be linked to collusion through its impact on parenting dynamics (see Figure 3.1). Parents' adjustment problems, such as high stress and depression, can disrupt positive, engaged parenting and lead to harsh and inconsistent parenting (Crnic & Low, 2002; Lovejoy, Graczyk, O'Hare, & Neuman, 2000), which can have implications for sibling dynamics like collusion. For example, if siblings detect that their parents are stressed or depressed, they may become anxious and have difficulty regulating their own emotions (Repetti, Taylor, & Seeman, 2002), potentially leading to more problematic sibling relationships. There have been few tests of this idea, but one study (Brody, Stoneman, & McCoy, 1994) found that parents' depression positively predicted sibling conflict one year later.

The link may be bidirectional: Parents report that sibling relationships are one of the most difficult child-rearing challenges that they face, and the most frequent source of arguments between parents and early adolescents is how siblings get along (McHale & Crouter, 1996; Perlman & Ross 1997; Siddiqui & Ross, 1999). Sibling collusion reflects joint child deviant behavior and/or direct challenges to parental authority, both of which are stressful for parents

to manage. If parents are stressed, they may withdraw from monitoring or supervising the siblings (Brody, 2003; Dishion, Nelson, & Bullock, 2004), making them less effective at detecting and disrupting collusion processes. Thus, parents' individual well-being may be both a cause and a consequence of problematic sibling relationships.

Dyadic parent-child relationships. Research on dyadic family subsystems has documented links between parent-child and sibling dynamics. For example, high levels of parent-child conflict and harsh or inconsistent parenting are associated with more conflictual and aggressive sibling relationships (Bank, Patterson, & Reid, 1996; Brody, Stoneman, & McCoy, 1992; Criss & Shaw, 2005), and warm parent-child relationships are predictive of more positive sibling dynamics (Stocker & McHale, 1992). Generally, these patterns are consistent with social learning theory tenets (Bandura, 1977), which suggest that children observe their parents' style of interaction and model that behavior in their exchanges with their siblings. However, the links between parent-child warmth and conflict and sibling collusion have not yet been tested, a gap that was addressed in the current study. If siblings learn, through their experiences with their parents, to be warm and supportive in their close relationships, they may be less likely to engage in clandestine activities together that actively exclude or undermine their parents. As shown in Figure 3.1, parent-child relationships also may function as mediators of parents' adjustment problems. For example, stressed parents are more likely to become hostile toward one (or both) of their children (Crnic & Low, 2002; Lovejoy et al., 2000), which could inspire the child to draw a sibling into a coalition against their parent.

Parenting the sibling dyad. A further specification of parenting as it relates to sibling relationships has to do with the triadic, parent-child-child subsystem and the extent to which

parents manage, supervise, or intervene in sibling exchanges. In an observational study of young siblings, Kramer, Perozynski, and Chung (1999) reported that parents had a variety of responses to sibling conflicts, ranging from ignoring, to redirection, to using punishment or threats to keep them from fighting. Controlling and authoritarian strategies were linked to more negativity in sibling relationships. Similarly, work with adolescent siblings suggests that parents' stepping in to end sibling conflicts or punishing youths for fighting is linked with more relational aggression (particularly in sisters) and hostility (McHale, Updegraff, Tucker, & Crouter, 2000; Updegraff, Thayer, Whiteman, Denning, & McHale, 2005). Developmental stage matters, as young children appear to benefit from parental interventions that take the form of scaffolding and conflict resolution strategies like reasoning and perspective-taking (Perlman & Ross, 1997; Siddiqui & Ross, 2004; Smith & Ross, 2007). For adolescents, such strategies were not associated with sibling relationship qualities (McHale et al., 2000; Updegraff et al., 2005).

To my knowledge, no one has examined how parenting *of the sibling dyad* is associated with collusion. Parenting behavior directed at the siblings as a dyad creates a source of shared experiences for the siblings. Parents' use of commands and punitive techniques to curb siblings' fighting may encourage siblings to join forces against their parents. On the other hand, parents' attempts to engage the siblings in family activities together or create opportunities for them to interact in positive ways could reduce the likelihood that siblings will and bond over their disobedience. In addition, parents who are more knowledgeable about their children's joint activities may be able to derail sibling collusion effectively (Snyder et al., 2005). I examined the associations between sibling collusion and mothers' and fathers' authoritarian control toward siblings and their involvement in sibling activities.

The Roles of Sex, Birth Order, and Age Spacing in Sibling Collusion

Because of their research designs, most studies on sibling collusion have been limited in their ability to explore fully the role of several usual suspects in sibling research: sex, dyad sex constellation, age spacing, and birth order. Given that other sibling relationship qualities, such as conflict and intimacy, differ by sex and birth order (e.g., Cole & Kerns, 2001; Kim, McHale, Osgood, & Crouter, 2006), and that these dyad characteristics sometimes moderate sibling influences (Compton, Snyder, Schrepferman, Bank, & Shortt, 2004; Kim, McHale, Crouter, & Osgood 2007), one might expect that they would also shape collusion processes. For instance, Slomkowski et al. (2001) found that boys with brothers were more likely to report high levels of risky behavior when they had an intimate sibling relationship, an effect that the authors interpreted as evidence for collusion between brothers. Others have suggested that stronger correlations in delinquency for same-sex sibling pairs, as compared to mixed-sex pairs, are observed because these siblings are more likely to model one another's behavior and share mutual friends, both of which could be part of collusion processes (Rende, et al., 2005; Rowe & Gulley, 1992). For the same reasons, siblings who are close in age also may be more likely to collude.

As previously discussed, available studies have measured collusion at the dyadic level, an approach that makes it difficult to tease apart birth order differences in the underlying processes. Further, given social learning theory tenets (Bandura, 1977), many researchers only examine how sibling collusion is linked to younger siblings' outcomes, not vice versa. One study, however, found that sibling collusion positively predicted both older and younger siblings' substance use three years later (Stormshak et al., 2004). In the current study, I tested

whether there were birth order differences in child-reported sibling collusion at the dyad level, and observed collusion at the individual level. The analysis of individual sibling collusion is novel because it allowed me to explore whether family context characteristics predicted older siblings' tendency to follow their younger sibling's lead by positively reinforcing their rule breaks versus discouraging their younger sibling's attempts to collude by disapproving of their rule breaks.

Study Goals

Recent studies of sibling collusion have illuminated this understudied sibling dynamic and its influence on youths' risky behaviors, and the current study extended this research by focusing on the conditions under which collusion occurred in a normative sample of sibling pairs. The larger sample also allowed me to explore the roles of sex, age spacing, and birth order in collusion processes. This study addressed three goals. First, I described the extent of sibling collusion as assessed with a new child-report and an observed measure of collusion, and tested whether collusion varied by sex, dyad sex constellation, age spacing, or birth order. To explore the broader family context of collusion, my second goal was to investigate individual adjustment of children and parents, dyadic parent-child relationships, and parents' involvement in the sibling relationship as correlates of sibling collusion. Finally, I examined sex, dyad sex constellation, age spacing, and birth order as moderators of these associations.

Method

Participants

Participants were mothers, fathers, and two target siblings from 174 families taking part in a multisite, randomized control trial of a sibling-focused afterschool program to prevent

substance use. Data for the present analyses came from the baseline wave of data collection which occurred before families were randomly assigned to the treatment or control groups. To be eligible for the study, families had to meet three requirements: (1) have a child in the 5th grade; (2) have a second child who was between one and three years younger; and (3) the siblings had to be living in the same household for at least the past three years. Dyads were not required to be full biological siblings, but most (91%) were. The remaining pairs were half siblings (7%) and step- or adopted siblings (2%). Families were recruited through 16 schools in seven rural and small urban school districts in central Pennsylvania. Families with children who met the age requirements were mailed a letter describing the study and returned a pre-paid reply card or called the project office to indicate their interest. There were 504 eligible families and 174 (35%) agreed to participate in the trial.

Reflecting the population of the region, the families were mostly White (79% of mothers, 77% of fathers), but included some African American (10% of mothers, 10% of fathers) and multiracial (5% of mothers, 8% of fathers) families. Families were working and middle class with a median annual family income of $63,750 (*M* = $68,857, *SD* = $45,841). Seventy percent of parents were married, 12% were cohabiting, and 18% were single parents. Thirty-eight fathers did not participate (six refused; 32 were single-mother families) and three mothers did not participate (one refused; two families were single-father families), reducing the sample size to 136 and 171 for models testing father- and mother-reported variables, respectively. Older siblings averaged 10.78 years (*SD* = 0.39) and younger siblings averaged 8.49 years (*SD* = 0.78). The mean age gap between the two target siblings was 2.29 years (*SD* = 0.75). Dyad sex constellation was roughly even, with 38 (22%) older sister-younger sister, 55 (32%) older sister-

younger brother, 41 (23%) older brother-younger sister, and 40 (23%) older brother-younger brother pairs. The number of siblings in each family ranged from 2 to 9, with an average of 3.05 (*SD* = 1.33).

Procedures

Data were collected through questionnaires from parents, children, and teachers, and videotaped family observations. Children's teachers were mailed surveys that asked about the child's behavior and academic and social competence. Teachers were paid $25 per student upon returning the questionnaires. Twelve teachers of older siblings and seven teachers of younger siblings did not complete the questionnaires.

Parent and child interview data were collected through home visits that lasted between 2 and 3 hours and for which families were paid $150. Data were collected separately from mothers, fathers, and each of the two target siblings. Each member was given a general orientation to the study and informed consent/assent was obtained. Parents then completed written questionnaires about their family relationships and personal well-being. Interviewers read questions aloud to the target siblings, separately, and recorded their responses. Children were assured that their answers were confidential and would only be shared with the research team, and other family members were not present during these interviews.

As part of the home visit, sibling dyads completed a videotaped observation task during which they were asked to spend 10 minutes planning a party together. Eight families refused the videotape procedure. Undergraduate and graduate students were trained to rate the sibling dyad interactions according to a global coding system. Coders were trained in weekly coding meetings by one experienced coder who served as the criterion coder. All cases were

coded by at least two coders, and final scores were created by averaging the paired ratings.

Measures

Sibling collusion. *Child-reported sibling collusion* was measured using a 6-item scale developed specifically for this study. The following five items were the same for older and younger siblings and asked about the past month: (1) “How often do you and your sister/brother joke about things in private so your parents don’t hear?”(2) “How often do you and your sister/brother break your parents’ rules together when your parents aren’t watching?” (3) “How often do you lie to your parents to help your sister/brother stay out of trouble?” (4) “How often does your sister/brother lie to your parents to help you stay out of trouble?” (5) “How often do you and your sister/brother laugh and joke about other people getting into trouble?” The sixth item was worded differently for older (“How often *do you tell your sister/brother* about things that younger kids aren’t supposed to know very much about?”) and younger siblings (“How often does *your sister/brother tell you* about things that younger kids aren’t supposed to know very much about?”). Children responded using a 5-point scale (1 = *almost never,* 5 = *almost always*). Items were averaged, with higher scores indicating more collusion. Older and younger sibling reports of collusion were correlated, $r = .34$, $p < .001$.

The observational coding scheme was adapted from Shebloski, Heylen, Conger, and Slomkowski (2002). Coders rated the frequency of rule breaks (e.g., getting up and touching/blocking the video camera equipment, obscene gestures, endorsement of illegal behavior). If a rule break was noted, coders rated the other sibling’s response to the rule break behavior. Siblings were rated as ignoring the rule break, actively disapproving of it (e.g., rolling eyes, telling the sibling to stop) or approving of it (e.g., laughing at the rule break, verbally

supporting the behavior). For the current analysis, I was interested in siblings' *response to rule breaks* as an indicator of collusion. Response to a rule break was originally scored on a 5-point scale (0 = *ignores,* 1 = *disapproves,* 2 = *sometimes approves,* 3 = *frequently approves,* 4 = *always approves*). The scores for approval were collapsed, creating a categorical scale with three possible responses: ignore, disapprove, and approve. Percent agreement between the two coders on this condensed scale of rule break response was 88% for older siblings and 93% for younger siblings.

In the case of 22 sibling dyads, the two coders disagreed on whether there was a rule break, and, subsequently, on the sibling's approval or disapproval of the rule break. In those cases, the criterion coder watched the videotape and made the final coding decision. After the final coding decisions were made, there was a total of 66 rule breaks. Thirteen of these rule breaks were ignored by the sibling, leaving a total of 53 cases of rule breaks and subsequent approvals or disapprovals in 43 families (in 10 families, both the older and younger siblings broke a rule).

Individual adjustment of children and parents. Indicators of children's adjustment were collected through teacher reports. Teachers responded to 28 items that measured behavior problems from the Behavior Problems Index (BPI; Peterson & Zill, 1986). Although there are five subscales, work by Parcel and Menaghan (1988) using the NLSY79 dataset provides justification for two broader dimensions of internalizing and externalizing problems. Based on their recommendations, I calculated youths' *externalizing behavior* as a sum across 20 items (e.g., "The child has a strong temper and loses it easily"). Items were scored on a 3-point scale (1 = *never true*, 2 = *sometimes true,* 3 = *often true*), which was re-coded by collapsing categories 2

and 3. Alphas for externalizing behavior were .92 for older siblings and .93 for younger siblings. Teachers rated each sibling's *social competence* using five items (e.g., "How often does the child help, share, and cooperate with others?") from a scale by Stormshak et al. (1996). Responses were scored on a 6-point scale (1 = *almost never,* 6 = *almost always*) and averaged. Alphas were .92 for older siblings and .95 for younger siblings.

Mothers' and fathers' individual adjustment was assessed with a measure of *parenting stress* comprised of eight items (e.g., "I feel trapped by my responsibilities as a parent") from the Parental Distress subscale on the Parenting Stress Index – Short Form (Abidin, 1995). Responses ranged from 1 (*strongly disagree*) to 5 (*strongly agree*) and items were averaged so that higher scores signified more stress. Cronbach's alpha was .80 for both parents.

Dyadic parent-child relationships. Mothers and fathers reported on their responsiveness and conflict with each child. *Parental responsiveness* was measured using eight items (e.g., "I understand my child's problems and worries") from the parent version of the Children's Report of Parenting Behavior Inventory (Schaefer, 1965; Schwarz, Barton-Henry, & Pruzinsky, 1985). Responses were scored on a 5-point scale (1 = *almost never,* 5 = *almost always*) and Cronbach's alpha ranged from .82 to .88 across reporters and targets. *Parent-child conflict* was measured using a scale adapted from Smetana (1988). Parents reported on how often they had had conflicts in each of eight domains (e.g., homework, social life, curfew) over the past month on a 6-point scale from *not at all* to *several times a day*. Alphas ranged from .86 to .94 across reporters and targets. Items were averaged, with higher scores signifying higher levels of responsiveness or conflict.

Parenting the sibling dyad. Parents reported on their involvement in the sibling

relationship using a 27-item, 5-point scale (1 = *never*, 5 = *almost always*) that drew on work by McHale et al. (2000). An exploratory factor analysis yielded four subscales: authoritarian control, involvement in sibling activities, positive guidance, and involvement in sibling conflict. The current paper focused on *authoritarian control* (4 items; e.g., "How often do you threaten to punish your children to get them to stop fighting?") and *involvement in sibling activities* (6 items; e.g., "How often do you plan activities that your children do together?"). Items were averaged such that higher scores indicated more authoritarian control and involvement in sibling activities. Alphas for each subscale were .70 or higher, with the exception of mother's involvement in sibling activities for which the alpha was .54.

Results

Analysis Plan

All models were tested in SAS 9.2. There were two dependent variables: child-reported sibling collusion and observed sibling collusion. For the models predicting child-reported collusion, I used a multilevel modeling (MLM) framework (PROC MIXED) to account for the nonindependence due to siblings nested within families. Separate random intercepts and residual variances were estimated for each sibling and were allowed to co-vary. All models included a separate fixed intercept for older siblings and younger siblings, as is appropriate for dyadic data (Laurenceau & Bolger, 2005). Models for observed collusion were tested with logistic regression to predict the probability that older siblings approved (vs. disapproved) of their younger sibling's rule breaks.

In order to explore birth order differences in the MLM analyses, I used a model where the main effects represented the effects for older siblings, and included an interaction between

the independent variables and a dummy variable marking birth order (0 = older sibling, 1 = younger sibling). The interaction term represented the *difference* in the effect between older and younger siblings. A significant interaction term indicated that the association between collusion and the independent variable was significantly different for older and younger siblings; if this was the case, separate effects were estimated for older and younger siblings. If the interaction term was not significant, the effect was pooled across both siblings.

Descriptive Analyses

To address my first research goal of describing sibling collusion, I explored sibling characteristics – including youths' sex, 2-group dyad sex constellation (same-sex vs. mixed-sex dyads), and age spacing – as correlates of child-reported and observed sibling collusion. For child-reported collusion, I also included the interaction between youth sex and the dyad sex constellation terms to yield comparisons between the four possible sex constellations (sister-sister, sister-brother, brother-sister, and brother-brother). Given the small sample size for observed sibling collusion, only the 2-group dyad sex constellation was tested. Because observed sibling collusion was a binary variable, I used chi-square tests and *t*-tests to compare older siblings who approved to those who disapproved of their younger sibling's rule breaks.

Means and standard deviations for the study variables are presented separately for older and younger siblings in Table 3.1. The means for child-reported sibling collusion indicated that youths reported engaging in some collusion, with averages falling below the scale midpoint. The results from the descriptive model for child-reported collusion are presented in Table 3.2. Intercepts in this model revealed that younger siblings reported higher levels of collusion than older siblings, a difference that was statistically significant as revealed by the

follow-up test, $\gamma = 0.20$, $SE = 0.07$, $p = .003$. A trend emerged for 2-group dyad sex constellation, with same-sex siblings reporting higher levels of collusion than mixed-sex pairs. There was no association between age spacing and child-reported collusion.

Turning to the observed scores, as a preliminary step I tested whether sex, dyad sex constellation, or age spacing were related to the occurrence of a rule break by either the older or younger sibling ($n = 66$ rule breaks). A chi-square test showed a significant effect for 2-group dyad sex constellation, $\chi^2 (1, 174) = 5.93$, $p = .015$, indicating that rule breaks were more likely to occur in families with mixed-sex pairs (69% of all rule breaks) than same-sex pairs (31% of all rule breaks).

Next, I examined siblings' responses to rule breaks, the observed indicator of sibling collusion. Of the 53 rule breaks that were either approved or disapproved (cases where the rule break was ignored were removed from these analyses), approximately one third were by older siblings ($n = 17$) and two thirds were by younger siblings ($n = 36$). Older siblings were equally likely to approve ($n = 15$) or disapprove ($n = 21$) of their younger sibling's rule breaks, as revealed by a non-significant one-way Chi-squared goodness-of-fit test, $\chi^2 (1, 36) = 1.00$, $p = .32$. Younger siblings, on the other hand, were significantly more likely to approve ($n = 14$) than to disapprove ($n = 3$) of their sibling's rule breaks, $\chi^2 (1, 17) = 7.12$, $p = .008$, resulting in limited variability in this scale for younger siblings. As such, I chose to focus my analyses only on older siblings' (dis)approval scores as an indicator of collusion. There were no significant differences in older sibling collusion by older sibling sex, younger sibling sex, 2-group dyad sex constellation, or age spacing. A 2 (*approve* vs. *disapprove*) X 2 (*older sibling* vs. *younger sibling*) mixed model ANOVA with sibling as the within-groups factor revealed no significant association

between child-reported collusion and older sibling observed collusion.

Family Context Correlates

The second set of analyses examined each of the family context variables as predictors of collusion in a separate model. In the models for child-reported collusion, I also tested interactions between these predictors and youth sex, dyad sex constellation, and age spacing. Only significant interaction terms were retained in the final models (Aiken & West, 1991). Moderator effects were not tested for observed sibling collusion, given the small sample size. Single parent status and siblings' biological relatedness (full biological siblings vs. not) were included as control variables, but were never significant, did not change the results, and so were removed from the final models. All models included sex, dyad sex constellation, and age spacing (coefficients not shown). Results for the models testing the family context correlates are presented in Tables 3.3 (child-reported collusion) and 3.4 (older sibling observed collusion).

Child-reported sibling collusion. With respect to children's adjustment, there was a significant birth order difference for the coefficient for teacher reports of externalizing problems predicting collusion, $\gamma = -0.07$, $SE = 0.02$, $p = .003$, and thus separate effects for older and younger siblings were estimated (see Table 3.3). Further, there was a significant interaction between externalizing problems and sex, which also differed by birth order, $\gamma = 0.08$, $SE = 0.02$, $p = .003$. This interaction was followed up by noting the effect of externalizing problems for girls, then changing the reference group and noting the effect for boys. There was a positive link between externalizing problems and sibling collusion, but only for older sisters, $\gamma = 0.08$, $SE = 0.02$, $p < .001$. There were no links for older brothers or younger siblings of either sex. The effect for social competence was also moderated by sex, and follow-up analysis revealed a

negative association for girls, γ = -0.04, *SE* = 0.01, *p* < .001, but no association for boys, γ = -0.003, *SE* = 0.01, *p* = .79.

Turning to parents' adjustment, fathers' parenting stress was positively associated with children's reports of sibling collusion (see Table 3.3). There was an interaction between mothers' parenting stress and sex, and follow-up analysis revealed that maternal parenting stress was positively linked with girls' reports of collusion, γ = 0.28, *SE* = 0.09, *p* = .001, but not with boys' reports, γ = 0.06, *SE* = 0.08, *p* = .44.

In terms of dyadic parent-child relationships, fathers' responsiveness was negatively associated with sibling collusion, but mothers' responsiveness was not. Parent-child conflict was qualified by interactions with 2-group dyad sex constellation for mothers and 4-group dyad sex constellation for fathers. For mothers, there was a significant positive link between conflict and collusion for all dyads, but it was significantly stronger for same-sex dyads, γ = 0.32, *SE* = 0.07, *p* < .001, than mixed-sex dyads, γ = 0.12, *SE* = 0.06, *p* = .04. For fathers, conflict was positively associated with collusion for sister-sister pairs, γ = 0.39, *SE* = 0.12, *p* = .002, sister-brother pairs, γ = 0.16, *SE* = 0.09, *p* = .06, and brother-sister pairs, γ = 0.18, *SE* = 0.08, *p* = .02. There was no link between father-child conflict and brother-brother collusion, γ = 0.07, *SE* = 0.13, *p* = .57.

For parenting of the sibling dyad, both mothers' and father's authoritarian control was positively associated with child-reported sibling collusion. Mother's involvement in sibling activities also was positively linked with collusion, and the effect for father's involvement was moderated by 4-group dyad sex constellation. Follow-up analysis revealed that there was a trend-level negative association between father involvement in sibling activities and collusion

for brother-brother pairs, γ = -0.42, *SE* = 0.24, *p* = .09, but there were no links for the other three dyad sex constellations.

Older sibling observed collusion. Of the 36 families in which younger siblings performed a rule break and older siblings were scored for collusion, eight were missing data on father reports of the family context variables. As such, I focused only on mother reports of family context and did not test the associations between father-reported variables and older sibling observed collusion. Logistic regression models revealed a significant effect for social competence, showing that older siblings who were more socially competent were less likely to approve of their younger siblings' rule breaks (see Table 3.4). Mothers' parenting stress positively predicted older siblings' collusion at the trend level. There were no links between observed collusion and any of the other family context variables.

Discussion

This study explored individual family members' adjustment and parenting dynamics as correlates of sibling collusion in a normative sample of school-aged sibling pairs. To shed further light on the conditions under which collusion occurs, I tested sex, dyad sex constellation and age spacing as moderators of linkages between collusion, and family context characteristics. By using a MLM framework, I was able to include two siblings in the same models and test statistically for birth order differences in these effects, but found little evidence to suggest different patterns for older and younger siblings. Findings suggested that sibling collusion was related to other family dynamics, that there were unique associations between mothers' vs. fathers' parenting and sibling collusion, and that collusion correlates varied by sex and dyad sex constellation. This study was cross-sectional, however, and did not

provide insights into direction of effect.

Describing Sibling Collusion in Normative Families

The first goal of this study was to describe the nature of sibling collusion in a sample of community families using child-reported and observed indices of collusion. Siblings reported relatively low levels of collusion on average, but there was variability: 24% of youths reported engaging in collusion at least once in a while. This is consistent with Bullock and Dishion (2002) who observed sibling collusion in 20% of the sibling pairs from low-risk families.

To my knowledge, this is the first study to test for birth order and dyad sex constellation differences in the level of sibling collusion. Younger siblings reported higher levels of collusion than older siblings, on average. Given that the items were framed at the dyad level, rather than asking about each sibling's unique role in collusion, this birth order difference indicated that younger siblings perceived collusion to a greater extent than did older siblings. Older siblings have higher status in the family and younger siblings often look up to them (Furman & Buhrmester, 1985), so it may be that younger siblings enjoy sharing secrets and place greater importance on such behaviors with an older sibling. Collusion with a younger sibling may not be as salient to older siblings, or they may not be as willing to admit to steering their younger sibling in a risky direction.

Same-sex pairs reported higher levels of collusion than mixed-sex pairs, which is consistent with prior work that did not assess collusion but inferred it based on other measures of sibling relationship qualities (Rowe & Gulley, 1992; Slomkowski et al., 2001). According to social learning theory (Bandura, 1977), same-sex siblings are more likely to model each other's behavior because they are more objectively similar than mixed-sex siblings. For example, boys

may be more likely to laugh about a brother's bad behavior and join him in deviant talk than they would with a sister. Interestingly, the observational data showed that youths in mixed-sex pairs were more likely to break a rule than same-sex pairs; however, simply breaking a rule does not constitute collusion. Rather, it is how the sibling *responds* to a rule break that signifies collusion, and in our sample, older siblings' responses to rule breaks *did not* vary by dyad sex constellation.

My analysis of observed sibling collusion was exploratory, as the small sample size permitted me to look only at older siblings. This fact is interesting in itself: Contrary to theoretical predictions about the older sibling's role as the instigator in collusion, younger siblings were more likely to break a rule than older siblings. In response to their younger sibling's rule breaks, older siblings were equally likely to reinforce it or admonish them for it. Thus, it seems that older siblings do not always initiate the collusion process by trying to lead their brother or sister astray. Instead, I argue that the way in which they respond to their younger sibling's bids for collusion may be important. Some older siblings are more likely to try to keep their sibling in line by reprimanding them. Others may see their younger sibling's misbehavior as an opportunity to form a coalition for shared deviance and undermining parents. It is possible that older sibling collusion was under-estimated, as children knew that they were being observed and may have been cautious about acting in a way that adults might find inappropriate. In addition, I did not consider the possibility that older siblings encouraged rule breaking behavior, which could account for the higher rates of younger sibling rule breaks. Clearly, more work is needed to further specify the unique roles of older and younger siblings in collusion processes.

There were no links between age spacing and child-reported or observed collusion, nor did it emerge as a moderator. This could be because there was limited variability in age spacing in this sample due to the study design – all older siblings were in the fifth grade and all younger siblings were between one and three years younger. Studies with a wider range of age differences between siblings are needed to confirm that collusion does not vary by age spacing.

Correlates of Sibling Collusion

Grounded in a family systems perspective (S. Minuchin, 1974), I examined the links between sibling collusion and the family context at three different levels: the individual (i.e. parents' and children's adjustment), the dyad (i.e., parent-child relationships), and the triad (i.e., parenting of the siblings *as a dyad*). A strength of the study was the use of multiple informants: Mothers and fathers reported on parenting, teachers reported on children's externalizing problems and peer competence, and collusion was measured both through sibling reports and videotaped observations. Thus, the observed associations were not due to correlated self-reports.

Individual family members' adjustment. Previous work on sibling collusion suggests that it is more likely to occur when one sibling has behavior problems or social difficulties (Bullock & Dishion, 2002; Snyder et al., 2005). Consistent with these findings, the results showed that teacher-reported externalizing behavior problems among older sisters were predictive of higher levels of child-reported collusion by older sisters. Similarly, poor social competence was positively linked to older sisters' observed sibling collusion and both older and younger sisters' reported sibling collusion. Taken together, these findings suggest that behavior problems and social competence may play a role in collusion in sibling pairs that include a

sister, but are not linked to collusion between brothers. To my knowledge, this is the first study to examine sex differences in these associations.

One potential explanation for these sex differences lies in the different culture of girls and boys. Maccoby (1998) argues that boys are more likely to reward each other's risk-taking behavior than girls. It may be that boys engage in collusion with their siblings regardless of their personal qualities, whereas girls only do so when they have behavior problems or social difficulties. On average, girls show fewer externalizing behaviors and are more socially competent than boys (Bongers, Koot, Van Der Ende, & Verhulst, 2004; Eisenberg et al, 1995), and girls with elevated problems in these areas may be particularly at risk for enlisting a sibling as a partner in crime. Similarly, these girls may be more likely to endorse stereotypically male culture and its approval and reward of deviant behaviors.

There were positive main effects for parenting stress of both fathers and mothers predicting child-reported collusion, with mothers' parenting stress more closely linked to girls' than boys' reports. Mother's stress also predicted older sibling observed collusion. In general, these findings are consistent with work showing links between parental stress and depression and sibling conflict (Brody et al., 1994). If parents feel that their children are undermining their authority or encouraging each other's misbehavior, collusion may be a source for worry and stress. Sisters' collusion may be especially distressing for mothers, perhaps if mothers think that collusion with a sister is worrisome but collusion with a brother is more normative (Maccoby, 1998). The links with parenting stress may also be evidence for a compensatory process, wherein siblings respond to perceived parental stress by turning to one another for a sense of camaraderie (Jenkins & Smith, 1990). This pattern was evident for girls, but not boys, with

respect to mothers' parenting stress. A goal for future research is to test the direction of effect, which I was not able to do in this cross-sectional study.

Dyadic parent-child relationships. With respect to parenting each child, I found evidence that fathers' responsiveness was negatively linked to collusion. If children have a warm relationship with their father, they may be less likely to join forces to undermine his authority. Associations between parent-child conflict and sibling collusion varied by dyad sex constellation, but every significant link showed that higher conflict was associated with more collusion. Although there were distinct patterns of dyad sex constellation differences for mother-child and father-child relationships, it is important to note that I did not statistically test for mother-father differences.

That said, these finding suggest that children may react to conflict with their mother by attempting to draw a sibling, particularly a same-sex sibling, into a coalition. This is consistent with previous research suggesting that same-sex siblings are more likely to collude (Rowe & Gulley, 1992; Slomkowski et al., 2001). This positive link emerged for father-child conflict and all dyad sex constellations except brother-brother pairs. Because father-son-son dynamics involve three males and no females, one might expect stereotypically masculine values such as independence and self-reliance (Golombok & Fivush, 1994) to be prominent. One possible explanation is that boys who have high levels of conflict with their fathers are less likely to join forces with a brother because they prefer to deal with conflict on their own. Or, perhaps fathers with two sons act as participants and/or promoters of a culture of sibling deviance (Bullock & Dishion, 2002), leading to a de-coupling of father-son conflict and sibling collusion.

The links between collusion and dyadic parent-child relationships echo other research

that has found associations between these two family subsystems (Bank et al., 1996; Brody et al., 1992; Criss & Shaw, 2005; Stocker & McHale, 1992). The findings highlight the importance of considering families as systems (P. Minuchin, 1985) by showing that the experiences that each child has with a parent may spill over into their sibling relationship (Larson & Almeida, 1999). These results should be replicated in larger samples, but they add to the literature by showing that parent-child conflict is related to sibling collusion in most of the six possible sex configurations of parent-sibling triads.

Parenting the sibling dyad. A novel contribution of this study is that I also considered parenting of the sibling *as a dyad,* in addition to parent-child relationships. There was a positive association between parents' authoritarian control and collusion, suggesting that siblings were more likely to forge a coalition that undermined their parents' authority when they came from families in which parents responded to sibling conflict with threats or punishment. These findings have important implications for family-based intervention programs. Providing parents with a variety of tools to intervene in sibling disputes, such as scaffolding problem solving strategies, could help them to derail potentially risky collusion processes.

In addition to parents' control strategies regarding managing sibling exchanges, I also tested the associations between collusion and parents' involvement in sibling activities. I expected that when parents were more aware of what the siblings were doing together and worked to engage them in joint positive activities, the siblings would be less likely to collude. This was the case for fathers' involvement in brothers' activities, but there were no significant links for the other three dyad sex constellations. Like the results for father-child conflict, this finding also involves a unique pattern for father-son-son triads. Prior research shows that

fathers tend to be more involved with sons than with daughters (Harris & Morgan, 1991), and fathers with *two* sons who are able to create a positive triadic relationship may be particularly effective at discouraging the brothers from forming a coalition that excludes their father.

Mothers' involvement in sibling activities was linked in the opposite direction: When mothers were more actively involved in the siblings' joint activities, siblings were *more* likely to report collusion. This may be a child-driven effect, wherein mothers notice their children colluding and respond by becoming more actively involved in their shared time. Because these analyses were cross-sectional, it was not possible to tease apart the direction of effect.

Limitations and Future Directions

This study was not without limitations. I examined both child-reported and observed sibling collusion, measured at the level of the dyad and at the level of the individual. Measuring collusion in these different ways represents an important step toward a better understanding of the underlying processes. However, the measure of observed sibling collusion was limited because collusion during the videotaped task was relatively rare in this low-risk, community-based sample, resulting in a small analysis sample for these models and findings that should be interpreted as exploratory. Future research should be directed at developing more precise methods of measuring collusion in low-risk samples and observation tasks designed to elicit collusion so it can be studied more closely. Other study designs, such as daily diaries or qualitative approaches, would also yield rich information about sibling collusion processes.

The observed and child-reported measures of collusion were not significantly related to each other, suggesting that they tap into different constructs. Further, in comparing the results for the two measures, there were more links between child-reports and the family context

variables than there were for observed collusion. This could be due to statistical issues such as the limited sample size for observed collusion or the fact that the child-report scale included multiple items, and consequently, had greater variability and potentially better reliability than the dichotomous observed scale. The discrepancies may also be due to the conceptual differences in the two measurements.

Although this was a normative community sample, in contrast to most prior research on sibling collusion, it was not nationally representative. Further, the sample size was relatively small, especially when divided into the four dyad sex constellations. Replications in larger samples, different ethnic groups, and other family structures (e.g., step-families, adopted siblings) are needed to verify these findings.

Finally, this study was cross-sectional, and direction of effect could not be determined. The analyses were set up with collusion as the dependent variable, but it is likely that these dynamics are bidirectional and that collusion may cause changes in parenting dynamics and children's and parents' adjustment. A next step is to test the associations in a longitudinal framework. The data presented here are part of a larger, randomized trial of a sibling-focused intervention, and future analyses will be able to test whether experimentally-induced changes in sibling relationships predict changes in parenting and family members' well-being.

Despite its limitations, this study provided one of the first descriptions of collusion in a non-risk sample of siblings and has implications for family-based interventions. In recent years, researchers have pointed out the potential for interventions that target sibling relationships to prevent or reduce children's behavior problems (Feinberg et al., in press; Kramer, 2004; Stormshak et al., 2009). A concern about sibling-based interventions is that, as they strengthen

sibling relationships, they may also inadvertently promote collusion. This study sheds light on some of the correlates of collusion. If future research clarifies the direction of influence, these findings would suggest that targeting other dyadic and triadic family processes as part of a sibling intervention, such as including a parenting component that teaches parents how to handle sibling conflicts effectively and promotes positive parent-child bonds, may help to discourage collusion processes.

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Table 3.1

Means and (Standard Deviations) for Study Variables

Scale	*M*	*(SD)*
Child-reported sibling collusion		
Older sibling collusion	1.63	(0.70)
Younger sibling collusion	1.82	(0.80)
Individual family members' adjustment		
Older sibling externalizing behavior	3.48	(4.50)
Younger sibling externalizing behavior	5.01	(5.32)
Older sibling social competence	4.78	(1.00)
Younger sibling social competence	4.57	(1.14)
Mother parenting stress	2.33	(0.73)
Father parenting stress	2.28	(0.72)
Dyadic parent-child relationships		
Mother-Older sibling responsiveness	4.17	(0.51)
Mother-Younger sibling responsiveness	4.23	(0.55)
Father-Older sibling responsiveness	3.95	(0.58)
Father-Younger sibling responsiveness	3.99	(0.58)
Mother-Older sibling conflict	2.75	(0.93)
Mother-Younger sibling conflict	2.92	(0.94)
Father-Older sibling conflict	2.60	(0.86)
Father-Younger sibling conflict	2.68	(0.90)
Parenting the sibling dyad		
Mother authoritarian control	3.16	(0.69)
Father authoritarian control	3.11	(0.64)
Mother involvement in sibling activities	3.88	(0.43)
Father involvement in sibling activities	3.65	(0.53)

Table 3.2

Conditional Model Parameters and (Standard Errors) for Multilevel Models Including Sex, Dyad Sex Constellation, and Age Spacing as Predictors of Child-Reported Sibling Collusion

Parameter	Estimate	*(SE)*
Fixed Effects		
Older sibling intercept	1.64**	(0.16)
Younger sibling intercept	1.84**	(0.17)
Sex	0.01	(0.07)
Dyad sex constellation	-0.16†	(0.09)
Age spacing	0.03	(0.06)
Random Effects		
Older sibling intercept variance	0.50**	(0.05)
Younger sibling intercept variance	0.63**	(0.07)
Older-younger intercept covariance	0.18**	(0.05)

Note. 1 = male, 0 = female. 1 = mixed-sex, 0 = same-sex.

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

Table 3.3

Conditional Model Parameters and (Standard Errors) for Multilevel Models Including Family Context Variables as Predictors of Child-Reported Sibling Collusion

Parameter	Estimate	*(SE)*
Individual family members' adjustment		
T externalizing problems – osib [a]	0.08**	(0.02)
T externalizing problems – ysib [a]	0.01	(0.02)
T externalizing problems X sex – osib [a]	-0.07**	(0.02)
T externalizing problems X sex – ysib [a]	0.01	(0.02)
T social competence	-0.04**	(0.01)
T social competence X sex	0.04**	(0.02)
M parenting stress	0.28**	(0.09)
M parenting stress X sex	-0.22*	(0.10)
F parenting stress	0.14*	(0.07)
Dyadic parent-child relationships		
M responsiveness	-0.05	(0.08)
F responsiveness	-0.18*	(0.08)
M conflict	0.32**	(0.07)
M conflict X dyad sex constellation	-0.21*	(0.09)
F conflict	0.29**	(0.12)
F conflict X sex	-0.32†	(0.18)
F conflict X dyad sex constellation	-0.23	(0.15)
F conflict X sex X dyad sex constellation	0.34†	(0.20)
Parenting the sibling dyad		
M authoritarian control	0.13*	(0.07)
F authoritarian control	0.16*	(0.08)
M involvement in sibling activities	0.21*	(0.11)
F involvement in sibling activities	0.17	(0.25)
F involvement X sex	-0.60†	(0.35)
F involvement X dyad sex constellation	-0.22	(0.29)
F involvement X sex X dyad sex constellation	-0.65†	(0.38)

Note. Osib = older sibling, Ysib = younger sibling. M = Mother-reported, F = Father-reported, T = Teacher-reported. Reference groups are females and same-sex sibling pairs. *N* for models including mother reports ranged from 168 to 171 families; *N* for models including father reports ranged from 132 to 136 families; *N* for models including teacher reports was 173 families.

[a] Separate effects were estimated for older ("– osib") and younger ("–ysib") siblings.

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

Table 3.4

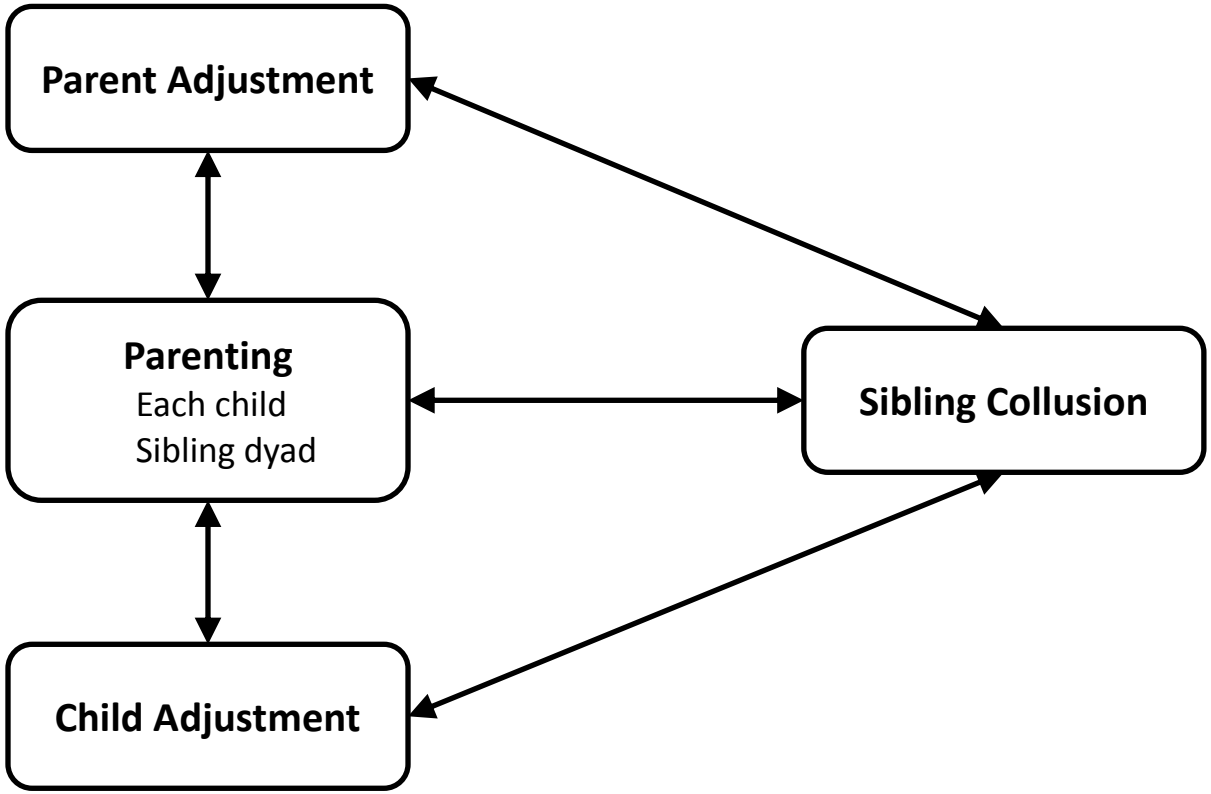
Summary of Logistic Regression Models for Family Context Variables Predicting Observed Older Sibling Collusion (N = 36)

Parameter	*B*	*(SE)*	*Odds Ratio*
Individual family members' adjustment			
T older sibling externalizing problems	0.13	(0.09)	1.14
T older sibling social competence	-0.27*	(0.10)	0.76
M parenting stress	1.11†	(0.65)	3.05
Dyadic mother-older sibling relationships			
M responsiveness	-1.04	(0.80)	0.35
M conflict	0.23	(0.43)	1.26
Parenting the sibling dyad			
M authoritarian control	-0.31	(0.57)	0.73
M involvement in sibling activities	0.25	(0.88)	1.28

Note. M = Mother-reported, T = Teacher-reported.

† $p < .10$. * $p < .01$.

Figure 3.1. Conceptual model illustrating the links between sibling collusion and family context.



CHAPTER 4

Parents' Differential Treatment of Adolescent Siblings in African American Families:

The Roles of Birth Order, Sex, and Financial Stress

We thank Megan Baril, Kelly Davis, Aryn Dotterer, Marni Kan, Ji-Yeon Kim, Jamie Marks, Ashleigh May, Carolyn Ransford, Cindy Shearer, Shawn Whiteman, Sandee Hemman, Kristen Johnston, and Temple University's Survey Research Center for their help in conducting this research and the participating families for their time and cooperation. This work was funded by a grant from the National Institute of Child Health and Human Development (R01-HD32336) to Ann C. Crouter and Susan M. McHale. Portions of this paper were presented at the annual meeting for the National Council on Family Relations, November 2011, Orlando, FL.

Abstract

This study examined the longitudinal associations between parents' differential treatment and youths' well-being and tested adolescent sex, birth order, and parents' financial stress as moderators of these associations. Mothers, fathers, and two adolescent siblings in 179 African American families were interviewed on 3 annual occasions. Multilevel models revealed that, controlling for dyadic parent-child relationship qualities, decreases in youths' experiences of parental warmth, *relative to a sibling*, were associated with increases in youths' risky behavior and depressive symptoms, particularly for boys. Negative links emerged for differential parental conflict. These links were evident, however, in families under low but not under high financial stress. The discussion focuses on differential treatment under different conditions and highlights the role of contextual factors in the implications that parental differential treatment has for adolescent well-being.

Parents' Differential Treatment of Adolescent Siblings in African American Families: The Roles of Birth Order, Sex, and Financial Stress

Parents' differential treatment (PDT) of siblings is a pervasive family dynamic that persists throughout the life course (Brody, Stoneman, & McCoy, 1992; Shanahan, McHale, Crouter, & Osgood, 2008; Suitor & Pillemer, 2000). Although parents cite legitimate reasons for differential treatment, such as siblings' different maturity levels or needs (McHale & Crouter, 2003), PDT is generally linked with more adjustment problems for the less favored sibling (Kowal, Krull, & Kramer, 2006; Shanahan et al., 2008) and particularly when PDT is perceived as unfair (Kowal & Kramer, 1997). In his theory of individual psychology, Alfred Adler explained that the social comparisons youths make in how they are treated relative to a sibling have unique implications for individual development (Ansbacher & Ansbacher, 1956). When youths perceive that their parents treat a sibling more favorably, they may develop low self-worth or act out in an attempt to gain attention (Feinberg & Hetherington, 2001; Richmond, Stocker, & Rienks, 2005; Shanahan et al., 2008).

A person-process-context model of family dynamics (Bronfenbrenner & Crouter, 1983) suggests that the implications of family processes like PDT are not universal, but instead are shaped by both individual and contextual factors. Indeed, some evidence shows that PDT dynamics have different implications for youths' adjustment depending on individual and sibling dyad characteristics including adolescent sex, dyad sex constellation, and birth order (McHale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000; Shanahan et al., 2008; Tamrouti-Makkink, Dubas, Gerris, & van Aken, 2004). Other work has found that contextual factors including marital discord (Richmond & Stocker, 2008), family chaos (Asbury, Dunn, Pike,

& Plomin, 2003; Asbury, Dunn, & Plomin, 2006), and a collectivistic orientation (McHale, Updegraff, Shanahan, Crouter, & Killoren, 2005) also moderate PDT effects.

The available research on PDT is limited to mostly European American families despite the fact that children from other ethnic groups have more siblings than European American children, on average (Hernandez, 2004), and spend a great deal of their free time together (Updegraff, McHale, Whiteman, Thayer, & Delgado, 2005). The present study advanced research on PDT by studying this dynamic in African American families, and also contributed to the literature on African American families, which mostly has focused on pathology or dysfunction (e.g., McLoyd, 1998), by investigating PDT as a normative family process. Using a three-year study of two-parent African American families, the current study aimed: (1) to examine the longitudinal associations between PDT and youths' risky behaviors and depressive symptoms across adolescence, controlling for the overall level of dyadic parent-child relationship quality and youths' perceptions of the fairness of PDT; (2) to explore individual and sibling dyad characteristics, including sex, dyad sex constellation, and birth order as moderators of PDT-adjustment linkages; and (3) to test parents' financial stress as a potential moderator of the associations between PDT and youths' adjustment.

Parents' Differential Treatment and Adolescent Adjustment

Social comparison theory (Festinger, 1954) holds that individuals evaluate themselves based on comparisons with other persons in their environments. These comparisons are driven by the motivation to enhance one's self-esteem (Suls, Martin, & Wheeler, 2002) either through upward comparisons (finding qualities in common with a high-status individual) or downward comparisons (finding that one is better off compared to a lower-status individual). Falling short

of the comparison target can result in poor self-evaluations, manifested as depressive symptoms and/or externalizing behaviors.

Sisters and brothers represent prime candidates for social comparison because of their proximity, shared family and individual characteristics, and the fact that they are readily compared to one another by other individuals such as parents (Wills, 1991). Adler articulated how social comparison theory could be applied to the sibling context by focusing on comparisons between the quality of one's own relationship with a parent and a sibling's relationship with that parent (Ansbacher & Ansbacher, 1956). Adler suggested that siblings are sensitive to parents' treatment and react to perceived disfavor with feelings of rivalry and low self-worth.

Empirical research on PDT in European and European American families has found both concurrent and longitudinal evidence of PDT's negative implications for a less favored sibling. For instance, adolescents who reported relatively more parental negativity or less parental warmth compared to a sibling showed higher levels of internalizing and antisocial behavior (Feinberg & Hetherington, 2001; Tamrouti-Makkink et al., 2004). Longitudinal studies also suggest that changes in PDT are associated with changes in youths' adjustment: Youths' reports of decreases in parental warmth or increases in parental conflict relative to their siblings' experiences were associated with increased depressive symptoms (Shanahan et al., 2008). Similar results have been reported for relative increases in negative parenting (e.g., punishment, blame) and increases in externalizing problems (Richmond et al., 2005). Importantly, the links between PDT and youths' adjustment remain even after taking into account the overall level of (dyadic) parent-child warmth or negativity, which can act as a third

variable that is also linked with youths' well-being (Feinberg & Hetherington, 2001; Shanahan et al., 2008; Tamrouti-Makkink et al., 2004).

The little available research on PDT in African American families has focused on parents' differential socialization of sons and daughters, testing the adage that African American parents "love their sons and raise their daughters" (Hill & Zimmerman, 1995). Using data from the NLSY, Mandara, Varner, and Richman (2010) found that second-born sons had fewer responsibilities, less cognitively stimulating environments, and more maternal conflict than second-born daughters, and those differences accounted for the lower academic achievement observed in adolescent boys compared to girls. A major limitation of this and some other research on PDT is that it employed a between-families design that compared a sibling from one family to a sibling from a different family (see Feinberg & Hetherington, 2001). PDT is inherently a *within-family* variable, as the crux of the issue is how one child experiences or interprets his or her relationship with a parent vis a vis a sibling's relationship with that parent. To my knowledge, no published studies have used a within-family approach to explore the associations between differences in parent-child warmth and conflict and youths' adjustment in African American sibling pairs, a research gap that is addressed by the current study.

Moderators of the Links Between PDT and Adolescent Adjustment

A limitation of social comparison theory (Festinger, 1954) and Adler's theory of individual psychology (Ansbacher & Ansbacher, 1956) is that they do not specify how contextual factors could mitigate or exacerbate the effects of PDT. Consistent with a person-process-context model (Bronfenbrenner & Crouter, 1983), however, empirical studies have highlighted individual, sibling dyad, and family-wide characteristics that moderate PDT's effects

on youths' adjustment.

Individual and sibling dyad characteristics. Prior research shows that gender dynamics are relevant to family processes, including PDT. Maccoby (1998) suggested that girls become more relationship-oriented through adolescence, and engage in social comparisons to a greater extent than boys. Further, because social comparison is most likely to take place when the target is similar to oneself (Bandura, 1997), youths are more likely to compare themselves to a same-sex sibling than an opposite-sex sibling. Indeed, studies have found stronger associations between PDT and adolescent adjustment for girls and for same-sex sibling pairs (McHale et al., 2000; Shanahan et al., 2008; Tamrouti-Makkink et al., 2004). Gender dynamics may have different implications for PDT processes in African American families, as there is some evidence that African American mothers and fathers are less gender-stereotyped in their parenting than European American parents (Hill, 2001; Hossain & Roopnarine, 1993). If this is true, mixed-sex siblings in African American families may expect equal treatment to a greater extent than European American siblings, for whom PDT variation by child sex is normative (O'Connor, Dunn, Jenkins, & Rasbash, 2006; Tucker, McHale, & Crouter, 2003). However, this pattern would stand in contrast to the adage that African American parents do differentiate by child sex if they "raise" daughters and "love" sons (Mandara et al., 2010). The current study explores these distinct views of how gender might shape PDT in African American families.

Others have found that birth order and youths' age condition PDT's effects. First- and earlier-born siblings may react more strongly to PDT if they feel that their higher status and privilege in the family is threatened; indeed, several studies have found stronger associations between disfavored status and adjustment problems among older siblings than younger siblings

(Feinberg & Hetherington, 2001; Feinberg, Neiderhiser, Simmens, Reiss, & Hetherington, 2000; Tamrouti-Makkink et al., 2004). Furthermore, Shanahan et al.'s (2008) longitudinal study found that youths aged 13 years old or older, regardless of birth order, reported more depressive symptoms when they received relatively less maternal and paternal warmth compared to their sibling. For youths under age 13, there was no association between differential warmth and depressive symptoms.

Family context. In addition to these structural factors, research points to youths' evaluations of PDT fairness and family-level variables, such as marital dynamics and household chaos, as factors that shape siblings' reactions to PDT. When siblings view their disfavored treatment as fair, for example, they feel that their sibling requires or deserves special attention due to a disability or a younger age, PDT does not have the expected detrimental effect on their individual adjustment (McHale & Pawletko, 1992). In fact, some studies show that siblings' perception of fairness has stronger links with adjustment than differential treatment, per se (Kowal, Kramer, Krull, & Crick, 2002; McHale et al., 2000). The present study controlled for perceived fairness to study the unique impact of PDT.

Research on other family-wide factors can be classified as factors that tend to reflect tighter family ties (e.g., familism values) and those that impair family cohesion (e.g., marital discord, household chaos). In a study of Mexican American families, McHale et al. (2005) found that less favored siblings who held strong familism values were protected from expected elevated depressive symptoms and risky behavior. Familism values emphasize putting the family ahead of the individual, and the authors reasoned that these values also make siblings less inclined to engage in social comparison and less likely to interpret unequal treatment as an

indication of personal shortcomings or parental preferences.

Factors that tend to inhibit a sense of family solidarity, such as marital discord, have been found to exacerbate PDT's negative effects on adolescent adjustment (Richmond & Stocker, 2008). Family structure plays a similar role: Mekos, Hetherington, and Reiss (1996) found that youths in stepfamilies who experienced relatively higher levels of parenting negativity used more substances than their siblings, but PDT was not linked to substance use in non-divorced families. Further, Asbury and colleagues (Asbury et al., 2003; Asbury et al., 2006) found that differential parenting was more predictive of twin differences in problem behaviors in families with low SES and high household chaos. In general, these studies suggest that factors that impair family cohesion tend to exacerbate the effects of PDT, whereas factors that promote cohesion diminish PDT effects.

In the current study, I extended this work by exploring parents' financial stress as a potential moderator of PDT. I examined perceived financial hardship, rather than a more objective measure such as income or parental education, because subjective and objective markers often show a low degree of correspondence (Short, 2005), and I expected that parents' subjective perception of their financial situation would be more relevant to PDT. Feelings of financial stress may be particularly salient among African American populations, given the marked racial inequalities in accumulated wealth, which is distinct from earned income. For example, the median wealth held by African American households was only 5-10% of that held by non-Hispanic White households in 2000 (Orzechowski & Sepielli, 2003). Thus, even at high income levels, African American families may be more prone to financial stress if they do not have assets to fall back on.

A handful of studies have found that objective measures of financial hardship such as low education and income are predictive of more pronounced PDT (Atzaba-Poria & Pike, 2008; Jenkins, Rasbash, & O'Connor, 2003; for an exception, see O'Connor et al., 2006). The one study that has examined parents' subjective perceptions of economic pressure found that it also was associated with a higher degree of PDT (Crouter, McHale, & Tucker, 1999). According to Henderson, Hetherington, Mekos, and Reiss (1996), parents who spend a great deal of energy coping with economic pressure have fewer resources in the form of time, attention, and support, to split among their children. Financial strain could lead parents to be less effective at monitoring their differential treatment, or to invest the bulk of their resources in the sibling they feel has a greater likelihood for success (Conley, 2005).

However, it is not clear whether or how financial stress might *moderate* the linkages between PDT and youths' adjustment. I developed two competing hypotheses. The "intensification hypothesis" predicts that financial stress functions in a similar way to marital discord and family chaos, with a high amount of financial stress intensifying the negative implications of being the less favored sibling. Siblings whose parents are stressed may become more sensitive to perceived differences in parental treatment, and subsequently react more strongly to PDT. Indeed, much research suggests that economic stress is associated with strained dyadic family relationships (e.g., Conger & Elder, 1994; Conger et al., 2002). Further, the intensification hypothesis is consistent with a cumulative risk model (Rutter, 1979), which suggests that the combination of being the disfavored sibling in a family under financial pressure will be associated with the poorest outcomes.

The "mitigation hypothesis," on the other hand, predicts that financial pressures

diminish the effects of PDT on youths' adjustment. In this scenario, financial strain could promote a sense that PDT does not necessarily reflect parents' preferences, but is instead a result of pressures outside the family. If this is the case, financial stress would act as familism values did in McHale et al.'s (2005) study of Mexican American siblings and mitigate the negative effects of PDT on adolescent adjustment. I explored these competing hypotheses in a sample of middle-class African American families to further illuminate normative PDT dynamics.

The Current Study

This paper builds on previous research, using a longitudinal design to examine the role of PDT in youths' adjustment across adolescence in two-parent African American families. The first research aim was to test the time-varying associations between mothers' and fathers' differential warmth and conflict and youths' risky behavior and depressive symptoms, controlling for the overall level of parent-youth relationship qualities and the perceived fairness of differential treatment. Second, I examined individual and sibling dyad characteristics as potential moderators of differential treatment-youth adjustment linkages. I expected to replicate work on European American families which shows that disfavored status is associated with more risky behaviors and depressive symptoms, particularly for older siblings, girls, and same-sex dyads (Feinberg et al., 2000; Feinberg & Hetherington, 2001; McHale et al., 2000; Shanahan et al., 2008; Tamrouti-Makkink et al., 2004). My third aim was to extend this research by exploring the moderating role of financial stress. These analyses were exploratory, given that few studies have tested these dynamics.

Method

Participants

Participants were mothers, fathers, and two target siblings from 179 families that participated in a three-year longitudinal study of family gender socialization. Given the goals of the larger investigation, we did not seek a representative sample but instead targeted families who self-identified as Black or African American and included a mother and father who were living together and raising at least two children in middle childhood or adolescence. Participants lived in two contiguous urban centers with substantial African American populations on the Eastern Seaboard. Two methods were used to recruit families. Roughly half of the sample was recruited through local African Americans who were hired to distribute information about the project to community groups and churches and to collect contact information from interested families. Second, we obtained from a marketing firm the names and address of African American students in grades 4 through 7 who lived in the communities of interest. We mailed these families a letter describing the study and criteria for participation and asked them to return a postcard or call a toll free number if they were interested in participating.

Data collection began in 2002 and was conducted on an annual basis. In Year 1 the sample included 202 families. Data from 23 families were excluded from the current analyses: seven families in which the parental figures were not romantically involved (e.g., the biological mother of the children and her brother-in-law who acted as a father figure to the children), six families in which mothers and fathers had been living together for less than three years, and ten families in which older siblings were over the age of 18 in Year 1. This resulted in a final

sample of 179 families at Year 1. Over the course of the three-year study, 11 families stopped participating (an attrition rate of 5%).

Most families were working and middle class, with an average family income of $90,039 (*SD* = $57,465; range = $3,000 – $275,000) in Year 1. This figure is higher than the national average, in part because nearly all of the families were urban, dual-earner families (87% of mothers and 95% of fathers were employed). Mothers had completed 14.68 years of education (*SD* = 1.82) and fathers, 14.31 years (*SD* = 2.37) on average, with 14 years equivalent to some college and 16 years equivalent to a college degree. In Year 1, 88% of couples were married, and 12% were cohabiting. Over the course of the study, 24 couples (13%) separated or divorced. In almost all families, parents were biologically related to the target adolescents (96% of mothers and 80% of fathers). All youths self-identified as African American or Black, as did 96% of the mothers and 99% of the fathers. In Year 1, older siblings averaged 13.81 years of age (*SD* = 1.73, range = 10.03 – 17.91) and younger siblings averaged 10.37 (*SD* = 1.08, range = 7.84 – 13.11), with an average age gap of 3.47 years (*SD* = 1.76). In 82% of the families, siblings were fully biologically related; the remaining 33 pairs were half- or step-siblings. Nearly all (98%) of the sibling pairs were consecutive in birth order and the majority (75%) were first- and second-borns. Dyad sex constellation was evenly distributed, with 46 older sister-younger sister, 41 older sister-younger brother, 50 older brother-younger sister, and 42 older brother-younger brother pairs. Average family size was 4.82 (*SD* = 1.15, range = 4 – 10 family members).

Procedures

Data were collected through home interviews conducted separately with mothers, fathers, and each sibling on an annual basis by a pair of interviewers, nearly all of whom were

African American. Each family member answered questions about his or her family relationships and personal well-being. Questions were presented orally to children under the age of 13 and to participants with reading difficulties. Youth interviews lasted approximately 1 hour and parent interviews were 2 to 3 hours. Families received an honorarium of $100 in Year 1 and $200 in Years 2 and 3 after completing their home interviews.

Measures

Youths reported on maternal and paternal warmth and conflict in Years 1, 2, and 3. *Differential treatment* scores were calculated separately for mothers and fathers with a directional difference score. For older siblings, differential treatment was calculated by subtracting younger siblings' reports of dyadic parent-youth relationship characteristics from older siblings' reports; for younger siblings, the opposite was done. This resulted in variables where a negative score indicated that the target reported lower levels of a given form of treatment than the sibling ("sibling more"), a score of zero indicated "equal" treatment, and a positive score indicated that the target reported higher levels of a given form of treatment than the sibling ("self more"). For example, youths who scored above zero on differential maternal warmth reported a higher level of maternal warmth than did their sibling. I used parent reports of parent-youth warmth and conflict to control for dyadic parent-youth relationships. This approach allowed me to avoid correlated self-reports because youth-reported variables (from both siblings) comprised the differential treatment scores and parent-reported variables comprised the control variables.

Youths reported on *parental warmth* using an 8-item (e.g., "My mother/father understands my problems and worries"), 4-point scale (1 = *really unlike,* 4 = *really like*) from the

acceptance subscale on the Child's Report of Parental Behavior Inventory (CRPBI; Schaefer, 1965; Schwarz, Barton-Henry, & Pruzinsky, 1985). Each sibling rated his or her experiences with his or her mother and father separately. Parents' ratings of their warmth toward their offspring were measured with the acceptance subscale of the parent version of the CRPBI. Parents responded to eight items (e.g., "I understand my child's problems and worries") about their experiences with each sibling using a 5-point scale (1 = *not at all,* 5 = *very much*). Items were averaged, with higher values indicating more warmth during the past year. Cronbach's alphas for youth and parent reports ranged from .78 to .94 across the three years, with an average alpha of .88.

Youth reports of *parent-youth conflict* were measured with a scale adapted from Smetana (1988). Youths were asked how often they had conflicts with their mother and father in nine domains (e.g., chores, social life, behavior) on a 6-point scale (1 = *not at all*, 6 = *several times a day*). Parents were asked parallel questions about their experiences with each sibling. Items were averaged, with higher scores reflecting more conflict during the past year. Cronbach's alphas ranged from .77 to .92, and the average alpha was .83.

Siblings' perceptions about the *fairness of differential treatment* were measured in Year 1 with a scale from McHale et al. (2000). Youths were asked to rate their parents' fairness in eight domains (e.g., allocation of privileges, chores, parental involvement) on a 5-point scale (1 = *very unfair,* 5 = *very fair*). Responses were averaged with higher values indicating that differential treatment was perceived as more fair. Cronbach's alpha was .78 for older siblings and .77 for younger siblings.

Youths reported on their *depressive symptoms* at each of the three data collection

points using the 10-item version of the Children's Depression Inventory (CDI; Kovacs, 1981). Each item consisted of three sentences and youths were asked to indicate which sentence best described their feelings in the past two weeks (e.g., 0 = "I am sad once in a while;" 1 = "I am sad many times;" 2 = "I am sad all the time"). Responses were summed and reliabilities ranged from .68 to .82, with an average of .75.

Risky behavior was assessed in Years 1, 2, and 3 for older siblings and Years 2 and 3 for younger siblings. Youths reported on how often they had participated in 18 behaviors (e.g., smoked cigarettes, skipped a day of school, disobeyed parents on an important issue) in the past year (1= *never,* 4 = *more than ten times*; Eccles & Barber, 1990). Because of their young age, younger siblings did not report on risky behavior in Year 1. Items were summed, with higher values signifying more risky behaviors. A log transformation was applied to correct for positive skew. Cronbach's alphas ranged from .79 to .87, and the average alpha was .84.

Financial stress was measured in Year 1 through mother and father reports of economic adjustments and financial hardship on items adapted from Conger and Elder (1994). Parents responded "yes" or "no" to nine questions about changes their family had made in the past year because of financial need (e.g., "Have you changed food shopping or eating habits to save money?"). Parents received a 1 for each "yes" and items were summed. Parents rated financial hardship over the past year with three items: "How difficult has it been for you to pay your family's bills each month?" (1 = *not difficult,* 5 = *very difficult*), "How much money did you have left over each month after paying your bills?" (1 = *more than enough,* 5 = *not enough to make ends meet*), and "How satisfied are you with your family's total financial situation?" (1 = *very unsatisfied,* 9 = *very satisfied*; reverse-coded). Scores for economic adjustments and financial

hardships were standardized and averaged, with higher values indicating more financial stress. Because mother and father reports were correlated (*r* = .57) and to simplify the analysis, I used the mean of mother and father reports in the analyses. Cronbach's alpha for the overall scale was .85.

Results

Analysis Plan

In this study, time was nested within persons and siblings were nested within families, a data structure suited to a multilevel modeling (MLM) approach. I estimated a series of eight 3-level models, testing separate models for maternal warmth, paternal warmth, mother-youth conflict, and father-youth conflict predicting the two dependent variables, depressive symptoms and risky behavior.

First, I examined the developmental course of depressive symptoms and risky behavior and tested birth order, sex, and dyad sex constellation (same- vs. mixed-sex) as moderators to capture variability in the developmental trajectories by these characteristics. A linear age term, centered at age 13 (the average age across all time points across both siblings), was included as a time-varying covariate at Level 1. Log likelihood ratio tests were used to determine which random variances to include for each outcome.

Controlling for age-related changes in the dependent variables, I then explored the time-varying associations between PDT and youths' adjustment and tested sibling dyad characteristics and financial stress as moderators of these associations. Level 1 predictors included time-varying dyadic parent-youth relationship qualities reported by mothers and fathers and PDT, all of which were centered at each individual's cross-time mean (i.e., group-

mean centered). These variables captured within-person variability in PDT and dyadic parent-youth relationships. Level 2 predictors were youths' ratings of fairness and cross-time means for dyadic parent-youth relationship qualities and PDT, centered at the sample average (i.e., grand-mean centered). The Level 2 variables captured between-person variability. Including these cross-time means allowed me to control for stable individual differences in PDT and meant that the level 1 within-person PDT term represented the associations between within-person changes in PDT and within-person changes in the dependent variables.

To explore moderation, PDT X individual and sibling dyad characteristics and PDT X financial stress terms were entered. Only significant interactions were retained in the final models. Follow-ups on PDT X financial stress interactions were conducted by comparing a group of families whose financial stress scores were 1 SD above the mean and a group of families whose financial stress scores were 1 SD below the mean (Aiken & West, 1991). All models included parental separation (1 = parents separated over the course of the study, 0 = all others) and siblings' biological relatedness (1 = full biological siblings, 0 = all others) as controls at Level 3. Parent education also was tested as a control variable but was never significant and did not change the results substantively, and was not included in the final models.

All models were tested with SAS 9.2. For the models with risky behavior as the dependent variable, I used PROC MIXED to estimate linear MLMs. In the case of depressive symptoms, however, I used a non-linear model because the distribution of scores on depressive symptoms was positively skewed and contained a large number of zeros (38% of all scores across siblings and time points). To account for this non-normality, depressive symptoms were modeled using PROC GLIMMIX, which used residual pseudo-likelihood with a subject-specific

expansion (i.e., METHOD=RSPL) and for which I specified a negative binomial distribution and a log link function. The negative binomial distribution is appropriate for count data, and the regression modeled the log of the expected count. As such, the coefficients for depressive symptoms represented the change in the log of the expected number of depressive symptoms that was associated with a one-unit change in the independent variable.

Preliminary Analysis

Table 4.1 presents the means and standard deviations for youths' depressive symptoms, risky behavior, dyadic parent-youth relationships, and PDT at each time point, separately for older and younger siblings. Youths in this sample were well-adjusted, with scores on the low ends of the depressive symptom (possible range: 0 – 20) and risky behavior (possible range: 18 – 72) measures. Older siblings' scores for differential warmth were negative, indicating that, on average, younger siblings reported more warmth with mothers and fathers compared to older siblings. Average scores for differential conflict were negative in Year 1 and positive in Year 3, indicating that older siblings reported higher conflict with parents at the first time point and younger siblings reported more conflict at the third time point. Youths generally felt that differential treatment was fair, with average responses between 3 ("sort of fair/sort of unfair") and 4 ("sort of fair") on this 5-point scale.

Before standardization, parents' scores on the financial stress items showed that parents responded "yes" to making one or two changes on average (out of a possible nine) in their behavior as a result of economic need (M = 1.54, SD = 1.41), that they experienced "some" difficulty paying their bills (M = 2.50, SD = 0.99), that they had enough money at the end of the month (M = 3.05, SD = 1.01), and that they were "somewhat satisfied" with their overall

financial situation (*M* = 5.06, *SD* = 1.95). Although on average the sample was fairly well-off in terms of earned income, there was variability in perceived financial stress. For example, 14% of the sample reported making three or more adjustments in their behavior to save money in the past year, and 25% said they had some trouble making ends meet at the end of the month. Family income was moderately correlated with financial stress, $r = -.40$, $p < .001$.

The correlations for risky behavior and depressive symptoms showed that these constructs were somewhat stable across the three time points (see Appendix C). There were moderate positive correlations between the two siblings' reports of their risky behavior, but no significant correlations for depressive symptoms. Differential warmth and conflict showed substantial cross-time stability, and maternal and paternal differential treatment scores were positively correlated (see Appendix D).

Based on a series of preliminary MLMs and deviance tests, the most appropriate growth curve models for risky behavior and depressive symptoms included random intercepts at Levels 2 and 3 (Table 4.2). With respect to depressive symptoms, there were no predictable changes in depressive symptoms by age or by any of the other predictor variables in the growth curve model. In the model predicting risky behavior, the main effects for birth order, youths' sex, siblings' biological relatedness, and parents' divorce status were significant. The LSMEANS statement was used to obtain estimates of the adjusted averages for risky behavior in each of these subgroups.

At age 13, risky behavior was higher among older siblings, *M* = 3.24, *SE* = 0.02, than younger siblings, *M* = 3.20, *SE* = 0.02, boys, *M* = 3.26, *SE* = 0.02, as compared to girls, *M* = 3.19, *SE* = 0.02, non-biological siblings, *M* = 3.25, *SE* = 0.03, vs. biologically related siblings, *M* = 3.19,

SE = 0.02, and youths whose parents got divorced over the course of the study, γ = 3.27, *SE* = 0.03, compared to youths whose parents remained together, γ = 3.18, *SE* = 0.02. The linear age term was positive and significant, indicating that youths' risky behavior increased as they got older. The age term was qualified by a marginally significant interaction with youths' sex. Girls reported fewer risky behaviors than boys at age 9, but increased more rapidly across adolescence. Follow-up tests indicated that by age 16, the sex difference was no longer statistically significant (see Figure 4.1).

Links Between PDT and Risky Behavior

Results for the models predicting risky behavior can be found in Table 4.3. With respect to the control variables, dyadic parent-youth warmth was negatively associated and parent-youth conflict was positively associated with youths' risky behavior. Adolescents who perceived the differential treatment in their families to be fairer reported marginally lower levels of risky behavior. The main effect for financial stress on risky behavior was not significant.

Differential parental warmth. Results for the model that included differential maternal warmth revealed a significant between-person effect (see Table 4.3, column 2). This effect indicated that, averaged across all time points, youths who reported relatively more warmth with their mother, compared to their sibling's report of warmth with their mother, also reported lower risky behavior. The between-person effect for differential paternal warmth was not significant.

The main effect for within-person maternal differential warmth was qualified by two interactions, one with birth order and one with dyad sex constellation. Follow-ups on these within-person effects revealed that *changes* in differential maternal warmth were associated

with *changes* in risky behavior for older siblings, $\gamma = -0.07$, $SE = 0.02$, $p < .001$, but not for younger siblings, $\gamma = 0.02$, $SE = 0.03$, $p = .61$, and for same-sex, $\gamma = 0.07$, $SE = 0.03$, $p = .02$, but not mixed-sex siblings, $\gamma = 0.02$, $SE = 0.03$, $p = .61$. On occasions when older siblings reported relatively more maternal warmth than their younger sibling, compared to their usual level of differential maternal warmth, they reported fewer risky behaviors at the same occasion. Among same-sex siblings, youths who reported relatively higher maternal warmth at a particular point in time reported higher levels of risky behavior at the same point in time. There was a significant within-person main effect for paternal differential warmth, showing that adolescents who reported more warmth with their fathers, compared to their siblings, engaged in fewer risky behaviors at the same occasion.

Differential parental conflict. Results for differential maternal and paternal conflict revealed significant between-person effects, wherein youths who reported higher levels of conflict with their parents across all time points, relative to their siblings' reports, also reported more risky behavior.

An interaction at the within-person level between fathers' differential conflict and youths' sex emerged at the trend level. When girls reported more conflict with their father than their usual differential conflict, they engaged in more risky behavior at the same point in time, $\gamma = 0.03$, $SE = 0.01$, $p = .01$. For boys, father's differential conflict was not linked to risky behavior, $\gamma = 0.003$, $SE = 0.01$, $p = .79$. Mother's within-person conflict was qualified by a marginally significant interaction with financial stress (see Figure 4.2). For families under low financial stress, the typical effect emerged: Adolescents who reported relatively more conflict with their mothers at a given time point, compared to their sibling's conflict with their mother, showed

more risky behavior at the same time point, $\gamma = 0.03$, $SE = 0.01$, $p = .02$. For families who reported high financial stress, however, there was no association between differential maternal conflict and youths' risky behavior, $\gamma = -0.003$, $SE = 0.01$, $p = .79$. This pattern was consistent with the mitigation hypothesis.

Links Between PDT and Depressive Symptoms

Results for the models predicting youths' depressive symptoms are presented in Table 4.4. Coefficients for the control variables revealed strong negative associations between perceived fairness and depressive symptoms. Dyadic father-youth relationship qualities were also significant predictors, with more paternal warmth and less conflict associated with fewer depressive symptoms. There were no significant effects for dyadic mother-youth relationship qualities or financial stress.

Differential parental warmth. Significant PDT effects emerged at the between-person level for both maternal and paternal differential warmth, both of which were moderated by youth's sex at the trend level (see Table 4.4, columns 2 and 4). Follow-up tests showed that across all time points, boys who reported relatively more warmth with their mother or father, compared to their sibling, also reported fewer depressive symptoms, $\gamma = -0.51$, $SE = 0.14$, $p < .001$ (mother's differential warmth), and $\gamma = -0.37$, $SE = 0.12$, $p = .003$ (father's differential warmth). The same effect was not significant for girls' reports of father's differential warmth, $\gamma = -0.10$, $SE = 0.09$, $p = .26$, and was significant at the trend level for mother's differential warmth, $\gamma = -0.19$, $SE = 0.10$, $p = .07$.

A main effect for maternal differential warmth emerged at the within-person level in the expected direction: On occasions when youths reported relatively more warmth with their

mother, relative to their sibling and compared to their average level of differential treatment, they reported fewer depressive symptoms at the same occasion. Fathers' within-person differential warmth was qualified by an interaction with financial stress, which followed the same pattern as described above (not pictured; see Figure 4.2 for a similar effect). For youths in families under low financial stress, relatively more paternal warmth was linked with fewer depressive symptoms, $\gamma = -0.32$, $SE = 0.09$, $p < .001$. For adolescents in families with high financial stress, however, there was no association between fathers' differential warmth and depressive symptoms, $\gamma = -0.02$, $SE = 0.09$, $p = .86$.

Differential parental conflict. Results showed between-person differential treatment effects for both parents in the expected direction, with relatively more maternal and paternal conflict associated with higher levels of depressive symptoms.

There was a trend-level interaction between mothers' within-person differential conflict and dyad sex composition, such that youths with same-sex siblings who engaged in more conflict with their mothers, compared to their sibling's level of conflict with their mother, reported more depressive symptoms, $\gamma = 0.19$, $SE = 0.06$, $p = .002$. For mixed-sex sibling pairs, mothers' differential conflict was not associated with depressive symptoms, $\gamma = 0.02$, $SE = 0.06$, $p = .79$.

Father's within-person differential conflict was moderated both by youth's sex and financial stress. Similarly to the results for differential parental warmth, follow-ups revealed that relatively more paternal conflict was linked with more depressive symptoms for boys, $\gamma = 0.16$, $SE = 0.07$, $p = .02$, but not for girls, $\gamma = 0.001$, $SE = 0.06$, $p = .99$. The pattern for financial stress was also the same as previously described (see Figure 4.2 for an example): Among

families with low financial stress, there was a significant positive association between fathers' differential conflict and depressive symptoms, $\gamma = 0.29$, $SE = 0.09$, $p = .001$, but no link among families with high financial stress, $\gamma = 0.03$, $SE = 0.07$, $p = .73$.

Discussion

There is substantial evidence suggesting that PDT has implications for European American youths' well-being (Feinberg & Hetherington, 2001; Richmond et al., 2005). I built on this research by examining PDT in a longitudinal study of two-parent African American families and drawing on a person-process-context model (Bronfenbrenner & Crouter, 1983) to explore PDT effects under different conditions. Using a MLM approach, I was able to control for stable individual differences in PDT and isolate the associations between relative increases and decreases in PDT and relative increases and decreases in youths' adjustment problems over time. I found strong, consistent results that match previous work on European American families (Shanahan et al., 2008; Tamrouti-Makkink et al., 2004). Further, some of these associations were time-varying, indicating that on occasions when youths reported relatively less favorable treatment compared to a sibling, they also reported higher levels of risky behavior and depressive symptoms. PDT did not have universally negative implications for adolescent adjustment; rather, the associations depended on personal and contextual factors, including birth order, sex, dyad sex constellation, and parents' perceived financial stress. I studied parents' differential warmth and conflict and found similar effects across mothers and fathers and both domains of treatment; however, PDT effects differed somewhat depending on the adjustment domain.

Moderators of PDT

Individual and sibling dyad characteristics. I tested three individual and sibling dyad characteristics as moderators of PDT effects: birth order, adolescent sex, and dyad sex constellation. One significant birth order effect emerged, and consistent with previous work on European American families (Feinberg & Hetherington, 2001; Feinberg et al., 2000; Tamrouti-Makkink et al., 2004), it revealed stronger links between differential treatment and risky behavior for older siblings compared to younger siblings. As others have argued, earlier ordinal positions are generally associated with higher status in the family, and older siblings may perceive less favorable treatment as a threat to their privileged position and be more reactive to it.

A novel contribution of this study was my exploration of gender dynamics and PDT in African American families, which are thought to be less gender-stereotyped than European American families (Hill, 2001; Hossain & Roopnarine, 1993). All four of the PDT X youths' sex interactions that emerged were at the trend level, but the pattern of results was fairly consistent. Taken together, these findings suggested different patterns for girls and boys, depending on the domain of adjustment studied. For the model predicting risky behavior, I found that relatively more paternal differential conflict was linked with more risky behavior for girls only. This finding is in line with past research, which has been interpreted as suggesting that girls may be more sensitive and/or reactive to PDT because they tend to be more relationship-oriented (Shanahan et al., 2008). In contrast, PDT was associated only with boys', but not girls', depressive symptoms. Importantly, these effects were evident across both mothers' and fathers' differential treatment; it was not the case, for example, that maternal

differential treatment mattered only for girls and paternal differential treatment mattered only for boys.

I developed two potential explanations for these sex differences. First, it may be that there is a greater potential for family dynamics to have an impact on boys' depressive symptoms because they tend to have lower levels of internalizing problems compared to girls (Bongers, Koot, van der Ende, & Verhulst, 2003). Alternatively, the effect could be child-driven; perhaps boys react to PDT by becoming moody or dejected and girls react by acting out. Although this pattern may seem counter-intuitive, given normative sex differences in internalizing and externalizing behavior, youths' responses to PDT may involve gender-atypical behavior because they are aimed at garnering maximum parental attention. I was not able to disentangle direction of effect in the present study, however, and future research should explore whether and how PDT leads to different responses by boys and girls.

The findings regarding dyad sex constellation showed associations between PDT and individual adjustment for same-sex, but not mixed-sex pairs, consistent with previous work on European American families (McHale et al., 2000). I did not find evidence that individual differences in adolescent adjustment could be accounted for by parents "loving their sons and raising their daughters" (Hill & Zimmerman, 1995; Mandara et al., 2010) – which would have been reflected in associations between PDT and adjustment for *mixed-sex* pairs. Instead, as predicted by a social learning perspective (Bandura, 1977), the results suggest that PDT had stronger implications for same-sex siblings, who may be more likely to engage in social comparisons because they are more objectively similar to one another. They also may be more sensitive to discrepancies in parental treatment, and parents may have more difficulty justifying

their differential treatment of same-sex siblings. As such, PDT could be more salient for their well-being than it is for mixed-sex siblings who feel that PDT is normative and partly due to gender dynamics. This also suggests that PDT may have less to do with the cultural adage of "loving sons and raising daughters" and more to do with social learning processes.

The results were mixed for the direction of this effect, however. In the case of internalizing behavior, relatively more maternal conflict was associated with more depressive symptoms among same-sex siblings, as expected. But, the direction of effect was opposite for risky behavior. For same-sex siblings, relatively more maternal warmth was linked with *more* risky behavior over time, when I expected that being favored with more maternal warmth would protect against risky behavior. This could be evidence of another child-driven effect, wherein mothers responded to youths' participation in delinquent activities by investing relatively more in that child compared to his or her sibling. This may be true for same-sex siblings because having two children of the same sex provides mothers with an opportunity for direct comparison between the siblings' behavior, making emerging problems more apparent. Perhaps this comparison dynamic leads mothers to be more responsive to sibling differences in risky behavior and respond by attempting to draw the more delinquent sibling closer. Additional research is needed to replicate these findings and explore parent- and child-driven effects.

Financial stress. I examined financial stress as a contextual moderator of PDT's associations with youth adjustment. I developed two competing hypotheses, and all of the significant interactions were in the direction predicted by the mitigation hypothesis: Among families with low financial stress, siblings who were less favored reported higher levels of risky

behavior and depressive symptoms, as I expected based on Adler's theory about sibling's social comparisons (Ansbacher & Ansbacher, 1954). But, there were *no associations* between PDT and youths' adjustment for families who reported high financial stress.

The findings suggest that parents' perceptions of financial hardship create a context that moderates PDT dynamics. In this sample, financial stress functioned like other factors that promote a sense of family solidarity, such as familism values (McHale et al., 2005), and diminished the link between relatively less favored status and poorer well-being. It may be that facing challenging circumstances promotes bonding and a sense of family identity and discourages siblings' social comparisons. Consistent with this idea, in prior research with this sample we reported that youths from families with lower income and parental education had more positive sibling relationships (McHale, Whiteman, Kim, & Crouter, 2007).

Financial difficulties also may color the meaning that siblings attribute to PDT. Prior work on siblings' reports of fairness suggests that attributions matter, as disfavored siblings who perceive PDT to be justified are less likely to show poorer outcomes (Kowal et al., 2002; McHale & Pawletko, 1992; McHale et al., 2000). Adolescents may recognize their parents' financial struggles and be more tolerant of PDT, or attribute it to outside forces that their parents are not able to control. For example, imagine a father who must work long hours to make ends meet. This leaves him with a limited amount of time to devote to his children, and he may end up investing more attention in one sibling than the other. The sibling who receives less paternal attention could view this PDT as a consequence of the father's efforts to provide for the family, rather than thinking that the father prefers a sibling over him/herself. A limitation of the current study is that I did not measure siblings' social comparison or their

perceived reasons for PDT. Future research should be directed at illuminating the processes underlying PDT-adjustment linkages and how these processes operate in different family contexts.

This study contributed to the literature on two-parent African American families by focusing on the role of parents' financial stress in a pervasive, normative family dynamic. As I have argued, economic strain may be particularly salient to this population, given racial differences in net worth that are distinct from income (Orzechowski & Sepielli, 2003). In contrast to other research that has found that families under financial strain tend to be at greater risk for problems (e.g., Conger & Elder, 1994; Conger et al., 2002), the findings suggest that these youths may be less vulnerable to the negative effects of PDT. A direction for future research is to explore financial strain as a moderator of PDT in other racial/ethnic groups to determine whether its effects are unique to this African American sample or generalizable to other samples.

Conclusions

This study was limited in several ways. First, although I was able to shed light on PDT dynamics in two-parent African American families, the recruitment criteria for the larger study restricted the sample to one that was not nationally representative. An advantage of this small, local sample, however, was that we maintained a high rate of participation across three years and collected in-depth data from four family members. This allowed examination of the complex dynamics of PDT that would not be possible with larger, nationally representative datasets. Replication of these findings in other racial/ethnic groups and across a range of family structures, such as single-parent and step-families, is needed.

A strength of this study was that I tested the associations between *changes* in PDT and *changes* in youths' adjustment across adolescence, net of the average level of PDT, dyadic parent-youth relationship qualities, and youths' perceptions of fairness. Thus, I was able to rule out some third variable explanations, though I was limited to examining concurrent covariation, and the analytic approach did not permit establishing causal pathways or direction of effect. Longitudinal studies that use structural equation modeling to test lagged relationships are needed. Another way to determine causality would be an experimental design in which parents were randomly assigned to either a control or a treatment group where they were trained to avoid PDT and/or how to explain to offspring their reasons for it. Such research would be a critical step toward understanding causal effects.

In sum, this study contributes to what is known about normative family dynamics in two-parent African American families, a group that has received very little research attention. The analytic strategy was designed to capture PDT, a dynamic that involves at least three family members, by using reports from multiple family members across three years and testing longitudinal associations with adolescent adjustment. The results highlight the importance of studying families as systems and how factors tied to the world beyond the family, like parents' experiences of financial hardship, can penetrate family dynamics.

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Table 4.1

Means and (Standard Deviations) for Study Variables

	Year 1		Year 2		Year 3	
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Older siblings						
Age	13.81	(1.73)	14.86	(1.72)	16.02	(1.77)
Depressive symptoms	1.99	(2.53)	1.92	(2.43)	1.68	(2.22)
Risky behavior	25.73	(7.02)	24.61	(6.17)	26.40	(7.33)
Fairness of PDT	3.73	(0.78)	---	---	---	---
Dyadic mother-youth warmth [a]	4.21	(0.55)	4.09	(0.60)	4.05	(0.64)
Dyadic father-youth warmth [a]	3.90	(0.68)	3.85	(0.64)	3.92	(0.66)
Dyadic mother-youth conflict [a]	2.66	(0.83)	2.52	(0.76)	2.48	(0.81)
Dyadic father-youth conflict [a]	2.69	(1.04)	2.39	(0.88)	2.40	(0.95)
Differential mother-youth warmth	-0.22	(0.71)	-0.23	(0.69)	-0.21	(0.77)
Differential father-youth warmth	-0.30	(0.84)	-0.24	(0.89)	-0.25	(0.91)
Differential mother-youth conflict	0.13	(1.12)	0.06	(1.02)	-0.03	(1.10)
Differential father-youth conflict	0.21	(1.10)	0.04	(0.92)	-0.14	(1.12)
Younger siblings						
Age	10.37	(1.08)	11.41	(1.08)	12.55	(1.12)
Depressive symptoms	1.78	(2.27)	1.82	(2.73)	1.77	(2.26)
Risky behavior	---	---	22.05	(5.08)	23.07	(4.90)
Fairness of PDT	3.88	(0.77)	---	---	---	---
Dyadic mother-youth warmth [a]	4.34	(0.51)	4.24	(0.54)	4.19	(0.57)
Dyadic father-youth warmth [a]	4.12	(0.55)	4.02	(0.56)	3.92	(0.62)
Dyadic mother-youth conflict [a]	2.60	(0.83)	2.57	(0.86)	2.55	(0.85)
Dyadic father-youth conflict [a]	2.37	(0.88)	2.34	(0.90)	2.37	(0.86)

Note. For older siblings, differential treatment scores were created by subtracting younger siblings' reports from older siblings' reports. For younger siblings, differential treatment scores were created by subtracting older siblings' reports from younger siblings' reports, resulting in the same values for older and younger siblings' differential treatment scores with the opposite

sign (younger siblings' values not shown).

[a] Parent reports.

Table 4.2

Regression Coefficients, (Standard Errors), and Random Effects for the Growth Curves of Risky Behavior and Depressive Symptoms (Risky Behavior Scores are Logged)

	Risky Behavior		Depressive Symptoms [a]	
Parameter	*γ*	*(SE)*	*γ*	*(SE)*
	Fixed effects			
Intercept	3.21**	(0.03)	0.24	(0.17)
Level 1				
Age	0.02**	(0.01)	-0.03	(0.03)
Age X Youths' sex	0.01†	(0.01)	---	---
Level 2				
Birth order	0.04†	(0.02)	0.18	(0.13)
Youths' sex	-0.09**	(0.02)	0.16	(0.10)
Level 3				
Dyad sex constellation	-0.01	(0.02)	-0.07	(0.11)
Sibling biological relationship	-0.06†	(0.03)	-0.05	(0.14)
Divorce	0.09**	(0.03)	0.05	(0.17)
	Random effects			
Residual/Overdispersion [b]	0.023**	(0.002)	0.364	(0.049)
Level 2 intercept	0.018**	(0.003)	0.479**	(0.092)
Level 3 intercept	0.006*	(0.003)	0.096†	(0.075)

Note. Older sibling = 1, younger sibling = 0; Female = 1, male = 0. Same-sex dyad = 1, mixed-sex dyad = 0. Full biological siblings = 1, not full biological siblings = 0. Divorced/separated = 1, married/cohabiting = 0.

[a] Depressive symptoms were modeled using a negative binomial regression.

[b] For the risky behavior model, this value is the residual. For the depressive symptoms model, this value is the overdispersion parameter.

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

Table 4.3

Between-Person (B-P) and Within-Person (W-P) Changes in Parental Differential Treatment (PDT) Predicting Youths' Risky Behavior

	Mother Warmth as Predictor		Father Warmth as Predictor		Mother Conflict as Predictor		Father Conflict as Predictor	
Fixed parameters	*γ*	*(SE)*	*γ*	*(SE)*	*γ*	*(SE)*	*γ*	*(SE)*
Level 1								
W-P Dyadic P-Y relationship	-0.01	(0.02)	-0.05**	(0.02)	0.02	(0.01)	0.02†	(0.01)
W-P PDT	0.02	(0.03)	-0.04**	(0.01)	0.01	(0.01)	0.003	(0.01)
W-P PDT X Birth order	-0.09**	(0.03)						
W-P PDT X Youths' sex							0.03†	(0.02)
W-P PDT X Dyad sex const.	0.05*	(0.03)						
W-P PDT X Financial stress					-0.02†	(0.01)		
Level 2								
Fairness	-0.02	(0.01)	-0.03†	(0.01)	-0.03†	(0.01)	-0.02†	(0.01)
B-P Dyadic P-Y relationship	-0.08**	(0.02)	-0.03	(0.02)	0.05**	(0.02)	0.06**	(0.01)
B-P PDT	-0.04*	(0.02)	-0.02	(0.01)	0.04**	(0.01)	0.03**	(0.01)
Level 3								
Financial stress	0.01	(0.02)	0.01	(0.02)	0.001	(0.02)	0.001	(0.02)

Note. P-Y = parent-youth. Older sibling = 1, younger sibling = 0; Female = 1, male = 2. Same-sex dyad = 1, mixed-sex dyad = 0.

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

Table 4.4

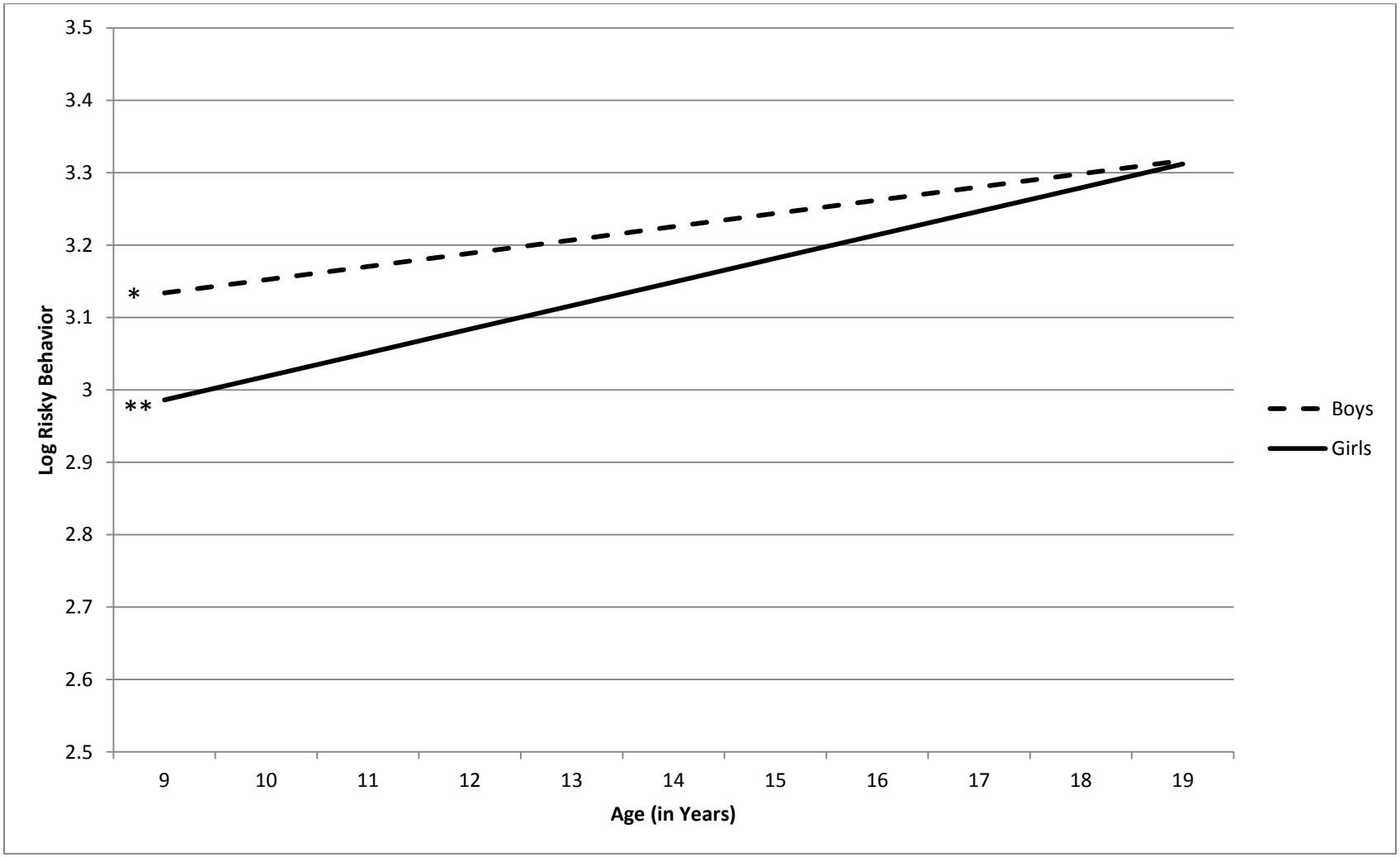
Between-Person (B-P) and Within-Person (W-P) Changes in Parental Differential Treatment (PDT) Predicting Youths' Depressive Symptoms

	Mother Warmth as Predictor		Father Warmth as Predictor		Mother Conflict as Predictor		Father Conflict as Predictor	
Fixed parameters	*γ*	*(SE)*	*γ*	*(SE)*	*γ*	*(SE)*	*γ*	*(SE)*
Level 1								
W-P Dyadic P-Y relationship	-0.17	(0.12)	-0.26*	(0.10)	0.09	(0.07)	0.18*	(0.07)
W-P PDT	-0.24**	(0.07)	-0.17**	(0.06)	0.02	(0.06)	0.16*	(0.07)
W-P PDT X Youths' sex							-0.16†	(0.09)
W-P PDT X Dyad sex const.					0.16†	(0.09)		
W-P PDT X Financial stress			0.21*	(0.09)			-0.19**	(0.07)
Level 2								
Fairness	-0.28**	(0.06)	-0.29**	(0.07)	-0.30**	(0.06)	-0.29**	(0.07)
B-P Dyadic P-Y relationship	-0.12	(0.11)	-0.21*	(0.10)	0.11	(0.08)	0.06	(0.07)
B-P PDT	-0.51**	(0.14)	-0.37**	(0.12)	0.22**	(0.06)	0.23**	(0.06)
B-P PDT X Youth's sex	0.32†	(0.17)	0.26†	(0.15)				
Level 3								
Financial stress	0.01	(0.07)	0.02	(0.08)	0.01	(0.08)	0.01	(0.08)

Note. P-Y = parent-youth. Older sibling = 1, younger sibling = 0; Female = 1, male = 2. Same-sex dyad = 1, mixed-sex dyad = 0.

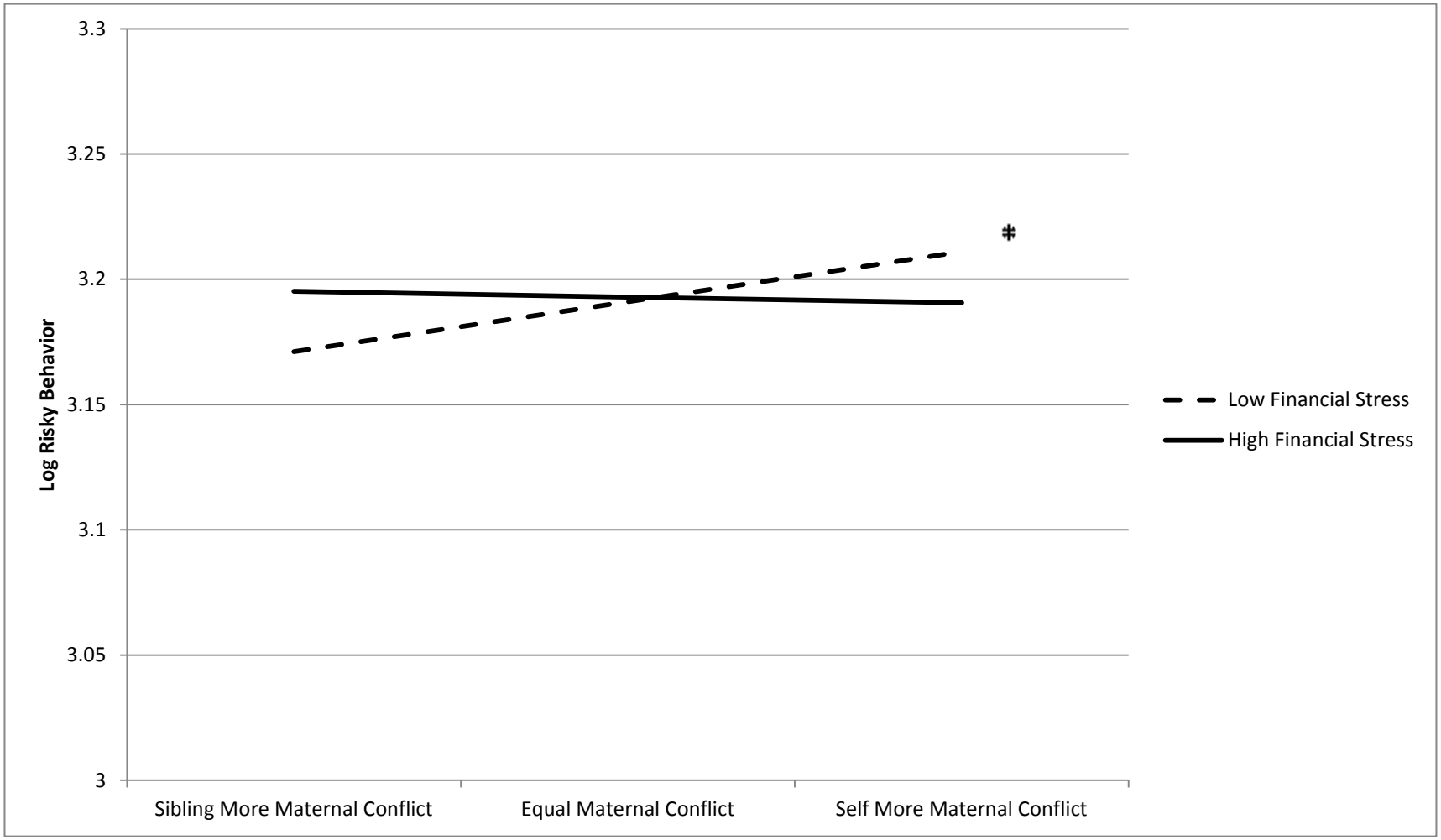
† $p < .10$. * $p < .05$. ** $p < .01$.

Figure 4.1. The growth curve for risky behavior as a function of age and sex.



Note. Asterisks indicate effects that were significantly different from zero, * $p < .01$; ** $p < .0001$.

Figure 4.2. Interaction between mothers' differential conflict and financial stress predicting youths' risky behaviors.



Note. All three significant PDT X financial stress interactions showed the same pattern as pictured here. Asterisks indicate effects that were significantly different from zero, * $p < .05$.

APPENDIX A

Means and (Standard Deviations) for Risky Behavior, Sibling Intimacy, and Sibling Conflict

	Firstborns		Second-borns	
	M	*(SD)*	*M*	*(SD)*
Risky behavior				
Time 1	26.08	(7.20)	23.48	(6.01)
Time 2	27.31	(8.13)	24.45	(7.10)
Time 3	28.46	(8.36)	25.95	(7.82)
Time 4	31.26	(9.67)	27.30	(8.77)
Time 5	32.70	(10.19)	29.94	(10.03)
Sibling intimacy				
Time 1	2.86	(0.69)	2.97	(0.72)
Time 2	2.91	(0.69)	3.01	(0.75)
Time 3	3.08	(0.72)	3.16	(0.79)
Time 4	3.32	(0.68)	3.36	(0.76)
Time 5	3.24	(0.74)	3.44	(0.86)
Sibling conflict				
Time 1	2.78	(0.67)	2.83	(0.75)
Time 2	2.61	(0.69)	2.68	(0.74)
Time 3	2.36	(0.69)	2.49	(0.78)
Time 4	2.02	(0.63)	2.13	(0.63)
Time 5	2.01	(0.58)	2.14	(0.64)

APPENDIX B

Stability Coefficients for Risky Behavior, Sibling Intimacy, and Sibling Conflict and Correlations between Firstborns and Second-borns

Time	Time 1	Time 2	Time 3	Time 4	Time 5
			Risky behavior [a]		
1	**.31****	.72**	.58**	.49**	.40*
2	.81**	**.31****	.78**	.71**	.77**
3	.65**	.77**	**.31****	.78**	.83**
4	.68**	.68**	.73**	**.36****	.86**
5	.62**	.64**	.77**	.74**	**.60****
			Sibling intimacy		
1	**.48****	.69**	.55**	.44**	.34†
2	.73**	**.52****	.67**	.64**	.62**
3	.65**	.73**	**.60****	.77**	.86**
4	.56**	.54**	.74**	**.48****	.81**
5	.72**	.54**	.85**	.80**	**.78****
			Sibling conflict		
1	**.34****	.60**	.52**	.28**	.23*
2	.65**	**.41****	.60*	.33**	.41*
3	.59**	.67**	**.44****	.51**	.58**
4	.45**	.64**	.72**	**.41****	.79**
5	.31	.32	.49*	.62**	**.36†**

Note. Correlations for firstborns are below the diagonal, correlations for second-borns are above the diagonal, and correlations between firstborns and second-borns are on the diagonal and in **bold**.

[a] Log-transformed.

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

APPENDIX C

Stability Coefficients for Logged Risky Behavior and Depressive Symptoms and Correlations between Older and Younger Siblings

Year	Year 1	Year 2	Year 3
		Risky behavior	
1	**---**	---	---
2	.60**	**.25***	.43**
3	.58**	.59**	**.25****
		Depressive symptoms	
1	**.07**	.43**	.31**
2	.42**	**.09**	.41**
3	.29**	.39**	**.05**

Note. Correlations for older siblings are below the diagonal, correlations for younger siblings are above the diagonal, and correlations between older and younger siblings are on the diagonal and in **bold**. Risky behavior was not assessed in Year 1 for younger siblings.

* $p < .05$. ** $p < .01$.

APPENDIX D

Stability Coefficients for Parental Differential Treatment Scores

Year	Year 1	Year 2	Year 3
		Differential warmth	
1	**.51****	.45**	.19*
2	.49**	**.51****	.37**
3	.23**	.50**	**.55****
		Differential conflict	
1	**.70****	.29**	.29**
2	.27**	**.70****	.31**
3	.33**	.34**	**.71****

Note. Correlations for mothers are below the diagonal, correlations for fathers are above the diagonal, and correlations between mother and father differential treatment are on the diagonal and in **bold**.

* $p < .05$. ** $p < .01$.

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Education

Ph.D. Human Development and Family Studies	The Pennsylvania State University	2012
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B.A. Psychology (magna cum laude)	Carleton College	2005

Awards and Honors

Grace M. Henderson Graduate Scholarship	2010
University Graduate Fellowship	2006-2010
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Research Experience

Siblings Are Special Project, Mark E. Feinberg (Principal Investigator)	2009-present
Penn State Family Relationships Project Ann C. Crouter and Susan M. McHale (Principal Investigators)	2006-present

Selected Publications

Solmeyer, A. R., & Feinberg, M. E. (2011). Mother and father adjustment during early parenthood: The roles of infant temperament and coparenting relationship quality. *Infant Behavior and Development, 34,* 504-514.

Solmeyer, A. R., Killoren, S. E., Updegraff, K. A., & McHale, S. M. (2011). Coparenting around siblings' differential treatment in Mexican-origin families. *Journal of Family Psychology, 25,* 251-260.

***Soli, A. R**., McHale, S. M., & Feinberg, M. E. (2009). Risk and protective effects of sibling relationships among African American Adolescents. *Family Relations, 58,* 578-592.

Selected Presentations

Solmeyer, A. R., Feinberg, M. E., & McHale, S. M. (2012, March). *Sibling collusion in context: Family and individual correlates.* Paper to be presented at the biennial meeting for the Society for Research on Adolescence, Vancouver, British Columbia, Canada.

Solmeyer, A. R., & McHale, S. M. (2011, November). *Parental differential treatment in African American families: Longitudinal links with adolescent adjustment.* Paper presented at the annual meeting for the National Council on Family Relations, Orlando, FL.

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