

The Impact of Family Contexts and Sibling Relationships on Youth Behavior Outcomes

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ABSTRACT

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Sibling relationships are central to the lives of American children and, for many of them, they are the longest lasting relationships they will have in their lifetimes. Interactions with siblings often serve as training grounds for other interpersonal relationships, making them particularly important for children who may not have stable adult figures in their lives. Drawing on data from the Fragile Families and Child Wellbeing Study when children were nine and 15 years of age, this study examines how family contexts are associated with the quality of sibling relationships, how sibling relationships are related to children and youth's behavioral trajectories, and whether positive sibling relationships are protective in terms of children's behaviors. A secondary goal of this study was to understand the importance of sibling relationships in the context of other family relationships, such as the mother-child relationship and the father-child relationships. Finally, increases in family fluidity and complexity have led to the increase in many different types of sibling configurations in children's homes, including half- and stepsiblings. This study sought to understand if there were differential effects of sibling type in terms of relationship quality and its impact on children's behavior outcomes.

Results from this study indicated that sibling relationships were more positive in single-parent households compared to married-parent households when no other factors other than family structure were taken into consideration. Furthermore, sibling relationship conflict was significantly lower in single-parent households compared to married-parent households when the child was nine. There was strong evidence to support that high sibling relationship conflict was associated with more child-reported and mother-reported problem behaviors, such as engagement in criminal activities toward others, drug and substance use, and engaging in theft

and vandalism. Above and beyond the effects of living in a single-parent household or living in a household with high family instability, having highly conflictual sibling relationships were strongly associated with poor behavior outcomes for nine year olds. Slightly different results emerged for when the child was 15. Although having positive sibling relationships was generally associated with a reduced likelihood of engaging in behaviors such as criminal activities toward others, theft, vandalism and drug and substance use, the buffer of having a positive sibling relationship was not enough to counter the negative impact of living in particular family environments.

In examining the quality of sibling relationships and also the effect of sibling relationships on children's behavior outcomes, one of the most consistent predictors was the child's report of closeness with his or her mother and father. Close mother-child relationships were consistently associated with more positive and less conflictual sibling relationships, and, to a lesser degree, close father-child relationships.

The goal of this study was to add to the growing body of empirical research on the importance and relevance of sibling relationships. Findings from this study can be used to inform family-based intervention programs for adolescents; intervention programs that aim to increase prosocial behaviors and reduce problem behaviors for at-risk youth should more frequently involve siblings, as targeting sibling pairs to improve social competencies such as conflict and aggression management might have promising outcomes.

TABLE OF CONTENTS

List of Tables	iii
List of Figures.....	vii
Acknowledgements.....	viii
INTRODUCTION	1
CHAPTER 1 Background.....	5
Family structure, family instability, and youth behavioral adjustment	5
Multipartnered fertility and family complexity	8
Mediators for family instability and youth behavioral outcomes	9
Sibling relationships and youth behavioral adjustment	9
Family influences on sibling relationship quality	15
Differences across types of siblings (full siblings, half-siblings, and stepsiblings)	18
Limitations of the current research	20
Implications for research and interventions.....	21
CHAPTER 2 Theoretical Framework and Hypotheses	24
Theoretical framework.....	24
Research questions and hypotheses	28
CHAPTER 3 Method.....	34
Data.....	34
Sample.....	34
Measures	35
Independent Variables	37
Dependent Variables.....	39
Key Covariates.....	42
Controls.....	46
Analytic Strategy	47
Research Question One.....	47

Research Question Two	50
Research Question Three	52
Research Question Four	55
Research Question Five	58
CHAPTER 4 Results.....	60
Research Question One.....	60
Research Question Two	71
Research Question Three	77
Research Question Four.....	123
Research Question Five	168
CHAPTER 5 Discussion.....	171
Summary of Results.....	172
Family structure, instability, and sibling relationship quality.....	172
Sibling relationships and child behavior.....	172
Moderation by family structure and race	174
Directionality of the association between sibling relationship quality and behavior	174
Discrepancies in mother-reported and child-reported behaviors by race	175
Strong correlation between sibling relationships and other family relationships.....	175
Differences by types of siblings: full, half and stepsiblings	176
Limitations	177
Implications.....	178
References.....	180
Appendix A.....	188
Appendix B	199
Appendix C	202
Appendix D.....	220

List of Tables

Table 1. Summary of study variables	35
Table 2. Descriptive statistics for study variables	36
Table 3. Regression coefficients representing baseline family structure effect on sibling relationship quality at age 9.	63
Table 4. Regression coefficients representing family instability effect on sibling relationship quality at age 9.	65
Table 5. Regression coefficients representing baseline family structure effect on sibling relationship conflict at age 9.	67
Table 6. Regression coefficients representing family instability effect on sibling relationship conflict at age 9.	69
Table 7. Regression coefficients representing baseline family structure effect on sibling relationship quality at age 15.	73
Table 8. Regression coefficients representing family instability effect on sibling relationship quality at age 15.	75
Table 9. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9.	83
Table 10. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9.	85
Table 11. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9.	87
Table 12. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9.	89
Table 13. Regression estimates for child-reported criminal activities toward others at age 9.	91
Table 14. Regression estimates for child-reported criminal activities toward others at age 9.	93
Table 15. Regression estimates for child-reported drug and substance use at age 9.	95
Table 16. Regression estimates for child-reported drug and substance use at age 9.	97
Table 17. Regression estimates for child-reported theft activities at age 9.	99
Table 18. Regression estimates for child-reported theft activities at age 9.	101

Table 19. Regression estimates for child-reported vandalism activities at age 9.	103
Table 20. Regression estimates for child-reported vandalism activities at age 9.	105
Table 21. Regression estimates for child-reported juvenile delinquent behaviors at age 9.	107
Table 22. Regression estimates for child-reported juvenile delinquent behaviors at age 9.	109
Table 23. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9, moderated by baseline family structure.	111
Table 24. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9, moderated by baseline family structure.	113
Table 25. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality and conflict at age 9, moderated by baseline family structure.	115
Table 26. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9, moderated by race.	117
Table 27. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9, moderated by race.	119
Table 28. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality and conflict at age 9, moderated by race.	121
Table 29. Regression estimates for externalizing behaviors on sibling relationship quality at age 15.	128
Table 30. Regression estimates for externalizing behaviors on sibling relationship quality at age 15.	130
Table 31. Regression estimates for internalizing behaviors on sibling relationship quality at age 15.	132
Table 32. Regression estimates for internalizing behaviors on sibling relationship quality at age 15.	134
Table 33. Regression estimates for child-reported criminal activities toward others at age 15.	136
Table 34. Regression estimates for child-reported criminal activities toward others at age 15.	138
Table 35. Regression estimates for child-reported drug and substance use at age 15.	140
Table 36. Regression estimates for child-reported drug and substance use at age 15.	142
Table 37. Regression estimates for child-reported theft activities at age 15.	144
Table 38. Regression estimates for child-reported theft activities at age 15.	146

Table 39. Regression estimates for child-reported vandalism activities at age 15.	148
Table 40. Regression estimates for child-reported vandalism activities at age 15.	150
Table 41. Regression estimates for child-reported juvenile delinquent behaviors at age 15.....	152
Table 42. Regression estimates for child-reported juvenile delinquent behaviors at age 15.....	154
Table 43. Regression estimates for externalizing behaviors on sibling relationship quality at age 15, moderated by baseline family structure.	156
Table 44. Regression estimates for internalizing behaviors on sibling relationship quality at age 15, moderated by baseline family structure.	158
Table 45. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality at age 15, moderated by baseline family structure.....	160
Table 46. Regression estimates for externalizing behaviors on sibling relationship quality at age 15, moderated by race.	162
Table 47. Regression estimates for internalizing behaviors on sibling relationship quality at age 15, moderated by race.	164
Table 48. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality at age 15, moderated by race.....	166
Table 49. Measurement details for dependent variables in study.....	188
Table 50. Measurement details for independent variables and covariates in study.....	193
Table 51. Regression estimates for externalizing behaviors on sibling relationship quality at age 9.....	202
Table 52. Regression estimates for externalizing behaviors on sibling relationship quality at age 9.....	204
Table 53. Regression estimates for internalizing behaviors on sibling relationship quality at age 9.....	206
Table 54. Regression estimates for internalizing behaviors on sibling relationship quality at age 9.....	208
Table 55. Regression estimates for externalizing behaviors on sibling relationship conflict at age 9.....	210
Table 56. Regression estimates for externalizing behaviors on sibling relationship conflict at age 9.....	212

Table 57. Regression estimates for internalizing behaviors on sibling relationship conflict at age 9.....	214
Table 58. Regression estimates for internalizing behaviors on sibling relationship conflict at age 9.....	216
Table 59. Logistic regression estimates for the top quartile of problem behaviors on sibling relationship quality and conflict at age 9	220
Table 60. Logistics regression estimates for top quartile of problem behaviors on sibling relationship quality at age 15.	222

List of Figures

Figure 1. Existing research on the association between family structure, family instability and child behavior outcomes.	24
Figure 2. Existing research on the association between sibling relationship quality and child behavior.....	25
Figure 3. Proposed conceptual model for research questions 1 and 2.....	28
Figure 4. Cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and mother-reported child behavior.....	59
Figure 5. Cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and child-reported delinquent behavior.	59
Figure 6. Results from a cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and externalizing behaviors.	169
Figure 7. Results from a cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and internalizing behaviors.	170
Figure 8. Results from a cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and child-reported juvenile delinquent behaviors.....	170
Figure 9. Sibling breakdowns for age nine sample.....	201
Figure 10. Sibling breakdown for age 15 sample.....	201
Figure 11. Results from a cross-lagged SEM path model from age 5 to 15 for sibling relationship quality and externalizing behaviors.....	218
Figure 12. Results from a cross-lagged SEM path model from age 5 to 15 for sibling relationship quality and internalizing behaviors.....	219

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INTRODUCTION

For many people, sibling relationships are the longest lasting relationships they will have in their lifetimes and a growing body of evidence suggests that sibling relationships are important influences on children and youth's development and wellbeing. Sibling relationships are ubiquitous—according to data from the 2017 Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) extracted from the Integrated Public Use Microdata Series (IPUMS), approximately 80 percent of children in the United States have at least one sibling, and about 40 percent of all children have at least two siblings. Data from the 2010 Current Population Survey indicates that the proportion of youth under the age of 18 who live with at least one sibling is higher than the proportion of youth who live with a father figure (King, Stamps Mitchell, & Hawkins, 2010). Despite the universality of sibling relationships and the potentially powerful influence that siblings exert on one another in families where the second parent figure might not exist (Cicirelli, 1994), the academic research on sibling relationships has been relatively neglected and largely overshadowed by the research on parental and peer influences on children and youth's development (McHale, Updegraff, & Whiteman, 2012).

A substantial portion of the historical research on sibling relationships has focused on birth order effects on personality and cognitive development, gender constellation of siblings, siblings as attachment figures, and siblings in the context of family size and the resource dilution perspective. More recent research on siblings has focused on the quality of interpersonal relationships between siblings, the factors that contribute to it, and the potential impact sibling relationships may have on the developing child (White & Hughes, 2017; Cicirelli, 1995).

Sibling relationships and youth's behavioral adjustment

Many recent studies on sibling relationships have examined the sibling relationship quality in the context of youth's behavioral adjustment, with mixed results. Some studies have found that sibling relationships that are low in conflict and high in warmth were predictive of fewer behavior problems, more prosocial behaviors and better mental health (Buist & Vermande, 2014; Gass, Jenkins, & Dunn, 2007; Branje, van Lieshout, van Aken, & Haselager, 2004). Older studies have found that for at-risk youth, sibling relationships can serve as a training ground for aggressive behavior if siblings learn, reinforce, and reward each other's negative behaviors (Patterson, 1984). Despite the mixed research, what is perhaps most important to note are the findings that suggests that siblings exert direct and indirect influences on youth's adjustment above and beyond what is accounted for by parents and peers (Harper, Padilla-Walker, & Jensen, 2014; Conger & Elder, 1994).

Family influences on sibling relationship quality

Sibling relationships do not exist in isolation and are usually embedded in the context of other family relationships and many interdependent environmental factors. For example, the quality of other relationships in the family unit have spillover effects on the quality of sibling relationships. More positive mother-child, father-child, and marital relationship quality have all been linked to less conflict and more warmth in sibling relationships (Volling & Belsky, 1992; Kim, McHale, Osgood, & Crouter, 2006).

Family structure, which refers to the presence of either or both parents in the household as well as their relationship status, also appears to have implications for sibling relationship quality. In a meta-analysis of studies on children's interpersonal relationships and parental divorce, Kunz (2001) summarized that parental divorce was associated with more positive sibling relationships, whereas other close relationships (father-child, mother-child, and with

peers) were negatively impacted by parental divorce. In contrast, a study that compared sibling relationship quality across different types of families (intact, single-mother, and complex stepfamilies) found that sibling negativity was higher in single-mother families than intact, two-parent families (Deater-Deckard, Dunn, & Lussier, 2002). Together, the studies on how families influence the quality of sibling relationships underscore the importance of viewing sibling relationships in the context of family characteristics.

Family structure, instability, and youth's behavioral adjustment

A separate body of research on families has explored the ways in which family structure and family instability influence the behavioral trajectories of children and youth. Some research has found that compared to children of married parents, children born to cohabiting parents have more behavior problems at age three (Moffitt, Caspi, Harrington, & Milne, 2002), and that boys who are not raised in continuous two-parent families exhibit more behavior problems in middle childhood (Carlson & Corcoran, 2001). Family instability—which refers to the multiple transitions in family structure, including divorce and transitions in and out of cohabiting and other relationships—has also been linked to poorer behavioral outcomes for children and youth. Studies have found that children whose mothers experienced more partnership changes were more likely to demonstrate aggressive and anxious behaviors at age three (Osborne & McLanahan, 2007) and more externalizing behavior problems and attention problems at age five (Cooper, Osborne, Beck, & McLanahan, 2011).

The present study

The purpose of the present study is first, to understand how family structure and family instability are associated with the quality of sibling relationships, and, secondly, to explore the association between family instability and youth adjustment and whether the positive sibling

relationships are protective in terms of children's behaviors. The cultural shift in how people view union formation and the increase in non-marital births have given rise to many different types of families and family instability (McLanahan, 2004), which can be disruptive to children and youth's home environments. In this context of multiple disruptions in the home environment, sibling relationships could serve as a protective factor in children's lives by serving as the constant factor and serving as a source of support, or, conversely, they could serve as a risk factor if siblings learn, reinforce, and reward each other's negative behaviors. To date, no study has explored sibling relationships in the context of family instability, and how they impact youth's behavioral adjustment. Using data from six waves of the Fragile Families and Child Wellbeing Study, this study will explore the longitudinal association between family instability, sibling relationship quality, and behavioral adjustment in youth.

Implications for research and interventions

The centrality of sibling relationships in children's lives has largely gone unnoticed in the academic literature on family contexts and family relationships. The goal of this study is to add to the growing body of empirical research on sibling relationships. Additionally, the findings from this study can be used to inform family-based intervention programs for adolescents. Intervention programs that aim to increase prosocial behaviors and reduce problem behaviors for at-risk youth have generally focused on improving the quality of peer and parent-child relationships, which might not be the only effective sources of change for adolescents. The few existing intervention programs that target sibling pairs to improve social competencies such as conflict and aggression management have demonstrated promising outcomes (Solmeyer et al., 2013), and the overarching aim of this study is to provide the empirical support to serve as the basis for such interventions.

CHAPTER 1
BACKGROUND

Family structure, family instability, and youth behavioral adjustment

A large body of research spanning over three decades has explored the numerous ways in which family structure and family instability influence the developmental trajectories of children and youth. Overall, children who grow up in stable, married-parent households fare better than children who grow up in unstable single-parent and cohabiting-parenting households (Waldfogel, Craigie, & Brooks-Gunn, 2010). In the literature, family instability refers to multiple transitions in family structure, which may include parental divorce, transitions in and out of cohabiting relationships, remarriage, or any relationship or residential transitions that may potentially be disruptive in the functioning of a family system (Wu & Martinson, 1993; Fomby & Cherlin, 2007). Conversely, family stability is when children grow up with the same parent or parents that were present at the time of the child's birth (Waldfogel, Craigie, & Brooks-Gunn, 2010). Family structure refers to the presence of either or both parents in the household, as well as their relationship or marital status (Astone & McLanahan, 1991).

Evidence from several studies on family structure suggests that growing up in a married two-parent household is associated with more positive behavioral outcomes for children and youth. For example, results from a study by Osborne, McLanahan, and Brooks-Gunn (2007) that used data from the Fragile Families and Child Wellbeing Study indicated that compared to children born to cohabiting parents, children born to married parents have fewer behavior problems at age three, which may have implications for future behavioral adjustment because problem behaviors at earlier ages are strongly associated with anti-social behaviors in youth (Moffitt, Caspi, Harrington, & Milne, 2002). A similar study that examined behavioral outcomes

in middle childhood—ages seven to nine—using data from the National Longitudinal Study of Youth also found that children who are not raised in continuous two-parent families demonstrate higher levels of behavior problems, especially boys (Carlson & Corcoran, 2001).

While family structure and family instability refer to two different constructs, there is some research that points to the important interaction between the two—for example, that family structure at the time of the child’s birth is highly correlated with family instability (Waldfogel, Craigie, & Brooks-Gunn, 2010). Studies have found that children who are born to single-parent or cohabiting-parent families are significantly more likely to experience multiple family structure transitions compared to children born to married-parent families (Craigie, 2008; Osborne & McLanahan, 2007). Additionally, some researchers have found that children who grow up in stable, single-mother families and unstable cohabiting-couple families are more likely to have behavior problems than children who grow up in stable married-parent families (Osborne & McLanahan, 2007). Given these mixed results, it is yet unclear how family structure and family instability rank in importance in predicting children’s behavioral outcomes.

A cluster of studies on family instability has found that children and youth who experience multiple family structure changes in their childhood are more likely to experience poorer behavioral outcomes (Osborne & McLanahan, 2007; Fomby & Cherlin, 2007; Cooper, Osborne, Beck, & McLanahan, 2011; Ackerman, Brown, D’Eramo, & Izard, 2002; Cavanagh & Huston, 2006; Cavanagh & Huston, 2008). Although the operationalization of family instability has varied across studies—referring to the multiple family structure changes that disrupt the relationships and residential patterns for children—the conclusions on its negative effects on children’s behavior problems are generally consistent. For example, Ackerman, Brown, D’Eramo and Izard (2002) constructed a measure of maternal relationship instability to account

for the number of dissolved relationships with residential partners and the number of residential transitions to examine family instability. The authors reported that a large majority of families in their sample of 139 families experienced some form of instability (66%) and that chronic family instability, while unrelated to academic competence, was predictive of externalizing behaviors for both boys and girls and internalizing behaviors for girls.

Similarly, using data from three waves of the Fragile Families and Child Wellbeing Study, Osborne and McLanahan (2007) found that children whose mothers experienced more partnership changes between the time of their birth and age three were more likely to demonstrate aggressive and anxious/depressive behaviors at age three, and poor parenting behaviors and maternal stress together explained most of the association between numerous partnership changes and children's behavior problems. In addition, mothers who did not live with the child's biological father (i.e., single or visiting mothers) were at highest risk of experiencing numerous partnership transitions in the three-year period. Also using data from the Fragile Families study, Cooper, Osborne, Beck, and McLanahan (2011) found that higher instability in the form of mother's residential and dating transitions was associated with more externalizing behavior problems, attention problems and social problems for boys at age five.

While many of the studies on the association between family instability and problem behaviors examined outcomes in younger childhood, recent research on the topic finds that the results are consistent for children in middle childhood. In a recent examination of family instability and multipartnered fertility, two phenomena that often co-occur, Fomby and Osborne (2017) found that family instability and multipartnered fertility were predictive of significantly more externalizing behavior problems at age nine and more teacher-reported problem behaviors in school.

Multipartnered fertility and family complexity

Changes in behaviors and attitudes about marriage and fertility, alongside vast improvements in the availability and types contraceptives, have led to the increase in multipartnered fertility, which refers to the phenomenon in which adults have children with more than one partner (Furstenberg & King, 1999; Mincy, 2002). An analysis of the Fragile Families data from when the child was born and the one-year follow up revealed that over one third (36%) of couples who have recently had a child together had previous children with another partner, and the prevalence of multipartnered fertility was highest for unmarried couples and black and Hispanic couples (Carlson & Furstenberg, 2006). In conjunction with the increase in multipartnered fertility, there have been dramatic changes in the types and composition of families in the United States, and researchers have described this trend as family complexity (Meyer & Carlson, 2014).

While a vast majority of children lived with their biological, married two-parents just fifty years ago, children today live in multiple different family forms. The different family types include same-sex couples, three-generation households in which grandparents co-reside with children, nonresidential partnerships or arrangements where intimate partners live apart (“living apart together”), and mixed-status families, where some members of the family are U.S. citizens and others are living in the U.S. without documentation.

Taken together, multipartnered fertility and family complexity have substantial implications for how we view and treat the family construct in research, as well as in this study. Increases in multipartnered fertility and family complexity mean that children and youth today live in households where there are potentially several different types of sibling relationships (the literature on the quality of such sibling relationships is explored in a subsequent section of this

chapter). Understanding the differences in the quality of such relationships—if they exist—and examining the influence on children’s outcomes is one area of research that is study aims to contribute to.

Mediators for family instability and youth behavioral outcomes

Some explanations for poorer behavioral outcomes among children who experience family instability are maternal parenting, parenting stress, and poor mother-child relationship quality. In a longitudinal study of maternal dating and residential transitions and their effects on parenting behavior, family instability in the form of maternal dating and residential transitions was associated with harsher parenting and higher levels of maternal parenting stress (Beck, Cooper, McLanahan, & Brooks-Gunn, 2010). Mothers who have more relationship and coresidential transitions (i.e., higher instability) tend to experience more parenting stress, engage in harsher parenting behaviors, and, in general, have less optimal mother-child relationships (Osbourne, 2004; Osbourne & McLanahan, 2007). Harsh parenting, low parenting engagement and low support have been linked to poor adjustment and behavior problems for adolescents (Elder & Conger, 1994; Amato & Fowler, 2002).

Sibling relationships and youth behavioral adjustment

Although the research on children’s behavior problems has typically emphasized the role of parents and the quality of parent-child interactions, sibling relationships and interactions have also been associated with the long-term social adjustment and behavioral outcomes for children and youth. Some researchers have linked sibling relationships that are nurturing, high in warmth, high in affect, and low in hostility to positive youth adjustment as measured by prosocial behaviors, fewer depressive symptoms, and fewer behavior problems as reported by parents and teachers. High sibling conflict and hostility, on the other hand, have been found to be predictive

of conduct problems in youth. A small number of other studies have demonstrated contradictory findings: In at-risk youth populations, positive sibling relationships have been linked to an increase in externalizing behavior problems, a result that has been explained by social learning theory in which youth mimic the problem behaviors of people to whom they relate.

One of the only seminal longitudinal studies of child development across the life course that examined sibling relationships comes from Conger and Elder's (1994) Iowa Youth and Family Project (IYFP), which explored the experiences of children and families that lived through the Iowa farm crisis and subsequent economic hardship in the 1980s. The study followed 451 families with at least one seventh grader in the household in small towns in north-central Iowa to assess how economic disadvantage impacted the behaviors and well-being of children, adolescents and adults, and to also explore how disadvantage influenced the nature and quality of family relationships including as marital, parent-child and sibling relationships.

In the context of economic pressure and high family stress during the farm crisis, Conger and Elder (1994) examined the protective effects of sibling relationships on youth adjustment as a mediator and moderator of the association between parenting and youth adjustment outcomes. Specifically, they asked whether parenting behaviors impact the quality of sibling relationships, and, if so, how that impacted youth adjustment: Do higher levels of sibling warmth and lower levels of sibling hostility act as a buffer for harsh parenting behaviors? The authors found that increased parental hostility was significantly associated with higher levels of sibling hostility, which was subsequently linked to more externalizing behavior problems for adolescents. This suggests that siblings learn from their parents' negative interactional styles and replicate them in their own relationships. In looking at sibling relationships as a moderator between harsh parenting and adolescent adjustment, the authors found that for low levels of sibling warmth,

mothers' hostility was significantly related to adolescents' antisocial behaviors, providing some support for the idea that highly supportive and warm sibling relationships may buffer the negative effects of harsh parenting behaviors on adolescents' externalizing behavior problems.

Several more recent studies on high-quality sibling relationships suggest that they have a protective effect on youth's adjustment outcomes above and beyond what is accounted for by positive parent-child relationships. Harper, Padilla-Walker, and Jensen (2014) examined the contribution of sibling relationships in the context of other critical teen relationships—with close peers and parents—and their influence on adolescents' behavior and adjustment over a two-year period. The researchers reported a longitudinal association between sibling hostility and youth depressive symptoms after accounting for the influence of the youth's relationship with the mother, father, and close friend, underscoring the unique role that siblings play in impacting youth adjustment—in many sibling studies, sibling influences emerge even after accounting for the effects of other critical relationships in the adolescent's life (McHale, Updegraff, & Whiteman, 2012).

Using a slightly different measure of sibling relationship quality that categorizes it in three main clusters—affect-intense, conflictual, and harmonious—Buist and Vermande (2014) found that sibling pairs in the conflictual cluster were significantly more aggressive, anxious, and depressed than those in the harmonious cluster and those in the harmonious cluster were significantly less anxious and depressed than those in the affect-intense cluster. Siblings in the harmonious cluster also reported higher levels of self-perceived academic and social competence and general self-worth. A study by Stormshak, Bellanti and Bierman (1996) examined behaviorally disruptive children ranging from six to eight years old and interviewed and observed the siblings of the children. Like Buist and Vermande (2014), they defined three types

of sibling pairs—conflictual, involved, and supportive—and found that for this population of at-risk children, warm sibling relationships were associated with better social adjustment at school and conflictual sibling relationships were related to social difficulty with peers and more behavioral problems at school. Taken together, these studies suggest that fostering warm sibling relationships may serve as a protective influence for at-risk children or children in families where other critical relationships such as the mother-child or the father-child relationship is not warm, consistent, and nurturing.

The protective quality of sibling relationships appears to be particularly important for children experiencing stressful life events. Children whose families experienced stressful life events such as accidents, illnesses, deaths, disasters, and parental separation were found to have fewer internalizing and externalizing behavior problems when the children reported higher levels of affect toward their siblings (Gass, Jenkins, & Dunn, 2007). In other words, sibling relationships moderated the association between stressful life events and children's adjustment. A more recent study that examined life events and sibling relationships in predicting youth's adjustment outcomes found that the protective effects of sibling warmth is only applicable to certain types of life events (Waite, Shanahan, Calkins, Keane, & O'Brien, 2011). In differentiating life events that fall under three categories—family wide, personal events of the target sibling, and personal events of the non-target sibling—sibling warmth was only protective for family-wide life events (such as parental divorce or the death of a family member) in depressive symptoms (Waite, Shanahan, Calkins, Keane, & O'Brien, 2011). Although having more stressful personal life events was associated with higher levels of depressive symptoms, sibling warmth was not found to reduce the link between personal events and depressive

symptoms. These studies point to the importance of the considering the family and other environmental contexts in evaluating the protective quality of sibling relationships.

A majority of studies on the protective effects of sibling relationships have utilized predominantly European American samples from intact, two-parent families (Harper, Padilla-Walker, & Jensen, 2014; Gass, Jenkins, & Dunn, 2007; Waite, Shanahan, Calkins, Kean, & O'Brien, 2011). However, the results from the study by Soli, McHale, and Feinberg (2009) suggest that findings from these studies may hold true for other racial and ethnic populations. In one of the few studies on the protective effects of sibling relationships among racial and ethnic minorities, Soli and colleagues (2009) analyzed data from 179 African American sibling pairs to first look at the relationship between sibling warmth, and aggression, hostility, and youth adjustment as measured by depressive symptoms and risky behaviors, and also to look at whether these behavioral adjustment outcomes varied by the level of "familism values," which reflects the African American cultural values of strong familial support and interdependence, obligation, and solidarity. The authors found main effects for sibling warmth in predicting depressive symptoms and sibling relational aggression in predicting depressive symptoms. An interesting result from this study was the multiplicative protective effect of having strong familism values and low sibling relational aggression in predicting depressive symptoms, suggesting that having good sibling relationships can be especially beneficial among some ethnic minority families.

Based on the life course perspective of viewing lives over time and in the context of time and place, several studies have examined changes in sibling relationships over time and its influence on youth's behavioral adjustment. The longitudinal study of siblings from 197 white, working class, and two-parent families by Kim, McHale, Crouter, and Osgood (2007) examined

changes in sibling conflict and intimacy over four time periods spanning six years and its link to changes in youth's social competence and depressive symptoms. Using multilevel modeling and a nested data approach to account for the characteristics of both members of the sibling pair, Kim and colleagues (2007) found that changes in sibling conflict corresponded to the changes in depressive symptoms whereas changes in sibling intimacy corresponded to the changes in youth's perceived social competence, accounting for mother-child and father-child relationship quality and each family member's adjustment. In a similar longitudinal study that employed growth curve modeling techniques to examine changes in sibling relationship quality over time, sibling relationship quality was found to be predictive of delinquency for boys but not girls (Buist, 2010). Similarly, Branje, van Lieshout, van Aken, and Haselager (2004) found in their three-wave study of Dutch siblings that levels of sibling support peaked between 11 and 13 years of age, and that higher perceived levels of sibling support were related to lower levels of internalizing and externalizing behavior problems.

While a majority of the research on the protective effects of sibling relationships has focused on the adjustment outcomes of adolescents or children in middle childhood, there appears to be evidence to suggest that the quality of sibling relationships is important for very young children. In a study of preschool-aged children in a Head Start program and their siblings closest in age, Modry-Mandell, Gamble, and Taylor (2006) found that children whose mothers reported high levels of sibling warmth were significantly more likely to have fewer behavior problems as measured by the Child Behavior Checklist (CBCL) and higher teacher-rated social competence. Similarly, Dunn, Slomkowski, Beardsall, and Rende (1994) found that the quality of sibling relationships during the preschool years was highly predictive of their adjustment

seven years later. These results highlight the importance of looking at the nature and quality of sibling relationships at an early age.

In contrast to the majority of studies that have found positive sibling relationships to be associated with better adjustment outcomes for youth, some studies have found that for at-risk youth, sibling relationships can serve as a training ground for aggressive behavior if siblings learn, reinforce, and reward each other's negative behaviors (Patterson, 1984). In a study of 164 sibling pairs over a 4-year period, the self-reported delinquent behaviors for siblings were found to be highly correlated, and, furthermore, both high levels of warmth and high levels of conflict between brothers were predictive of increased delinquency (Slomkowski, Rende, Conger, Simons, & Conger, 2003). These studies provide support for what Slomkowski and colleagues (2003) called the "partners-in-crime" model of behaviors among at-risk youth.

Family influences on sibling relationship quality

Sibling relationships do not exist in isolation, and the family systems and ecological perspectives, two theoretical frameworks that guide this study, highlight the importance of viewing sibling relationships as embedded in the context of other family relationships (such as mother-child and father-child relationships) and the interdependent ecosystems in which children develop. Despite efforts to consider family effects on sibling relationships, a recent review of the empirical literature from the past two decades on sibling relationships and its influences on children and youth found that the research on family influences on sibling relationships has been mixed and inconclusive (McHale, Updegraff, & Whiteman, 2012).

One of the earliest studies on sibling relationships is based on Patterson's (1984, 1986) work on family conflict and antisocial and aggressive behavioral outcomes for youth, which highlighted the ways in which siblings relationships help to explain both the spread and

containment of family conflict. Siblings who learn from the hostile interactions between parents may adopt from their parents' interactional style and form sibling relationships that are high in conflict (Patterson, 1984), or, conversely, they may develop warm sibling relationships to serve as a buffer for the negative effect of family hostility. He argued that sibling interactions are central to the psychological wellbeing of adolescents because sibling relationships serve as a training ground for other interpersonal relationships.

More recent studies of sibling relationships in the family context suggest that the quality of other family relationships have direct consequences on the quality of sibling relationships. For example, the quality of mother-child and father-child relationships have been found to have spillover effects on the quality of sibling relationships (Volling & Belsky, 1992). Children whose mothers who were intrusive and over-controlling, and had poorer mother-child relationships were more likely to demonstrate high levels of conflict and aggression in their sibling relationships. Similarly, children who had more positive father-child relationships were more prosocial sibling interactions (Volling & Belsky, 1992).

Research evidence also suggests that the relationship quality between the child's parents may impact the quality of sibling relationships. In one of the earliest qualitative studies of sibling relationships that examined the quality of sibling dyad interactions in married and divorced families, MacKinnon (1989) found that the poor quality of spousal relationships was associated with sibling negativity, and, to a lesser degree, that marital status (i.e., married or divorced) of the parents was also related to the negativity in sibling interactions. Other research has also found high correlations between the relationship quality between different dyads in families. Brody, Stoneman, McCoy, and Forehand (1992) found that sibling conflict was lower in families where inter-parental conflict was lower and marital quality was higher as reported by the mother

and the father. In examining the association between changes in marital relationship quality and changes in sibling intimacy and conflict over time, Kim, McHale, Osgood, and Crouter (2006) found that sibling intimacy was closely linked to fathers' evaluation of marital love. Although the studies by MacKinnon (1989) and Brody and colleagues (1992) have used predominantly white and middle-class samples, similar results have been replicated in a sample of culturally diverse children and parents. In a study of Mexican American, European American, and Taiwanese families, marital relationship quality was found to have direct effects on sibling relationship quality and there were bidirectional effects between sibling relationships and parenting styles (Yu & Gamble, 2008).

Maternal characteristics, such as parenting quality and mental health, also contribute to the quality of sibling relationships. For example, in an effort to examine maternal contribution to the quality of sibling relations, Jenkins, Rabash, Leckie, Gass, and Dunn (2012) used data on 118 families and multiple sibling pairs from each of those families in the Avon Longitudinal Study of Parents and Children and found that maternal affective climate—defined as maternal positive and negative feelings toward children and maternal depressive symptoms—was significantly associated with the level of sibling hostility.

Some studies have found that family structure was associated with more positive sibling relationships, while others have found the exact opposite. In a meta-analysis of studies on children's interpersonal relationships and parental divorce, Kunz (2001) found that in the eight studies that explored the quality of sibling relationships in divorced families, parental divorce was associated with more positive sibling relationships, whereas other close relationships (father-child, mother-child, and with peers) were negatively impacted by parental divorce. These results suggest that siblings might rely on one another when there are disruptions in the family system.

In contrast, some studies have found that sibling relationships were more negative in single-mother and divorced families. Deater-Deckard, Dunn, and Lussier (2002) compared the quality of sibling relationships in five types of families—intact, single-mother, stepfather, stepmother, and complex stepfamilies—and found that that sibling negativity was higher in single-mother families than intact families. The authors found no significant differences in sibling negativity and positivity between intact families and all types of stepfamilies, suggesting that there may be other factors at play in single-mother families, such as higher instability, high parenting stress, and, consequently, less warm and less nurturing parenting behaviors. Interestingly, Deater-Deckard and colleagues (2002) found that the association between sibling relationship quality and behavioral adjustment did not vary by the degree of siblings' genetic relatedness. Similarly, Noller, Feeney, Sheehan, Darlington, and Rogers (2008) found that compared to adolescent sibling relationships in married-parent families, sibling relationships in separated or divorced families were more negative and higher in conflict. Moreover, all family relationships (partner, parent-child, and sibling) were higher in conflict in divorced families compared to married-parent families. It's important to note that no study has examined sibling relationship quality in the context of changes in family structures over time and the subsequent effects on youth adjustment outcomes.

Differences across types of siblings (full siblings, half-siblings, and stepsiblings)

The compositions of families have become increasingly diverse and complex due to the changing trends in marriage, cohabitation, non-marital births, multipartnered fertility, and the stability of unions. In examining family complexity trends in the United States, Manning, Brown, and Stykes (2014) found that family complexity, a measure of both family structure (parental relationship and residential status) and the composition of siblings (half-siblings,

stepsiblings and full siblings), has increased between 1996 and 2009. A recent report from the U.S. Census Bureau that summarized data from the 2014 Survey of Income and Program Participation (SIPP) found that roughly 11 percent of children with siblings had both biological, half-siblings, and stepsiblings (i.e., in a blended family). About 76 percent of children with siblings had only biological siblings, and approximately 13 percent of children with siblings only had half-siblings or stepsiblings (Knop & Siebens, 2018). Taken together, about one fourth of children with siblings have blended sibling configurations, including a mix of full siblings, half-siblings, and stepsiblings.

Despite the many types of siblings that children have—full biological siblings, half-siblings, adoptive-siblings, and stepsiblings—the empirical research on sibling relationships has mostly been limited to biological siblings due to methodological difficulties in studying half-siblings and stepsiblings. When there are multiple entrances and exits out of marriages or romantic relationships, there are many different possibilities in terms of sibling patterns, and researchers have found it particularly difficult to keep track of how long half-siblings and stepsiblings have lived together with the target child (Cicirelli, 1995).

In one of the few studies that aim to account for family complexity and sibling relationships, Stocker, Dunn, and Plomin (1989) did not find statistically significant differences in sibling relationship quality between full biological siblings and adoptive siblings. Contrary to this, in a more recent study that explored differences in sibling positivity and negativity based on sibling type, Deater-Deckard, Dunn, and Lussier (2002) found that unrelated stepsiblings were lower in negativity than biological half- and full siblings, and full siblings were higher in negativity than half-siblings and unrelated stepsiblings. The increasing diversification of the

types of families and the limited body of existing research on the various sibling types identifies an important area of future research that merits further exploration.

Limitations of the current research

Despite the relatively strong empirical support for the association between sibling relationship quality and youth adjustment, and the importance of select maternal and family characteristics, there remain important gaps in the empirical research on siblings. For instance, no study has yet explored the ways in which family instability during childhood impacts the quality of sibling relationships in youth. It is also yet unclear whether positive sibling relationships serve as a protective factor for youth's adjustment in the context of high family instability during childhood. Given the existing research on the numerous ways in which family instability impacts children's behavioral and academic outcomes, it is important to examine whether sibling relationships mediate and moderate the association between family instability and youth adjustment. This need to explore the diverse family contexts in which siblings live is echoed by McHale, Updegraff, and Whiteman (2012) in their review of the sibling literature, where they urged researchers to examine the family contexts of siblings given that "demographic changes in rates of cohabitation, marriage, divorce, and multiple births have resulted in substantial diversity in the family contexts in which siblings' relationships are embedded" (p. 924).

Another aspect of the sibling research that has yet to be fully uncovered are the differences in sibling relationship quality and sibling effects based on the type of sibling one has (full siblings, half-siblings, and stepsiblings). Although many studies have looked into birth order effects, the number of siblings, age spacing, and gender composition, very few studies have attempted to examine the variations in sibling relationship quality and other sibling effects that

may be due to the different types of sibling relationships (Cicirelli, 1995; White & Hughes, 2017). Some research has documented that living with half-siblings is associated with poorer children's well-being (Strow & Strow, 2008). Changing trends in union formation, cohabitation, and nonmarital childbearing have given way to blended families in which at least one parent has a child that is not biologically related to the partner or spouse in the household; according to Kreider and Ellis (2011), at least 15% of all children with siblings in the United States lives with a sibling who is not fully biologically related to them. Despite this, there is inconclusive evidence around the quality of sibling relationships when the siblings are not fully biologically related. The proposed study is designed to address these gaps in the existing literature on sibling relationships.

Implications for research and interventions

The centrality of sibling relationships in children's lives has largely gone unnoticed in the academic literature on family contexts and family relationships. The goal of this study is to add to the growing body of empirical research on sibling relationships. Additionally, the findings from this study can be used to inform family-based intervention programs for adolescents. Intervention programs that aim to increase prosocial behaviors and reduce problem behaviors for at-risk youth have generally focused on improving the quality of parent-child relationships, which might not be the most effective outlet for adolescents. The few existing intervention programs that target sibling pairs to improve social competencies, such as conflict and aggression management, have demonstrated promising outcomes (Solmeyer et al., 2013), and the overarching aim of this study is to provide the empirical support to serve as the basis for such interventions.

Additional motivation for this study comes from a recent study by Fahey (2017), which highlighted a demographic trend that has mostly gone unnoticed in the academic literature—namely, the convergence in sibsize (the number of siblings a child has) based on race and maternal education. While there were large differences in the number of siblings children had based on maternal race and level of education between the 1940s and 1960s, there was a sharp decline in this disparity between the 1970s and 1980s. Historically, black families and families of less educated mothers tended to have larger sibsizes, which, based on the resource dilution theory of economists, was generally considered negative for children’s development because limited family and parental resources had to be shared by many children.

At the same time of this sharp decline in sibsize disparity, there was a trend of “diverging destinies” of children—an increase in social disparities and parental resources between the least-educated mothers (who are also often single mothers, experience higher family instability, and have poorer job opportunities) and the highly educated mothers (McLanahan, 2004). Fahey (2017) hypothesized that these two disparate trends may counterbalance one another—and that the positive effects of decreasing sibsize from the resource dilution perspective may negate the negative effects stemming from the “diverging destinies” of children of less-educated and highly-educated mothers.

Grounded in Fahey’s (2017) and McLanahan’s (2014) observations of changing demographic trends—which theoretically have opposite effects on children’s developmental outcomes—the present study explores whether having high quality sibling relationships in the context of high family instability is positive for children’s behavioral development. If sibling relationships are found to be protective in what McLanahan (2014) describes as a trend of diverging destinies between children who grow up under unstable family circumstances, then

Fahey's (2017) hypothesis that the decrease in sibsize differences between black and white families and between families of more educated and less educated mothers should have been a positive impact on children may not necessarily be true for all children.

CHAPTER 2

THEORETICAL FRAMEWORK AND HYPOTHESES

Theoretical framework

A substantial body of research has documented the association between family structure, family instability, and behavioral outcomes for children and youth. Overall, children and youth who grow up in non-married parent families are at higher risk of poorer behavioral trajectories (Osborne, McLanahan, & Brooks-Gunn, 2007; Carlson & Corcoran, 2001). Furthermore, children of mothers who experience multiple partnership and residential transitions are more likely to demonstrate aggressive behaviors, externalizing and internalizing behaviors, anxiety, and depressive symptoms (Osborne & McLanahan, 2007; Cooper, Osborne, Beck, & McLanahan, 2011; Ackerman, Brown, D’Eramo, & Izard, 2002). This association between family instability and poorer behavioral outcomes for children has been explained in part by the effects that family instability on parenting behaviors, maternal parenting stress, and the poorer parent-child relationship quality (Beck, Cooper, McLanahan, & Brooks-Gunn, 2010; Osbourne, 2004; Osborne & McLanahan, 2007) (**Error! Not a valid bookmark self-reference.**).

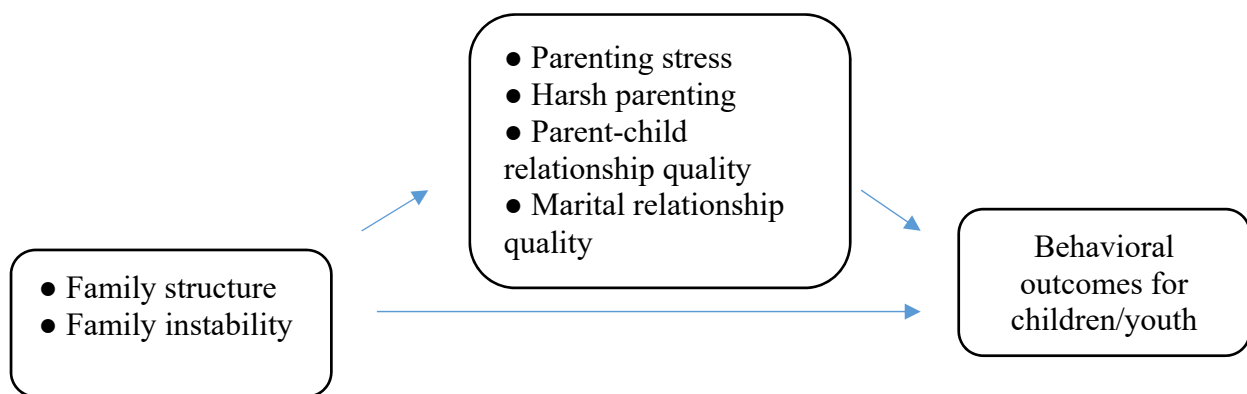


Figure 1. Existing research on the association between family structure, family instability and child behavior outcomes.

A related, but distinct body of literature has emerged linking sibling relationship quality and youth's behavioral outcomes. Children who report sibling relationships that are low in conflict and high in warmth tend to experience fewer depressive symptoms, and demonstrate fewer aggressive and problem behaviors and more prosocial behaviors (Conger & Elder, 1994; Modry-Mandell, Gamble, & Taylor, 2006; McHale, Crouter, & Osgood, 2007; Harper, Padilla-Walker, & Jensen, 2014) (Figure 2).



Figure 2. Existing research on the association between sibling relationship quality and child behavior.

To date, no study has examined whether and how family instability in childhood impacts the quality of sibling relationships in childhood and in youth, and, subsequently, whether the quality of sibling relationships moderates the effects of family structure and instability on youth's behavioral development. The goals of this study is to 1) explore how family instability is associated with sibling relationship quality, and 2) explore the association between family instability, sibling relationship quality, and behavior outcomes in childhood and youth. Because a large body of research has already established the strong association between family structure and family instability, namely, that unmarried couples are more likely to experience more relationship and co-residential transitions, models in this study account for both family structure and instability.

Several relevant theories of human development will guide the exploration of these questions: the ecological systems theory (Bronfenbrenner, 1977; 1992), family systems theory (Bowen, 1974; Minuchin, 1977), and family stress theory (Conger & Elder, 1994).

Bronfenbrenner's (1977, 1992) theory of ecological systems supports the notion that human development depends on five interdependent and interrelated sociocultural and environmental contexts: the microsystem, mesosystem, exosystem, macrosystem, and the chronosystem. Human development and behavior, then, is seen as being determined from multiple interdependent sources of influence. The theory is useful in understanding different patterns of outcomes and development based on the various contexts and environments in which children develop. Some contexts like the microsystem are more directly and immediately related to the development of a person; in the microsystem, family, peers, the home environment, and the school are seen as powerful developmental contexts that exert influence on a child. The relationship a child has with his or her sibling, then, is viewed as a direct influence on the development of the child within the microsystem. The linking of family instability and sibling relationship quality is in the realm of the mesosystem, which is the next level of the child's ecological system where distinct contexts in the microsystem interact with one another. The chronosystem, which is the outermost level of the ecological system, encompasses contexts and transitions that occur over the course of the child's life. In keeping with the idea of the chronosystem, family instability, sibling relationships, and children's behavior will be observed at multiple time points. As such, the present study's exploration of influences in the microsystem (siblings), the mesosystem (association between family instability and sibling relationships) and the chronosystem (family instability and youth's behavioral adjustment viewed over time) in understanding the behavioral adjustment of youth aligns closely with Bronfenbrenner's (1977, 1992) theory of ecological systems.

In addition to the guiding ideas from Bronfenbrenner's (1992) ecological systems theory, central concepts from family systems theory (Bowen, 1974; Minuchin, 1977) will provide the

framework for exploring the questions in this study. Family systems theory describes that relationships and patterns of interactions within the family unit primarily influence and reinforce human behaviors. In this framework, family members function in relation to one another and, as a result, each member is viewed not in isolation but as an interdependent part of a system. Furthermore, with its origins in psychotherapy and family therapy, the relationships in the family unit are considered to be of utmost importance in the well-being of individuals (McHale, Updegraff, & Whiteman, 2012). In this view, parents and the inter-parental relationship regulates the family environment and the other relationships in the family system—the relationship parents have with one another, the parent-child relationship, and sibling relationships are all seen as being mutually influential and interdependent. The idea that relationships within the family are not only of greatest significance but also highly dependent on the other relationships in the family unit will provide the basis for the exploration of sibling relationships in the context of parents' relationship (family instability) and parent-child relationship, as well as the exploration of how the mother's relationship and residential transitions impacts the quality of sibling relationship and subsequently the behavioral adjustment of youth.

Lastly, the family stress model is based from the idea that conflicts that arise among family members, which may be triggered by external factors such as economic hardship, develops into one of the most significant stressors in a person's life, often continuing to exist even when the external stressor no longer exists (Conger & Elder, 1994). Similarly, Coyne and Downey (1991) have explained that stressful situations in people's lives most frequently have the greatest impact on people through the strains they put on close relationships, such as relationships among family members. In this view, sibling relationships that are negative or high in conflict, which may be triggered by family instability or other circumstances associated with

family instability, may develop into one of the greatest stressors in adolescents' lives, subsequently impacting youth adjustment.

Research questions and hypotheses

The present study aims to answer five central research questions using the Fragile Families and Child Wellbeing Study (FFCWS). As a data set that oversampled nonmarital births, FFCWS has the advantage of capturing parents' romantic and residential transitions over time, along with multiple measures of children's developmental trajectories at different time points. The following sections detail each research question, my hypotheses, and a summary of theory and research that supports my hypotheses.

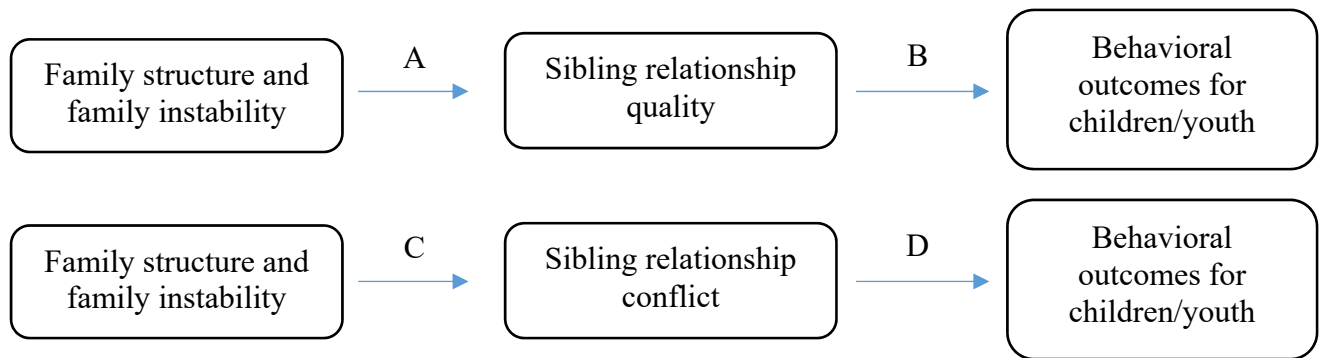


Figure 3. Proposed conceptual model for research questions 1 and 2.

Research question 1: How are family structure and family instability associated with the quality of sibling relationships when the focal child is nine years old? How are family structure and family instability associated with sibling relationship conflict when the focal child is nine years old? This research question explores paths A and C in Figure 3. For age nine, we have two different measures of sibling relationships—sibling relationship quality and sibling relationship conflict (see Table 49 for measurement details). As such, the effects of family structure and instability will be examined for both measures of sibling relationships.

Family structure, which indicates the marital status of the parents at the time of the child's birth, has previously been linked to poorer quality relationships for siblings. Some studies have found that relationships are higher in conflict in divorced or separated families compared to married-parent families (Noller, Feeney, Sheehan, Darlington, & Rogers, 2009), while others have found that parental divorce is associated with more positive sibling relationships (Kunz, 2001). However, research has found that other dyadic relationships within the family unit are less positive in non-married parent households. For example, cohabiting couples and single mothers have higher conflict and poorer quality relationships compared to married couples (Brown & Booth, 1996; McLanahan & Beck, 2010).

As discussed in the previous chapter, family instability refers to the multiple transitions in family structure, which includes divorce and remarriage, transitions in and out of cohabiting relationships, or any other parental relationship or coresidential transitions that can be disruptive in the child's family system and living environment (Wu & Martinson, 1993; Fomby & Cherlin, 2007). Previous research has demonstrated that family instability impacts the quality of other relationships in the family unit, such as the mother-child relationship. Mothers who have more relationship and coresidential transitions (i.e., higher instability) tend to experience more parenting stress, engage in harsher parenting behaviors, and, in general, have less optimal mother-child relationships (Osbourne, 2004; Osbourne & McLanahan, 2007). Additionally, in the Iowa Youth and Families Project, increased parental harshness was associated with more hostile sibling relationships, suggesting that siblings emulate the negative interactional styles of their parents (Conger & Elder, 1994).

Based on the perspectives from family systems theory that relationships in the family unit are highly interdependent and the body of research that demonstrated that the quality of

relationships between two members of a family might have spillover effects onto other family relationships (Brody, Stoneman, McCoy, & Forehand, 1992; Volling & Belsky, 1992), I hypothesize that sibling relationships are less positive and more negative in single-parent and cohabiting-parent households compared to married-parent households. I also hypothesize that family instability is associated with lower sibling relationship quality.

Research question 2: How are family structure and family instability associated with the quality of sibling relationships when the focal child is 15 years old? This research question explores path A in Figure 3 as in research question 1, but using data from when the focal child is 15 years old.

For the same reasons as in explained in research question 1, I hypothesize that high family instability is predictive of poorer sibling relationship quality at age 15, and that sibling relationships will be more negative and less positive in single or cohabiting parent households compared to married parent households.

Research question 3: What is the association between family structure, family instability, sibling relationship quality, and the child's behavioral outcomes at age nine? What is the association between family structure, family instability, sibling relationship conflict, and the child's behavioral outcomes at age nine? Does family structure moderate the association between sibling relationship quality and child's behavior? Does race moderate the association between sibling relationship quality and child's behavior? These research questions explore paths A and B in the same model, and paths C and D in a separate model (Figure 3).

The analytic models to answer these questions will include lagged dependent variables for behaviors at age five. Multiple measures of the child's behavior at age nine will be used to examine whether results vary depending on who is reporting the child's behavior—the mother or

the child. I use both the mother-reported measure of the child's internalizing and externalizing behaviors and the child's self-reported measure of juvenile delinquency (comprised of behaviors related to theft, vandalism, drug and substance use, and criminal acts towards other people).

The potential moderation of family structure will be tested by stratifying my models by whether the mother is single, cohabiting, or married at the time of the child's birth. The potential moderator of race will also be tested by stratifying my models by whether the mother is black, white, Hispanic, or other race.

While some studies have found no evidence to support the relationship between family structure and child behavior problems (Liu & Heiland, 2012), other studies have found results that support the link between family structure and children and youth's behavioral outcomes. Overall, children born to single-parent and cohabiting-parent households tend to have more behavior problems in early and middle childhood compared to those born to married-parent households (Osborne, McLanahan, & Brooks-Gunn, 2007; Carlson & Corcoran, 2001).

A separate body of research has demonstrated the association between sibling relationship quality and behavioral outcomes for youth; youth who report sibling relationships that are low in conflict and high in warmth tend to experience fewer depressive symptoms, demonstrate fewer aggressive and problem behaviors and more prosocial behaviors (Modry-Mandell, Gamble, & Taylor, 2006; McHale, Crouter, & Osgood, 2007; Harper, Padilla-Walker, & Jensen, 2014). Taken together, these bodies of research suggest that growing up in single-parent or cohabiting-parent household where there are many transitions and high instability, as well as having more negative sibling relationships, could have harmful effects on youth's behavioral trajectories.

I hypothesize that more positive sibling relationships are associated with fewer mother-reported and child-reported behavior problems at age nine. I also hypothesize that high sibling relationship conflict is associated with more mother-reported and child-reported behavior problems at age nine.

Research question 4: What is the association between family structure, family instability, sibling relationship quality, and the child's behavioral outcomes at age 15? Does family structure moderate the association between sibling relationship quality and child's behavior? Does race moderate the association between sibling relationship quality and child's behavior? Like research question 3, these questions explore paths A and B in the same model, and paths C and D in a separate model for age 15 data (Figure 3).

Similar to research question 3, the analytic models to answer these questions will include lagged dependent variables for behaviors at age nine. Multiple measures of the child's behavior at age 15 will be used to examine whether results vary depending on who is reporting the child's behavior—the mother or the child. I use both the mother-reported measure of the child's internalizing and externalizing behaviors and the child's self-reported measure of juvenile delinquency (comprised of behaviors related to theft, vandalism, drug and substance use, and criminal acts towards other people).

The potential moderator of family structure will be tested by stratifying my models by whether the mother is single, cohabiting, or married at the time of the child's birth. The potential moderator of race will also be tested by stratifying my models by whether the mother is black, white, Hispanic, or other race.

Prior research has demonstrated that children who experience multiple family structure changes in childhood are more likely to demonstrate poorer behavioral outcomes. For example,

higher instability in the form of mother's dating or coresidential transitions has been associated with more externalizing behavior problems for boys and more attention and social problems (Cooper, Osborne, Beck, & McLanahan, 2011) and children whose mothers experienced more partnership changes were more likely to demonstrate aggressive and anxious/depressive behaviors (Osborne & McLanahan, 2007). Research on sibling relationships has demonstrated the association between sibling relationship quality and behavioral outcomes for youth; youth who report sibling relationships that are low in conflict and high in warmth tend to experience fewer depressive symptoms, and demonstrate fewer aggressive and problem behaviors and more prosocial behaviors (Modry-Mandell, Gamble, & Taylor, 2006; McHale, Crouter, & Osgood, 2007; Harper, Padilla-Walker, & Jensen, 2014). Given these findings, I hypothesize that positive sibling relationship quality will be associated with fewer mother-reported and child-reported behavior problems at age 15.

Research question 5: What is the directionality of the relationship between sibling relationship quality and children's behavior? Do positive sibling relationships lead to positive behavior outcomes and fewer problem behaviors, or do children who have fewer behavior problems tend to have sibling relationships that are more positive and less conflictual?

The directionality of the relationship between sibling relationship quality and children's behavior will be tested using cross-lagged path models that takes into account the measures of sibling relationship quality and child's behavior at two time points.

As in the previous research questions, the directionality of the association between sibling relationship quality and children's behavior will be tested using measure of behavior from both the mother and the child's self-report.

CHAPTER 3

METHOD

Data

The FFCWS is a six-wave longitudinal study of children and their parents that oversampled non-marital births in the United States (Reichman, Teitler, Garfinkel, & McLanahan, 2001). A birth cohort of 4,898 children born between 1998 and 2000 and their parents were selected from a stratified random sample of all U.S. cities ($n=20$ cities). Because the central goals of FFCWS was to examine non-marital childbearing, welfare policies (welfare generosity, labor market climate, and child support enforcement policies), and father involvement, the stratification of the sample was not geographic. Hospitals were randomly sampled for most cities, except the cities with too few birthing hospitals, and married and unmarried births were randomly sampled within hospitals (Reichman, Teitler, Garfinkel, & McLanahan, 2001). Mothers and fathers were surveyed across six waves of data collection starting from when the child was born (wave 1), and when the child was age one (wave two), age three (wave three), age five (wave four), age nine (wave five), and age 15 (wave six). Children and their household environments were assessed in waves three through six as a part of the in-home assessment. Questions about the quality of children's sibling relationships were asked during the in-home assessments in waves five and six. The present study will draw from all six waves of data in the FFCWS.

Sample

Youth were asked about the quality of their sibling relationships at two time points—during the in-home child interviews when they were nine and 15 years old. The analytic sample for this study was restricted to children who participated in the child interview at age nine and

15. Specifically, we examine children for whom we have sibling relationship quality data at age nine ($n=2,847$) and at age 15 ($n=2,864$) (See Appendix B for details about the analytic sample).

Measures

Table 1 summarizes the key independent and dependent variables of interest from the FFCWS study, as well the waves of the study from which I draw to construct the variables. Table 2 provides descriptive statistics for study variables of interest.

Table 1. Summary of study variables

	Child age					
	0	1	3	5	9	15
Independent Variables						
Family structure	✓					
Family stability	✓	✓	✓	✓	✓	
Sibling relationship quality*					✓	✓
Sibling relationship conflict*					✓	
Dependent Variables						
Sibling relationship quality*					✓	✓
Sibling relationship conflict*					✓	
Internalizing behavior problems*				✓	✓	✓
Externalizing behavior problems*				✓	✓	✓
Child self-reported delinquent behavior					✓	✓
Key Covariates and Controls						
Child gender	✓					
Total number of siblings					✓	✓
Stepsibling presence					✓	✓
Half-sibling presence					✓	✓
Older sibling presence					✓	
Siblings all female					✓	
Siblings all male					✓	
Child closeness to mom					✓	✓
Child closeness to dad					✓	✓
Parents' relationship quality					✓	✓
Maternal characteristics	✓					
Poverty	✓					
Cities	✓					

* indicates that the variable was used as both an independent and dependent variable

Table 2. Descriptive statistics for study variables

	Age 9 (n=2,847)	Age 15 (n=2,864)	Notes
	M (SD) / %	M (SD) / %	
Family structure (baseline)			
Single	39.0%	39.4%	
Cohabiting	37.1%	35.6%	
Married	24.3%	25.0%	
Family instability	1.15 (1.18)	1.27 (1.14)	Count of the total number of transitions of father or father figure.
Sibling relationship quality	3.14 (0.97)	3.02 (0.83)	Range 1-4 where 4 indicates a positive relationship.
Sibling relationship conflict	2.19 (0.90)	-	Range 1-4 where 4 indicates a conflictual relationship.
Child/Sibling characteristics			
Child female	47.9%	48.4%	
Total number of siblings	2.00 (1.10)	1.91 (1.62)	
Half sibling present	34.5%	36.5%	Half sibling indicates having the same mother with the focal child.
Step sibling present	10.2%	7.8%	See Appendix B for note about counting stepsiblings.
Older sibling present	64.9%	-	
Siblings all female	14.3%	-	Focal child and all co-resident siblings are female.
Siblings all male	16.4%	-	Focal child and all co-resident siblings are male.
Mother's race			
White	20.4%	21.3%	
Black	50.5%	50.0%	
Hispanic	25.9%	25.2%	
Other	3.3%	3.6%	
Mother's age	24.93 (5.79)	24.76 (5.74)	Mother's age at the time of child's birth.
Mother's education			
Less than HS	34.2%	32.8%	
HS graduate	32.2%	31.6%	
Some college	23.6%	24.6%	
College graduate	10.1%	11.1%	
Household poverty ratio	2.15 (2.40)	2.24 (2.45)	Range 0-14, ratio of mother's household income to federal poverty ratio. Ratios greater than 1 indicate living at or above federal poverty threshold.

Quality of other family relationships			
Child close to mother	74.5%	57.8%	Binary variable where 1 means child described relationship with his/her mother to be "extremely close."
Child close to father	48.8%	27.8%	Binary variable where 1 means child described relationship with his/her father to be "extremely close."
Mother's relationship quality with father	2.74 (1.64)	2.56 (1.54)	Range 0-5 where 0 indicates no relationship and 5 indicates an "excellent" relationship.
Externalizing behaviors	6.31 (7.05)	4.42 (5.07)	Range for age 9: 0-72. Range for age 15: 0-33. Higher number indicates more problem behaviors.
Internalizing behaviors	4.86 (5.60)	2.01 (2.45)	Range for age 9: 0-64. Range for age 15: 0-15. Higher number indicates more problem behaviors.
Child-reported behaviors			
Criminal activities toward others	31.7%	29.1%	Binary variable where 1 indicates child ever engaging in criminal activities toward others.
Theft	23.1%	13.0%	Binary variable where 1 indicates child ever engaging in theft.
Drug and substance use	4.5%	28.1%	Binary variable where 1 indicates child ever engaging in drug an substance use.
Vandalism	18.8%	6.9%	Binary variable where 1 indicates child ever engaging in vandalism.

Independent Variables

Family structure at the time of the child's birth. In the first wave of data collection, mothers were asked "Are you currently married to the father of your new baby?" and for mothers who were not married but romantically involved with the baby's father, mothers were asked "Are you and the baby's father living together now?" Based on these questions, mothers were coded as married ($n=1,187$), cohabiting ($n=1,783$), or single and not cohabiting ($n=1,926$).

Family structure stability. These set of family structure variables—stably single, stably cohabiting, stably married, unstably single, unstably cohabiting, and unstably married—take into

account the baseline family structure (i.e., whether the mom is single, or cohabiting or married with the biological father when the child is born), as well as any subsequent changes in family structure after the first wave of data collection. If a mother is single when the child is born and remains a single mother until the child is nine or 15, then the mother is coded as being stably single. If a mother is cohabiting with the biological father of the child when the child is born, but is with a new partner at any one of the subsequent waves, then the mother is coded as being unstably cohabiting.

Family instability from birth to age nine and age 15. At each wave of the study, mothers were asked about their relationship and residential status with the child's biological father, whether the mother was in a relationship with a new partner, and, if so, if the mother was living with a new partner. The family instability variable is a constructed a continuous variable that counts the number of times a biological or social father figure enters and exits the household (i.e., total number of disruptions) between the child's ages of zero to nine and zero to 15. For example, if a child was born into a married-parent household and lived with his/her biological parents in the subsequent waves, the total number of transitions for that child is zero. If a child was born into a single-mother household, was living with a social father at age three, and living with his/her biological father at age five, the total number of transitions will be four.

Sibling relationship quality at age 9¹. During the in-home assessment of the child at age nine, children who indicated that they had brothers and sisters living with them were asked "If one of your siblings is hurt or upset, how often do you try to make them feel better?" (1=never, 2=sometimes, 3=often, 4= always). For this question, which was designed to measure sibling warmth and a positive sibling relationship, five percent of adolescents indicated "never," 26%

¹ Sibling relationship quality at age nine, sibling relationship conflict at age nine, and sibling relationship quality at age 15 are used as both independent and dependent variables in my study depending on the research question.

indicated “sometimes,” 19% indicated “often,” and 51% indicated “always.” A score of four indicates a very positive and warm sibling relationship, while a score of one indicates a relationship that is not positive.

Sibling relationship conflict at age nine. During the in-home assessment when the child is nine years old, children who indicated that they had brothers and sisters living with them were asked, “Brothers and sisters sometimes cause trouble, start fights or are mean to each other. How often do you start fights, cause trouble, or are mean to your sibling(s)?” (1=never, 2=sometimes, 3=often, 4= always). For this question, which was intended to measure level of sibling conflict, 20% of children indicated “never,” 51% indicated “sometimes,” 16% indicated “often,” and 12% indicated “always.” A score of four indicates a high-conflict sibling relationship, while a score of one indicates a sibling relationship that is low in conflict.

Sibling relationship quality at age 15. Participating youth who had co-resident siblings at age 15 were asked, “How well do you and your siblings get along?” (4=extremely well, 3=quite well, 2=fairly well, 1=not very well). Of the youth who answered this question, 32% indicated “extremely well,” 42% indicated “quite well,” 22% indicated “fairly well,” and approximately four percent indicated “not very well.” A four indicates a very positive sibling relationship, while a score of one indicates the least positive sibling relationship.

Dependent Variables

Internalizing and externalizing behavior problems at age nine. When the child was nine years old, the child’s mother was asked to answer 35 questions about the child’s aggressive and rule breaking behaviors and 17 questions about the child’s anxious/depressed, withdrawn/depressed, and somatic complaint behaviors from the Child Behavior Checklist (6-18) (Achenbach & Rescorla, 2001). The 35 items in the aggressive and rule breaking behavior

subscales comprise the child's level of externalizing behavior problems, while the 17 items in the anxious/depressed, withdrawn, and somatic complaints subscales comprise the child's level of internalizing behavior problems. Mothers were asked to indicate whether the statements were not true (0), somewhat true (1), and very/often true (2), and the child's externalizing and internalizing behavior problems is the sum of the mother's answers on the statements. Statements in the aggressive behavior subscale includes: "child gets in many fights," "child is cruel, bullies, or shows meanness to others," and "child destroys things belonging to family or others." Statements in the anxious/depressed subscale includes: "child fears going to school," "child feels he or she has to be perfect," and "child is too fearful or anxious." (See Table 49 in Appendix A for the full list of statements used in this measure.)

Internalizing and externalizing behavior problems at age 15. Data about adolescents' behavioral, social, and emotional problems were collected using items from the Child Behavior Checklist/6-18 (CBCL) (Achenbach & Rescorla, 2001). Parents or surrogate parents were asked to rate the teen on 34 items from the following seven CBCL subscales: aggressive behavior, anxious/depressed, attention problems, social problems, rule-breaking behavior, withdrawn, and thought problems.

Externalizing behavior problems includes a total of 20 items from the aggressive behavior and rule-breaking behavior subscales and sample items from the two scales, respectively, are: "Child is cruel, bullies, or shows meanness to others," "Child argues a lot," "Child is disobedient at school," "Child lies or cheats," "Child hangs around with others who get in trouble," and "Child doesn't seem to feel guilty after misbehaving" (1=not true, 3=very/often true). The constructed variable of externalizing behavior problems is a sum of the answers

parents selected for each item, where not true is coded as zero, somewhat true is coded as one, and very/often true is coded as two.

Internalizing behavior problems is a constructed variable that includes a total of eight items from the anxious/depressed, and withdrawn subscales and sample items from the two scales, respectively, are: “Child fears worthless or inferior,” “Child is too fearful or anxious,” “Child feels too guilty,” and “Child is unhappy, sad, or depressed” (1=not true, 3=very/often true). The constructed variable of internalizing behavior problems is a sum of the answers parents selected for each item, where not true is coded as zero, somewhat true is coded as one, and very/often true is coded as two.

Child-reported delinquent behaviors at age nine. When the child was nine, the child was asked to self-report their own delinquent behaviors in the form of 17 questions from the Things That You Have Done scale (Maumary-Gremaud, 2000). Similar survey items were asked of youth in the National Longitudinal Survey of Youth (1997). Subscales included constructs for crimes against other people, theft, vandalism, and substance use (alcohol and drugs). Children were asked to answer “yes” or “no” to questions such as, “Purposely damaged or destroyed property that wasn’t yours,” “Had a fist fight with another person,” “Written things or spray painted on walls or sidewalks or cars,” “Been suspended or expelled from school,” and “Avoided paying for movies, bus or subway rides or food.”

Items from this measure were scored two ways. Items for all four subscales were summed to create a continuous score of juvenile delinquent behaviors. Because the behaviors were so rare, and based on other research that has coded the four subscales a four dichotomous measures (Schneider, Waldfoegel, & Brooks-Gunn, 2015), the four subscales were recoded as a dichotomous variable indicating whether the child reported engaging in any of the behaviors. (See Table 49 in Appendix A for the full list of statements used in this measure.)

Youth-reported delinquent behaviors at age 15. Youth were asked 13 questions about delinquent behaviors and the frequency they engaged in them in the last 12 months (never, 1-2 times, 3-4 times, or 5 or more times). These items, which were adopted from the measures in the National Longitudinal Study of Adolescent Health, include: “Get into a serious physical fight,” “Hurt someone badly enough to need bandages or care from a doctor or nurse?” “Take something from a store without paying for it?” “Go into a house or building to steal something?” and “Were you loud, rowdy, or unruly in a public space?”

Similar to the coding of child-reported delinquent behaviors at age nine, responses to these 13 questions will be coded such that never=0, 1-2 times=1, 3-4 times=2, and 5 or more times=3 and they will be summed to create a total score, with higher values representing higher levels of delinquent behavior. Responses to the four subscales (constructs for crimes against other people, theft, vandalism, and drug and substance use) will also be coded as dichotomous measures indicating whether the youth ever engaged in any of the behaviors.

Key Covariates

Child closeness to mom at age nine and 15. At the nine-year and 15-year survey of children in the study, they were asked the question, “How close do you feel to your mom?” The Likert scale ranged from extremely close, quite close, fairly close, or not very close.

Of the children who answered this question at age nine, 74% reported feeling extremely close, 15% reported feeling quite close, six percent reported feeling fairly close, and five percent reported feeling not very close to their mother. Because of the skew in the distribution of answers, with most children reporting feeling extremely close to their mothers, a dichotomous variable was constructed to indicate extremely close relationships versus quite, fairly, or not very close mother-child relationships.

Of the children who answered this question at age 15, 56% reported feeling extremely close, 26% reported feeling quite close, 11% reported feeling fairly close, and seven percent reported feeling not very close to their mother. Again, the variable was recoded as a dichotomous variable indicating extremely close mother-child relationships.

Child closeness to dad at age nine and 15. At the nine-year and 15-year survey of children in the study, they were asked the question, “How close do you feel to your dad?” Answer choices ranged from extremely close, quite close, fairly close, or not very close.

At age nine, 47% reported feeling extremely close, 16% reported feeling quite close, eight percent reported feeling fairly close, and 29% reported feeling not very close to their father. Although the distribution of this question was less skewed compared to the same question asked about the mother, I recoded the variable to be a dichotomous variable indicating extremely close father-child relationships. For children who reported not having seen his or her biological father in the past year, I group them with the children who reported not being close to their father.

At age 15, 28% reported feeling extremely close, 21% reported feeling quite close, 14% reported feeling fairly close, and 37% reported feeling not very close to their father. Although the distribution for this variable is relatively balanced, in following the same logic for the other child-reported closeness to mom/dad variables, I recoded the variable to be a dichotomous variable indicating extremely close father-child relationships. For children who reported not having seen his or her biological father in the past year, I group them with the children who reported not being close to their father.

Parent’s relationship quality at age nine and 15. Parental relationship quality was based on the following question, which was asked to mothers at every wave: “In general, would you say that your relationship with [the child’s biological] is excellent, very good, good, fair, or

poor?” Excellent was coded as five and poor was coded as one, with higher scores indicating the most positive relationships. For mothers who reported nothing having a relationship with the child’s biological father or never seeing him, I coded them as zero.

At age nine, 17% of mothers reported that her relationship with the child’s father was excellent, 21% reported very good, 20% reported good, 15% reported fair, 14% reported poor, and 14% reported either never seeing the child’s father or not having a relationship with him.

At age 15, the primary caregiver of the study’s focal child, most of whom were the mother, was asked to rate the quality of their relationship with the other biological parent—excellent (5), very good (4), good (3), fair (2) or poor (1). Mothers or fathers who reported not having a relationship with the other biological parent were not asked the question and I coded them as zero. Of the parents who answered this question at the 15-year survey, 14% reported the relationship was excellent, 17% reported it was very good, 17% reported it was good, 16% reported that it was fair, 30% reported that it was poor, and six percent reported never seeing him or her.

Total number of siblings at age nine (mother-report). In the first five waves of FFCWS, mothers were asked to complete the household matrix, listing every person who lives in the household not including herself. The mother was also asked to report every household member’s gender, age, relationship (to her), as well as the employment status of each member. Based on the household matrix data when the child is nine, I constructed a continuous variable for the total number of siblings. This total number is inclusive of full siblings, half-siblings, and stepsiblings who live in the household. Details about the breakdown of the types of siblings at ages nine and 15 can be found in Appendix B.

Stepsibling presence at age nine (mother-report). Based on the mother's answers on the household matrix question at the nine-year survey, I constructed a binary variable to indicate the presence of a stepsibling in the home. As mentioned in the explanation of the previous measure (Total number of siblings in the home at age nine), the mother listed every person living in the home and his or her relationship to her. A stepsibling is someone the mother indicated as being her "stepchild."

Half-sibling presence at age nine (mother-report). The indicator for the presence of a half-sibling in the home is based on two questions in the nine-year survey of mothers—the mother's answers on the household matrix question about other biological children in the home, as well as a question about having children with other partners (besides the focal child's biological father). The mother was asked to list and name the fathers of all of her biological children, and whether he was the same person as the focal child's biological father. If the mother indicated that she had another biological child living with her and that his/her father was not the same person as the focal child's biological father, then I assume the presence of a half-sibling.

Older sibling presence at age nine. Based on the household matrix question in the nine-year survey, I created a binary indicator for the presence of an older sibling. An older sibling is someone who lives in the household, who the mother indicated to be her biological child, and who is older than 10 years of age. Because children were between the ages of eight and 10 at the time of the age nine data collection, I indicated there being a co-resident older sibling if there was a biological child (of the mother) who was older than 10.

Sibling gender composition at age nine: all siblings female, all siblings male. Using sibling gender data from the household matrix question in the nine-year survey, I created two variables related to the gender composition of the children in the household. All siblings female

is a binary variable that indicates the focal child is female, as well as all of her siblings in the household. All siblings male is a binary variable that indicates the focal child is male, as well as all of his siblings in the household. The reference category is mixed-gender siblings.

Total number of siblings at age 15 (child-report). Unlike the first five waves of data collection, in the sixth wave of data collection that took place when the child was 15 years old, the primary caregiver was not asked the household matrix question about all the members living in the same household as the focal child. However, the child was asked, “How many full siblings do you live with?” “How many half-siblings do you live with?” and “How many stepsiblings do you live with?” I sum the child’s report to the three questions to construct a continuous variable to indicate the total number of co-resident siblings, inclusive of full, half and stepsiblings.

Stepsibling presence at age 15 (child-report). At the 15-year child survey, the child was asked “How many stepsiblings do you live with?” Based on the response to this question, I constructed a binary variable to indicate the presence of a co-resident stepsibling(s).

Half-sibling presence at age 15 (child-report). At the 15-year child survey, the child was asked “How many half-siblings do you live with?” Based on the response to this question, I constructed a binary variable to indicate the presence of a co-resident half-sibling(s).

Controls

Mother’s age at child’s birth. Because maternal characteristics are likely associated with children’s developmental trajectories, I will control for mother’s age at the time of the child’s birth, race, and level of education.

Mother's level of education. Four dummy variables are included in my analyses to control for the mother's level of education at the time of the child's birth. The variables include: less than high school, high school graduate or equivalent, some college, college graduate or more. The reference category in my analyses is the highest level of education—college graduate or more. At the time of the child's birth, 35% of mothers reported not having a high school degree, 30% reported having a high school degree or equivalent, 24% reported having some college, and 11% reported being a college graduate or attaining a postsecondary degree.

Mother's race. Four dummy variables are included in my analyses to control for the mother's race—black, white, Hispanic, or other. I use white mothers as the reference category. Approximately 48% of mothers in the initial wave were black, 27% Hispanic, 21% white and four percent other.

Household poverty. The Fragile Families data set includes a constructed variable for the ratio of the mother's household income to the federal poverty threshold at the time. I use this poverty ratio—the household income to the federal poverty threshold—to control for the family's level of economic need. Ratios greater than one mean that the family is living at or above the federal poverty threshold, while ratios less than one mean that the family is living below the federal poverty threshold.

Analytic Strategy

Research Question One

Research question 1a: How are family structure and family instability associated with the quality of sibling relationships when the focal child is nine years old?

Research question 1b: How are family structure and family instability associated with sibling relationship conflict when the focal child is nine years old?

I will use ordinary least squares regression models to examine the association between family structure and sibling relationship quality. I will start with a main effects model (Model 1) that compares married mothers at wave one to single and cohabiting mothers (the reference category is married mothers). Model 2 will include family instability. Model 3 will include characteristics of the child and sibling: child gender, the total number of siblings, the presence of a half-sibling, the presence of a stepsibling, the presence of an older sibling, a variable to indicate whether all the children in the family are female, and a variable to indicate whether all the children in the family are male. Model 4 will include demographic characteristics of the mother and the family: mother's race, mother's age, mother's level of education, and household poverty level. Finally, the last model (Model 5) will include variables about the quality of other family relationships: parents' relationship quality, child's closeness to his or her mother, and child's closeness to his or her father. Every model for FFCWS will also contain fixed effects for cities (i.e., a dummy variable for each city to account for the stratified sampling of FFCWS by city).

The models below will be run twice using two different operationalizations of family structure and instability. One set of models will use the continuous measure of family instability while the second set of models will use more detailed breakdowns of family structure (see Appendix A, Table 50). Models 1a-5a use the continuous measure of family instability, while models 1b-5b use the measure of family instability that takes into account the baseline family structure and any subsequent transitions take place.

Model 1a: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{single}) + \beta_2(\text{cohab}) + \beta_{\text{cities}} + \varepsilon$
 The reference category will be married-parent families.

Model 2a: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{single}) + \beta_2(\text{cohab}) + \beta_3(\text{family instability}) + \beta_{\text{cities}} + \varepsilon$

Model 3a: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{single}) + \beta_2(\text{cohab}) + \beta_3(\text{family instability}) + \beta_4(\text{child female}) + \beta_5(\text{total siblings}) + \beta_6(\text{half sibling present}) + \beta_7(\text{step sibling present}) + \beta_8(\text{older sibling present}) + \beta_9(\text{siblings all female}) + \beta_{10}(\text{siblings all male}) + \beta_{\text{cities}} + \varepsilon$

Model 4a: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{single}) + \beta_2(\text{cohab}) + \beta_3(\text{family instability}) + \beta_4(\text{child female}) + \beta_5(\text{total siblings}) + \beta_6(\text{half sibling present}) + \beta_7(\text{step sibling present}) + \beta_8(\text{older sibling present}) + \beta_9(\text{siblings all female}) + \beta_{10}(\text{siblings all male}) + \beta_{11}(\text{black}) + \beta_{12}(\text{other}) + \beta_{13}(\text{hispanic}) + \beta_{14}(\text{mother's age}) + \beta_{15}(\text{mother less than HS}) + \beta_{16}(\text{mother HS grad}) + \beta_{17}(\text{mother some college}) + \beta_{18}(\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$

The reference category for race will be white families and for mother's education, the reference category will be college graduate.

Model 5a: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{single}) + \beta_2(\text{cohab}) + \beta_3(\text{family instability}) + \beta_4(\text{child female}) + \beta_5(\text{total siblings}) + \beta_6(\text{half sibling present}) + \beta_7(\text{step sibling present}) + \beta_8(\text{older sibling present}) + \beta_9(\text{siblings all female}) + \beta_{10}(\text{siblings all male}) + \beta_{11}(\text{black}) + \beta_{12}(\text{other}) + \beta_{13}(\text{hispanic}) + \beta_{14}(\text{mother's age}) + \beta_{15}(\text{mother less than HS}) + \beta_{16}(\text{mother HS grad}) + \beta_{17}(\text{mother some college}) + \beta_{18}(\text{household poverty}) + \beta_{19}(\text{child close to mother}) + \beta_{20}(\text{child close to father}) + \beta_{21}(\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Model 1b: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{stably single}) + \beta_2(\text{stably cohab}) + \beta_3(\text{unstably single}) + \beta_4(\text{unstably cohab}) + \beta_5(\text{unstably married}) + \beta_{\text{cities}} + \varepsilon$

The reference category will be stably married households.

Model 2b: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{stably single}) + \beta_2(\text{stably cohab}) + \beta_3(\text{unstably single}) + \beta_4(\text{unstably cohab}) + \beta_5(\text{unstably married}) + \beta_6(\text{family instability}) + \beta_{\text{cities}} + \varepsilon$

Model 3b: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{stably single}) + \beta_2(\text{stably cohab}) + \beta_3(\text{unstably single}) + \beta_4(\text{unstably cohab}) + \beta_5(\text{unstably married}) + \beta_6(\text{family instability}) + \beta_7(\text{child female}) + \beta_8(\text{total siblings}) + \beta_9(\text{half sibling present}) + \beta_{10}(\text{step sibling present}) + \beta_{11}(\text{older sibling present}) + \beta_{12}(\text{siblings all female}) + \beta_{13}(\text{siblings all male}) + \beta_{\text{cities}} + \varepsilon$

Model 4b: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1(\text{stably single}) + \beta_2(\text{stably cohab}) + \beta_3(\text{unstably single}) + \beta_4(\text{unstably cohab}) +$

$$\beta_5 (\text{unstably married}) + \beta_6 (\text{family instability}) + \beta_7 (\text{child female}) + \beta_8 (\text{total siblings}) + \beta_9 (\text{half sibling present}) + \beta_{10} (\text{step sibling present}) + \beta_{11} (\text{older sibling present}) + \beta_{12} (\text{siblings all female}) + \beta_{13} (\text{siblings all male}) + \beta_{14} (\text{black}) + \beta_{15} (\text{other}) + \beta_{16} (\text{hispanic}) + \beta_{17} (\text{mother's age}) + \beta_{18} (\text{mother less than HS}) + \beta_{19} (\text{mother HS grad}) + \beta_{20} (\text{mother some college}) + \beta_{21} (\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$$

Model 5b: $Y_{(\text{sibling relationship quality or sibling relationship conflict age 9})} = \beta_0 + \beta_1 (\text{stably single}) + \beta_2 (\text{stably cohab}) + \beta_3 (\text{unstably single}) + \beta_4 (\text{unstably cohab}) + \beta_5 (\text{unstably married}) + \beta_6 (\text{family instability}) + \beta_7 (\text{child female}) + \beta_8 (\text{total siblings}) + \beta_9 (\text{half sibling present}) + \beta_{10} (\text{step sibling present}) + \beta_{11} (\text{older sibling present}) + \beta_{12} (\text{siblings all female}) + \beta_{13} (\text{siblings all male}) + \beta_{14} (\text{black}) + \beta_{15} (\text{other}) + \beta_{16} (\text{hispanic}) + \beta_{17} (\text{mother's age}) + \beta_{18} (\text{mother less than HS}) + \beta_{19} (\text{mother HS grad}) + \beta_{20} (\text{mother some college}) + \beta_{21} (\text{household poverty}) + \beta_{22} (\text{child close to mother}) + \beta_{23} (\text{child close to father}) + \beta_{24} (\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Research Question Two

Research question 2: How are family structure and family instability associated with the quality of sibling relationships when the focal child is 15 years old?

I will use ordinary least squares regression models to examine the association between family structure and sibling relationship quality at age 15. I will start with a main effects model (Model 1) that compares married mothers at wave one to single and cohabiting mothers (the reference category is married mothers). Model 2 will include family instability. Model 3 will include characteristics of the child and sibling: child gender, the total number of siblings, the presence of a half-sibling, the presence of a step sibling, the presence of an older sibling, a variable to indicate whether all the children in the family are female, and a variable to indicate whether all the children in the family are male. Model 4 will include demographic characteristics of the mother and the family: mother's race, mother's age, mother's level of education, and household poverty level. Finally, the last model (Model 5) will include variables about the quality of other family relationships: parents' relationship quality, child's closeness to his or her

mother, and child's closeness to his or her father. Every model for will also contain fixed effects for cities.

The models below will be run twice using two different operationalizations of family structure and instability. One set of models will use the continuous measure of family instability while the second set of models will use more detailed breakdowns of family structure (see Appendix A Table 50). Models 1a-5a use the continuous measure of family instability, while models 1b-5b use the measure of family instability that takes into account the baseline family structure and any subsequent transitions take place.

Model 1a: $Y_{(sibling\ relationship\ quality\ age\ 15)} = \beta_0 + \beta_1(single) + \beta_2(cohab) + \beta_{cities} + \varepsilon$

The reference category will be married-parent families.

Model 2a: $Y_{(sibling\ relationship\ quality\ age\ 15)} = \beta_0 + \beta_1(single) + \beta_2(cohab) + \beta_3(family\ instability) + \beta_{cities} + \varepsilon$

Model 3a: $Y_{(sibling\ relationship\ quality\ age\ 15)} = \beta_0 + \beta_1(single) + \beta_2(cohab) + \beta_3(family\ instability) + \beta_4(child\ female) + \beta_5(total\ siblings) + \beta_6(half\ sibling\ present) + \beta_7(step\ sibling\ present) + \beta_{cities} + \varepsilon$

Model 4a: $Y_{(sibling\ relationship\ qualit\ age\ 15)} = \beta_0 + \beta_1(single) + \beta_2(cohab) + \beta_3(family\ instability) + \beta_4(child\ female) + \beta_5(total\ siblings) + \beta_6(half\ sibling\ present) + \beta_7(step\ sibling\ present) + \beta_8(black) + \beta_9(other) + \beta_{10}(hispanic) + \beta_{11}(mother's\ age) + \beta_{12}(mother\ less\ than\ HS) + \beta_{13}(mother\ HS\ grad) + \beta_{14}(mother\ some\ college) + \beta_{15}(household\ poverty) + \beta_{cities} + \varepsilon$

The reference category for race will be white families and for mother's education, the reference category will be college graduate.

Model 5a: $Y_{(sibling\ relationship\ quality\ age\ 15)} = \beta_0 + \beta_1(single) + \beta_2(cohab) + \beta_3(family\ instability) + \beta_4(child\ female) + \beta_5(total\ siblings) + \beta_6(half\ sibling\ present) + \beta_7(step\ sibling\ present) + \beta_8(black) + \beta_9(other) + \beta_{10}(hispanic) + \beta_{11}(mother's\ age) + \beta_{12}(mother\ less\ than\ HS) + \beta_{13}(mother\ HS\ grad) + \beta_{14}(mother\ some\ college) + \beta_{15}(household\ poverty) + \beta_{16}(child\ close\ to\ mother) + \beta_{17}(child\ close\ to\ father) + \beta_{18}(mother's\ relationship\ quality\ with\ father) + \beta_{cities} + \varepsilon$

Model 1b: $Y_{(\text{sibling relationship quality age 15})} = \beta_0 + \beta_1 (\text{stably single}) + \beta_2 (\text{stably cohab}) + \beta_3 (\text{unstably single}) + \beta_4 (\text{unstably cohab}) + \beta_5 (\text{unstably married}) + \beta_{\text{Cities}} + \varepsilon$

The reference category will be stably married households.

Model 2b: $Y_{(\text{sibling relationship quality age 15})} = \beta_0 + \beta_1 (\text{stably single}) + \beta_2 (\text{stably cohab}) + \beta_3 (\text{unstably single}) + \beta_4 (\text{unstably cohab}) + \beta_5 (\text{unstably married}) + \beta_6 (\text{family instability}) + \beta_{\text{cities}} + \varepsilon$

Model 3b: $Y_{(\text{sibling relationship quality age 15})} = \beta_0 + \beta_1 (\text{stably single}) + \beta_2 (\text{stably cohab}) + \beta_3 (\text{unstably single}) + \beta_4 (\text{unstably cohab}) + \beta_5 (\text{unstably married}) + \beta_6 (\text{family instability}) + \beta_7 (\text{child female}) + \beta_8 (\text{total siblings}) + \beta_9 (\text{half sibling present}) + \beta_{10} (\text{step sibling present}) + \beta_{\text{cities}} + \varepsilon$

Model 4b: $Y_{(\text{sibling relationship quality age 15})} = \beta_0 + \beta_1 (\text{stably single}) + \beta_2 (\text{stably cohab}) + \beta_3 (\text{unstably single}) + \beta_4 (\text{unstably cohab}) + \beta_5 (\text{unstably married}) + \beta_6 (\text{family instability}) + \beta_7 (\text{child female}) + \beta_8 (\text{total siblings}) + \beta_9 (\text{half sibling present}) + \beta_{10} (\text{step sibling present}) + \beta_{11} (\text{black}) + \beta_{12} (\text{other}) + \beta_{13} (\text{hispanic}) + \beta_{14} (\text{mother's sage}) + \beta_{15} (\text{mother less than HS}) + \beta_{16} (\text{mother HS grad}) + \beta_{17} (\text{mother some college}) + \beta_{18} (\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$

Model 5b: $Y_{(\text{sibling relationship quality age 15})} = \beta_0 + \beta_1 (\text{stably single}) + \beta_2 (\text{stably cohab}) + \beta_3 (\text{unstably single}) + \beta_4 (\text{unstably cohab}) + \beta_5 (\text{unstably married}) + \beta_6 (\text{family instability}) + \beta_7 (\text{child female}) + \beta_8 (\text{total siblings}) + \beta_9 (\text{half sibling present}) + \beta_{10} (\text{step sibling present}) + \beta_{11} (\text{black}) + \beta_{12} (\text{other}) + \beta_{13} (\text{hispanic}) + \beta_{14} (\text{mother's sage}) + \beta_{15} (\text{mother less than HS}) + \beta_{16} (\text{mother HS grad}) + \beta_{17} (\text{mother some college}) + \beta_{18} (\text{household poverty}) + \beta_{19} (\text{child close to mother}) + \beta_{20} (\text{child close to father}) + \beta_{21} (\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Research Question Three

Research question 3a: What is the association between family structure, family instability, sibling relationship quality, and mother-reported child behavioral outcomes at age nine? What is the association between family structure, family instability, sibling relationship conflict, and mother-reported child behavioral outcomes at age nine?

Research question 3b: What is the association between family structure, family instability, sibling relationship quality, and child-reported child behavioral outcomes at age nine? What is

the association between family structure, family instability, sibling relationship conflict, and child-reported child behavioral outcomes at age nine?

Research question 3c: Does family structure moderate the association between sibling relationship quality or sibling relationship conflict and children's behavior outcomes at age nine?

Research question 3d: Does race moderate the association between sibling relationship quality or sibling relationship conflict and children's behavior outcomes at age nine?

I will use ordinary least squares regression models to examine the association between family structure, family instability, and sibling relationship quality and behavior outcomes at age 9. Similar to the analytic strategy for research questions one and two, I will examine these questions by using the two different operationalizations of family structure and instability. Furthermore, covariates will be added from a simple model (Model 1) that only examines the effects of family structure and sibling relationship quality to a more comprehensive model (Model 5) that includes family instability, child and sibling characteristics, mother's demographic characteristics, and the quality of other dyadic relationships in the family.

As previously mentioned, models include lagged dependent variables for child behavior (for example, the child's level of externalizing behaviors at age five) based on the research literature on the strong continuity of problem behaviors over time. Models A use the family structure variables of single, cohabiting, or married at baseline (at child's birth) while models b use the variables for stably married, stably cohabiting, stably single, unstably married, unstably cohabiting, and unstably single.

To test for moderation by family structure, I will stratify my models by baseline family structure (married, cohabiting or single). To test for moderation by race, I will stratify my models by mother' race.

Model 1a: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 5}) + \beta_{\text{Cities}} + \varepsilon$

The reference category will be married-parent families.

Model 2a: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 5}) + \beta_5 (\text{family instability}) + \beta_{\text{Cities}} + \varepsilon$

Model 3a: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 5}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{10} (\text{older sibling present}) + \beta_{11} (\text{siblings all female}) + \beta_{12} (\text{siblings all male}) + \beta_{\text{cities}} + \varepsilon$

Model 4a: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 5}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{10} (\text{older sibling present}) + \beta_{11} (\text{siblings all female}) + \beta_{12} (\text{siblings all male}) + \beta_{13} (\text{black}) + \beta_{14} (\text{other}) + \beta_{15} (\text{hispanic}) + \beta_{16} (\text{mother's age}) + \beta_{17} (\text{mother less than HS}) + \beta_{18} (\text{mother HS grad}) + \beta_{19} (\text{mother some college}) + \beta_{20} (\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$

The reference category for race will be white families and for mother's education, the reference category will be college graduate.

Model 5a: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 5}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{10} (\text{older sibling present}) + \beta_{11} (\text{siblings all female}) + \beta_{12} (\text{siblings all male}) + \beta_{13} (\text{black}) + \beta_{14} (\text{other}) + \beta_{15} (\text{hispanic}) + \beta_{16} (\text{mother's age}) + \beta_{17} (\text{mother less than HS}) + \beta_{18} (\text{mother HS grad}) + \beta_{19} (\text{mother some college}) + \beta_{20} (\text{household poverty}) + \beta_{21} (\text{child close to mother}) + \beta_{22} (\text{child close to father}) + \beta_{23} (\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Model 1b: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 5}) + \beta_{\text{Cities}} + \varepsilon$

The reference category will be married-parent families.

Model 2b: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 5}) + \beta_8 (\text{family instability}) + \beta_{\text{cities}} + \varepsilon$

Model 3b: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 5}) + \beta_8 (\text{family instability}) + \beta_9 (\text{child female}) + \beta_{10} (\text{total siblings}) + \beta_{11} (\text{half sibling present}) + \beta_{12} (\text{step sibling present}) + \beta_{13} (\text{older sibling present}) + \beta_{14} (\text{siblings all female}) + \beta_{15} (\text{siblings all male}) + \beta_{\text{cities}} + \varepsilon$

Model 4b: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 5}) + \beta_8 (\text{family instability}) + \beta_9 (\text{child female}) + \beta_{10} (\text{total siblings}) + \beta_{11} (\text{half sibling present}) + \beta_{12} (\text{step sibling present}) + \beta_{13} (\text{older sibling present}) + \beta_{14} (\text{siblings all female}) + \beta_{15} (\text{siblings all male}) + \beta_{16} (\text{black}) + \beta_{17} (\text{other}) + \beta_{18} (\text{hispanic}) + \beta_{19} (\text{mother's age}) + \beta_{20} (\text{mother less than HS}) + \beta_{21} (\text{mother HS grad}) + \beta_{22} (\text{mother some college}) + \beta_{23} (\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$

The reference category for race will be white families and for mother's education, the reference category will be college graduate.

Model 5b: $Y_{(\text{mother or child-report of child behavior at 9})} = \beta_0 + \beta_1 (\text{sib relationship quality/conflict}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 5}) + \beta_8 (\text{family instability}) + \beta_9 (\text{child female}) + \beta_{10} (\text{total siblings}) + \beta_{11} (\text{half sibling present}) + \beta_{12} (\text{step sibling present}) + \beta_{13} (\text{older sibling present}) + \beta_{14} (\text{siblings all female}) + \beta_{15} (\text{siblings all male}) + \beta_{16} (\text{black}) + \beta_{17} (\text{other}) + \beta_{18} (\text{hispanic}) + \beta_{19} (\text{mother's age}) + \beta_{20} (\text{mother less than HS}) + \beta_{21} (\text{mother HS grad}) + \beta_{22} (\text{mother some college}) + \beta_{23} (\text{household poverty}) + \beta_{24} (\text{child close to mother}) + \beta_{25} (\text{child close to father}) + \beta_{26} (\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Research Question Four

Research question 4a: What is the association between family structure, family instability, sibling relationship quality, and mother-reported child behavioral outcomes at age 15?

Research question 4b: What is the association between family structure, family instability, sibling relationship quality, and child-reported child behavioral outcomes at age 15?

Research question 4c: Does family structure moderate the association between sibling relationship quality and children’s behavior outcomes at age 15?

Research question 4d: Does race moderate the association between sibling relationship quality and children’s behavior outcomes at age 15?

I will use ordinary least squares regression models to examine the association between family structure, family instability, and sibling relationship quality and behavior outcomes at age 15. Similar to the analytic strategy for research question three, I will examine these questions by using the two different operationalizations of family structure and instability. Furthermore, covariates will be added from a simple model (Model 1) that only examines the effects of family structure and sibling relationship quality to a more comprehensive model (Model 5) that includes family instability, child and sibling characteristics, mother’s demographic characteristics, and the quality of other dyadic relationships in the family.

Models include lagged dependent variables for child behavior (for example, the child’s level of externalizing behaviors at age nine) based on the research literature on the strong continuity of problem behaviors over time. Models A use the family structure variables of single, cohabiting, or married at baseline (at child’s birth) while models b use the variables for stably married, stably cohabiting, stably single, unstably married, unstably cohabiting, and unstably single.

To test for moderation by family structure, I will stratify my models by baseline family structure (married, cohabiting or single). To test for moderation by race, I will stratify my models by mother’ race.

Model 1a: $Y_{(mother\ or\ child\text{-}report\ of\ child\ behavior\ at\ 15)} = \beta_0 + \beta_1 (sib\ relationship\ quality) + \beta_2 (single) + \beta_3 (cohab) + \beta_4 (child\ behavior\ at\ age\ 9) + \beta_{Cities} + \varepsilon$

The reference category will be married-parent families.

Model 2a: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 9}) + \beta_5 (\text{family instability}) + \beta_{\text{Cities}} + \varepsilon$

Model 3a: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 9}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{\text{cities}} + \varepsilon$

Model 4a: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 9}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{10} (\text{black}) + \beta_{11} (\text{other}) + \beta_{12} (\text{hispanic}) + \beta_{13} (\text{mother's sage}) + \beta_{14} (\text{mother less than HS}) + \beta_{15} (\text{mother HS grad}) + \beta_{16} (\text{mother some college}) + \beta_{17} (\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$

The reference category for race will be white families and for mother's education, the reference category will be college graduate.

Model 5a: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 9}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{10} (\text{black}) + \beta_{11} (\text{other}) + \beta_{12} (\text{hispanic}) + \beta_{13} (\text{mother's sage}) + \beta_{14} (\text{mother less than HS}) + \beta_{15} (\text{mother HS grad}) + \beta_{16} (\text{mother some college}) + \beta_{17} (\text{household poverty}) + \beta_{18} (\text{child close to mother}) + \beta_{19} (\text{child close to father}) + \beta_{20} (\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Model 1b: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 9}) + \beta_{\text{Cities}} + \varepsilon$

The reference category will be married-parent families.

Model 2b: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 9}) + \beta_8 (\text{family instability}) + \beta_{\text{Cities}} + \varepsilon$

Model 3b: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{single}) + \beta_3 (\text{cohab}) + \beta_4 (\text{child behavior at age 9}) + \beta_5 (\text{family instability}) + \beta_6 (\text{child female}) + \beta_7 (\text{total siblings}) + \beta_8 (\text{half sibling present}) + \beta_9 (\text{step sibling present}) + \beta_{\text{cities}} + \varepsilon$

Model 4b: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1 (\text{sib relationship quality}) + \beta_2 (\text{stably single}) + \beta_3 (\text{stably cohab}) + \beta_4 (\text{unstably single}) + \beta_5 (\text{unstably cohab}) + \beta_6 (\text{unstably married}) + \beta_7 (\text{child behavior at age 9}) + \beta_8 (\text{family instability}) + \beta_9 (\text{child female}) + \beta_{10} (\text{total siblings}) + \beta_{11} (\text{half sibling present}) + \beta_{12} (\text{step sibling present}) + \beta_{13} (\text{black}) +$

$$\beta_{14}(\text{other}) + \beta_{15}(\text{hispanic}) + \beta_{16}(\text{mother's age}) + \beta_{17}(\text{mother less than HS}) + \beta_{18}(\text{mother HS grad}) + \beta_{19}(\text{mother some college}) + \beta_{20}(\text{household poverty}) + \beta_{\text{cities}} + \varepsilon$$

The reference category for race will be white families and for mother's education, the reference category will be college graduate.

Model 5b: $Y_{(\text{mother or child-report of child behavior at 15})} = \beta_0 + \beta_1(\text{sib relationship quality}) + \beta_2(\text{stably single}) + \beta_3(\text{stably cohab}) + \beta_4(\text{unstably single}) + \beta_5(\text{unstably cohab}) + \beta_6(\text{unstably married}) + \beta_7(\text{child behavior at age 9}) + \beta_8(\text{family instability}) + \beta_9(\text{child female}) + \beta_{10}(\text{total siblings}) + \beta_{11}(\text{half sibling present}) + \beta_{12}(\text{step sibling present}) + \beta_{13}(\text{black}) + \beta_{14}(\text{other}) + \beta_{15}(\text{hispanic}) + \beta_{16}(\text{mother's age}) + \beta_{17}(\text{mother less than HS}) + \beta_{18}(\text{mother HS grad}) + \beta_{19}(\text{mother some college}) + \beta_{20}(\text{household poverty}) + \beta_{21}(\text{child close to mother}) + \beta_{22}(\text{child close to father}) + \beta_{23}(\text{mother's relationship quality with father}) + \beta_{\text{cities}} + \varepsilon$

Research Question Five

Research question 5a: What is the directionality of the relationship between sibling relationship quality and children's behavior (mother-reported)?

Research question 5b: What is the directionality of the relationship between sibling relationship quality and children's behavior (child-reported)?

To examine research question five, I estimate a cross-lagged path analysis of sibling relationship quality and child's behaviors across two waves, ages nine and 15 (see Figure 4 and

Figure 5 below). The cross-lag structural equation model (SEM) allows me to estimate the reciprocal association between sibling relationship quality and child behavior while controlling for the influence of other family relationships, demographic factors, child and sibling characteristics, and cities. Models will be fit using full information maximum likelihood (FIML) estimation with missing values, which uses all of the available information on variables in the sample and assumes variables are missing at random or as a function of other observed variables. Studies have found that FIML produced less biased estimates compared to three other missing

data methods—listwise deletion, pairwise deletion and similar response pattern imputation (Enders & Bandalos, 2001).

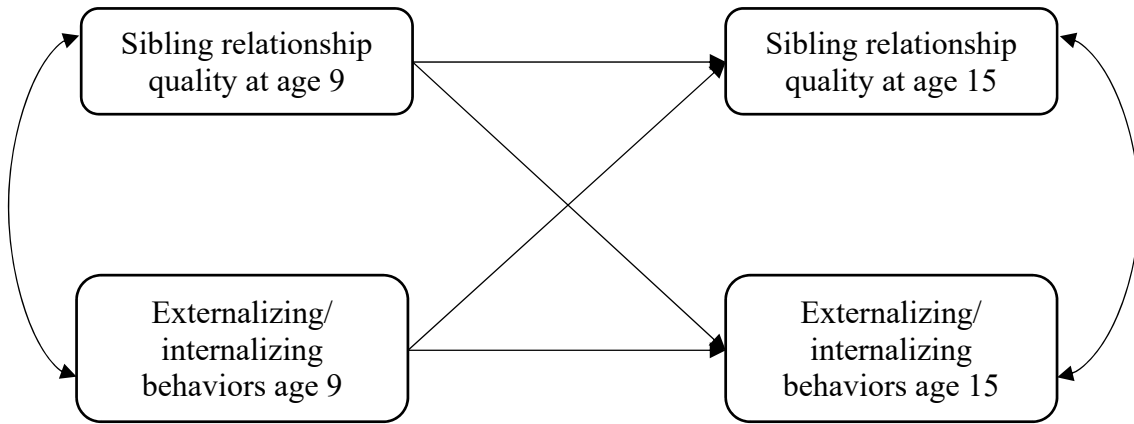


Figure 4. Cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and mother-reported child behavior.

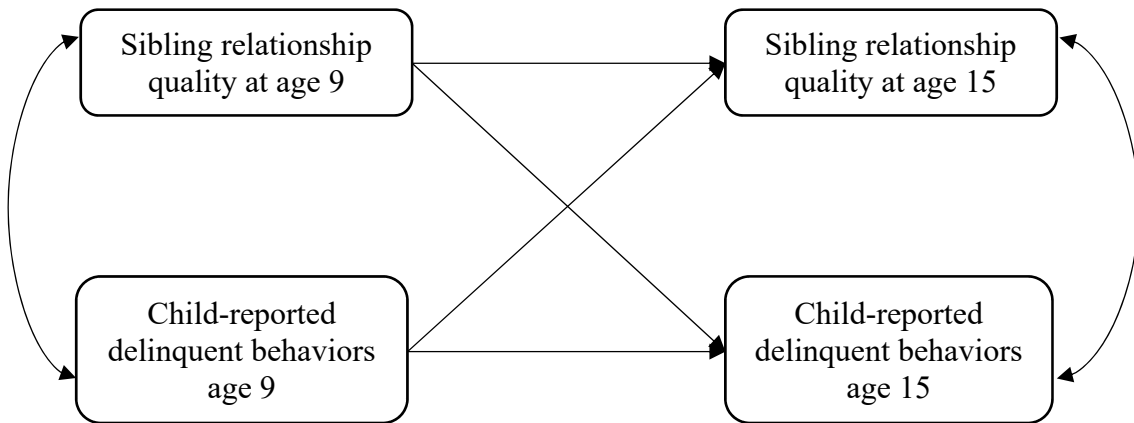


Figure 5. Cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and child-reported delinquent behavior.

CHAPTER 4

RESULTS

Research Question One

Family structure and instability and sibling relationship quality at age nine

The first research question of the study explored how family structure and family instability were associated with the quality of sibling relationships when the child was nine years old. Two measures of sibling relationships were examined at age nine—sibling relationship quality and sibling relationship conflict. Table 3 and Table 4 below present the estimated regression coefficients for baseline family structure on sibling relationship quality at age nine. Family structure is categorized as single, cohabiting, or married at baseline in Table 3, while in Table 4, the categorization includes stably single, stably cohabiting, stably married, unstably single, unstably cohabiting, and unstably married families. Children born to single-parent households reported having more positive sibling relationships compared to children born to married-parent households ($\beta = 0.103, p < 0.05$) (Table 3). Contrary to my hypotheses about the effect of family instability, there is no significant association between family instability in the quality of sibling relationships at age nine. In the most comprehensive model (Model 5) that includes controls for child and sibling characteristics, demographic characteristics, and the quality of other familial relationships, there is no significant difference in sibling relationship quality at age nine by family structure. Although there is no significant difference in sibling relationship quality by family structure in the model with extensive controls, there are several covariates that appear to be significantly associated with the quality of sibling relationships at age nine.

In Model 5, we see that female children have more positive sibling relationships compared male children ($\beta = 0.115, p < 0.05$), and having an older sibling in the household is associated with more negative sibling relationship quality ($\beta = -0.132, p < 0.01$). Although having a half-sibling or a stepsibling in the household is associated with slightly more negative sibling relationship quality, the coefficients for these variables are not statistically significant. In looking at the quality of other family relationships, it appears that the child's report of having a close relationship with his or her mother is strongly associated with more positive sibling relationships ($\beta = 0.242, p < 0.001$), as is the child's report of having a close relationship with his or her father ($\beta = 0.121, p < 0.01$).

When examining families that are stably or unstably single, cohabiting, or married, I find no significant effects of family structure on sibling relationship quality at age nine (Table 4). However, similar to the results presented in Table 3, being a female child ($\beta = 0.112, p < 0.05$), and having a close relationship to the mother ($\beta = 0.216, p < 0.001$) and the father ($\beta = 0.102, p < 0.05$) are all significantly associated with having more positive sibling relationships at age nine. Again, having an older sibling in the household is associated with less positive sibling relationship quality ($\beta = -0.131, p < 0.01$).

Family structure and instability and sibling relationship conflict at age nine

The associations between family characteristics and sibling relationship conflict at age nine are presented in Table 5 and Table 6. Unlike the results for sibling relationship quality at age nine, there are strong effects of family structure on sibling relationship conflict at age nine (Table 5). Children born into single-parent households report less sibling relationship conflict compared to children in married-parent households, and the association remains significant in the comprehensive model with all study covariates (Model 5). Having an older sibling in the

household is associated with more sibling relationship conflict ($\beta = 0.104, p < 0.05$), although none of the other variables for sibling characteristics are significantly associated with sibling relationship conflict. Compared to white children, black children report having less conflictual sibling relationships at age nine ($\beta = -0.150, p < 0.01$).

The quality of other relationships in the household, such as the child's closeness to his or her mother and father, and the relationship quality between the mother and the father, appear to be unrelated to the child's report of sibling relationship conflict at age nine.

There is less sibling relationship conflict in families that experience more instability over time. For example, in the first three models presented in Table 6, which control for the characteristics of the family, child and the siblings, sibling relationship conflict is lower in unstably single ($\beta = -0.194, p < 0.01$) and unstably cohabiting ($\beta = -0.143, p < 0.5$) families compared to stably married families. There is less sibling relationship conflict in stably single families ($\beta = -0.183, p < 0.01$) compared to stably married families, controlling for the characteristics of the focal child and siblings.

Table 3. Regression coefficients representing baseline family structure effect on sibling relationship quality at age 9.

	Sibling relationship quality at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure at baseline (ref: Married)					
Single	0.103*	0.100*	0.096	0.027	0.070
	(0.047)	(0.050)	(0.053)	(0.062)	(0.063)
Cohabiting	0.082	0.080	0.087	0.013	0.038
	(0.048)	(0.049)	(0.051)	(0.059)	(0.059)
Family instability		0.003	0.008	-0.001	0.003
		(0.016)	(0.017)	(0.018)	(0.018)
Child/Sibling characteristics					
Child female			0.138**	0.136**	0.115*
			(0.045)	(0.045)	(0.045)
Total number of siblings			-0.008	-0.018	-0.011
			(0.020)	(0.021)	(0.021)
Half sibling present			-0.023	-0.022	-0.023
			(0.048)	(0.048)	(0.049)
Step sibling present			-0.004	-0.011	-0.025
			(0.091)	(0.091)	(0.090)
Older sibling present			-0.183***	-0.127**	-0.132**
			(0.043)	(0.046)	(0.046)
Siblings all female			0.064	0.059	0.058
			(0.062)	(0.062)	(0.061)
Siblings all male			0.036	0.037	0.040
			(0.058)	(0.058)	(0.058)
Mother's race (ref: White)					
Black				-0.078	-0.104
				(0.061)	(0.060)
Hispanic				-0.028	-0.046
				(0.070)	(0.069)
Other				0.059	0.063
				(0.114)	(0.113)
Mother's age					
				-0.012**	-0.011**
				(0.004)	(0.004)
Mother's education (ref: College graduate)					
Mother less than HS				0.213*	0.208*
				(0.093)	(0.092)
Mother HS graduate				0.198*	0.196*
				(0.088)	(0.087)

Mother some college				0.181*	0.180*
				(0.083)	(0.083)
Household poverty				0.008	0.006
				(0.011)	(0.011)
Quality of other family relationships					
Child close to mother					0.242***
					(0.046)
Child close to father					0.121**
					(0.044)
Mother's relationship quality with father					0.007
					(0.014)
Intercept	3.068***	3.066***	3.122***	3.304***	3.021***
	(0.081)	(0.081)	(0.097)	(0.185)	(0.192)
R ²	0.010	0.010	0.014	0.019	0.051
n	2857	2856	2638	2630	2624

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 4. Regression coefficients representing family instability effect on sibling relationship quality at age 9.

	Sibling relationship quality at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref: Stably married)					
Stably single	0.005 (0.085)	0.005 (0.085)	0.010 (0.089)	-0.092 (0.101)	-0.003 (0.105)
Stably cohabiting	0.110 (0.113)	0.110 (0.113)	0.115 (0.114)	0.011 (0.121)	0.058 (0.121)
Unstably single	0.104 (0.057)	0.101 (0.070)	0.068 (0.072)	-0.037 (0.083)	0.004 (0.085)
Unstably cohabiting	0.065 (0.056)	0.062 (0.063)	0.049 (0.066)	-0.057 (0.076)	-0.023 (0.077)
Unstably married	-0.049 (0.085)	-0.052 (0.092)	-0.083 (0.094)	-0.144 (0.098)	-0.110 (0.099)
Family instability		0.002 (0.021)	0.012 (0.022)	0.007 (0.022)	0.013 (0.022)
Child/Sibling characteristics					
Child female			0.134** (0.046)	0.134** (0.046)	0.112* (0.046)
Total number of siblings			-0.009 (0.021)	-0.021 (0.021)	-0.014 (0.021)
Half sibling present			-0.013 (0.049)	-0.013 (0.049)	-0.016 (0.050)
Step sibling present			-0.014 (0.092)	-0.019 (0.092)	-0.031 (0.092)
Older sibling present			-0.186*** (0.044)	-0.125** (0.048)	-0.131** (0.047)
Siblings all female			0.046 (0.063)	0.039 (0.063)	0.040 (0.062)
Siblings all male			0.038 (0.060)	0.039 (0.060)	0.040 (0.059)
Mother's race (ref: White)					
Black				-0.081 (0.062)	-0.108 (0.062)
Hispanic				-0.015 (0.071)	-0.031 (0.071)
Other				0.086 (0.118)	0.091 (0.117)
Mother's age				-0.013**	-0.012**

				(0.004)	(0.004)
Mother's education (ref: College graduate)					
Mother less than HS				0.232*	0.218*
				(0.098)	(0.098)
Mother HS graduate				0.208*	0.200*
				(0.093)	(0.092)
Mother some college				0.191*	0.183*
				(0.088)	(0.088)
Household poverty				0.007	0.006
				(0.012)	(0.012)
Quality of other family relationships					
Child close to mother					0.216***
					(0.048)
Child close to father					0.102*
					(0.045)
Mother's relationship quality with father					0.006
					(0.015)
Intercept	3.096***	3.096***	3.170***	3.390***	3.131***
	(0.088)	(0.088)	(0.103)	(0.192)	(0.201)
R ²	0.011	0.011	0.025	0.034	0.048
n	2693	2693	2515	2507	2502

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 5. Regression coefficients representing baseline family structure effect on sibling relationship conflict at age 9.

	Sibling relationship conflict at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure at baseline (ref: Married)					
Single	-0.188*** (0.044)	-0.197*** (0.046)	-0.183*** (0.049)	-0.125* (0.058)	-0.125* (0.059)
Cohabiting	-0.117** (0.044)	-0.123** (0.046)	-0.119* (0.048)	-0.076 (0.055)	-0.076 (0.055)
Family instability		0.012 (0.015)	0.012 (0.016)	0.012 (0.016)	0.014 (0.017)
Child/Sibling characteristics					
Child female			0.066 (0.042)	0.060 (0.042)	0.063 (0.042)
Total number of siblings			-0.035 (0.019)	-0.033 (0.019)	-0.035 (0.019)
Half sibling present			-0.014 (0.045)	-0.005 (0.045)	0.002 (0.046)
Step sibling present			-0.056 (0.084)	-0.063 (0.084)	-0.059 (0.084)
Older sibling present			0.072 (0.039)	0.105* (0.043)	0.104* (0.043)
Siblings all female			-0.100 (0.057)	-0.099 (0.057)	-0.097 (0.057)
Siblings all male			0.027 (0.054)	0.028 (0.054)	0.030 (0.054)
Mother's race (ref: White)					
Black				-0.155** (0.056)	-0.150** (0.056)
Hispanic				-0.126 (0.065)	-0.123 (0.065)
Other				-0.184 (0.105)	-0.184 (0.106)
Mother's age				-0.005 (0.004)	-0.005 (0.004)
Mother's education (ref: College graduate)					
Mother less than HS				-0.037 (0.086)	-0.037 (0.086)
Mother HS graduate				0.010 (0.082)	0.012 (0.082)

Mother some college				-0.056 (0.077)	-0.054 (0.078)
Household poverty				0.011 (0.010)	0.010 (0.010)
Quality of other family relationships					
Child close to mother					-0.032 (0.043)
Child close to father					-0.037 (0.041)
Mother's relationship quality with father					0.012 (0.013)
Intercept	2.331*** (0.075)	2.326*** (0.075)	2.324*** (0.090)	2.518*** (0.172)	2.528*** (0.180)
R ²	0.018	0.018	0.023	0.028	0.030
n	2847	2846	2629	2621	2618

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 6. Regression coefficients representing family instability effect on sibling relationship conflict at age 9.

	Sibling relationship conflict at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref: Stably married)					
Stably single	-0.221** (0.078)	-0.221** (0.078)	-0.183* (0.082)	-0.101 (0.093)	-0.097 (0.098)
Stably cohabiting	-0.103 (0.105)	-0.103 (0.105)	-0.070 (0.106)	-0.011 (0.113)	-0.015 (0.113)
Unstably single	-0.178*** (0.053)	-0.196** (0.065)	-0.194** (0.067)	-0.123 (0.077)	-0.117 (0.079)
Unstably cohabiting	-0.126* (0.052)	-0.139* (0.059)	-0.143* (0.061)	-0.085 (0.070)	-0.080 (0.072)
Unstably married	-0.026 (0.079)	-0.042 (0.085)	-0.037 (0.087)	0.007 (0.090)	0.019 (0.092)
Family instability		0.009 (0.019)	0.016 (0.020)	0.014 (0.020)	0.015 (0.021)
Child/Sibling characteristics					
Child female			0.080 (0.043)	0.072 (0.043)	0.075 (0.043)
Total number of siblings			-0.037 (0.019)	-0.035 (0.020)	-0.038 (0.020)
Half sibling present			-0.007 (0.046)	0.000 (0.046)	0.008 (0.046)
Step sibling present			-0.043 (0.085)	-0.053 (0.086)	-0.048 (0.086)
Older sibling present			0.065 (0.041)	0.101* (0.044)	0.100* (0.044)
Siblings all female			-0.113 (0.058)	-0.111 (0.058)	-0.110 (0.058)
Siblings all male			0.029 (0.055)	0.029 (0.055)	0.031 (0.055)
Mother's race (ref: White)					
Black				-0.160** (0.057)	-0.154** (0.058)
Hispanic				-0.125 (0.066)	-0.121 (0.066)
Other				-0.182 (0.109)	-0.181 (0.110)
Mother's age				-0.006	-0.006

				(0.004)	(0.004)
Mother's education (ref: College graduate)					
Mother less than HS				-0.047	-0.047
				(0.091)	(0.091)
Mother HS graduate				0.003	0.005
				(0.086)	(0.086)
Mother some college				-0.061	-0.059
				(0.082)	(0.082)
Household poverty				0.010	0.009
				(0.011)	(0.011)
Quality of other family relationships					
Child close to mother					-0.029
					(0.045)
Child close to father					-0.046
					(0.042)
Mother's relationship quality with father					0.015
					(0.014)
Intercept	2.323***	2.324***	2.316***	2.527***	2.528***
	(0.082)	(0.082)	(0.095)	(0.179)	(0.188)
R ²	0.016	0.016	0.022	0.028	0.029
n	2684	2684	2507	2499	2496

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Research Question Two

Family structure and instability and sibling relationship quality at age 15

Research question two examined how family structure and family instability were associated with the quality of sibling relationships when the child was fifteen years old. Consistent with the findings for sibling relationship quality at age nine, sibling relationships were generally more positive in single-parent households compared to married parent households ($\beta = 0.119, p < 0.01$) after controlling for the characteristics of the family, child, and siblings (Table 7). In the full models containing all study covariates, there were no significant differences in sibling relationship quality at age 15 for single, cohabiting, or married-parent families.

Unlike the results for age nine, however, having a half-sibling was associated with less positive sibling relationships ($\beta = -0.083, p < 0.05$) controlling for family and child characteristics as well as the demographic characteristics of the child's mother. Being black ($\beta = 0.236, p < 0.001$) or Hispanic ($\beta = 0.202, p < 0.001$) was strongly associated with more positive sibling relationships at age 15, even after controlling for the effects of other family relationships.

The influence of the quality of other family relationships were consistent in the results for age 15 as age nine. Having a close relationship with one's mother was strongly associated with having a positive sibling relationship ($\beta = 0.374, p < 0.001$), as was the effect of having a close relationship with one's father ($\beta = 0.245, p < 0.001$). As was the case for the quality of sibling relationships at age nine, there was no significant effect of the quality of the relationship between the mother and the father at age 15.

Contrary to my initial hypotheses, sibling relationships at age 15 were more positive in stably single ($\beta = 0.176, p < 0.05$) and unstably single ($\beta = 0.146, p < 0.05$) households compared to stably married households, and these associations remained statistically significant

even after controlling for demographic characteristics and the quality of other family relationships.

Table 7. Regression coefficients representing baseline family structure effect on sibling relationship quality at age 15.

	Sibling relationship quality at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure at baseline (ref: Married)					
Single	0.095*	0.098*	0.119**	0.059	0.093
	(0.040)	(0.042)	(0.043)	(0.051)	(0.050)
Cohabiting	-0.010	-0.007	0.006	-0.043	-0.028
	(0.040)	(0.042)	(0.042)	(0.049)	(0.047)
Family instability		-0.003	-0.001	0.003	0.011
		(0.014)	(0.015)	(0.015)	(0.014)
Child/Sibling characteristics					
Child female			-0.026	-0.024	0.027
			(0.031)	(0.031)	(0.030)
Total number of siblings			0.014	0.010	0.004
			(0.011)	(0.012)	(0.011)
Half sibling present			-0.091*	-0.083*	-0.043
			(0.036)	(0.036)	(0.035)
Step sibling present			0.077	0.107	0.097
			(0.061)	(0.061)	(0.059)
Mother's race (ref: White)					
Black				0.236***	0.202***
				(0.049)	(0.047)
Hispanic				0.258***	0.223***
				(0.057)	(0.055)
Other				0.081	0.053
				(0.091)	(0.087)
Mother's age				0.011***	0.012***
				(0.003)	(0.003)
Mother's education (ref: College graduate)					
Mother less than HS				0.060	0.034
				(0.075)	(0.072)
Mother HS graduate				0.093	0.037
				(0.071)	(0.069)
Mother some college				-0.012	-0.045
				(0.067)	(0.065)
Household poverty				-0.001	-0.005
				(0.009)	(0.009)
Quality of other family relationships					
Child close to mother					0.374***

					(0.031)
Child close to father					0.245***
					(0.037)
Mother's relationship quality with father					-0.011
					(0.011)
Intercept	3.069***	3.070***	3.069***	2.560***	2.358***
	(0.070)	(0.070)	(0.074)	(0.150)	(0.148)
R ²	0.021	0.021	0.025	0.041	0.115
n	2864	2864	2864	2854	2842

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 8. Regression coefficients representing family instability effect on sibling relationship quality at age 15.

	Sibling relationship quality at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref: Stably married)					
Stably single	0.130 (0.072)	0.130 (0.072)	0.163* (0.073)	0.099 (0.083)	0.176* (0.083)
Stably cohabiting	0.005 (0.102)	0.005 (0.102)	0.009 (0.103)	-0.074 (0.108)	-0.121 (0.104)
Unstably single	0.129** (0.049)	0.143* (0.060)	0.163** (0.061)	0.112 (0.071)	0.146* (0.069)
Unstably cohabiting	0.027 (0.049)	0.037 (0.055)	0.056 (0.056)	0.012 (0.065)	0.041 (0.063)
Unstably married	0.084 (0.073)	0.096 (0.079)	0.106 (0.080)	0.070 (0.082)	0.083 (0.080)
Family instability		-0.008 (0.019)	-0.004 (0.019)	-0.000 (0.019)	0.009 (0.018)
Child/Sibling characteristics					
Child female			-0.032 (0.033)	-0.027 (0.033)	0.024 (0.031)
Total number of siblings			0.015 (0.012)	0.012 (0.012)	0.007 (0.012)
Half sibling present			-0.095* (0.038)	-0.085* (0.038)	-0.046 (0.036)
Step sibling present			0.056 (0.064)	0.087 (0.064)	0.076 (0.062)
Mother's race (ref: White)					
Black				0.242*** (0.051)	0.203*** (0.049)
Hispanic				0.275*** (0.060)	0.235*** (0.057)
Other				0.169 (0.098)	0.119 (0.094)
Mother's age				0.012*** (0.003)	0.012*** (0.003)
Mother's education (ref: College graduate)					
Mother less than HS				0.068 (0.080)	0.030 (0.077)
Mother HS graduate				0.091 (0.076)	0.023 (0.074)

Mother some college				-0.008 (0.072)	-0.056 (0.069)
Household poverty				0.004 (0.010)	-0.000 (0.009)
Quality of other family relationships					
Child close to mother					0.389*** (0.033)
Child close to father					0.250*** (0.039)
Mother's relationship quality with father					-0.007 (0.012)
Intercept	3.028*** (0.078)	3.027*** (0.078)	3.024*** (0.082)	2.476*** (0.161)	2.275*** (0.159)
R ²	0.020	0.020	0.024	0.040	0.118
n	2646	2646	2646	2636	2624

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Research Question Three

The effect of family characteristics and sibling relationship quality on mother-reported age nine behaviors

Research question three examined the association between family characteristics, sibling relationship measures, and the child's behavior outcomes at age nine. The first set of analyses examined children's behaviors as reported by the mother using the Child Behavior Checklist (Achenbach & Rescorla, 2001). The models discussed in the results section examine the effects of sibling relationship quality and sibling relationship conflict in the same models (see Appendix C for models that examine the effects of sibling relationship quality and sibling relationship conflict separately).

Sibling relationship conflict was strongly and significantly associated with children's externalizing behaviors at age nine (Table 9). Sibling relationships that are high in conflict are associated with more externalizing behavior problems ($\beta = 0.505, p < 0.001$) above and beyond the effects of family structure and family instability. There appears to be no significant impact of sibling relationship quality on externalizing behavior problems at age nine. As a robustness check, additional models were examined predicting the top quartile of problem behaviors and the results were consistent as in the models that examined problem behaviors on the continuous spectrum (see Appendix D).

Children born to single-parent or cohabiting-parent households tend to have more externalizing behavior problems at age nine compared to children born to married-parent households (Table 9), consistent with the research literature on behavior outcomes for children in different family types discussed in Chapter 1. Higher family instability was also associated with more externalizing behavior problems ($\beta = 0.273, p < 0.01$) in Model 4, although the impact is

no longer present in the final model (Model 5) that controls for the quality of other family relationships.

Female children generally had fewer externalizing behavior problems as compared to male children ($\beta = -1.005, p < 0.01$), consistent to other studies that have found externalizing behaviors to be more prevalent in boys. An interesting finding presented in Table 9 is that compared to children with siblings of both genders (e.g., focal child is female and has a male sibling and a female sibling; focal child is male and has a female sibling), children with only female siblings tended to have more externalizing behavior problems at age nine ($\beta = 0.947, p < 0.05$).

Compared to white children, black and Hispanic children had fewer externalizing behavior problems controlling for sibling relationship quality and conflict, as well as other family and sibling characteristics. Having a close relationship with one's mother was associated with fewer externalizing behaviors ($\beta = -0.764, p < 0.05$), while a close relationship with one's father was not significantly associated with fewer problem behaviors.

In the models looking at externalizing behaviors and family structure breakdowns that take into account stability over time (Table 10), I again find that sibling relationship conflict is significantly associated with more externalizing behaviors ($\beta = 0.465, p < 0.01$). Children in stably married households had the fewest problem behaviors, controlling for all study variables. Living in a stably single household was associated with externalizing behavior scores that were 1.5 points higher than living in a stably married household, above and beyond the effects of sibling relationships and other child and family characteristics.

Table 11 and Table 12 present the regression estimates for internalizing behaviors on sibling relationship quality and conflict at age nine. I find no significant effects of sibling

relationship quality nor sibling relationship conflict on internalizing behavior problems at age nine. However, as seen in the results for externalizing behaviors, being a female child with all female siblings was associated with more internalizing behavior problems ($\beta = 0.764, p < 0.05$).

Having a close relationship with one's mother was associated with fewer internalizing behavior problems ($\beta = -0.526, p < 0.05$), as was having a mother who reported more positive relationships with the child's biological father ($\beta = -0.163, p < 0.05$).

Table 12 presents more evidence to support that living in a stable married-parent household is associated with better behavioral outcomes for children. Compared to children in stably married households, children in unstably married households had more internalizing behaviors at age nine ($\beta = 1.328, p < 0.05$).

The effect of family characteristics and sibling relationship quality on child-reported age nine behaviors

Table 13 to Table 22 present results for the impact of sibling relationship quality and sibling relationship conflict on the child's self-reported problem behaviors at age nine. The child's self-report of problem behaviors are measured in four domains: criminal activities toward others, drug and substance abuse, theft, and vandalism. Because these behaviors are rare, outcomes are coded to be binary, where if a child has engaged in any of the behaviors at least once, they are coded as a one. The impact of sibling relationships on a combined measure of all four domains—a continuous measure of the child's juvenile delinquent behaviors—are presented in Table 21.

Criminal activities toward others. As seen in the results for mother-reported behavior outcomes at age nine, higher sibling relationship conflict, but not sibling relationship quality,

appears to be significantly associated with an increased odds of engaging in criminal activities toward other people at age nine ($OR = 1.363, p < 0.001$) (Table 13). The impact of family structure on increased odds of engaging in criminal activities was not significant in the full model controlling for the effect of other family relationships.

Being female was associated with lower odds of engaging in criminal activities toward others ($OR = 0.401, p < 0.001$), as was having a close relationship with one's mother ($OR = 0.691, p < 0.01$). Besides sibling relationship conflict, being black ($OR = 2.542, p < 0.001$) and being a male child with all male siblings ($OR = 1.393, p < 0.01$) was associated with greater odds of taking part in criminal activities toward other people. These results are in stark contrasts to the mother's report of the child's externalizing behaviors at age nine.

Table 14 presents the regression estimates for child-reported criminal activities toward others on sibling relationship quality, as in Table 13. A notable observation in Table 14 is the effect of family instability on the child's report of criminal activities toward others. Compared to living in a stably married-parent household, living in a stably single, unstably single, unstably cohabiting, and unstably married household is associated with greater odds of engaging in criminal activities toward others at age nine.

Drug and substance use. Higher sibling relationship conflict is significantly associated with an increased odds of drug or substance use at age nine ($OR = 1.561, p < 0.001$ in Table 15 and $OR = 1.568, p < 0.001$ in Table 16). The quality of other family relationships are also not significantly associated with drug and substance use at age nine. Unlike the models that examined child's engagement in criminal activities toward others, family structure is not significantly associated with drug and substance use. However, higher family instability is significantly associated with a greater odds of drug and substance use ($OR = 1.233, p < 0.05$).

Engagement in theft. Sibling relationship conflict, but not sibling relationship quality, was associated with a greater odds of engaging in theft activities at age nine (Table 17 and Table 18). In the simple model (Model 1), which only includes baseline family structure, positive sibling relationship quality was associated with reduced odds of engaging in theft ($OR = 0.847, p < 0.001$) while higher sibling conflict was associated with increased odds of engaging in theft ($OR = 1.340, p < 0.001$). Both sibling relationship quality and conflict are significantly associated with engagement in theft in the full model.

Vandalism. Sibling relationship conflict was significantly associated with increased odds of engaging in vandalism at age nine (Table 19, Table 20). An interesting result in the models for vandalism is in regard to the presence of a stepsibling. Children who live with at least one stepsibling in the household is at significantly greater odds of engaging in vandalism at age nine ($OR = 1.744, p < 0.05$). Black children also report a higher likelihood of engaging in vandalism compared to white children ($OR = 1.499, p < 0.05$).

Juvenile delinquent behaviors (continuous measure). In using a continuous measure of child-reported behaviors that combines all four domains of problem behaviors (criminal activities, drug and substance use, engagement in theft, and vandalism), sibling relationship quality is significantly associated with fewer delinquent behaviors ($\beta = -0.078, p < 0.01$) and sibling relationship conflict is significantly associated with more delinquent behaviors ($\beta = 0.241, p < 0.001$) (Table 21). Having an older sibling in the household is associated with more child-reported delinquent behaviors ($\beta = 0.159, p < 0.05$). As seen in the results for mother-reported child behaviors at age nine, having a close relationship to one's mom is significantly associated with fewer child-reported juvenile delinquent behaviors ($\beta = -0.204, p < 0.01$).

Family structure as a moderator for the association between sibling relationship quality and child's behavior at age nine

There were no significant differences for the effects of sibling relationship quality and sibling relationship conflict on mother-reported child's behavior at age nine between the three family structures (Table 23 and Table 24). However, there is evidence for moderation by family structure when examining child-reported problem behaviors at age nine. Positive sibling relationship quality is protective for children born into single-parent households as compared to children born into cohabiting-parent households in terms of child-reported juvenile delinquent behaviors ($\beta = -0.165, p < 0.01$). Furthermore, having an older sibling in the household is associated with more juvenile delinquent behaviors for children in single-parent households ($\beta = 0.386, p < 0.01$), but not for children in cohabiting or married parent households, and the differences in coefficients are statistically significant (Table 25).

Race as a moderator for the association between sibling relationship quality and child's behavior at age nine

There were no significant differences for the effects of sibling relationship quality and sibling relationship conflict on mother-reported child's behavior at age nine between the racial groups (Table 26 and Table 27). However, for the child-reported juvenile delinquent behaviors at age nine, there was some evidence for moderation by race. Positive sibling relationship quality was significantly associated with fewer child-reported juvenile delinquent behaviors for black children ($\beta = -0.128, p < 0.01$) but not Hispanic or white children, and the coefficient for sibling relationship quality was significantly different from that of Hispanic children (Table 28). For white children but not for black and Hispanic children, being born in a single-parent household was associated with more juvenile delinquent behaviors ($\beta = 0.440, p < 0.05$).

Table 9. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9.

	Externalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.181 (0.142)	-0.189 (0.142)	-0.015 (0.140)	-0.040 (0.141)	0.026 (0.141)
Sibling relationship conflict	0.325* (0.154)	0.321* (0.154)	0.523*** (0.152)	0.504*** (0.152)	0.505*** (0.152)
Family structure at baseline (ref: Married)					
Single	1.461*** (0.357)	1.166** (0.379)	0.963* (0.380)	0.785 (0.446)	0.541 (0.452)
Cohabiting	1.134** (0.358)	0.922* (0.369)	0.849* (0.366)	0.682 (0.420)	0.563 (0.421)
Externalizing behaviors age 5	0.392*** (0.020)	0.388*** (0.020)	0.388*** (0.020)	0.384*** (0.020)	0.378*** (0.020)
Family instability		0.290* (0.124)	0.309* (0.124)	0.273* (0.125)	0.222 (0.128)
Child/Sibling characteristics					
Child female			-1.071*** (0.322)	-1.069*** (0.323)	-1.005** (0.322)
Total number of siblings			0.176 (0.143)	0.115 (0.145)	0.110 (0.145)
Half sibling present			0.002 (0.340)	0.023 (0.342)	-0.038 (0.346)
Step sibling present			-0.109 (0.631)	-0.081 (0.632)	-0.064 (0.631)
Older sibling present			0.105 (0.302)	0.181 (0.330)	0.225 (0.330)
Siblings all female			0.964* (0.435)	0.951* (0.436)	0.947* (0.435)
Siblings all male			0.364 (0.410)	0.333 (0.411)	0.359 (0.410)
Mother's race (ref: White)					
Black				-1.161** (0.424)	-1.070* (0.424)
Hispanic				-1.605** (0.506)	-1.522** (0.505)
Other				0.174 (0.802)	0.171 (0.800)
Mother's age				-0.017	-0.019

				(0.030)	(0.030)
Mother's education (ref: College graduate)					
Mother less than HS				0.329	0.311
				(0.655)	(0.654)
Mother HS graduate				0.126	0.096
				(0.616)	(0.614)
Mother some college				-0.165	-0.200
				(0.582)	(0.581)
Household poverty				-0.155*	-0.142
				(0.078)	(0.078)
Quality of other family relationships					
Child close to mother					-0.764*
					(0.332)
Child close to father					-0.459
					(0.311)
Mother's relationship quality with father					-0.132
					(0.101)
Intercept	0.596	0.594	-0.486	1.637	2.825
	(1.151)	(1.150)	(1.174)	(1.660)	(1.705)
R ²	0.17	0.172	0.198	0.205	0.21
n	2397	2397	2236	2230	2230

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 10. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9.

	Externalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.209 (0.142)	-0.214 (0.142)	-0.041 (0.142)	-0.071 (0.143)	-0.015 (0.144)
Sibling relationship conflict	0.331* (0.154)	0.325* (0.154)	0.490** (0.154)	0.465** (0.155)	0.465** (0.155)
Family structure (ref: Stably married)					
Stably single	1.826** (0.616)	1.848** (0.615)	1.936** (0.629)	1.920** (0.709)	1.506* (0.738)
Stably cohabiting	0.995 (0.794)	0.990 (0.793)	0.967 (0.780)	0.896 (0.833)	0.691 (0.834)
Unstably single	1.783*** (0.414)	1.012* (0.506)	1.051* (0.508)	1.019 (0.582)	0.811 (0.593)
Unstably cohabiting	1.591*** (0.407)	1.046* (0.455)	1.214** (0.458)	1.192* (0.528)	1.032 (0.535)
Unstably married	1.685** (0.624)	1.007 (0.674)	1.446* (0.670)	1.506* (0.690)	1.332 (0.701)
Externalizing behaviors age 5	0.395*** (0.020)	0.392*** (0.020)	0.391*** (0.020)	0.387*** (0.020)	0.383*** (0.020)
Family instability		0.406** (0.153)	0.326* (0.153)	0.296 (0.155)	0.261 (0.157)
Child/Sibling characteristics					
Child female			-1.143*** (0.327)	-1.151*** (0.328)	-1.077** (0.328)
Total number of siblings			0.222 (0.144)	0.163 (0.147)	0.145 (0.147)
Half sibling present			-0.092 (0.345)	-0.066 (0.347)	-0.073 (0.350)
Step sibling present			-0.139 (0.641)	-0.137 (0.641)	-0.117 (0.641)
Older sibling present			0.012 (0.307)	0.168 (0.335)	0.204 (0.335)
Siblings all female			0.821 (0.440)	0.819 (0.441)	0.815 (0.440)
Siblings all male			0.246 (0.417)	0.223 (0.418)	0.255 (0.418)
Mother's race (ref: White)					
Black				-1.230**	-1.120**

				(0.429)	(0.429)
Hispanic				-1.514**	-1.438**
				(0.511)	(0.510)
Other				0.360	0.356
				(0.820)	(0.819)
Mother's age				-0.026	-0.028
				(0.030)	(0.030)
Mother's education (ref: College graduate)					
Mother less than HS				0.096	0.105
				(0.678)	(0.677)
Mother HS graduate				-0.191	-0.197
				(0.637)	(0.636)
Mother some college				-0.534	-0.540
				(0.601)	(0.600)
Household poverty				-0.129	-0.124
				(0.080)	(0.080)
Quality of other family relationships					
Child close to mother					-0.847*
					(0.337)
Child close to father					-0.372
					(0.317)
Mother's relationship quality with father					-0.061
					(0.105)
Intercept	0.300	0.426	-0.597	1.796	2.839
	(1.155)	(1.154)	(1.201)	(1.698)	(1.756)
R ²	0.182	0.185	0.205	0.212	0.217
n	2308	2308	2172	2166	2166

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 11. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9.

	Internalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.091 (0.116)	-0.090 (0.116)	0.005 (0.112)	0.014 (0.113)	0.052 (0.114)
Sibling relationship conflict	-0.075 (0.125)	-0.074 (0.125)	0.064 (0.121)	0.068 (0.122)	0.071 (0.122)
Family structure at baseline (ref: Married)					
Single	0.323 (0.290)	0.378 (0.308)	0.218 (0.304)	0.478 (0.357)	0.301 (0.363)
Cohabiting	0.278 (0.292)	0.317 (0.301)	0.174 (0.294)	0.390 (0.337)	0.308 (0.338)
Internalizing behaviors age 5	0.492*** (0.029)	0.492*** (0.029)	0.502*** (0.028)	0.490*** (0.028)	0.486*** (0.028)
Family instability		-0.053 (0.101)	-0.038 (0.099)	-0.008 (0.100)	-0.055 (0.103)
Child/Sibling characteristics					
Child female			0.010 (0.258)	0.005 (0.259)	0.041 (0.259)
Total number of siblings			-0.216 (0.115)	-0.229* (0.116)	-0.225 (0.117)
Half sibling present			0.293 (0.272)	0.323 (0.274)	0.247 (0.277)
Step sibling present			0.432 (0.506)	0.459 (0.507)	0.451 (0.507)
Older sibling present			-0.263 (0.242)	-0.436 (0.265)	-0.398 (0.265)
Siblings all female			0.760* (0.349)	0.773* (0.350)	0.764* (0.349)
Siblings all male			0.011 (0.328)	-0.060 (0.329)	-0.053 (0.329)
Mother's race (ref: White)					
Black				-0.898** (0.340)	-0.847* (0.340)
Hispanic				-0.573 (0.406)	-0.524 (0.406)
Other				0.359 (0.643)	0.361 (0.642)
Mother's age				0.052* (0.028)	0.052* (0.028)

				(0.024)	(0.024)
Mother's education (ref: College graduate)					
Mother less than HS				0.153	0.131
				(0.525)	(0.524)
Mother HS graduate				-0.095	-0.129
				(0.493)	(0.493)
Mother some college				-0.399	-0.443
				(0.467)	(0.467)
Household poverty				-0.103	-0.091
				(0.062)	(0.062)
Quality of other family relationships					
Child close to mother					-0.526*
					(0.266)
Child close to father					-0.091
					(0.250)
Mother's relationship quality with father					-0.163*
					(0.081)
Intercept	3.403***	3.405***	3.330***	2.718*	3.682**
	(0.939)	(0.939)	(0.943)	(1.332)	(1.368)
R ²	0.123	0.123	0.148	0.154	0.159
n	2397	2397	2236	2230	2230

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 12. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9.

	Internalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.119 (0.114)	-0.119 (0.114)	-0.016 (0.113)	-0.010 (0.114)	0.021 (0.114)
Sibling relationship conflict	-0.050 (0.123)	-0.050 (0.123)	0.051 (0.122)	0.049 (0.122)	0.051 (0.122)
Family structure (ref: Stably married)					
Stably single	0.743 (0.492)	0.741 (0.492)	0.688 (0.498)	1.187* (0.562)	0.880 (0.586)
Stably cohabiting	0.512 (0.638)	0.512 (0.638)	0.445 (0.620)	0.748 (0.661)	0.617 (0.663)
Unstably single	0.416 (0.330)	0.490 (0.405)	0.495 (0.403)	0.913* (0.461)	0.748 (0.471)
Unstably cohabiting	0.534 (0.326)	0.586 (0.366)	0.526 (0.363)	0.914* (0.419)	0.786 (0.425)
Unstably married	1.031* (0.499)	1.096* (0.540)	1.243* (0.532)	1.496** (0.547)	1.328* (0.557)
Internalizing behaviors age 5	0.501*** (0.028)	0.501*** (0.028)	0.508*** (0.028)	0.497*** (0.028)	0.494*** (0.028)
Family instability		-0.039 (0.123)	-0.097 (0.122)	-0.076 (0.123)	-0.106 (0.125)
Child/Sibling characteristics					
Child female			-0.058 (0.260)	-0.073 (0.260)	-0.030 (0.260)
Total number of siblings			-0.184 (0.115)	-0.192 (0.117)	-0.198 (0.117)
Half sibling present			0.216 (0.274)	0.235 (0.275)	0.203 (0.278)
Step sibling present			0.411 (0.508)	0.414 (0.509)	0.408 (0.509)
Older sibling present			-0.284 (0.243)	-0.388 (0.266)	-0.356 (0.266)
Siblings all female			0.640 (0.349)	0.652 (0.350)	0.645 (0.349)
Siblings all male			-0.020 (0.331)	-0.090 (0.332)	-0.075 (0.331)
Mother's race (ref: White)					
Black				-0.908**	-0.845*

				(0.340)	(0.341)
Hispanic				-0.621	-0.579
				(0.405)	(0.405)
Other				0.486	0.483
				(0.650)	(0.650)
Mother's age				0.044	0.043
				(0.024)	(0.024)
Mother's education (ref: College graduate)					
Mother less than HS				0.087	0.089
				(0.537)	(0.537)
Mother HS graduate				-0.177	-0.189
				(0.505)	(0.505)
Mother some college				-0.606	-0.620
				(0.477)	(0.477)
Household poverty				-0.063	-0.057
				(0.064)	(0.064)
Quality of other family relationships					
Child close to mother					-0.543*
					(0.267)
Child close to father					-0.051
					(0.252)
Mother's relationship quality with father					-0.104
					(0.083)
Intercept	3.266***	3.255***	3.246***	2.746*	3.572*
	(0.927)	(0.928)	(0.955)	(1.349)	(1.395)
R ²	0.139	0.139	0.157	0.164	0.167
n	2308	2308	2172	2166	2166

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 13. Regression estimates for child-reported criminal activities toward others at age 9.

	Child-reported criminal activities toward others at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.883 (0.042)	0.883** (0.042)	0.916 (0.046)	0.919 (0.047)	0.937 (0.049)
Sibling relationship conflict	1.281 (0.065)	1.281 (0.065)	1.321*** (0.073)	1.359*** (0.076)	1.363*** (0.077)
Family structure at baseline (ref: Married)					
Single	2.220*** (0.281)	2.212*** (0.295)	2.272 (0.328)	1.257 (0.214)	1.217 (0.211)
Cohabiting	1.863*** (0.240)	1.858*** (0.246)	1.975*** (0.280)	1.281 (0.208)	1.253 (0.205)
Externalizing behaviors age 5	1.040*** (0.007)	1.040*** (0.007)	1.036*** (0.007)	1.035*** (0.007)	1.034*** (0.007)
Family instability		1.004 (0.041)	0.986 (0.044)	0.943 (0.043)	0.945 (0.044)
Child/Sibling characteristics					
Child female			0.405*** (0.049)	0.393*** (0.048)	0.401*** (0.049)
Total number of siblings			0.982 (0.051)	0.939 (0.051)	0.933 (0.051)
Half sibling present			1.316* (0.160)	1.217 (0.152)	1.226 (0.155)
Step sibling present			0.768 (0.184)	0.823 (0.202)	0.823 (0.203)
Older sibling present			1.283* (0.143)	1.213 (0.151)	1.230 (0.154)
Siblings all female			1.117 (0.191)	1.112 (0.194)	1.110 (0.194)
Siblings all male			1.372* (0.195)	1.384* (0.202)	1.393* (0.204)
Mother's race (ref: White)					
Black				2.439*** (0.395)	2.542*** (0.415)
Hispanic				0.803 (0.164)	0.819 (0.168)
Other				1.462 (0.461)	1.490 (0.470)
Mother's age				0.986 (0.011)	0.985 (0.011)

Mother's education (ref: College graduate)					
Mother less than HS				1.118	1.105
				(0.290)	(0.286)
Mother HS graduate				0.883	0.867
				(0.217)	(0.213)
Mother some college				0.843	0.822
				(0.199)	(0.194)
Household poverty				0.915**	0.917**
				(0.030)	(0.030)
Quality of other family relationships					
Child close to mother					0.691**
					(0.084)
Child close to father					1.041
					(0.121)
Mother's relationship quality with father					0.977
					(0.036)
Intercept	0.0797***	0.0798	0.0740***	0.157**	0.216*
	(0.033)	(0.033)	(0.034)	(0.101)	(0.142)
R ²	0.095	0.095	0.145	0.176	0.18
n	2426	2426	2259	2253	2252

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 14. Regression estimates for child-reported criminal activities toward others at age 9.

	Child-reported criminal activities toward others at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.896*	0.896*	0.928	0.936	0.950
	(0.043)	(0.043)	(0.048)	(0.049)	(0.050)
Sibling relationship conflict	1.302***	1.301***	1.340***	1.377***	1.378***
	(0.068)	(0.068)	(0.075)	(0.079)	(0.079)
Family structure (ref: Stably married)					
Stably single	4.562***	4.565***	4.879***	2.474***	2.471**
	(0.989)	(0.989)	(1.148)	(0.669)	(0.695)
Stably cohabiting	2.794***	2.793***	2.671***	1.689	1.593
	(0.800)	(0.799)	(0.796)	(0.543)	(0.516)
Unstably single	2.766***	2.640***	2.913***	1.760*	1.770*
	(0.447)	(0.501)	(0.587)	(0.412)	(0.422)
Unstably cohabiting	2.536***	2.452***	2.822***	1.920**	1.929**
	(0.409)	(0.432)	(0.527)	(0.416)	(0.423)
Unstably married	2.722***	2.611***	3.024***	2.603***	2.650***
	(0.612)	(0.631)	(0.771)	(0.700)	(0.725)
Externalizing behaviors age 5	1.040***	1.040***	1.035***	1.035***	1.035***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Family instability		1.024	0.988	0.936	0.944
		(0.052)	(0.054)	(0.053)	(0.055)
Child/Sibling characteristics					
Child female			0.393	0.382***	0.388***
			(0.048)	(0.048)	(0.049)
Total number of siblings			1.005	0.962	0.954
			(0.053)	(0.053)	(0.052)
Half sibling present			1.236	1.169	1.199
			(0.153)	(0.148)	(0.154)
Step sibling present			0.816	0.880	0.879
			(0.196)	(0.216)	(0.217)
Older sibling present			1.264*	1.196	1.202
			(0.144)	(0.152)	(0.153)
Siblings all female			1.098	1.098	1.094
			(0.191)	(0.195)	(0.195)
Siblings all male			1.349*	1.359*	1.369*
			(0.197)	(0.203)	(0.205)
Mother's race (ref: White)					
Black				2.405***	2.505***
				(0.398)	(0.418)

Hispanic				0.842 (0.175)	0.858 (0.179)
Other				1.764 (0.567)	1.802 (0.580)
Mother's age				0.989 (0.011)	0.988 (0.011)
Mother's education (ref: College graduate)					
Mother less than HS				0.913 (0.249)	0.907 (0.247)
Mother HS graduate				0.722 (0.186)	0.713 (0.184)
Mother some college				0.691 (0.172)	0.681 (0.169)
Household poverty				0.917* (0.032)	0.917* (0.032)
Quality of other family relationships					
Child close to mother					0.713** (0.089)
Child close to father					1.033 (0.123)
Mother's relationship quality with father					1.017 (0.039)
Intercept	0.0501*** (0.022)	0.0507*** (0.023)	0.0455*** (0.022)	0.0998*** (0.067)	0.119** (0.082)
R ²	0.103	0.103	0.153	0.181	0.184
n	2335	2335	2195	2189	2188

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 15. Regression estimates for child-reported drug and substance use at age 9.

	Child-reported drug and substance use at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.978 (0.100)	0.973 (0.099)	0.946 (0.100)	0.937 (0.100)	0.944 (0.101)
Sibling relationship conflict	1.511*** (0.160)	1.508*** (0.160)	1.555*** (0.172)	1.567 (0.174)	1.561*** (0.173)
Family structure at baseline (ref: Married)					
Single	1.298 (0.352)	1.028 (0.294)	0.993 (0.301)	0.851 (0.300)	0.854 (0.304)
Cohabiting	1.121 (0.315)	0.948 (0.273)	1.022 (0.309)	0.898 (0.304)	0.902 (0.306)
Externalizing behaviors age 5	1.039** (0.014)	1.035** (0.014)	1.031* (0.014)	1.030 (0.014)	1.030* (0.014)
Family instability		1.249** (0.102)	1.235* (0.107)	1.225* (0.108)	1.233* (0.111)
Child/Sibling characteristics					
Child female			0.740 (0.193)	0.733 (0.192)	0.749 (0.197)
Total number of siblings			1.004 (0.115)	0.982 (0.115)	0.971 (0.114)
Half sibling present			1.130 (0.301)	1.096 (0.293)	1.134 (0.307)
Step sibling present			0.174 (0.177)	0.176 (0.180)	0.179 (0.183)
Older sibling present			0.894 (0.209)	0.897 (0.232)	0.900 (0.233)
Siblings all female			0.957 (0.367)	0.965 (0.370)	0.962 (0.369)
Siblings all male			1.258 (0.364)	1.229 (0.359)	1.237 (0.361)
Mother's race (ref: White)					
Black				1.020 (0.335)	1.043 (0.344)
Hispanic				1.320 (0.594)	1.342 (0.604)
Other				1.545 (0.931)	1.571 (0.948)
Mother's age				0.999 (0.024)	0.997 (0.024)

Mother's education (ref: College graduate)					
Mother less than HS				1.292 (0.712)	1.284 (0.707)
Mother HS graduate				1.176 (0.612)	1.182 (0.615)
Mother some college				1.054 (0.534)	1.054 (0.535)
Household poverty				0.960 (0.067)	0.957 (0.066)
Quality of other family relationships					
Child close to mother					0.910 (0.227)
Child close to father					0.828 (0.199)
Mother's relationship quality with father					1.068 (0.079)
Intercept	0.00413*** (0.005)	0.00407*** (0.005)	0.00498*** (0.006)	0.00484*** (0.007)	0.00475*** (0.007)
R ²	0.0285	0.0317	0.0391	0.0401	0.041
n	2426	2426	2259	2253	2252

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 16. Regression estimates for child-reported drug and substance use at age 9.

	Child-reported drug and substance use at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.972 (0.101)	0.969 (0.101)	0.944 (0.102)	0.932 (0.101)	0.938 (0.102)
Sibling relationship conflict	1.538*** (0.166)	1.523*** (0.165)	1.559 (0.176)	1.573 (0.178)	1.568*** (0.177)
Family structure (ref: Stably married)					
Stably single	1.625 (0.724)	1.653 (0.736)	1.613 (0.750)	1.301 (0.703)	1.318 (0.741)
Stably cohabiting	0.882 (0.688)	0.877 (0.684)	0.906 (0.712)	0.717 (0.592)	0.685 (0.568)
Unstably single	1.458 (0.492)	0.711 (0.291)	0.647 (0.277)	0.510 (0.258)	0.515 (0.265)
Unstably cohabiting	1.319 (0.446)	0.781 (0.298)	0.803 (0.319)	0.658 (0.305)	0.670 (0.316)
Unstably married	1.020 (0.526)	0.546 (0.302)	0.459 (0.272)	0.395 (0.246)	0.404 (0.256)
Externalizing behaviors age 5	1.037** (0.014)	1.034* (0.014)	1.029* (0.014)	1.028 (0.014)	1.028* (0.015)
Family instability		1.401*** (0.142)	1.401** (0.150)	1.401 (0.151)	1.403** (0.152)
Child/Sibling characteristics					
Child female			0.703 (0.187)	0.697 (0.186)	0.712 (0.191)
Total number of siblings			0.993 (0.116)	0.968 (0.115)	0.958 (0.115)
Half sibling present			1.144 (0.315)	1.119 (0.309)	1.147 (0.319)
Step sibling present			0.181 (0.185)	0.182 (0.187)	0.184 (0.189)
Older sibling present			0.929 (0.222)	0.938 (0.249)	0.943 (0.250)
Siblings all female			0.934 (0.372)	0.941 (0.375)	0.936 (0.373)
Siblings all male			1.232 (0.363)	1.203 (0.358)	1.207 (0.360)
Mother's race (ref: White)					
Black				0.989 (0.334)	1.015 (0.344)

Hispanic				1.339	1.366
				(0.617)	(0.628)
Other				1.669	1.697
				(1.014)	(1.033)
Mother's age				0.997	0.994
				(0.025)	(0.025)
Mother's education (ref: College graduate)					
Mother less than HS				1.180	1.175
				(0.677)	(0.674)
Mother HS graduate				1.071	1.077
				(0.580)	(0.583)
Mother some college				0.989	0.983
				(0.522)	(0.519)
Household poverty				0.943	0.942
				(0.069)	(0.069)
Quality of other family relationships					
Child close to mother					0.864
					(0.218)
Child close to father					0.836
					(0.205)
Mother's relationship quality with father					1.056
					(0.082)
Intercept	0.00367***	0.00429***	0.00565***	0.00710**	0.00746**
	(0.004)	(0.005)	(0.007)	(0.011)	(0.012)
R ²	0.03	0.035	0.044	0.045	0.046
n	2335	2335	2195	2189	2188

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 17. Regression estimates for child-reported theft activities at age 9.

	Child-reported theft activities at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.847*** (0.042)	0.844*** (0.042)	0.876* (0.046)	0.874 (0.046)	0.888* (0.047)
Sibling relationship conflict	1.340*** (0.072)	1.339*** (0.072)	1.353*** (0.076)	1.356*** (0.077)	1.356*** (0.077)
Family structure at baseline (ref: Married)					
Single	1.078 (0.138)	0.980 (0.133)	1.022 (0.147)	0.874 (0.148)	0.819 (0.142)
Cohabiting	0.956 (0.124)	0.893 (0.120)	0.918 (0.129)	0.824 (0.134)	0.795 (0.130)
Externalizing behaviors age 5	1.030 (0.007)	1.028*** (0.007)	1.028*** (0.007)	1.027*** (0.007)	1.026*** (0.008)
Family instability		1.099* (0.048)	1.093 (0.050)	1.066 (0.050)	1.053 (0.051)
Child/Sibling characteristics					
Child female			0.695** (0.087)	0.694** (0.087)	0.708** (0.089)
Total number of siblings			0.946 (0.052)	0.938 (0.053)	0.936 (0.053)
Half sibling present			1.044 (0.135)	1.009 (0.132)	1.000 (0.133)
Step sibling present			1.047 (0.250)	1.058 (0.254)	1.074 (0.258)
Older sibling present			1.233 (0.143)	1.264 (0.161)	1.278 (0.163)
Siblings all female			1.070 (0.186)	1.073 (0.187)	1.073 (0.187)
Siblings all male			1.127 (0.168)	1.132 (0.170)	1.141 (0.172)
Mother's race (ref: White)					
Black				1.290 (0.207)	1.325 (0.214)
Hispanic				0.630* (0.127)	0.644* (0.130)
Other				0.951 (0.300)	0.955 (0.301)
Mother's age				0.985 (0.011)	0.985 (0.011)

Mother's education (ref: College graduate)					
Mother less than HS				1.079 (0.275)	1.074 (0.274)
Mother HS graduate				1.017 (0.243)	1.012 (0.242)
Mother some college				0.934 (0.212)	0.927 (0.211)
Household poverty					
				1.004 (0.030)	1.007 (0.031)
Quality of other family relationships					
Child close to mother					0.849 (0.106)
Child close to father					0.837 (0.100)
Mother's relationship quality with father					0.977 (0.038)
Intercept	0.156*** (0.065)	0.156*** (0.066)	0.149*** (0.067)	0.272* (0.175)	0.360 (0.238)
R ²	0.043	0.045	0.054	0.061	0.064
n	2426	2426	2259	2253	2252

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 18. Regression estimates for child-reported theft activities at age 9.

	Child-reported theft activities at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.855** (0.044)	0.853** (0.043)	0.878* (0.047)	0.877 (0.047)	0.889* (0.048)
Sibling relationship conflict	1.342*** (0.073)	1.339*** (0.073)	1.346*** (0.077)	1.348*** (0.077)	1.348*** (0.078)
Family structure (ref: Stably married)					
Stably single	1.265 (0.285)	1.274 (0.287)	1.284 (0.306)	1.064 (0.290)	0.931 (0.265)
Stably cohabiting	1.206 (0.365)	1.206 (0.365)	1.249 (0.382)	1.150 (0.379)	1.079 (0.359)
Unstably single	1.218 (0.190)	0.957 (0.182)	1.046 (0.206)	0.945 (0.218)	0.878 (0.207)
Unstably cohabiting	1.112 (0.172)	0.937 (0.162)	0.988 (0.178)	0.923 (0.195)	0.870 (0.187)
Unstably married	1.682* (0.368)	1.359 (0.325)	1.435 (0.354)	1.459 (0.376)	1.380 (0.363)
Externalizing behaviors age 5	1.030 (0.007)	1.029*** (0.007)	1.028*** (0.007)	1.028*** (0.008)	1.027*** (0.008)
Family instability		1.132* (0.062)	1.107 (0.063)	1.071 (0.063)	1.058 (0.063)
Child/Sibling characteristics					
Child female			0.710** (0.090)	0.708** (0.090)	0.724* (0.092)
Total number of siblings			0.963 (0.054)	0.956 (0.055)	0.952 (0.055)
Half sibling present			1.024 (0.135)	0.995 (0.132)	0.993 (0.134)
Step sibling present			1.079 (0.259)	1.092 (0.264)	1.111 (0.269)
Older sibling present			1.160 (0.136)	1.207 (0.156)	1.219 (0.158)
Siblings all female			1.053 (0.185)	1.058 (0.187)	1.057 (0.187)
Siblings all male			1.149 (0.174)	1.155 (0.177)	1.169 (0.179)
Mother's race (ref: White)					
Black				1.296 (0.211)	1.337 (0.219)

Hispanic				0.660*	0.674
				(0.135)	(0.138)
Other				1.073	1.075
				(0.341)	(0.342)
Mother's age				0.982	0.982
				(0.012)	(0.012)
Mother's education (ref: College graduate)					
Mother less than HS				0.951	0.957
				(0.251)	(0.253)
Mother HS graduate				0.915	0.919
				(0.226)	(0.227)
Mother some college				0.832	0.835
				(0.195)	(0.196)
Household poverty				1.005	1.005
				(0.032)	(0.032)
Quality of other family relationships					
Child close to mother					0.853
					(0.108)
Child close to father					0.831
					(0.101)
Mother's relationship quality with father					0.987
					(0.040)
Intercept	0.121***	0.127***	0.125***	0.260*	0.343
	(0.053)	(0.056)	(0.059)	(0.173)	(0.237)
R ²	0.044	0.046	0.054	0.061	0.064
n	2335	2335	2195	2189	2188

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 19. Regression estimates for child-reported vandalism activities at age 9.

	Child-reported vandalism activities at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.880*	0.877	0.902	0.897	0.914
	(0.048)	(0.048)	(0.052)	(0.052)	(0.054)
Sibling relationship conflict	1.375***	1.373***	1.427***	1.448***	1.452***
	(0.080)	(0.079)	(0.088)	(0.090)	(0.091)
Family structure at baseline (ref: Married)					
Single	1.510**	1.359*	1.386*	0.824	0.772
	(0.216)	(0.206)	(0.224)	(0.155)	(0.148)
Cohabiting	1.153	1.069	1.041	0.674*	0.649*
	(0.172)	(0.164)	(0.169)	(0.125)	(0.121)
Externalizing behaviors age 5	1.035***	1.034***	1.033***	1.030***	1.029***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Family instability		1.109*	1.085	1.044	1.035
		(0.052)	(0.054)	(0.054)	(0.054)
Child/Sibling characteristics					
Child female			0.493***	0.479***	0.491***
			(0.068)	(0.067)	(0.069)
Total number of siblings			0.969	0.918	0.913
			(0.058)	(0.057)	(0.057)
Half sibling present			1.219	1.123	1.112
			(0.172)	(0.161)	(0.162)
Step sibling present			1.643*	1.725*	1.744*
			(0.405)	(0.433)	(0.440)
Older sibling present			1.061	1.064	1.078
			(0.136)	(0.151)	(0.154)
Siblings all female			0.943	0.935	0.931
			(0.198)	(0.199)	(0.198)
Siblings all male			1.140	1.128	1.130
			(0.181)	(0.183)	(0.184)
Mother's race (ref: White)					
Black				1.436*	1.499*
				(0.262)	(0.276)
Hispanic				0.592	0.601*
				(0.144)	(0.147)
Other				1.040	1.059
				(0.376)	(0.384)
Mother's age				0.978	0.978
				(0.013)	(0.013)

Mother's education (ref: College graduate)					
Mother less than HS				1.440	1.414
				(0.439)	(0.430)
Mother HS graduate				1.030	1.007
				(0.298)	(0.292)
Mother some college				1.265	1.223
				(0.349)	(0.338)
Household poverty				0.901**	0.905*
				(0.035)	(0.035)
Quality of other family relationships					
Child close to mother					0.720*
					(0.098)
Child close to father					0.967
					(0.129)
Mother's relationship quality with father					0.951
					(0.041)
Intercept	0.0895***	0.0898***	0.0965***	0.311	0.475
	(0.040)	(0.040)	(0.047)	(0.223)	(0.350)
R ²	0.063	0.065	0.093	0.11	0.114
n	2426	2426	2259	2253	2252

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 20. Regression estimates for child-reported vandalism activities at age 9.

	Child-reported vandalism activities at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.885*	0.884	0.907	0.903	0.917
	(0.049)	(0.049)	(0.053)	(0.054)	(0.055)
Sibling relationship conflict	1.377***	1.372***	1.419***	1.441***	1.445***
	(0.081)	(0.081)	(0.089)	(0.091)	(0.092)
Family structure (ref: Stably married)					
Stably single	1.993**	2.005**	1.973**	0.996	0.860
	(0.485)	(0.487)	(0.510)	(0.295)	(0.265)
Stably cohabiting	1.786	1.785	1.736	1.090	0.997
	(0.600)	(0.599)	(0.599)	(0.401)	(0.371)
Unstably single	1.880***	1.439	1.502	0.843	0.771
	(0.339)	(0.312)	(0.340)	(0.221)	(0.207)
Unstably cohabiting	1.419	1.173	1.156	0.690	0.641
	(0.260)	(0.238)	(0.245)	(0.169)	(0.160)
Unstably married	1.880*	1.486	1.674	1.260	1.162
	(0.476)	(0.407)	(0.473)	(0.374)	(0.350)
Externalizing behaviors age 5	1.036***	1.035***	1.033***	1.031***	1.029***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Family instability		1.145*	1.103	1.070	1.058
		(0.068)	(0.069)	(0.070)	(0.070)
Child/Sibling characteristics					
Child female			0.504***	0.492***	0.504***
			(0.071)	(0.070)	(0.072)
Total number of siblings			0.978	0.924	0.918
			(0.059)	(0.059)	(0.058)
Half sibling present			1.198	1.121	1.110
			(0.172)	(0.163)	(0.164)
Step sibling present			1.649*	1.728*	1.734*
			(0.413)	(0.442)	(0.445)
Older sibling present			1.033	1.038	1.054
			(0.134)	(0.150)	(0.152)
Siblings all female			0.927	0.918	0.912
			(0.196)	(0.197)	(0.196)
Siblings all male			1.121	1.113	1.118
			(0.182)	(0.184)	(0.186)
Mother's race (ref: White)					
Black				1.506*	1.573*
				(0.281)	(0.295)

Hispanic				0.645 (0.160)	0.652 (0.162)
Other				1.192 (0.435)	1.206 (0.441)
Mother's age				0.979 (0.013)	0.979 (0.013)
Mother's education (ref: College graduate)					
Mother less than HS				1.380 (0.436)	1.374 (0.434)
Mother HS graduate				0.973 (0.293)	0.962 (0.289)
Mother some college				1.229 (0.352)	1.204 (0.345)
Household poverty				0.908* (0.037)	0.910* (0.037)
Quality of other family relationships					
Child close to mother					0.740* (0.103)
Child close to father					0.999 (0.136)
Mother's relationship quality with father					0.945 (0.042)
Intercept	0.0647*** (0.031)	0.0686*** (0.032)	0.0762*** (0.039)	0.242 (0.181)	0.385 (0.297)
R ²	0.065	0.068	0.093	0.109	0.113
n	2335	2335	2195	2189	2188

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 21. Regression estimates for child-reported juvenile delinquent behaviors at age 9.

	Child-reported juvenile delinquent behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.110*** (0.028)	-0.111*** (0.028)	-0.090** (0.029)	-0.093** (0.029)	-0.078** (0.029)
Sibling relationship conflict	0.227*** (0.031)	0.226*** (0.031)	0.236*** (0.031)	0.241*** (0.031)	0.241*** (0.031)
Family structure at baseline (ref: Married)					
Single	0.330*** (0.071)	0.277*** (0.075)	0.297*** (0.079)	0.037 (0.091)	0.001 (0.093)
Cohabiting	0.154* (0.071)	0.115 (0.073)	0.143 (0.076)	-0.059 (0.086)	-0.080 (0.086)
Externalizing behaviors age 5	0.029*** (0.004)	0.028*** (0.004)	0.027*** (0.004)	0.025*** (0.004)	0.025*** (0.004)
Family instability		0.053* (0.025)	0.042 (0.025)	0.019 (0.026)	0.015 (0.026)
Child/Sibling characteristics					
Child female			-0.463*** (0.067)	-0.461*** (0.066)	-0.445*** (0.066)
Total number of siblings			-0.037 (0.030)	-0.060* (0.030)	-0.064* (0.030)
Half sibling present			0.112 (0.070)	0.070 (0.070)	0.070 (0.071)
Step sibling present			-0.064 (0.131)	-0.050 (0.131)	-0.046 (0.130)
Older sibling present			0.147* (0.062)	0.151* (0.068)	0.159* (0.068)
Siblings all female			0.023 (0.090)	0.018 (0.089)	0.016 (0.089)
Siblings all male			0.146 (0.085)	0.142 (0.085)	0.147 (0.084)
Mother's race (ref: White)					
Black				0.317*** (0.087)	0.340*** (0.087)
Hispanic				-0.144 (0.104)	-0.127 (0.104)
Other				0.010 (0.165)	0.011 (0.164)
Mother's age				-0.012 (0.006)	-0.012* (0.006)

Mother's education (ref: College graduate)					
Mother less than HS				0.210 (0.135)	0.205 (0.134)
Mother HS graduate				0.042 (0.127)	0.037 (0.126)
Mother some college				0.084 (0.120)	0.076 (0.119)
Household poverty				-0.022 (0.016)	-0.020 (0.016)
Quality of other family relationships					
Child close to mother					-0.204** (0.068)
Child close to father					-0.067 (0.064)
Mother's relationship quality with father					-0.014 (0.021)
Intercept	0.097 (0.224)	0.099 (0.223)	0.165 (0.238)	0.595 (0.338)	0.812* (0.347)
R ²	0.098	0.098	0.137	0.156	0.162
n	2426	2426	2259	2253	2252

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 22. Regression estimates for child-reported juvenile delinquent behaviors at age 9.

	Child-reported juvenile delinquent behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.102*** (0.029)	-0.103*** (0.029)	-0.085** (0.029)	-0.087** (0.030)	-0.075* (0.030)
Sibling relationship conflict	0.233*** (0.031)	0.232*** (0.031)	0.238*** (0.032)	0.243*** (0.032)	0.243*** (0.032)
Family structure (ref: Stably married)					
Stably single	0.625*** (0.125)	0.630*** (0.125)	0.651*** (0.130)	0.328* (0.146)	0.262 (0.152)
Stably cohabiting	0.413* (0.162)	0.412* (0.162)	0.401* (0.162)	0.175 (0.172)	0.132 (0.173)
Unstably single	0.404*** (0.084)	0.234* (0.103)	0.288** (0.105)	0.048 (0.120)	0.017 (0.122)
Unstably cohabiting	0.253** (0.083)	0.133 (0.093)	0.196* (0.095)	-0.002 (0.109)	-0.028 (0.110)
Unstably married	0.388** (0.127)	0.238 (0.137)	0.314* (0.139)	0.228 (0.142)	0.203 (0.145)
Externalizing behaviors age 5	0.029*** (0.004)	0.028*** (0.004)	0.026*** (0.004)	0.026*** (0.004)	0.025*** (0.004)
Family instability		0.089** (0.031)	0.066* (0.032)	0.040 (0.032)	0.036 (0.032)
Child/Sibling characteristics					
Child female			-0.473*** (0.068)	-0.470*** (0.068)	-0.455*** (0.068)
Total number of siblings			-0.028 (0.030)	-0.051 (0.030)	-0.056 (0.030)
Half sibling present			0.094 (0.071)	0.061 (0.072)	0.066 (0.072)
Step sibling present			-0.047 (0.133)	-0.028 (0.133)	-0.026 (0.133)
Older sibling present			0.126* (0.064)	0.136 (0.069)	0.142* (0.069)
Siblings all female			0.014 (0.091)	0.011 (0.090)	0.009 (0.090)
Siblings all male			0.121 (0.087)	0.119 (0.086)	0.125 (0.086)
Mother's race (ref: White)					
Black				0.324*** (0.088)	0.348*** (0.089)

Hispanic				-0.104	-0.089
				(0.105)	(0.105)
Other				0.095	0.095
				(0.169)	(0.169)
Mother's age				-0.013*	-0.013*
				(0.006)	(0.006)
Mother's education (ref: College graduate)					
Mother less than HS				0.118	0.119
				(0.140)	(0.139)
Mother HS graduate				-0.043	-0.044
				(0.131)	(0.131)
Mother some college				0.012	0.010
				(0.124)	(0.124)
Household poverty				-0.022	-0.021
				(0.017)	(0.017)
Quality of other family relationships					
Child close to mother					-0.189**
					(0.069)
Child close to father					-0.058
					(0.065)
Mother's relationship quality with father					-0.005
					(0.022)
Intercept	-0.054	-0.022	0.069	0.567	0.753*
	(0.229)	(0.229)	(0.244)	(0.347)	(0.359)
R ²	0.102	0.105	0.142	0.159	0.164
n	2335	2335	2195	2189	2188

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 23. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9, moderated by baseline family structure.

	Externalizing behaviors at age 9		
	Single	Cohabiting	Married
Sibling relationship quality	-0.227 (0.237)	0.247 (0.253)	-0.040 (0.238)
Sibling relationship conflict	0.466 (0.255)	0.551* (0.267)	0.400 (0.257)
Externalizing behaviors age 5	0.374*** (0.032)	0.392*** (0.035)	0.372*** (0.036)
Family instability	-0.005 (0.202)	0.366 (0.231)	0.141 (0.295)
Child/Sibling characteristics			
Child female	-1.840*** (0.555)	-0.660 (0.576)	-0.800 (0.517)
Total number of siblings	0.081 (0.241)	0.308 (0.259)	-0.135 (0.251)
Half sibling present	0.023 (0.566)	-0.336 (0.579)	-0.703 (0.734)
Step sibling present	-1.165 (1.314)	0.484 (0.971)	0.163 (1.022)
Older sibling present	1.262* (0.578)	0.046 (0.594)	-0.973 (0.512)
Siblings all female	1.387 (0.791)	0.863 (0.753)	0.660 (0.673)
Siblings all male	0.014 (0.711)	1.080 (0.765)	-0.544 (0.612)
Mother's race (ref: White)			
Black	-2.065* (0.875)	-0.784 (0.747)	-0.562 (0.630)
Hispanic	-2.562* (1.056)	-1.072 (0.864)	-1.273 (0.720)
Other	1.248 (1.654)	-0.299 (1.796)	0.115 (0.927)
Mother's age	0.028 (0.054)	-0.078 (0.054)	-0.018 (0.045)
Mother's education (ref: College graduate)			
Mother less than HS	1.716 (1.680)	-2.534 (1.739)	0.899 (0.865)
Mother HS graduate	2.290	-3.352*	-0.594

	(1.626)	(1.702)	(0.702)
Mother some college	1.459	-3.424*	-0.397
	(1.633)	(1.697)	(0.599)
Household poverty	0.088	-0.130	-0.169
	(0.219)	(0.157)	(0.087)
Quality of other family relationships			
Child close to mother	-0.275	-1.415*	-0.473
	(0.565)	(0.583)	(0.558)
Child close to father	-1.075	0.048	-0.645
	(0.562)	(0.531)	(0.510)
Mother's relationship quality with father	0.188	-0.220	-0.462*
	(0.169)	(0.178)	(0.201)
Intercept	1.084	6.036	6.341*
	(3.335)	(3.175)	(2.715)
R ²	0.219	0.226	0.277
n	861	806	563

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 24. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9, moderated by baseline family structure.

	Internalizing behaviors at age 9		
	Single	Cohabiting	Married
Sibling relationship quality	-0.247 (0.190)	0.386 (0.200)	0.096 (0.203)
Sibling relationship conflict	0.185 (0.204)	0.022 (0.209)	0.075 (0.220)
Internalizing behaviors age 5	0.466*** (0.049)	0.566*** (0.047)	0.399*** (0.054)
Family instability	-0.126 (0.162)	-0.216 (0.182)	0.333 (0.251)
Child/Sibling characteristics			
Child female	-0.347 (0.445)	0.025 (0.453)	0.263 (0.439)
Total number of siblings	-0.245 (0.193)	-0.016 (0.203)	-0.509* (0.214)
Half sibling present	0.637 (0.453)	-0.258 (0.455)	-0.365 (0.625)
Step sibling present	-0.094 (1.053)	0.955 (0.763)	-0.440 (0.873)
Older sibling present	-0.220 (0.463)	-0.151 (0.467)	-1.072* (0.436)
Siblings all female	1.486* (0.633)	0.982 (0.591)	-0.259 (0.573)
Siblings all male	-0.560 (0.570)	0.345 (0.599)	0.013 (0.522)
Mother's race (ref: White)			
Black	-0.982 (0.701)	-0.811 (0.587)	-0.564 (0.537)
Hispanic	-0.779 (0.847)	-0.807 (0.679)	-0.147 (0.614)
Other	2.731* (1.326)	-1.450 (1.410)	0.332 (0.790)
Mother's age	0.070 (0.043)	0.062 (0.042)	0.018 (0.039)
Mother's education (ref: College graduate)			
Mother less than HS	-0.641 (1.347)	-0.542 (1.366)	-0.069 (0.737)
Mother HS graduate	-0.621	-1.235	-0.568

	(1.304)	(1.337)	(0.599)
Mother some college	-1.023	-1.865	-0.517
	(1.309)	(1.333)	(0.510)
Household poverty	0.075	0.096	-0.175*
	(0.175)	(0.124)	(0.074)
Quality of other family relationships			
Child close to mother	-0.370	-0.977*	-0.321
	(0.453)	(0.458)	(0.474)
Child close to father	-0.455	0.126	-0.011
	(0.451)	(0.419)	(0.435)
Mother's relationship quality with father	0.070	-0.327*	-0.283
	(0.136)	(0.140)	(0.169)
Intercept	2.720	3.324	8.767***
	(2.665)	(2.510)	(2.304)
R ²	0.149	0.226	0.205
n	861	806	563

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 25. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality and conflict at age 9, moderated by baseline family structure.

	Child-reported juvenile delinquent behaviors at age 9		
	Single	Cohabiting	Married
Sibling relationship quality	-0.165** ^a (0.051)	-0.010 (0.046)	-0.064 (0.056)
Sibling relationship conflict	0.212*** (0.055)	0.267*** (0.048)	0.223*** (0.061)
Externalizing behaviors age 5	0.034*** (0.007)	0.012* (0.006)	0.021* (0.008)
Family instability	-0.004 (0.043)	0.031 (0.042)	0.075 (0.068)
Child/Sibling characteristics			
Child female	-0.430*** (0.120)	-0.425*** (0.104)	-0.465*** (0.122)
Total number of siblings	-0.093 (0.052)	-0.036 (0.047)	-0.007 (0.059)
Half sibling present	-0.033 (0.122)	0.155 (0.104)	0.002 (0.171)
Step sibling present	-0.292 (0.284)	-0.007 (0.176)	0.065 (0.241)
Older sibling present	0.386** ^b (0.124)	0.053 (0.108)	-0.057 (0.121)
Siblings all female	0.010 (0.169)	-0.054 (0.135)	0.159 (0.158)
Siblings all male	0.021 (0.153)	0.405** (0.138)	0.004 (0.144)
Mother's race (ref: White)			
Black	0.131 (0.188)	0.457*** (0.135)	0.464** (0.148)
Hispanic	-0.443 (0.228)	-0.052 (0.156)	0.033 (0.169)
Other	0.272 (0.357)	0.006 (0.325)	-0.101 (0.215)
Mother's age	-0.012 (0.012)	-0.022* (0.010)	0.006 (0.011)
Mother's education (ref: College graduate)			
Mother less than HS	0.377 (0.363)	-0.235 (0.307)	0.428* (0.204)

Mother HS graduate	0.122 (0.352)	-0.192 (0.300)	-0.026 (0.165)
Mother some college	0.274 (0.353)	-0.255 (0.299)	0.120 (0.141)
Household poverty	-0.044 (0.047)	-0.050 (0.029)	-0.004 (0.020)
Quality of other family relationships			
Child close to mother	-0.171 (0.122)	-0.355*** (0.105)	0.021 (0.130)
Child close to father	-0.095 (0.121)	0.015 (0.096)	-0.186 (0.118)
Mother's relationship quality with father	-0.020 (0.037)	0.014 (0.033)	-0.026 (0.048)
Intercept	1.376 (0.703)	0.816 (0.567)	0.034 (0.639)
R ²	0.186	0.193	0.179
n	869	815	568

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

^a Coefficient significantly different from the coefficient for cohabiting families but not married families ($p < .05$).

^b Coefficient significantly different from the coefficient for cohabiting families ($p < .05$) and married families ($p < .01$).

Table 26. Regression estimates for externalizing behaviors on sibling relationship quality and conflict at age 9, moderated by race.

	Externalizing behaviors at age 9		
	Black	Hispanic	White
Sibling relationship quality	0.215 (0.200)	-0.327 (0.289)	-0.259 (0.310)
Sibling relationship conflict	0.357 (0.217)	0.835** (0.296)	0.726* (0.338)
Family structure (Ref: Married)			
Single	0.656 (0.718)	0.105 (0.814)	1.621 (1.043)
Cohabiting	0.727 (0.698)	0.467 (0.730)	0.667 (0.874)
Externalizing behaviors age 5	0.369*** (0.028)	0.336*** (0.040)	0.456*** (0.044)
Family instability	0.283 (0.174)	0.106 (0.276)	0.455 (0.300)
Child/Sibling characteristics			
Child female	-0.556 (0.463)	-1.880** (0.651)	-1.686* (0.688)
Total number of siblings	0.246 (0.201)	-0.028 (0.303)	0.507 (0.363)
Half sibling present	0.082 (0.475)	0.306 (0.680)	-2.320* (0.904)
Step sibling present	-1.239 (0.967)	1.195 (1.216)	0.758 (1.220)
Older sibling present	0.287 (0.507)	-0.045 (0.629)	-0.390 (0.677)
Siblings all female	1.291* (0.653)	0.083 (0.862)	1.424 (0.875)
Siblings all male	0.505 (0.620)	-0.097 (0.823)	0.585 (0.818)
Mother's age	-0.026 (0.043)	0.052 (0.058)	-0.020 (0.066)
Mother's education (ref: College graduate)			
Mother less than HS	0.642 (1.178)	0.753 (1.668)	-0.017 (1.169)
Mother HS graduate	0.250 (1.118)	1.536 (1.637)	-1.703 (1.003)
Mother some college	-0.348	0.389	-0.739

	(1.093)	(1.636)	(0.846)
Household poverty	-0.066	-0.078	-0.200
	(0.145)	(0.178)	(0.125)
Quality of other family relationships			
Child close to mother	-1.275**	-0.066	0.018
	(0.488)	(0.671)	(0.678)
Child close to father	-0.213	-1.169	-0.577
	(0.454)	(0.619)	(0.656)
Mother's relationship quality with father	-0.075	-0.135	-0.183
	(0.144)	(0.206)	(0.234)
Intercept	1.977	-0.499	4.255
	(2.643)	(3.352)	(4.083)
R ²	0.197	0.234	0.346
n	1144	531	479

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 27. Regression estimates for internalizing behaviors on sibling relationship quality and conflict at age 9, moderated by race.

	Internalizing behaviors at age 9		
	Black	Hispanic	White
Sibling relationship quality	0.080 (0.149)	0.257 (0.270)	-0.237 (0.242)
Sibling relationship conflict	0.013 (0.161)	0.489 (0.277)	0.038 (0.261)
Family structure (Ref: Married)			
Single	0.502 (0.535)	0.072 (0.762)	-0.684 (0.814)
Cohabiting	0.403 (0.520)	0.497 (0.687)	-0.141 (0.682)
Internalizing behaviors age 5	0.488*** (0.041)	0.433*** (0.057)	0.544*** (0.062)
Family instability	0.037 (0.130)	-0.220 (0.257)	0.011 (0.234)
Child/Sibling characteristics			
Child female	0.537 (0.345)	-0.519 (0.609)	-0.708 (0.535)
Total number of siblings	-0.008 (0.150)	-0.354 (0.284)	-0.245 (0.284)
Half sibling present	0.213 (0.354)	0.712 (0.637)	-1.122 (0.707)
Step sibling present	-0.410 (0.722)	2.239* (1.137)	-0.044 (0.953)
Older sibling present	-0.457 (0.379)	-0.537 (0.588)	-0.926 (0.529)
Siblings all female	1.406** (0.487)	0.363 (0.805)	-0.079 (0.683)
Siblings all male	0.371 (0.462)	-0.343 (0.768)	-0.655 (0.640)
Mother's age	0.052 (0.032)	0.167** (0.055)	-0.030 (0.052)
Mother's education (ref: College graduate)			
Mother less than HS	0.453 (0.877)	0.450 (1.560)	-0.830 (0.913)
Mother HS graduate	0.375 (0.833)	0.434 (1.531)	-1.618* (0.784)
Mother some college	-0.233	-0.794	-0.975

	(0.814)	(1.532)	(0.661)
Household poverty	-0.005	-0.014	-0.150
	(0.108)	(0.167)	(0.098)
Quality of other family relationships			
Child close to mother	-0.615	0.190	-0.541
	(0.364)	(0.629)	(0.527)
Child close to father	-0.115	-0.614	0.009
	(0.339)	(0.583)	(0.512)
Mother's relationship quality with father	-0.109	-0.040	-0.551**
	(0.107)	(0.191)	(0.181)
Intercept	1.779	-1.614	11.821***
	(1.972)	(3.106)	(3.196)
R ²	0.154	0.169	0.297
n	1144	531	479

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 28. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality and conflict at age 9, moderated by race.

	Child-reported juvenile delinquent behaviors at age 9		
	Black	Hispanic	White
Sibling relationship quality	-0.128** ^a (0.042)	0.007 (0.057)	-0.028 (0.063)
Sibling relationship conflict	0.264*** (0.046)	0.173** (0.058)	0.241*** (0.069)
Family structure (Ref: Married)			
Single	-0.067 (0.152)	-0.274 (0.159)	0.440* ^b (0.211)
Cohabiting	-0.169 (0.148)	-0.169 (0.142)	0.028 (0.178)
Externalizing behaviors age 5	0.032*** (0.006)	-0.001 (0.008)	0.030*** (0.009)
Family instability	0.013 (0.037)	0.075 (0.054)	-0.056 (0.061)
Child/Sibling characteristics			
Child female	-0.513*** (0.099)	-0.390** (0.127)	-0.445** (0.140)
Total number of siblings	-0.071 (0.043)	-0.029 (0.059)	-0.063 (0.074)
Half sibling present	0.000 (0.101)	0.177 (0.132)	0.159 (0.183)
Step sibling present	-0.155 (0.207)	-0.112 (0.238)	0.432 (0.248)
Older sibling present	0.178 (0.108)	0.254* (0.123)	0.074 (0.138)
Siblings all female	-0.019 (0.138)	-0.066 (0.168)	0.311 (0.178)
Siblings all male	-0.070 (0.132)	0.407* (0.161)	0.324 (0.166)
Mother's age	-0.016 (0.009)	-0.019 (0.011)	0.006 (0.014)
Mother's education (ref: College graduate)			
Mother less than HS	0.170 (0.250)	-0.069 (0.325)	0.324 (0.237)
Mother HS graduate	-0.139 (0.237)	-0.048 (0.320)	0.274 (0.205)

Mother some college	-0.152 (0.232)	0.145 (0.319)	0.107 (0.172)
Household poverty	-0.018 (0.031)	-0.042 (0.034)	-0.004 (0.025)
Quality of other family relationships			
Child close to mother	-0.303** (0.104)	-0.108 (0.131)	-0.149 (0.137)
Child close to father	0.004 (0.096)	-0.179 (0.120)	-0.118 (0.133)
Mother's relationship quality with father	-0.028 (0.031)	-0.022 (0.040)	0.052 (0.047)
Intercept	1.937*** (0.549)	0.864 (0.653)	-0.084 (0.830)
R ²	0.162	0.158	0.182
n	1162	534	479

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

^a Coefficient significantly different from the coefficient for Hispanic children but not white children ($p < .05$).

^b Coefficient significantly different from the coefficient from Hispanic children but not black children ($p < .05$).

Research Question Four

The effect of family characteristics and sibling relationship quality on mother-reported age 15 behaviors

Research question four examined the association between family characteristics, sibling relationship quality, and the child's behavior outcomes at age 15. The first set of analyses examined children's behaviors as reported by the mother using the Child Behavior Checklist (Achenbach & Rescorla, 2001).

Positive sibling relationships were significantly and strongly associated with fewer externalizing behaviors at age 15 ($\beta = -0.423, p < 0.001$) even after accounting for the effects of child, sibling and demographic characteristics, as well as the quality of other family relationships (Table 29). As a robustness check, additional models were examined predicting the top quartile of problem behaviors and the results were consistent as in the models that examined problem behaviors on the continuous spectrum (see Appendix D).

As anticipated, compared to children born into married-parent households, children born into single-parent or cohabiting-parent households generally had more externalizing behavior problems at age 15 (Model 1). Consistent with the findings from age nine, the quality of other family relationships were significantly associated with fewer externalizing behaviors at age 15. Having a close relationship to one's mother was associated with fewer externalizing behaviors ($\beta = -0.841, p < 0.001$), as was having a mother who rate highly her relationship with the child's biological father ($\beta = -0.330, p < 0.001$).

In my analyses looking that the effects of stability, family instability was associated with more externalizing behavior problems at age 15 ($\beta = 0.229, p < 0.05$) even after accounting for family structure and sibling relationship quality in Model 5 (Table 30).

Unlike the effect of sibling relationship quality on internalizing behavior problems at age nine, at age 15, there were strong associations between sibling relationship quality and internalizing behavior problems (Table 31 and Table 32). In terms of internalizing behavior problems at age 15, positive sibling relationships had a stronger protective effect ($\beta = -0.311, p < 0.001$) than child's closeness to the mother ($\beta = -0.236, p < 0.01$) and child's closeness to the father ($\beta = -0.258, p < 0.01$). Consistent with the effects of race on mother-reported behaviors at age nine, being black ($\beta = -0.718, p < 0.001$) or Hispanic ($\beta = -0.633, p < 0.001$) was associated with fewer internalizing behaviors at age 15 compared to being white (Table 31).

The effect of family characteristics and sibling relationship quality on child-reported age 15 behaviors

Table 33 to Table 42 present results for the impact of sibling relationship quality and sibling relationship conflict on the child's self-reported problem behaviors at age 15. Similar to the child-reported measures of behaviors at age nine, the child's self-report of problem behaviors at age 15 are measured in four domains: criminal activities toward others, drug and substance abuse, theft, and vandalism. These four domains are observed as binary outcomes, as well as a continuous outcome combining all four domains into one measure of juvenile delinquent behaviors at age 15.

Criminal activities toward others. Positive sibling relationship quality is associated with lower odds of engaging in criminal activities toward others (Table 33) but the odds ratio is not significant after controlling for the quality of other family relationships (Model 5). A close relationship between the child and his or her mother is significantly associated with reduced odds of engaging in criminal activities toward others ($OR = 0.692, p < 0.001$). Consistent with the

effects of family instability in previous analyses, growing up in a stably married household is associated with the lowest odds of engaging in criminal activities at age 15. Growing up in an unstably single household, controlling for sibling relationship quality, is associated with greater odds of engaging in criminal activities at age 15 ($OR = 3.836, p < 0.001$) (Table 34).

Drug and substance use. Sibling relationship quality is not significantly associated with reduced odds of drug and substance use at age 15 controlling for child, sibling and family characteristics, as well as the quality of other relationships in the family (Table 35). However, being born into a single-parent household is associated with significantly greater odds of drug and substance use ($OR = 1.464, p < 0.05$). Female children are less likely to report drug and substance use ($OR = 0.740, p < 0.01$), but living with a half-sibling is associated with significantly increased odds of drug and substance use ($OR = 1.318, p < 0.01$) even after accounting for the quality of other family relationships. Child's closeness to his or her mother is significantly associated with lower odds of drug and substance use ($OR = 0.603, p < 0.001$), as is the child's closeness to his or her father ($OR = 0.763, p < 0.05$).

Engagement in theft. Positive sibling relationship quality is significantly associated with lower odds of engaging in theft ($OR = 0.786, p < 0.01$) (Table 37). There are no significant associations between family structure and instability and engagement in theft in Model 4 and Model 5, controlling for the demographic characteristics of the family and the quality of other family relationships. Child's closeness to his or her mother and father are both significantly associated with reduced odds of engagement in theft.

Vandalism. Similar to effect of sibling relationship quality on the child's criminal activities toward others and drug and substance use, sibling relationship quality was not significantly associated with reduced odds of vandalism after accounting for all of the study's

covariates (Table 39). Compared to being born into a married-parent household, children born into cohabiting-parent households were at significantly greater odds of vandalism at age 15 ($OR = 2.240, p < 0.01$).

Juvenile delinquent behaviors (continuous measure). In examining the effect of sibling relationship quality on all juvenile delinquent behaviors at age 15, I found that positive sibling relationship quality was associated fewer overall juvenile delinquent behaviors at age 15 ($\beta = -0.312, p < 0.001$) even after accounting for the effects of other family relationships. The child's closeness to his or her mother was significantly associated with fewer juvenile delinquent behaviors ($\beta = -0.749, p < 0.001$), as was the child's closeness to his or her father ($\beta = -0.331, p < 0.05$). Compared to children born to married parents, children born to single parents ($\beta = 0.469, p < 0.05$) and cohabiting parents ($\beta = 0.475, p < 0.01$) were more likely to have more juvenile delinquent behaviors at 15 (Table 41).

Family structure as a moderator for the association between sibling relationship quality and child's behavior at age 15

Table 43 presents the results for the examination of family structure as a moderator between sibling relationship quality and externalizing behavior problems at age 15. Positive sibling relationships are associated with fewer externalizing behaviors for children of all three family structures and I find no significant moderation effects by family structure. Similar to externalizing behaviors, there are no significant moderation effects by family structure for internalizing behavior problems at 15 (Table 44). Similar to the moderation analyses for age nine, I find significant moderation effects by family structure when examining child-reported behavior outcomes at age 15 (Table 45). Positive sibling relationships are associated with fewer

child-reported juvenile delinquent behaviors for all three family structures, but sibling relationships are more protective for children born to cohabiting parents ($\beta = -0.483, p < 0.001$) as compared to children born to married parents.

Race as a moderator for the association between sibling relationship quality and child's behavior at age 15

Sibling relationship quality is significantly associated with fewer externalizing behavior problems for Hispanic and white children but not for black children (Table 46). For black and Hispanic children, being close to his or her mother is significantly associated with fewer externalizing behavior problems, $\beta = -0.994 (p < 0.001)$ and $\beta = -0.975 (p < 0.001)$ respectively. Positive sibling relationships are significantly associated with fewer internalizing behavior problems at age 15 (Table 47) for children of all three racial groups. In examining the association between sibling relationship quality and child-reported juvenile delinquent behaviors at 15, I found that positive sibling relationships are significantly associated with fewer juvenile delinquent behaviors for black and Hispanic children but not white children (Table 48).

Table 29. Regression estimates for externalizing behaviors on sibling relationship quality at age 15.

	Externalizing behaviors at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.563*** (0.108)	-0.563*** (0.108)	-0.569*** (0.108)	-0.574*** (0.109)	-0.423*** (0.112)
Family structure at baseline (ref: Married)					
Single	1.179*** (0.232)	0.880*** (0.245)	0.830*** (0.251)	0.205 (0.297)	-0.067 (0.297)
Cohabiting	0.824*** (0.237)	0.593* (0.244)	0.542* (0.247)	0.011 (0.284)	-0.088 (0.282)
Externalizing behaviors age 9	0.337*** (0.013)	0.333*** (0.013)	0.332*** (0.013)	0.328*** (0.013)	0.318*** (0.013)
Family instability		0.309*** (0.083)	0.286*** (0.084)	0.219* (0.085)	0.151 (0.085)
Child/Sibling characteristics					
Child female			-0.027 (0.180)	-0.028 (0.180)	-0.167 (0.180)
Total number of siblings			0.116 (0.067)	0.064 (0.068)	0.090 (0.068)
Half sibling present			0.075 (0.205)	0.063 (0.206)	-0.145 (0.206)
Step sibling present			0.166 (0.353)	0.247 (0.354)	0.067 (0.352)
Mother's race (ref: White)					
Black				0.357 (0.286)	0.364 (0.284)
Hispanic				-0.242 (0.336)	-0.219 (0.333)
Other				0.349 (0.532)	0.409 (0.526)
Mother's age				-0.044* (0.018)	-0.040* (0.018)
Mother's education (ref: College graduate)					
Mother less than HS				0.697 (0.440)	0.758 (0.435)
Mother HS graduate				0.250 (0.418)	0.316 (0.414)
Mother some college				0.233 (0.394)	0.297 (0.390)

Household poverty				-0.048 (0.052)	-0.020 (0.052)
Quality of other family relationships					
Child close to mother					-0.841*** (0.190)
Child close to father					-0.256 (0.222)
Mother's relationship quality with father					-0.330*** (0.071)
Intercept	3.388*** (0.547)	3.327*** (0.546)	3.142*** (0.566)	4.419*** (0.931)	5.434*** (0.944)
R ²	0.251	0.256	0.257	0.264	0.282
n	2524	2524	2524	2515	2515

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 30. Regression estimates for externalizing behaviors on sibling relationship quality at age 15.

	Externalizing behaviors at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.552*** (0.111)	-0.550*** (0.111)	-0.555*** (0.111)	-0.561*** (0.112)	-0.407*** (0.116)
Family structure (ref: Stably married)					
Stably single	1.883*** (0.402)	1.896*** (0.401)	1.839*** (0.412)	1.046* (0.471)	0.415 (0.482)
Stably cohabiting	0.853 (0.561)	0.853 (0.560)	0.763 (0.563)	0.094 (0.599)	0.105 (0.594)
Unstably single	1.383*** (0.283)	0.670 (0.345)	0.628 (0.350)	-0.076 (0.404)	-0.426 (0.406)
Unstably cohabiting	1.107*** (0.280)	0.596 (0.313)	0.554 (0.319)	-0.072 (0.370)	-0.337 (0.370)
Unstably married	1.108** (0.424)	0.490 (0.457)	0.462 (0.461)	0.212 (0.475)	-0.147 (0.478)
Externalizing behaviors age 5	0.341*** (0.014)	0.338*** (0.014)	0.336*** (0.014)	0.333*** (0.014)	0.324*** (0.014)
Family instability		0.380*** (0.106)	0.362*** (0.107)	0.295** (0.108)	0.229* (0.108)
Child/Sibling characteristics					
Child female			-0.046 (0.187)	-0.050 (0.187)	-0.168 (0.186)
Total number of siblings			0.107 (0.069)	0.052 (0.070)	0.070 (0.070)
Half sibling present			0.026 (0.213)	0.033 (0.214)	-0.136 (0.214)
Step sibling present			0.015 (0.362)	0.122 (0.364)	0.008 (0.362)
Mother's race (ref: White)					
Black				0.404 (0.295)	0.431 (0.293)
Hispanic				-0.135 (0.345)	-0.118 (0.342)
Other				0.598 (0.562)	0.647 (0.557)
Mother's age				-0.045* (0.019)	-0.041* (0.019)
Mother's education (ref: College graduate)					

Mother less than HS				0.667 (0.463)	0.765 (0.459)
Mother HS graduate				0.185 (0.441)	0.296 (0.438)
Mother some college				0.162 (0.415)	0.283 (0.412)
Household poverty				-0.052 (0.056)	-0.031 (0.055)
Quality of other family relationships					
Child close to mother					-0.806*** (0.197)
Child close to father					-0.273 (0.231)
Mother's relationship quality with father					-0.319*** (0.073)
Intercept	3.010*** (0.578)	3.087*** (0.577)	2.946*** (0.596)	4.331*** (0.976)	5.396*** (0.996)
R ²	0.251	0.256	0.257	0.264	0.281
n	2396	2396	2396	2387	2387

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 31. Regression estimates for internalizing behaviors on sibling relationship quality at age 15.

	Internalizing behaviors at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.407*** (0.055)	-0.406*** (0.055)	-0.403*** (0.055)	-0.373*** (0.055)	-0.311*** (0.056)
Family structure at baseline (ref: Married)					
Single	0.122 (0.117)	0.049 (0.124)	0.045 (0.127)	0.220 (0.149)	0.072 (0.150)
Cohabiting	0.156 (0.119)	0.099 (0.124)	0.086 (0.125)	0.195 (0.143)	0.145 (0.142)
Internalizing behaviors age 9	0.142*** (0.008)	0.142*** (0.008)	0.143*** (0.008)	0.140*** (0.008)	0.136*** (0.008)
Family instability		0.073 (0.042)	0.072 (0.042)	0.075 (0.043)	0.034 (0.043)
Child/Sibling characteristics					
Child female			0.334*** (0.091)	0.324*** (0.090)	0.270** (0.090)
Total number of siblings			-0.024 (0.034)	-0.011 (0.034)	0.000 (0.034)
Half sibling present			-0.002 (0.103)	-0.016 (0.103)	-0.104 (0.103)
Step sibling present			0.340 (0.178)	0.292 (0.177)	0.217 (0.177)
Mother's race (ref: White)					
Black				-0.713*** (0.144)	-0.718*** (0.143)
Hispanic				-0.650*** (0.168)	-0.633*** (0.167)
Other				-0.621* (0.267)	-0.593* (0.265)
Mother's age				-0.006 (0.009)	-0.004 (0.009)
Mother's education (ref: College graduate)					
Mother less than HS				0.418 (0.221)	0.438* (0.219)
Mother HS graduate				0.426* (0.210)	0.451* (0.208)
Mother some college				0.034 (0.198)	0.060 (0.196)

Household poverty				0.051 (0.026)	0.065* (0.026)
Quality of other family relationships					
Child close to mother					-0.236* (0.095)
Child close to father					-0.258* (0.111)
Mother's relationship quality with father					-0.158*** (0.036)
Intercept	2.455*** (0.278)	2.434*** (0.278)	2.310*** (0.287)	2.438*** (0.466)	2.900*** (0.473)
R ²	0.153	0.154	0.16	0.175	0.193
n	2524	2524	2524	2515	2515

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 32. Regression estimates for internalizing behaviors on sibling relationship quality at age 15.

	Internalizing behaviors at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.389*** (0.056)	-0.388*** (0.056)	-0.384*** (0.056)	-0.358*** (0.056)	-0.295*** (0.058)
Family structure (ref: Stably married)					
Stably single	0.429* (0.202)	0.430* (0.201)	0.432* (0.207)	0.668** (0.235)	0.320 (0.241)
Stably cohabiting	0.237 (0.282)	0.235 (0.282)	0.242 (0.283)	0.397 (0.299)	0.383 (0.297)
Unstably single	0.168 (0.141)	-0.001 (0.174)	-0.015 (0.176)	0.211 (0.202)	0.014 (0.203)
Unstably cohabiting	0.248 (0.140)	0.126 (0.158)	0.103 (0.160)	0.264 (0.185)	0.118 (0.185)
Unstably married	0.475* (0.213)	0.329 (0.230)	0.283 (0.232)	0.418 (0.237)	0.200 (0.240)
Internalizing behaviors age 9	0.149*** (0.009)	0.149*** (0.009)	0.150*** (0.009)	0.146*** (0.009)	0.143*** (0.009)
Family instability		0.089 (0.053)	0.099 (0.054)	0.095 (0.054)	0.055 (0.054)
Child/Sibling characteristics					
Child female			0.324*** (0.093)	0.307*** (0.093)	0.263** (0.092)
Total number of siblings			-0.020 (0.034)	-0.008 (0.035)	-0.000 (0.035)
Half sibling present			-0.044 (0.107)	-0.063 (0.107)	-0.131 (0.107)
Step sibling present			0.244 (0.182)	0.190 (0.181)	0.147 (0.180)
Mother's race (ref: White)					
Black				-0.677*** (0.147)	-0.670*** (0.146)
Hispanic				-0.585*** (0.172)	-0.573*** (0.170)
Other				-0.637* (0.281)	-0.616* (0.278)
Mother's age				-0.009 (0.010)	-0.007 (0.010)
Mother's education (ref: College graduate)					

Mother less than HS				0.414	0.455*
				(0.231)	(0.230)
Mother HS graduate				0.387	0.435*
				(0.220)	(0.219)
Mother some college				-0.005	0.052
				(0.207)	(0.206)
Household poverty				0.060*	0.071*
				(0.028)	(0.028)
Quality of other family relationships					
Child close to mother					-0.217*
					(0.099)
Child close to father					-0.255*
					(0.115)
Mother's relationship quality with father					-0.157***
					(0.037)
Intercept	2.289***	2.301***	2.189***	2.318***	2.827***
	(0.292)	(0.292)	(0.301)	(0.486)	(0.497)
R ²	0.16	0.161	0.166	0.181	0.198
n	2396	2396	2396	2387	2387

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 33. Regression estimates for child-reported criminal activities toward others at age 15.

	Child-reported criminal activities toward others at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.910 (0.050)	0.910 (0.050)	0.889* (0.049)	0.861** (0.049)	0.903 (0.054)
Family structure at baseline (ref: Married)					
Single	2.898*** (0.383)	2.595*** (0.357)	2.659*** (0.376)	1.242 (0.200)	1.237 (0.203)
Cohabiting	2.469*** (0.335)	2.265*** (0.315)	2.307*** (0.327)	1.181 (0.185)	1.184 (0.188)
Externalizing behaviors age 9	1.043*** (0.007)	1.041*** (0.007)	1.036*** (0.007)	1.033*** (0.007)	1.031*** (0.007)
Family instability		1.124** (0.046)	1.111* (0.046)	1.052 (0.045)	1.044 (0.045)
Child/Sibling characteristics					
Child female			0.584*** (0.055)	0.570*** (0.055)	0.535*** (0.052)
Total number of siblings			1.117*** (0.037)	1.051 (0.036)	1.061 (0.036)
Half sibling present			0.953 (0.098)	0.943 (0.098)	0.890 (0.094)
Step sibling present			0.916 (0.162)	1.019 (0.183)	0.993 (0.180)
Mother's race (ref: White)					
Black				1.438* (0.227)	1.443* (0.230)
Hispanic				1.025 (0.195)	1.046 (0.201)
Other				1.168 (0.376)	1.186 (0.384)
Mother's age				0.981 (0.010)	0.981 (0.010)
Mother's education (ref: College graduate)					
Mother less than HS				3.160*** (0.976)	3.198*** (0.991)
Mother HS graduate				2.145* (0.646)	2.195** (0.664)
Mother some college				2.308** (0.680)	2.340** (0.693)
Household poverty				0.836***	0.838***

				(0.032)	(0.033)
Quality of other family relationships					
Child close to mother					0.692*** (0.070)
Child close to father					0.980 (0.118)
Mother's relationship quality with father					0.964 (0.035)
Intercept	0.244*** (0.068)	0.237*** (0.066)	0.268*** (0.077)	0.445 (0.241)	0.522 (0.288)
R ²	0.076	0.079	0.096	0.124	0.13
n	2526	2526	2526	2517	2508

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 34. Regression estimates for child-reported criminal activities toward others at age 15.

	Child-reported criminal activities toward others at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.904 (0.051)	0.905 (0.051)	0.881* (0.050)	0.859** (0.050)	0.898 (0.054)
Family structure (ref: Stably married)					
Stably single	3.671*** (0.806)	3.680*** (0.807)	3.865*** (0.875)	1.360 (0.344)	1.286 (0.337)
Stably cohabiting	3.064*** (0.907)	3.062*** (0.905)	2.926*** (0.880)	1.142 (0.363)	1.191 (0.383)
Unstably single	3.836*** (0.661)	3.028*** (0.602)	3.215*** (0.652)	1.231 (0.279)	1.212 (0.281)
Unstably cohabiting	3.168*** (0.548)	2.664*** (0.501)	2.827*** (0.541)	1.177 (0.250)	1.155 (0.251)
Unstably married	1.768* (0.440)	1.436 (0.379)	1.533 (0.410)	0.925 (0.258)	0.889 (0.254)
Externalizing behaviors age 9	1.040*** (0.007)	1.039*** (0.007)	1.034*** (0.007)	1.031*** (0.007)	1.030*** (0.007)
Family instability		1.132* (0.058)	1.112* (0.058)	1.059 (0.057)	1.051 (0.058)
Child/Sibling characteristics					
Child female			0.579*** (0.056)	0.567*** (0.056)	0.536*** (0.054)
Total number of siblings			1.113** (0.038)	1.047 (0.037)	1.055 (0.037)
Half sibling present			0.918 (0.097)	0.927 (0.100)	0.879 (0.096)
Step sibling present			0.891 (0.160)	1.015 (0.186)	0.998 (0.184)
Mother's race (ref: White)					
Black				1.409* (0.227)	1.412* (0.229)
Hispanic				1.046 (0.202)	1.063 (0.207)
Other				1.344 (0.443)	1.368 (0.454)
Mother's age				0.981 (0.010)	0.981 (0.010)
Mother's education (ref: College graduate)					
Mother less than HS				3.238***	3.282***

				(1.064)	(1.084)
Mother HS graduate				2.275*	2.337**
				(0.730)	(0.754)
Mother some college				2.406**	2.452**
				(0.756)	(0.774)
Household poverty				0.827***	0.829***
				(0.034)	(0.034)
Quality of other family relationships					
Child close to mother					0.717**
					(0.074)
Child close to father					0.967
					(0.120)
Mother's relationship quality with father					0.961
					(0.036)
Intercept	0.200***	0.206***	0.235***	0.462	0.550
	(0.060)	(0.062)	(0.073)	(0.263)	(0.320)
R ²	0.077	0.08	0.097	0.123	0.129
n	2398	2398	2398	2389	2380

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 35. Regression estimates for child-reported drug and substance use at age 15.

	Child-reported drug and substance use at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.864** (0.048)	0.865** (0.048)	0.866* (0.048)	0.869* (0.049)	0.959 (0.057)
Family structure at baseline (ref: Married)					
Single	2.073*** (0.268)	2.000*** (0.270)	1.840*** (0.254)	1.576** (0.254)	1.464* (0.241)
Cohabiting	1.822*** (0.241)	1.772*** (0.241)	1.675*** (0.230)	1.398* (0.219)	1.364 (0.216)
Externalizing behaviors age 9	1.031*** (0.007)	1.031*** (0.007)	1.030*** (0.007)	1.029*** (0.007)	1.026*** (0.007)
Family instability		1.039 (0.044)	1.017 (0.043)	0.999 (0.043)	0.981 (0.043)
Child/Sibling characteristics					
Child female			0.805* (0.076)	0.797* (0.076)	0.740** (0.072)
Total number of siblings			0.993 (0.034)	0.978 (0.034)	0.987 (0.035)
Half sibling present			1.438*** (0.149)	1.405** (0.147)	1.318** (0.140)
Step sibling present			1.015 (0.184)	1.002 (0.184)	0.968 (0.180)
Mother's race (ref: White)					
Black				0.759 (0.115)	0.762 (0.116)
Hispanic				0.859 (0.152)	0.877 (0.157)
Other				0.460* (0.155)	0.461* (0.157)
Mother's age				0.989 (0.010)	0.988 (0.010)
Mother's education (ref: College graduate)					
Mother less than HS				1.293 (0.325)	1.348 (0.342)
Mother HS graduate				1.171 (0.282)	1.247 (0.304)
Mother some college				1.116 (0.259)	1.177 (0.276)
Household poverty				0.949	0.956

				(0.029)	(0.030)
Quality of other family relationships					
Child close to mother					0.603***
					(0.060)
Child close to father					0.763*
					(0.094)
Mother's relationship quality with father					0.945
					(0.034)
Intercept	0.822	0.814	0.862	1.609	2.008
	(0.219)	(0.217)	(0.240)	(0.800)	(1.028)
R ²	0.067	0.067	0.074	0.08	0.095
n	2523	2523	2523	2514	2505

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 36. Regression estimates for child-reported drug and substance use at age 15.

Child-reported drug and substance use at age 15					
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.864** (0.049)	0.864** (0.049)	0.866* (0.049)	0.868* (0.050)	0.957 (0.058)
Family structure (ref: Stably married)					
Stably single	1.841** (0.384)	1.843** (0.384)	1.541* (0.331)	1.162 (0.286)	0.959 (0.246)
Stably cohabiting	1.490 (0.445)	1.490 (0.446)	1.363 (0.412)	0.996 (0.320)	1.050 (0.342)
Unstably single	1.948*** (0.302)	1.812** (0.334)	1.645** (0.309)	1.214 (0.263)	1.111 (0.248)
Unstably cohabiting	1.668*** (0.258)	1.583** (0.271)	1.448* (0.252)	1.058 (0.214)	0.989 (0.205)
Unstably married	0.772 (0.192)	0.725 (0.191)	0.661 (0.177)	0.558* (0.155)	0.522* (0.148)
Externalizing behaviors age 9	1.035*** (0.007)	1.035*** (0.007)	1.034*** (0.007)	1.033*** (0.007)	1.030*** (0.007)
Family instability		1.039 (0.055)	1.008 (0.055)	0.994 (0.055)	0.971 (0.055)
Child/Sibling characteristics					
Child female			0.788* (0.076)	0.779* (0.076)	0.728** (0.072)
Total number of siblings			0.981 (0.034)	0.960 (0.035)	0.966 (0.035)
Half sibling present			1.517*** (0.162)	1.494*** (0.162)	1.417** (0.156)
Step sibling present			1.102 (0.203)	1.107 (0.207)	1.084 (0.205)
Mother's race (ref: White)					
Black				0.777 (0.120)	0.784 (0.122)
Hispanic				0.873 (0.157)	0.885 (0.161)
Other				0.496* (0.169)	0.498* (0.171)
Mother's age					
				0.986 (0.010)	0.985 (0.010)
Mother's education (ref: College graduate)					
Mother less than HS				1.382	1.458

				(0.360)	(0.385)
Mother HS graduate				1.213	1.310
				(0.304)	(0.333)
Mother some college				1.115	1.196
				(0.268)	(0.292)
Household poverty				0.936*	0.943
				(0.030)	(0.031)
Quality of other family relationships					
Child close to mother					0.625***
					(0.064)
Child close to father					0.746*
					(0.095)
Mother's relationship quality with father					0.937
					(0.035)
Intercept	0.880	0.887	0.991	2.200	2.818
	(0.248)	(0.250)	(0.291)	(1.140)	(1.514)
R ²	0.069	0.069	0.078	0.087	0.101
n	2396	2396	2396	2387	2378

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 37. Regression estimates for child-reported theft activities at age 15.

	Child-reported theft activities at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.725*** (0.051)	0.725*** (0.051)	0.714*** (0.051)	0.703*** (0.051)	0.786** (0.060)
Family structure at baseline (ref: Married)					
Single	1.742** (0.300)	1.637** (0.294)	1.617** (0.297)	1.213 (0.258)	1.091 (0.235)
Cohabiting	1.582 (0.279)	1.505* (0.272)	1.485* (0.272)	1.193 (0.246)	1.139 (0.237)
Externalizing behaviors age 9	1.042*** (0.008)	1.041*** (0.008)	1.038*** (0.008)	1.037*** (0.008)	1.034*** (0.008)
Family instability		1.068 (0.058)	1.061 (0.058)	1.036 (0.058)	1.012 (0.058)
Child/Sibling characteristics					
Child female			0.756* (0.094)	0.753* (0.094)	0.693** (0.088)
Total number of siblings			1.111* (0.048)	1.085 (0.048)	1.093* (0.048)
Half sibling present			0.972 (0.133)	0.973 (0.133)	0.925 (0.129)
Step sibling present			0.774 (0.189)	0.813 (0.199)	0.806 (0.200)
Mother's race (ref: White)					
Black				1.390 (0.283)	1.401 (0.288)
Hispanic				1.062 (0.257)	1.090 (0.267)
Other				1.096 (0.439)	1.106 (0.447)
Mother's age				0.992 (0.013)	0.991 (0.013)
Mother's education (ref: College graduate)					
Mother less than HS				0.904 (0.295)	0.959 (0.315)
Mother HS graduate				0.737 (0.232)	0.801 (0.255)
Mother some college				0.824 (0.250)	0.861 (0.264)
Household poverty				0.920	0.929

				(0.040)	(0.040)
Quality of other family relationships					
Child close to mother					0.632***
					(0.083)
Child close to father					0.582**
					(0.103)
Mother's relationship quality with father					0.965
					(0.045)
Intercept	0.342**	0.335**	0.336**	0.652	0.746
	(0.115)	(0.113)	(0.117)	(0.418)	(0.490)
R ²	0.047	0.047	0.051	0.056	0.065
n	2526	2526	2526	2517	2508

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 38. Regression estimates for child-reported theft activities at age 15.

	Child-reported theft activities at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.724*** (0.052)	0.724*** (0.052)	0.712*** (0.051)	0.701*** (0.051)	0.780** (0.060)
Family structure (ref: Stably married)					
Stably single	1.895* (0.511)	1.902* (0.512)	1.898* (0.527)	1.191 (0.377)	0.955 (0.314)
Stably cohabiting	1.771 (0.650)	1.771 (0.650)	1.648 (0.612)	1.119 (0.444)	1.164 (0.471)
Unstably single	1.648 (0.342)	1.356 (0.333)	1.365 (0.341)	0.890 (0.255)	0.780 (0.230)
Unstably cohabiting	1.465 (0.304)	1.266 (0.292)	1.281 (0.300)	0.894 (0.240)	0.806 (0.222)
Unstably married	0.966 (0.307)	0.817 (0.276)	0.857 (0.292)	0.700 (0.247)	0.635 (0.229)
Externalizing behaviors age 9	1.040*** (0.008)	1.039*** (0.008)	1.036*** (0.008)	1.035*** (0.008)	1.033*** (0.008)
Family instability		1.108 (0.076)	1.092 (0.076)	1.062 (0.075)	1.038 (0.075)
Child/Sibling characteristics					
Child female			0.733* (0.093)	0.729* (0.093)	0.676** (0.087)
Total number of siblings			1.113* (0.048)	1.081 (0.048)	1.084 (0.048)
Half sibling present			0.973 (0.136)	0.987 (0.138)	0.951 (0.135)
Step sibling present			0.772 (0.190)	0.824 (0.204)	0.829 (0.207)
Mother's race (ref: White)					
Black				1.427 (0.295)	1.441 (0.300)
Hispanic				1.145 (0.280)	1.162 (0.288)
Other				1.173 (0.475)	1.191 (0.487)
Mother's age				0.987 (0.013)	0.986 (0.013)
Mother's education (ref: College graduate)					
Mother less than HS				0.966	1.040

				(0.327)	(0.356)
Mother HS graduate				0.792	0.874
				(0.259)	(0.290)
Mother some college				0.866	0.925
				(0.272)	(0.295)
Household poverty				0.911*	0.918
				(0.041)	(0.042)
Quality of other family relationships					
Child close to mother					0.658**
					(0.087)
Child close to father					0.596**
					(0.106)
Mother's relationship quality with father					0.963
					(0.046)
Intercept	0.349**	0.356**	0.357**	0.840	0.979
	(0.124)	(0.127)	(0.131)	(0.560)	(0.672)
R ²	0.043	0.044	0.049	0.054	0.063
n	2398	2398	2398	2389	2380

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 39. Regression estimates for child-reported vandalism activities at age 15.

	Child-reported vandalism activities at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.733*** (0.069)	0.734** (0.069)	0.713*** (0.068)	0.717*** (0.069)	0.842 (0.087)
Family structure at baseline (ref: Married)					
Single	2.282** (0.609)	2.098** (0.578)	2.147** (0.604)	1.822 (0.586)	1.643 (0.539)
Cohabiting	2.814*** (0.744)	2.630*** (0.710)	2.715*** (0.743)	2.329** (0.716)	2.240** (0.699)
Externalizing behaviors age 9	1.040*** (0.009)	1.039*** (0.009)	1.035*** (0.009)	1.034*** (0.010)	1.031** (0.010)
Family instability		1.093 (0.078)	1.093 (0.079)	1.079 (0.080)	1.056 (0.079)
Child/Sibling characteristics					
Child female			0.395*** (0.071)	0.399*** (0.071)	0.354*** (0.065)
Total number of siblings			1.050 (0.061)	1.049 (0.062)	1.058 (0.063)
Half sibling present			1.015 (0.184)	0.979 (0.178)	0.912 (0.170)
Step sibling present			0.677 (0.234)	0.677 (0.236)	0.664 (0.234)
Mother's race (ref: White)					
Black				0.921 (0.250)	0.919 (0.253)
Hispanic				0.837 (0.271)	0.847 (0.279)
Other				1.088 (0.538)	1.062 (0.533)
Mother's age				0.989 (0.017)	0.987 (0.017)
Mother's education (ref: College graduate)					
Mother less than HS				1.056 (0.513)	1.155 (0.567)
Mother HS graduate				0.911 (0.429)	1.010 (0.481)
Mother some college				1.302 (0.591)	1.369 (0.630)
Household poverty				0.928	0.936

				(0.055)	(0.056)
Quality of other family relationships					
Child close to mother					0.475***
					(0.085)
Child close to father					0.601*
					(0.146)
Mother's relationship quality with father					0.973
					(0.060)
Intercept	0.120***	0.117***	0.164***	0.306	0.317
	(0.054)	(0.053)	(0.077)	(0.267)	(0.283)
R ²	0.031	0.032	0.043	0.043	0.054
n	2527	2527	2527	2518	2509

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 40. Regression estimates for child-reported vandalism activities at age 15.

	Child-reported vandalism activities at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	0.743** (0.072)	0.746** (0.072)	0.721*** (0.070)	0.724** (0.072)	0.853 (0.090)
Family structure (ref: Stably married)					
Stably single	2.472* (0.939)	2.491* (0.946)	2.662* (1.047)	1.993 (0.900)	1.675 (0.788)
Stably cohabiting	2.046 (1.048)	2.043 (1.046)	1.989 (1.032)	1.613 (0.901)	1.771 (1.010)
Unstably single	1.849* (0.579)	1.300 (0.465)	1.422 (0.518)	1.043 (0.439)	0.910 (0.396)
Unstably cohabiting	2.413 (0.734)	1.849 (0.615)	2.055* (0.695)	1.533 (0.600)	1.404 (0.566)
Unstably married	0.445 (0.289)	0.330 (0.219)	0.376 (0.252)	0.298 (0.204)	0.286 (0.199)
Externalizing behaviors age 9	1.044*** (0.010)	1.043*** (0.010)	1.037*** (0.010)	1.037*** (0.010)	1.034*** (0.010)
Family instability		1.201* (0.105)	1.188 (0.106)	1.187 (0.107)	1.170 (0.108)
Child/Sibling characteristics					
Child female			0.383*** (0.071)	0.387*** (0.072)	0.347*** (0.066)
Total number of siblings			1.049 (0.063)	1.045 (0.064)	1.051 (0.064)
Half sibling present			0.969 (0.182)	0.940 (0.178)	0.881 (0.170)
Step sibling present			0.714 (0.250)	0.724 (0.256)	0.720 (0.256)
Mother's race (ref: White)					
Black				0.942 (0.263)	0.943 (0.266)
Hispanic				0.894 (0.296)	0.894 (0.301)
Other				1.226 (0.615)	1.236 (0.630)
Mother's age				0.989 (0.018)	0.988 (0.018)
Mother's education (ref: College graduate)					
Mother less than HS				0.986	1.093

				(0.498)	(0.562)
Mother HS graduate				0.908	1.027
				(0.443)	(0.512)
Mother some college				1.325	1.425
				(0.622)	(0.685)
Household poverty				0.903	0.911
				(0.058)	(0.059)
Quality of other family relationships					
Child close to mother					0.490***
					(0.091)
Child close to father					0.583*
					(0.147)
Mother's relationship quality with father					0.969
					(0.063)
Intercept	0.130***	0.134***	0.188***	0.411	0.415
	(0.063)	(0.065)	(0.094)	(0.375)	(0.391)
R ²	0.033	0.035	0.046	0.047	0.058
n	2399	2399	2399	2390	2381

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 41. Regression estimates for child-reported juvenile delinquent behaviors at age 15.

	Child-reported juvenile delinquent behaviors at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.430*** (0.069)	-0.430*** (0.069)	-0.442*** (0.069)	-0.448*** (0.069)	-0.312*** (0.072)
Family structure at baseline (ref: Married)					
Single	1.005*** (0.148)	0.919*** (0.156)	0.893*** (0.159)	0.552** (0.188)	0.469* (0.189)
Cohabiting	0.891*** (0.151)	0.825*** (0.156)	0.814*** (0.157)	0.505** (0.180)	0.475** (0.179)
Externalizing behaviors age 9	0.059*** (0.008)	0.058*** (0.008)	0.052*** (0.008)	0.050*** (0.008)	0.046*** (0.008)
Family instability		0.089 (0.053)	0.069 (0.053)	0.037 (0.054)	0.020 (0.054)
Child/Sibling characteristics					
Child female			-0.644*** (0.114)	-0.642*** (0.114)	-0.741*** (0.114)
Total number of siblings			0.065 (0.042)	0.031 (0.043)	0.042 (0.043)
Half sibling present			0.169 (0.130)	0.151 (0.130)	0.062 (0.131)
Step sibling present			-0.142 (0.224)	-0.095 (0.225)	-0.123 (0.224)
Mother's race (ref: White)					
Black				0.092 (0.182)	0.121 (0.181)
Hispanic				0.013 (0.213)	0.049 (0.212)
Other				0.026 (0.338)	0.063 (0.335)
Mother's age				-0.013 (0.012)	-0.014 (0.012)
Mother's education (ref: College graduate)					
Mother less than HS				0.310 (0.278)	0.364 (0.277)
Mother HS graduate				0.017 (0.264)	0.105 (0.264)
Mother some college				0.098 (0.249)	0.166 (0.248)
Household poverty				-0.075* (0.042)	-0.064 (0.042)

				(0.033)	(0.033)
Quality of other family relationships					
Child close to mother					-0.749*** (0.122)
Child close to father					-0.331* (0.141)
Mother's relationship quality with father					-0.028 (0.044)
Intercept	3.250*** (0.349)	3.231*** (0.349)	3.450*** (0.359)	4.093*** (0.592)	4.245*** (0.600)
R ²	0.084	0.085	0.099	0.105	0.125
n	2528	2528	2528	2519	2510

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 42. Regression estimates for child-reported juvenile delinquent behaviors at age 15.

	Child-reported juvenile delinquent behaviors at age 15				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.435*** (0.071)	-0.434*** (0.071)	-0.449*** (0.070)	-0.455*** (0.071)	-0.318*** (0.074)
Family structure (ref: Stably married)					
Stably single	1.013*** (0.256)	1.017*** (0.255)	0.953*** (0.261)	0.463 (0.297)	0.246 (0.304)
Stably cohabiting	0.684 (0.357)	0.683 (0.357)	0.616 (0.356)	0.132 (0.378)	0.211 (0.376)
Unstably single	1.030*** (0.180)	0.827*** (0.220)	0.829*** (0.222)	0.348 (0.255)	0.246 (0.257)
Unstably cohabiting	0.893*** (0.178)	0.747*** (0.200)	0.756*** (0.202)	0.314 (0.234)	0.236 (0.235)
Unstably married	-0.046 (0.269)	-0.223 (0.291)	-0.189 (0.292)	-0.412 (0.300)	-0.481 (0.303)
Externalizing behaviors age 9	0.057*** (0.009)	0.057*** (0.009)	0.050*** (0.009)	0.048*** (0.009)	0.044*** (0.009)
Family instability		0.108 (0.068)	0.074 (0.068)	0.046 (0.069)	0.023 (0.069)
Child/Sibling characteristics					
Child female			-0.684*** (0.118)	-0.679*** (0.118)	-0.774*** (0.118)
Total number of siblings			0.071 (0.044)	0.032 (0.045)	0.039 (0.044)
Half sibling present			0.175 (0.135)	0.171 (0.135)	0.093 (0.136)
Step sibling present			-0.114 (0.230)	-0.042 (0.231)	-0.055 (0.230)
Mother's race (ref: White)					
Black				0.099 (0.187)	0.126 (0.186)
Hispanic				0.091 (0.218)	0.119 (0.217)
Other				0.137 (0.356)	0.172 (0.353)
Mother's age				-0.016 (0.012)	-0.016 (0.012)
Mother's education (ref: College graduate)					
Mother less than HS				0.356	0.425

				(0.292)	(0.291)
Mother HS graduate				0.083	0.190
				(0.278)	(0.277)
Mother some college				0.100	0.192
				(0.262)	(0.261)
Household poverty				-0.083*	-0.074*
				(0.035)	(0.035)
Quality of other family relationships					
Child close to mother					-0.692***
					(0.126)
Child close to father					-0.382**
					(0.146)
Mother's relationship quality with father					-0.040
					(0.045)
Intercept	3.277***	3.298***	3.534***	4.319***	4.497***
	(0.368)	(0.368)	(0.377)	(0.618)	(0.630)
R ²	0.083	0.084	0.099	0.107	0.125
n	2400	2400	2400	2391	2382

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 43. Regression estimates for externalizing behaviors on sibling relationship quality at age 15, moderated by baseline family structure.

	Externalizing behaviors at age 15		
	Single	Cohabiting	Married
Sibling relationship quality	-0.207 (0.198)	-0.551** (0.195)	-0.615*** (0.169)
Externalizing behaviors age 9	0.309*** (0.021)	0.305*** (0.022)	0.352*** (0.026)
Family instability	0.339* (0.140)	-0.160 (0.142)	0.256 (0.190)
Child/Sibling characteristics			
Child female	-0.383 (0.321)	0.154 (0.307)	-0.221 (0.274)
Total number of siblings	0.120 (0.113)	0.041 (0.114)	0.105 (0.124)
Half sibling present	-0.073 (0.333)	-0.066 (0.344)	-0.082 (0.438)
Step sibling present	-0.299 (0.630)	-0.201 (0.562)	1.535* (0.611)
Mother's race (ref: White)			
Black	1.045 (0.594)	-0.265 (0.475)	0.618 (0.393)
Hispanic	0.328 (0.709)	-0.774 (0.554)	0.204 (0.440)
Other	1.266 (1.150)	-0.687 (1.088)	0.864 (0.572)
Mother's age	-0.024 (0.034)	-0.072* (0.032)	-0.008 (0.028)
Mother's education (ref: College graduate)			
Mother less than HS	1.254 (1.086)	0.842 (1.129)	0.659 (0.530)
Mother HS graduate	1.187 (1.064)	0.072 (1.108)	0.078 (0.461)
Mother some college	0.517 (1.060)	0.678 (1.104)	0.380 (0.385)
Household poverty	0.070 (0.143)	-0.240* (0.106)	0.045 (0.054)
Quality of other family relationships			
Child close to mother	-1.081** (0.335)	-0.712* (0.321)	-0.694* (0.301)

Child close to father	-0.558 (0.439)	-0.335 (0.360)	0.161 (0.320)
Mother's relationship quality with father	-0.164 (0.127)	-0.517*** (0.118)	-0.328** (0.113)
Intercept	2.384 (1.916)	8.442*** (1.805)	3.964** (1.376)
R ²	0.252	0.312	0.394
n	1018	888	609

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 44. Regression estimates for internalizing behaviors on sibling relationship quality at age 15, moderated by baseline family structure.

	Internalizing behaviors at age 15		
	Single	Cohabiting	Married
Sibling relationship quality	-0.265** (0.089)	-0.292** (0.102)	-0.363*** (0.107)
Internalizing behaviors age 9	0.111*** (0.012)	0.130*** (0.014)	0.222*** (0.020)
Family instability	0.052 (0.063)	-0.025 (0.074)	0.084 (0.121)
Child/Sibling characteristics			
Child female	0.075 (0.143)	0.480** (0.160)	0.323 (0.173)
Total number of siblings	0.009 (0.050)	0.009 (0.059)	-0.011 (0.079)
Half sibling present	-0.094 (0.149)	-0.238 (0.180)	0.141 (0.276)
Step sibling present	-0.118 (0.282)	0.304 (0.293)	0.568 (0.387)
Mother's race (ref: White)			
Black	-0.732** (0.266)	-0.770** (0.249)	-0.650** (0.250)
Hispanic	-0.745* (0.318)	-0.811** (0.289)	-0.470 (0.277)
Other	-0.105 (0.517)	-1.616** (0.569)	-0.344 (0.362)
Mother's age	0.000 (0.015)	-0.001 (0.017)	0.012 (0.018)
Mother's education (ref: College graduate)			
Mother less than HS	0.449 (0.487)	0.686 (0.590)	0.581 (0.335)
Mother HS graduate	0.620 (0.477)	0.469 (0.579)	0.307 (0.292)
Mother some college	0.053 (0.476)	0.302 (0.577)	-0.119 (0.244)
Household poverty	0.214*** (0.064)	0.039 (0.056)	0.042 (0.034)
Quality of other family relationships			
Child close to mother	-0.277 (0.150)	-0.308 (0.168)	-0.181 (0.191)

Child close to father	-0.618** (0.197)	-0.030 (0.188)	-0.083 (0.202)
Mother's relationship quality with father	-0.039 (0.056)	-0.265*** (0.061)	-0.168* (0.072)
Intercept	2.495** (0.858)	3.153*** (0.937)	1.858* (0.875)
R ²	0.187	0.217	0.302
n	1018	888	609

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 45. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality at age 15, moderated by baseline family structure.

	Child-reported juvenile delinquent behaviors at age 15		
	Single	Cohabiting	Married
Sibling relationship quality	-0.280* (0.118)	-0.483*** ^a (0.136)	-0.114 (0.110)
Externalizing behaviors age 9	0.049*** (0.013)	0.044** (0.015)	0.043* (0.017)
Family instability	0.115 (0.083)	-0.052 (0.099)	-0.133 (0.124)
Child/Sibling characteristics			
Child female	-0.743*** (0.190)	-1.077*** (0.214)	-0.330 (0.178)
Total number of siblings	0.028 (0.067)	0.012 (0.079)	0.127 (0.080)
Half sibling present	0.035 (0.198)	0.363 (0.240)	-0.345 (0.286)
Step sibling present	0.176 (0.373)	-0.486 (0.393)	0.174 (0.396)
Mother's race (ref: White)			
Black	0.378 (0.352)	0.022 (0.331)	-0.070 (0.255)
Hispanic	0.460 (0.420)	0.061 (0.386)	-0.306 (0.285)
Other	0.617 (0.681)	-0.482 (0.758)	0.172 (0.371)
Mother's age	-0.035 (0.020)	-0.008 (0.022)	0.011 (0.018)
Mother's education (ref: College graduate)			
Mother less than HS	-0.038 (0.643)	1.078 (0.786)	0.358 (0.344)
Mother HS graduate	-0.176 (0.630)	0.591 (0.772)	0.566 (0.299)
Mother some college	-0.194 (0.628)	1.026 (0.769)	0.275 (0.250)
Household poverty	-0.098 (0.085)	-0.133 (0.074)	-0.040 (0.035)
Quality of other family relationships			
Child close to mother	-0.736***	-0.928***	-0.681***

	(0.199)	(0.224)	(0.202)
Child close to father	-0.321	-0.427	-0.336
	(0.260)	(0.250)	(0.208)
Mother's relationship quality with father	-0.077	0.093	-0.144
	(0.070)	(0.081)	(0.074)
Intercept	5.474***	4.207***	2.999***
	(1.139)	(1.256)	(0.892)
R ²	0.126	0.137	0.147
n	1015	886	609

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

^a Coefficient significantly different from the coefficient for married families but not from single-parent families ($p < .05$).

Table 46. Regression estimates for externalizing behaviors on sibling relationship quality at age 15, moderated by race.

	Externalizing behaviors at age 15		
	Black	Hispanic	White
Sibling relationship quality	-0.212 (0.172)	-0.701** (0.219)	-0.592** (0.218)
Family structure (Ref: Married)			
Single	-0.381 (0.500)	0.626 (0.522)	-0.426 (0.601)
Cohabiting	-0.400 (0.498)	0.300 (0.462)	0.379 (0.531)
Externalizing behaviors age 9	0.330*** (0.019)	0.259*** (0.028)	0.316*** (0.028)
Family instability	0.180 (0.123)	0.011 (0.177)	0.122 (0.182)
Child/Sibling characteristics			
Child female	-0.299 (0.278)	-0.024 (0.351)	-0.190 (0.342)
Total number of siblings	0.063 (0.101)	0.162 (0.123)	0.103 (0.161)
Half sibling present	-0.298 (0.298)	-0.229 (0.401)	0.359 (0.472)
Step sibling present	-0.307 (0.556)	0.595 (0.688)	-0.232 (0.611)
Mother's age	-0.045 (0.028)	-0.013 (0.033)	-0.061 (0.038)
Mother's education (ref: College graduate)			
Mother less than HS	0.371 (0.835)	0.025 (1.004)	0.986 (0.707)
Mother HS graduate	-0.124 (0.799)	0.145 (0.990)	-0.083 (0.631)
Mother some college	-0.097 (0.781)	0.109 (0.973)	0.314 (0.531)
Household poverty	-0.199 (0.107)	0.132 (0.114)	0.040 (0.072)
Quality of other family relationships			
Child close to mother	-0.994*** (0.295)	-0.975** (0.362)	-0.322 (0.362)
Child close to father	-0.233 (0.352)	-0.086 (0.419)	-0.306 (0.400)

Mother's relationship quality with father	-0.393*** (0.111)	-0.266* (0.130)	-0.401** (0.136)
Intercept	6.370*** (1.536)	5.740** (1.780)	5.385* (2.315)
R ²	0.282	0.239	0.38
n	1272	634	522

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 47. Regression estimates for internalizing behaviors on sibling relationship quality at age 15, moderated by race.

	Internalizing behaviors at age 15		
	Black	Hispanic	White
Sibling relationship quality	-0.168*	-0.335**	-0.516***
	(0.073)	(0.120)	(0.142)
Family structure (Ref: Married)			
Single	0.017	0.148	0.053
	(0.213)	(0.287)	(0.393)
Cohabiting	0.071	0.354	0.097
	(0.212)	(0.255)	(0.347)
Internalizing behaviors age 9	0.106***	0.134***	0.237***
	(0.011)	(0.017)	(0.023)
Family instability	0.075	0.143	-0.332**
	(0.052)	(0.097)	(0.119)
Child/Sibling characteristics			
Child female	0.088	0.290	0.702**
	(0.118)	(0.188)	(0.223)
Total number of siblings	0.022	0.020	-0.114
	(0.043)	(0.067)	(0.106)
Half sibling present	-0.074	-0.281	0.270
	(0.127)	(0.220)	(0.307)
Step sibling present	0.236	0.276	0.241
	(0.237)	(0.377)	(0.400)
Mother's age	0.007	0.004	-0.052*
	(0.012)	(0.019)	(0.025)
Mother's education (ref: College graduate)			
Mother less than HS	0.598	-0.035	-0.028
	(0.355)	(0.552)	(0.463)
Mother HS graduate	0.491	0.032	0.466
	(0.340)	(0.544)	(0.413)
Mother some college	0.147	-0.708	0.181
	(0.332)	(0.535)	(0.348)
Household poverty	0.041	0.113	0.106*
	(0.046)	(0.062)	(0.047)
Quality of other family relationships			
Child close to mother	-0.292*	-0.606**	0.116
	(0.126)	(0.199)	(0.238)
Child close to father	-0.267	-0.033	-0.312
	(0.150)	(0.230)	(0.262)

Mother's relationship quality with father	-0.115*	-0.129	-0.364***
	(0.049)	(0.071)	(0.091)
Intercept	1.489*	2.558**	5.103***
	(0.653)	(0.974)	(1.522)
R ²	0.143	0.209	0.33
n	1272	634	522

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 48. Regression estimates for child-reported juvenile delinquent behaviors on sibling relationship quality at age 15, moderated by race.

	Child-reported juvenile delinquent behaviors at age 15		
	Black	Hispanic	White
Sibling relationship quality	-0.339** (0.103)	-0.481** (0.153)	-0.182 (0.142)
Family structure (Ref: Married)			
Single	0.479 (0.298)	0.663 (0.364)	0.263 (0.391)
Cohabiting	0.445 (0.297)	0.577 (0.322)	0.550 (0.345)
Externalizing behaviors age 9	0.050*** (0.011)	0.030 (0.019)	0.025 (0.018)
Family instability	0.055 (0.074)	-0.163 (0.124)	0.015 (0.118)
Child/Sibling characteristics			
Child female	-0.807*** (0.166)	-0.970*** (0.245)	-0.511* (0.223)
Total number of siblings	0.008 (0.061)	0.202* (0.086)	-0.065 (0.105)
Half sibling present	0.024 (0.178)	0.286 (0.280)	-0.162 (0.305)
Step sibling present	0.120 (0.332)	-0.892 (0.482)	0.048 (0.398)
Mother's age	-0.013 (0.017)	0.010 (0.023)	-0.060* (0.025)
Mother's education (ref: College graduate)			
Mother less than HS	-0.008 (0.498)	0.763 (0.701)	0.475 (0.460)
Mother HS graduate	-0.323 (0.477)	0.851 (0.691)	-0.204 (0.411)
Mother some college	-0.126 (0.466)	0.948 (0.679)	0.015 (0.345)
Household poverty	-0.115 (0.064)	-0.018 (0.080)	-0.050 (0.047)
Quality of other family relationships			
Child close to mother	-0.853*** (0.177)	-0.561* (0.252)	-0.687** (0.240)
Child close to father	-0.128	-0.857**	-0.228

	(0.209)	(0.292)	(0.260)
Mother's relationship quality with father	-0.035	-0.008	-0.023
	(0.063)	(0.091)	(0.096)
Intercept	4.978***	2.936*	5.715***
	(0.916)	(1.242)	(1.512)
R ²	0.136	0.15	0.17
n	1268	633	522

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Research Question Five

Research question five examined the directionality of the relationship between sibling relationship quality and mother-reported children's behavior, as well as the relationship between sibling relationship quality and child-reported behavior between ages of nine and 15 (see Appendix C, Figure 11 and Figure 12 for cross-lagged path models between ages five and 15).

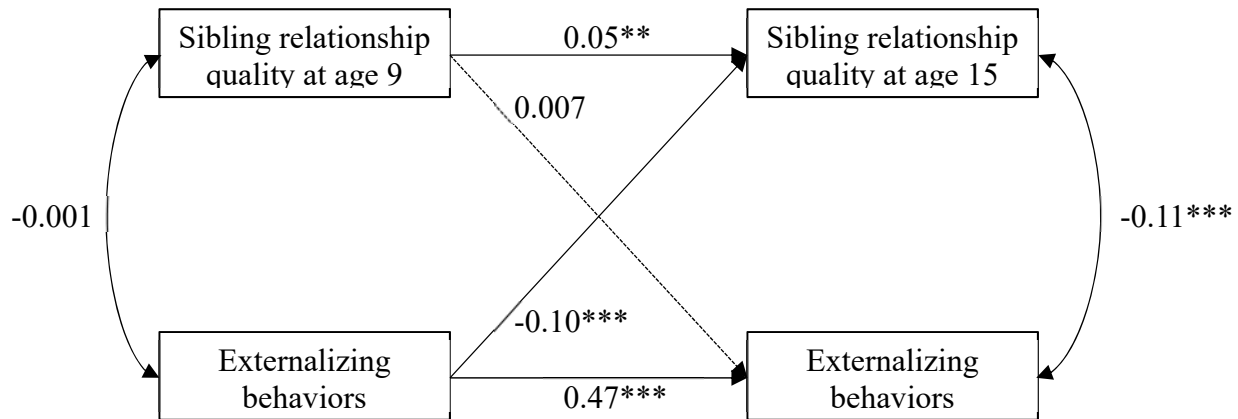
Figure 6 below presents the result of the cross-lagged path model of sibling relationship quality and externalizing behaviors. The path coefficients show a strong continuity in sibling relationship quality ($\beta = 0.05, p < 0.01$) and externalizing behaviors ($\beta = 0.47, p < 0.001$) between child's ages of nine and 15. The model also presents significant covariation between sibling relationship quality and externalizing behaviors at both waves. The cross lag path predicting externalizing behaviors at age 15 based on sibling relationship quality was not significant, whereas the cross lag path predicting sibling relationship quality at age 15 was significant ($\beta = -0.10, p < 0.001$). We can infer from this cross-lagged path model the directionality of the relationship between sibling relationship quality and externalizing behaviors; a youth with behavior problems at age 9 is likely going to have a less positive relationship with his or her sibling at age 15, but a youth with high sibling relationship quality at age 9 is not necessarily going to have fewer behavior problems at age 15.

Figure 7 presents the result of a cross-lagged path model of sibling relationship quality and internalizing behaviors. Again, there was find strong continuity in sibling relationship quality ($\beta = 0.05, p < 0.01$) and internalizing behaviors ($\beta = 0.31, p < 0.001$) between the ages of nine and 15. Like the cross lag path predicting externalizing behaviors in Figure 6, the cross lag path predicting internalizing behaviors at age 15 based on sibling relationship quality was not

significant. The cross lag path predicting sibling relationship quality at age 15 was significant ($\beta = -0.06, p < 0.001$).

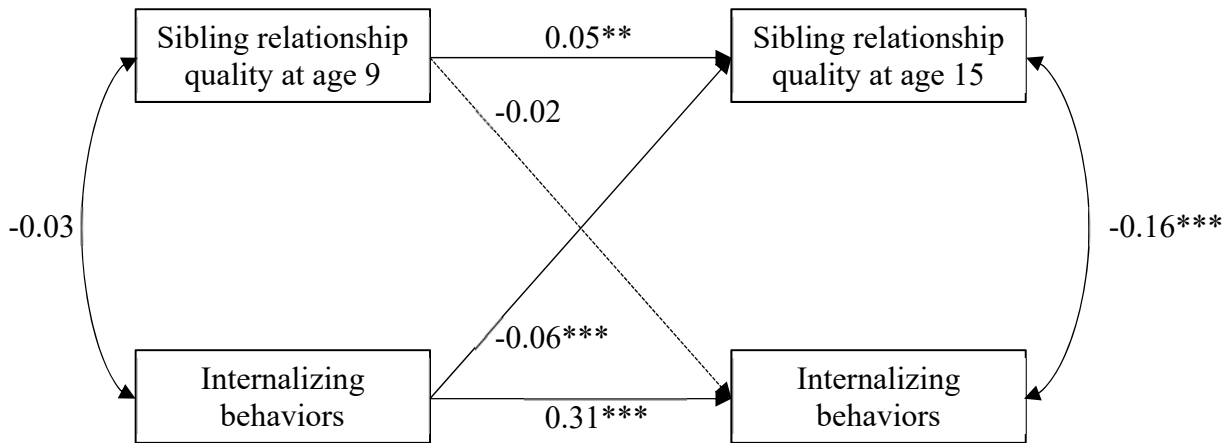
Figure 8 presents the results from a cross-lagged path model of sibling relationship quality and child-reported juvenile delinquent behaviors. Similar to the path models of mother-reported behaviors of the child, there is strong continuity in child-reported juvenile delinquent behaviors from age nine to 15 ($\beta = 0.21, p < 0.001$). Unlike the cross-lagged path models of mother-reported behaviors, in Figure 8, we see a significant cross-lag paths predicting both sibling relationship quality ($\beta = -0.04, p < 0.05$) as well as juvenile delinquent behavior at age 15 ($\beta = -0.04, p < 0.05$).

Figure 6. Results from a cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and externalizing behaviors.



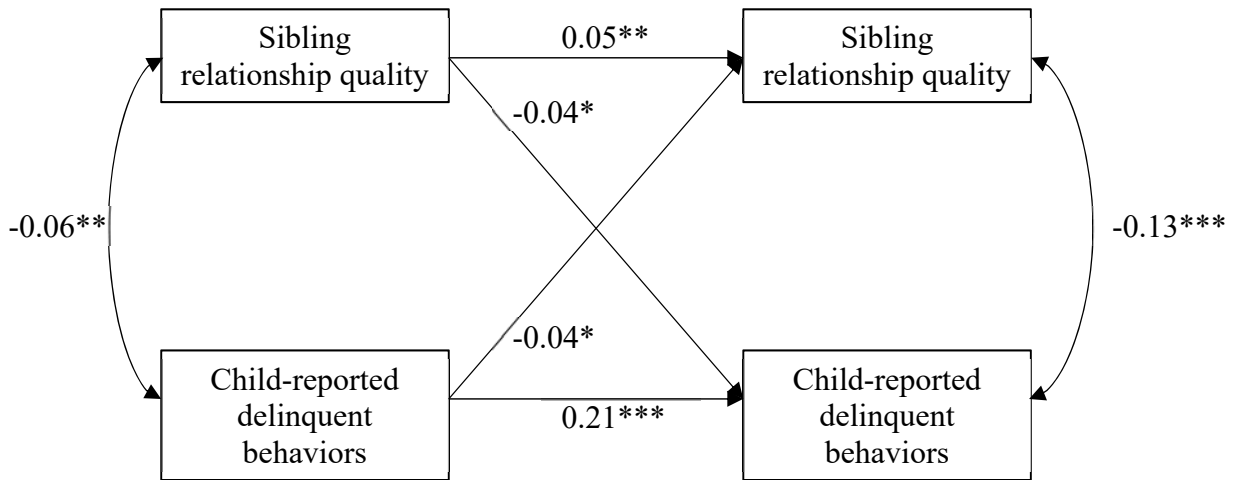
Values shown are standardized coefficients. Model controls for all study covariates and the effects of city of residence. $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 7. Results from a cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and internalizing behaviors.



Values shown are standardized coefficients. Model controls for all study covariates and the effects of city of residence. $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 8. Results from a cross-lagged SEM path model from age 9 to age 15 for sibling relationship quality and child-reported juvenile delinquent behaviors.



Values shown are standardized coefficients. Model controls for all study covariates and the effects of city of residence. $p < .05$, ** $p < .01$, *** $p < .001$.

CHAPTER 5

DISCUSSION

The centrality of sibling relationships in children's lives has largely gone unnoticed in the academic literature on family contexts and family relationships. Sibling interactions are central to the psychological and social wellbeing of children and adolescents because sibling relationships often serve as training grounds for other interpersonal relationships. The purpose of this study was to understand how family contexts are associated with the quality of sibling relationships, to examine how sibling relationships are related to children and youth's behavioral trajectories, and to explore whether positive sibling relationships are protective in terms of children's behaviors. Do positive sibling relationships act as a buffer for the negative effects of family structure and instability on children and youth's behavior outcomes?

A second goal of the study was to examine the importance of sibling relationships in the context of other family relationships. Much historical research on child wellbeing and families has focused on the importance of the quality of the mother-child relationship, and more recently on the importance of the quality of the father-child relationship. Given that sibling relationships are embedded in the context of other family relationships, it was important to examine how sibling relationships were associated with the quality of other family relationships in impacting children and youth's behavior.

Lastly, this study aimed to better understand differences in the impact of sibling relationships by different sibling types—full biological siblings, half-siblings, and stepsiblings. Increases in multi-partnered fertility and family complexity indicate that many children and youth today live in households where there are several different types of sibling relationships. Understanding the differences in the quality of such relationships—if they exist—and examining

their influence on children's behavioral outcomes was one of the secondary goals of this research.

Summary of Results

Family structure, instability, and sibling relationship quality

Contrary to my hypotheses about sibling relationships being more positive in stable, married parent households, I found that sibling relationships were more positive in single-parent households compared to married-parent households when no other factors other than family structure were taken into consideration. At both ages nine and 15, children born to single parents rated their sibling relationships to be more positive compared to children born to married parents. Furthermore, sibling relationship conflict was significantly lower in single-parent households compared to married-parent households when the child was nine. These findings are aligned to the results in Kunz's (2001) study, which found that parental divorce was associated with more positive sibling relationships whereas other family relationships negatively impacted by divorce.

Also contrary to my hypotheses, I found no significant effects of family instability on the quality of sibling relationships. Although there was some evidence that sibling relationships were more positive in stably single and unstably single families compared to stably married families at age 15, the difference was likely being driven by family structure (single versus married) rather than instability.

Sibling relationships and child behavior

One of the benefits of using the Fragile Families and Child Wellbeing data set to explore my research questions of interest was being able to examine children's behaviors at two time points—ages nine and 15—as reported by the mother and as reported by the child.

At age nine, there were no significant effects of having a positive sibling relationship on the child's self-reported and mother-reported behaviors. However, I found strong evidence that high sibling relationship conflict was related to more externalizing behavior problems, an increased likelihood of engaging in criminal activities toward others, using drugs and other substances, engaging in theft and vandalism. Overall, children born into single-parent households were more likely to engage in problem behaviors compared to children born into married-parent households. Above and beyond the effects of living in a single-parent household or living in a household with high family instability, having highly conflictual sibling relationships were strongly associated with poor behavior outcomes for nine year olds.

Unlike the effect of sibling relationship quality at age nine on behavior outcomes, positive sibling relationships at age 15 were associated with fewer externalizing and internalizing behavior problems. In particular, for mother-reported externalizing behaviors, it was interesting to find that the negative effects of living in a single or cohabiting-parent household were no longer significantly associated with problem behaviors when controlling for sibling relationship quality and the quality of other family relationships. Said differently, and maybe unsurprisingly so, having positive relationships with family members—siblings, mother, and father—are more important factors in influencing children's behavior outcomes than living in a particular type of family structure (single, cohabiting, or married).

A slightly different picture emerged when examining children's self-reported problem behaviors at age 15. Although having positive sibling relationships was generally associated with a reduced likelihood of engaging in behaviors such as criminal activities toward others, theft, vandalism, and drug and substance use, the buffer of having a positive sibling relationship was not enough to counter the negative impact of living in particular family environments. For

example, above and beyond the protective effects of positive sibling and family relationships, being born to a single or cohabiting households was associated with increased odds of drug and substance use and vandalism.

Moderation by family structure and race

There was some evidence to suggest that having positive sibling relationships is more protective for children born to a single-parent. Positive sibling relationships were linked to fewer child-reported juvenile delinquent behaviors at nine for children born to a single-parent but not for children born to cohabiting or married parents. Similar results were found at age 15, where having positive sibling relationships were particularly important in terms of child's problem behaviors for children born to cohabiting parents but not married parents.

In examining differences by race, I found that positive sibling relationships at age nine were linked to fewer child-reported juvenile delinquent behaviors for black children but not white or Hispanic children. Similarly at age 15, positive sibling relationships were associated with fewer child-reported juvenile delinquent behaviors for black and Hispanic children but not white children.

Directionality of the association between sibling relationship quality and behavior

The multi-wave and longitudinal structure of the Fragile Families and Child Wellbeing data set allowed for the exploration of the directionality of the relationship between sibling relationship quality and child behavior. In utilizing cross-lagged path models, I found evidence to support that problem behaviors led to poor sibling relationships, rather than poor sibling relationships leading to problem behaviors. A slightly different picture emerged when utilizing children's' report of behaviors: there was some evidence to support the reciprocal, bidirectional effects of sibling relationship quality and problem behaviors. Unsurprisingly, there was strong

support for the continuity of poor behaviors over time, as well as continuity of sibling relationship quality over time, with strong correlations between behaviors at ages nine and 15.

Discrepancies in mother-reported and child-reported behaviors by race

One unexpected finding emerged in my study regarding the discrepancy in behavior outcomes as reported by the mother and the child. Being black was significantly associated with fewer behavior problems at age nine when using the mother's report of child's problem behaviors. However, being black was significantly associated with increased odds of engaging in problem behaviors such as criminal activities toward others and vandalism when using the child's report of his or her behaviors. Similar patterns were found in the data for age 15, where being black was associated with fewer internalizing behavior problems, a measure reported by the mother. In using the child's report of his or her behaviors at age 15, however, being black is associated with increased odds of engaging in problem behaviors. Although additional analyses are needed to thoroughly understand the reasons for this discrepancy, this finding underscores the importance of utilizing multiple measures of outcomes when conducting secondary data analyses.

Strong correlation between sibling relationships and other family relationships

One of the least surprising findings from this study was with regard to the strong correlations between sibling relationship quality and the quality of other family relationships. The two theoretical frameworks that guided this work—the ecological systems theory and family systems theory—described the interdependent and interrelated nature of family relationships. The frameworks highlighted the importance of viewing sibling relationships as embedded in the context of other family relationships, such as mother-child and father-child relationship. Results from this study strongly support the interrelated nature of family relationships.

In examining the quality of sibling relationships and also the effect of sibling relationships on children's behavior outcomes, one of the most consistent predictors was the child's report of closeness with his or her mother and father. Close mother-child relationships were consistently associated with more positive and less conflictual sibling relationships, and to a lesser degree, close father-child relationships. Furthermore, close mother-child and father-child relationships were significantly associated with fewer mother-reported and child-reported problem behaviors at ages nine and 15.

Differences by types of siblings: full, half and stepsiblings. Presence of an older sibling.

There were few consistent results with regard to having a half-siblings or stepsibling in the household. For example, having a stepsibling was significantly associated with increased odds of vandalism at age nine, and having a half-sibling was significantly associated with increased odds of drug and substance use at age 15. However, in the majority of the analyses for this study, there was no significant positive or negative effect of living with a half-sibling or stepsibling. This could be due to a lack of an effect of sibling type, but it could also be due to the fact that a very small percentage of children were living with a stepsibling in this data set. While a large proportion of children were living with a half-sibling, the differential effect of living with a half versus full sibling may either be too small to detect, or it could be that children who share the same mother as their half-siblings do not necessarily view them as being different from a full biological sibling.

Although there were few significant effects by sibling type, having an older sibling in the household at age nine was linked to having less positive and more conflictual sibling relationships. Furthermore, having an older sibling at age nine was generally associated with more mother-reported and child-reported problem behaviors. This pattern could be evidence for

the “partners in crime” model of youth behavior, where youth model the poor behaviors of people to whom they feel a close bond or connection.

Limitations

This research study is limited in a number of important ways and more research is necessary to thoroughly understand how sibling relationships vary in different types of households and how they are related to the behavioral outcomes of children and youth. One of the biggest limitations of this study is with regard to the measurement of sibling relationship quality. Although the Fragile Families and Child Wellbeing Study included questions about the quality of sibling relationships in two waves (i.e., when the child was nine and 15), the study was not primarily designed to explore the nuances of sibling relationships and the types of sibling relationships children have today. Although children’s responses to the questions about the quality of sibling relationships were varied and insightful enough to give way for this study, nuanced analyses of the different measures of sibling relationships—conflict, warmth, jealousy and rivalry—were not possible in this data set. Furthermore, sibling relationships are dyadic relationships. To truly capture the quality of the relationship between a sibling dyad, it is important to consider the perceptions of both members of the dyad. In this study, sibling relationship quality refers to the quality as experienced by the focal child. The benefit of using FFCWS, however, was the ability to examine several important family characteristics such as instability and structure, which are not as easily done in other large data sets.

Another limitation in measurement is regarding the counts of different types of siblings in the household at ages nine and 15. In particular, with regard to stepsiblings in the household at age nine, the counts of stepsiblings was different depending on who was reporting it—the child or the mother. The mother was significantly under-reporting the number of stepchildren in the

house compared to the children. At age 15, an important limitation was that because the child was asked to provide overall counts of full, half, and stepsiblings in the household, I was not able to examine the effects of having an older sibling (which I suspect is quite significant in that age group), and the effects of having different sibling gender constellations.

We know from this study and from other research studies that self-reported data are often not as reliable as other sources of data. For example, there were fairly different results in behaviors at ages nine and 15 depending on who was reporting it—the child or the mother. An important limitation in this regard is the child-reported quality of sibling relationships. Observational data on sibling interactions would have provided a more systematic way to rate the quality of sibling relationships.

Although FFCWS is perhaps the best longitudinal data set to examine the different types of families, family relationships, and family transitions in the United States, families have since gotten more fluid and more diverse. The data set does not capture same-sex couples and same-sex couples with children

Finally, although the family contexts and family relationships have the greatest influence on children's development, it is very difficult to change or improve family processes through interventions or social policies. While this study underscores the potentially important influences of sibling relationships on the behavior outcomes of children, more work has to be done to explore how sibling relationships can be relevant in actionable work and application.

Implications

The centrality of sibling relationships in children's lives has largely gone unnoticed in the academic literature on family contexts and family relationships. The goal of this study was to add to the growing body of empirical research on the importance and relevance of sibling

relationships. The findings from this study can be used to inform family-based intervention programs for adolescents. Intervention programs that aim to increase prosocial behaviors and reduce problem behaviors for at-risk youth can begin to involve siblings, in addition to improving the quality of parent-child relationships. Targeting sibling pairs to improve social competencies such as conflict and aggression management might have promising outcomes.

One of the motivations for this study came from a recent study by Fahey (2017) that highlighted the demographic trend that has mostly gone unnoticed in the academic literature – namely, the convergence in sibsize (the number of siblings a child has) based on race and maternal education. Fahey (2017) argued that the positive effects of decreases in sibsize from the resource dilution perspective and the negative effects from what McLanahan (2004) called the “diverging destinies” of children—an increase in social disparities and parental resources between the least-educated mothers (who are also often single mothers, experience higher family instability, and have poorer job opportunities) and the highly educated mothers—might counterbalance one another, having a net neutral or potentially positive impact on children’s outcomes.

The present study found that generally, positive sibling relationships are associated with more positive behavior outcomes for children. Furthermore, there was some evidence to support that positive sibling relationships were protective for more certain groups, such as single-parent households and black families. These results imply that the demographic trend of sibsize convergence, as pointed out by Fahey (2017), might not necessarily have benefitted the children who were most negatively impacted by “diverging destinies,” as having fewer siblings may indicate lost opportunities for protective influences from siblings in the household for children with the fewest resources.

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Appendix A

Table 49. Measurement details for dependent variables in study

	Item Scoring	Measurement Items
Sibling relationship quality at age 9	Scale of 1 to 4, where 4 signifies the most positive relationship.	1) If one of your siblings is hurt or upset, how often do you try to make them feel better? (1=never, 2=sometimes, 3=often, 4=always)
Sibling relationship conflict at age 9	Scale of 1 to 4, where 4 signifies the most conflictual relationship.	1) Brothers and sisters sometimes cause trouble, start fights, or are mean to each other. How often would you say that you start fights, cause trouble, or are mean to your sibling(s)? (1=never, 2=sometimes, 3=often, 4=always)
Sibling relationship quality at age 15	Scale of 1 to 4, where 4 signifies the most positive relationship.	1) How well do you and your siblings get along? (4=extremely well, 3=quite well, 2=fairly well, 1=not very well)
Externalizing behaviors at age 9 (Child Behavior Checklist/6-18)	Sum of scores on the aggressive and rule breaking behavior subscales. (1=0, 2=1, 3=2)	1) Child argues a lot 2) Child is cruel to animals 3) Child is cruel, bullies, or shows meanness to others 4) Child demands a lot of attention 5) Child destroys his or her own things 6) Child destroys things belonging to family or others 7) Child is disobedient at home 8) Child is disobedient at school 9) Child gets in many fights 10) Child physically attacks people 11) Child screams a lot 12) Child is stubborn, sullen, or irritable 13) Child has sudden changes in mood or feelings 14) Child sulks a lot 15) Child is suspicious 16) Child teases a lot 17) Child has temper tantrums or a hot temper 18) Child threatens people 19) Child is unusually loud 20) Child doesn't seem to feel guilty after misbehaving

		<p>21) Child breaks rules at home, school, or elsewhere</p> <p>22) Child hangs around with others who get in trouble</p> <p>23) Child lies or cheats</p> <p>24) Child prefers being with older kids</p> <p>25) Child runs away from home</p> <p>26) Child sets fires</p> <p>27) Child has sexual problems</p> <p>28) Child steals at home</p> <p>29) Child steals outside the home</p> <p>30) Child swears or uses obscene language</p> <p>31) Child thinks about sex too much</p> <p>32) Child smokes, chews, or sniffs tobacco</p> <p>33) Child is truant, skips school</p> <p>34) Child uses alcohol or drugs for nonmedical purposes</p> <p>35) Child vandalizes</p>
Internalizing behaviors at age 9 (Child Behavior Checklist/6-18)	Sum of scores on the anxious/depressed, withdrawn/depressed, and somatic complaints subscales. (1=0, 2=1, 3=2)	<p>1) Child fears certain animals/situations/places other than school</p> <p>2) Child fears going to school</p> <p>3) Child fears he or she might do something bad</p> <p>4) Child feels he or she has to be perfect</p> <p>5) Child feels or complains that no one loves him or her</p> <p>6) Child feels others are out to get him or her</p> <p>7) Child feels worthless or inferior</p> <p>8) Child is nervous, highstrung, or tense</p> <p>9) Child is too fearful or anxious</p> <p>10) Child feels too guilty</p> <p>11) Child is self-conscious or easily embarrassed</p> <p>12) Child talks about killing self</p> <p>13) Child worries</p> <p>14) Child has nightmares</p> <p>15) Child feels dizzy or lightheaded</p> <p>16) Child is overtired without good reason</p> <p>17) Child has physical problems without known medical cause: Aches or pains</p>

		<p>18) Child has physical problems without known medical cause: Headaches</p> <p>19) Child has physical problems without known medical cause: Nausea</p> <p>20) Child has physical problems without known medical cause</p> <p>21) Child has rashes other skin problems without known medical cause</p> <p>22) Child has stomach aches or cramps without known medical cause.</p> <p>23) Child has vomiting, throwing up without known medical cause.</p> <p>24) Child has physical problems without known medical cause: Other</p> <p>25) Child enjoys very little</p> <p>26) Child would rather be alone than with others</p> <p>27) Child refuses to talk</p> <p>28) Child is secretive, keeps things to self</p> <p>29) Child is shy or timid</p> <p>30) Child is underactive, slow moving, or lacks energy</p> <p>31) Child is unhappy, sad, or depressed</p> <p>32) Child is withdrawn, doesn't get involved with others</p>
Externalizing behaviors at age 15 (Child Behavior Checklist/6-18)	Sum of scores on the aggressive and rule breaking behavior subscales. (1=0, 2=1, 3=2)	<p>1) Youth is cruel, bullies, or shows meanness to others</p> <p>2) Youth destroys things belonging to family or others</p> <p>3) Youth is disobedient at home</p> <p>4) Youth is disobedient at school</p> <p>5) Youth gets in many fights</p> <p>6) Youth physically attacks people</p> <p>7) Youth is stubborn, sullen, or irritable</p> <p>8) Youth has temper tantrums or a hot temper</p> <p>9) Youth threatens people</p> <p>10) Youth is unusually loud</p> <p>11) Youth argues a lot</p> <p>12) Youth doesn't seem to feel guilty after misbehaving</p> <p>13) Youth hangs around with others who get in trouble</p> <p>14) Youth lies or cheats</p> <p>15) Youth sets fires</p>

		16) Youth steals at home 17) Youth steals outside the home 18) Youth swears or uses obscene language 19) Youth vandalizes 20) Youth runs away from home
Internalizing behaviors at age 15 (Child Behavior Checklist/6-18)	Sum of scores on the anxious/depressed and withdrawn/depressed subscales. (1=0, 2=1, 3=2)	1) Youth cries a lot 2) Youth feels worthless or inferior 3) Youth is nervous, high-strung, or tense 4) Youth is too fearful or anxious 5) Youth feels too guilty 6) Youth worries 7) Youth is underactive, slow moving, or lacks energy 8) Youth is unhappy, sad or depressed
Child-reported vandalism at age 9	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	1) Purposely damaged or destroyed property 2) Thrown rocks or bottles at people or cars 3) Written things or sprayed paint on walls or sidewalks or cars 4) Purposely set fire to building, car, or other or tried to do so
Child-reported crimes against other people at age 9	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	1) Had a fist fight with another person 2) Thrown rocks or bottles at people or cars
Child-reported theft at age 9	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	1) Taken or stolen something 2) Taken money at home 3) Gone into somebody's garden/yard/house/garage when not supposed to 4) Avoided paying for things such as movies, bus or subway, or food
Child-reported drug/substance use at age 9	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	1) Secretly taken a sip of wine, beer, or liquor 2) Smoked marijuana, grass, pot, weed 3) Smoked a cigarette or used tobacco
Child-reported vandalism at age 15	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	1) Painted graffiti or signs on private property/public spaces 2) Deliberately damaged property that didn't belong to you

Child-reported crimes against other people at age 15	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	<ol style="list-style-type: none"> 1) Gotten into a serious physical fight 2) Hurt someone badly enough to need bandages or medical care 3) Taken part in a group fight
Child-reported theft at age 15	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	<ol style="list-style-type: none"> 1) Taken something from a store without paying for it 2) Driven a car without its owner's permission 3) Stolen something worth more than \$50 4) Gone into a house or building to steal something 5) Stolen something worth less than \$50
Child-reported drug/substance use at age 9	Binary measure (1=yes, 0=no) indicating whether child has engaged in one or more of the listed activities	<ol style="list-style-type: none"> 1) Ever smoked an entire cigarette 2) Ever drank alcohol more than two times without parents 3) Ever tried marijuana 4) Ever tried other illegal drugs besides marijuana 5) Ever used prescription drugs (not prescribed)

Table 50. Measurement details for independent variables and covariates in study

	Item Scoring	Measurement Items
Family structure at baseline	3 dummy coded variables indicating mother's relationship to child's father at baseline (age 0)	1) Single (reference category) 2) Cohabiting 3) Married
Family structure stability from age 0-15	6 dummy coded variables based on mother's relationship status with the child's father at baseline and subsequent changes in the mother's relationship status	1) Stably single – single at child's birth, and the 5 subsequent waves 2) Stably cohabiting – cohabiting with child's father at child's birth, and the 5 subsequent waves 3) Stably married (reference category) – married to child's father at child's birth, and the 5 subsequent waves 4) Unstably single – single at child's birth but experiences at least 1 partnership transition in the 5 subsequent waves 5) Unstably cohabiting – cohabiting with child's father at child's birth but experiences at least 1 partnership transition in the 5 subsequent waves 6) Unstably married – married to the child's father at child's birth but experiences at least 1 partnership transition during the 5 subsequent waves
Family instability	Continuous variable	The total number of co-residential transitions (entrances and exits of a biological and/or social father) that the focal child experiences between the ages of 0 and 15, resulting from the mother's partnership formation or partnership dissolution. For mothers who missed a wave but was observed at wave 5, I use the union history collected at wave 5 to complete the number of transitions.
Maternal race	4 dummy coded variables	1) Black 2) Hispanic 3) Other 4) White (reference category)
Mother's age	Continuous variable	Self-reported age of the mother at child's birth

Mother's education	4 dummy coded variables from mother's self-report at child's birth	1) Less than HS 2) HS graduate 3) Some college 4) College graduate (reference category)
Ratio of mother's household income/poverty threshold	Continuous variable; ratios below 1 indicate that the household income is below the official poverty threshold	Ratio of mother-reported household income to the federal poverty threshold at child's birth
Child's gender	2 dummy coded variables	1) Female 2) Male (reference category)
Total number of siblings at age 9	A count of the total number of children in the household that the mother indicated to be her biological child, step child, foster child, and other unrelated child.	Household matrix at age 9: At age 9, the mother was asked to list every member co-residing with her and her child in the home. She was also asked to report his/her relationship to her (biological child, step child, foster child, or other unrelated child, mother, father, grandmother, grandfather, etc.).
Half-siblings present at age 9	A binary variable indicating the presence of a half-sibling in the home. I determined whether the child was a half-sibling to the focal child by looking at whether the mom reported having a child with a different partner (other than the focal child's biological father), and whether the child lived with her.	She was also asked to indicate the person's gender and age.
Stepsibling present at age 9	A binary variable indicating the presence of a stepsibling in the home. The mother was explicitly asked to indicate whether the child living in the home was a step child.	

Older sibling present at age 9	<p>A binary variable indicating the presence of an older sibling.</p> <p>For every child the mom listed as living in the home, the mother was also asked to report his/her age. Because of the children were between the ages of 8-10 at the time of the age 9 data collection, I counted there being an older sibling if there was a child older than 10 years living in the home.</p>	
All siblings female	A binary variable indicating that the focal child, as well as every sibling in the home, is female.	
All siblings male	A binary variable indicating that the focal child, as well as every sibling in the home, is male.	
Total number of siblings at age 15	A count of the total number of full, half and stepsiblings in the home.	<p>Youth were asked “How many full siblings do you live with?”</p> <p>I added this number to the total number of half and stepsiblings (below).</p>
Half-siblings present at age 15	A binary variable indicating the presence of a half-sibling in the home.	Youth were asked “How many half-siblings do you live with?”
Stepsibling present at age 15	A binary variable indicating the presence of a stepsibling in the home.	Youth were asked “How many stepsiblings do you live with?”
Child’s report of closeness to mom at age 9	Binary variable indicating whether the child is extremely close (1) vs. quite, fairly, or not very close (0)	<p>1) How close do you feel to your mom? (1=extremely close, 2=quite close, 3=fairly close, 4=not very close)</p> <p>If the child has not seen his/her mom in the past year, the child was not asked</p>

		this question, and I code these relationships to be “not very close.”
Child’s report of closeness to dad at age 9	Binary variable indicating whether the child is extremely close (1) vs. quite, fairly, or not very close (0)	1) How close do you feel to your dad? (1=extremely close, 2=quite close, 3=fairly close, 4=not very close) If the child has not seen his/her dad in the past year, the child was not asked this question, and I code these relationships to be “not very close.”
Child’s report of closeness to mom at age 15	Binary variable indicating whether the child is extremely close (1) vs. quite, fairly, or not very close (0)	1) How close do you feel to your mom? (1=extremely close, 2=quite close, 3=fairly close, 4=not very close) If the child has not seen his/her mom in the past year, the child was not asked this question, and I code these relationships to be “not very close.”
Child’s report of closeness to dad at age 15	Binary variable indicating whether the child is extremely close (1) vs. quite, fairly, or not very close (0)	1) How close do you feel to your dad? (1=extremely close, 2=quite close, 3=fairly close, 4=not very close) If the child has not seen his/her dad in the past year, the child was not asked this question, and I code these relationships to be “not very close.”
Parent’s relationship quality at age 9	Continuous variable that indicates mother’s rating of her relationship quality with the child’s father when the child is 9. Mothers who have no relationship with the child’s father or has not seen him in the past year are coded as 0.	How good is your relationship with the child’s father? (0=no relationship, 1=poor, 2=fair, 3=good, 4=very good, 5=excellent)
Parent’s relationship quality at age 15	I use either the mother-report or father-report relationship quality variable depending on who the child is living with (mostly the mom) at age 15.	How good is your relationship with the child’s father? (1=poor, 2=fair, 3=good, 4=very good, 5=excellent) How good is your relationship with the child’s mother? (1=poor, 2=fair, 3=good, 4=very good, 5=excellent)

	<p>Continuous variable that indicates the quality of the relationship between the biological parents of the youth.</p> <p>Parents who have no relationship with one another or who report not having seen one another in the past year are coded as 0.</p>	
<p>Externalizing behaviors at age 5 (Child Behavior Checklist/4-18)</p>	<p>Sum of scores on the aggressive and delinquent behavior subscales. (1=0, 2=1, 3=2)</p>	<ol style="list-style-type: none"> 1. Doesn't seem to feel guilt after misbehaving 2. Hangs around w/ others who get in trouble 3. Lies or cheats 4. Prefers being with older kids 5. Runs away from home 6. Sets fire 7. Steals at home 8. Steals outside home 9. Swears or uses obscene language 10. Vandalizes 11. Argues a lot 12. Brags or boasts 13. Cruel, bullying or mean to others 14. Demands a lot of attention 15. Destroys his/her own things 16. Destroys things belonging to family/others 17. Disobedient at home 18. Disobedient in school 19. Easily jealous 20. Gets in many fights 21. Physically attacks people 22. Screams a lot 23. Showing off/clowning 24. Stubborn/sullen/irritable 25. Has sudden changes in mood or feelings 26. Variable Talks too much 27. Teases a lot 28. Has temper tantrums or hot temper

Internalizing behaviors at age 5 (Child Behavior Checklist/4-18)	Sum of scores on the withdrawn and anxious/depressed subscales. (1=0, 2=1, 3=2)	<p>29. Threatens people 30. Unusually loud</p> <hr/> <p>1. Complains of loneliness 2. Cries a lot 3. Fears s/he might think/do something wrong 4. Feels s/he has to be perfect 5. Feels/complains no one loves him/her 6. Feels others out to get him/her 7. Feels worthless/inferior 8. Nervous, high strung or tense 9. Too fearful or anxious 10. Feels too guilty 11. Self-conscious or easily embarrassed 12. Suspicious 13. Unhappy, sad or depressed 14. Worries 15. Would rather be alone than with others 16. Refuses to talk 17. Secretive, keeps things to self 18. Shy or timid 19. Stares blankly 20. Sulks a lot 21. Underactive, slow moving, lacks energy 22. Unhappy, sad or depressed 23. Withdrawn, doesn't get involved with others</p>
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Appendix B

A note about sibling samples for ages nine and 15

Figure 9 and Figure 10 below show the breakdown of siblings for ages nine and 15. At age 15, children were explicitly asked to give the total number of full, half, and stepsiblings co-residing with them in the household and I drew on these questions to code the types of siblings in the home.

For age nine, I used a combination of mother-reported and child-reported data to deduce the total number of full, half and stepsiblings in the household. In this process, I found that there was a discrepancy in the number of co-resident stepsiblings as reported by the child and the child's mother in the FFCWS data set. The child was asked whether his/her social father had any children living with them ("Does [social father] have any children living with you here?"), to which 248 children answered yes. According to the child-reported data, then, there are 248 children living with at least one stepsibling when they are nine years of age.

Also at age nine, the child's mother was asked to list every member of the household along with their relationship to her. One of the options for relationship in this survey question was "stepchild." Using this measure, only 77 mothers indicated co-residing with her stepchild.

There are a number of reasons for the discrepancy between the child's report and the mother's report of the total number of stepsiblings/stepchildren in the household. First, there were a number of instances where the child reported having a stepsibling and the mother did not report having a stepchild, but the mother had a child with a new partner (social father). Because the question asked the child whether the social father had any children living with them, the child

may be including half-siblings in their responses. Secondly, there are a number of cases where the mother reported having a stepchild in the house, but the child reports not living with the children of his/her social father. In examining the survey of fathers, it appears that mothers are counting as “stepchildren” the children of the child’s biological father from his previous marriages. These children would not be stepsiblings to the focal child as they share a father, so the children may not be including them in their responses.

For this study, I used a combination of the child-report and mother-report of stepsiblings in the household. I used the child’s report of living with the child of his/her social father, and added the instances of the mother-report of having co-resident stepchildren in cases where the child did not indicate having a stepsibling.

To deduce the number of co-resident half-siblings at age nine, I examine two questions from the mother survey – the household matrix question asking for the number of biological children in the household, and a question that asks the mother to name the father of each of her biological children. If the mother names a different father for any of her co-resident biological children, then I infer that the focal child has a co-resident half-sibling.

Figure 9. Sibling breakdowns for age nine sample

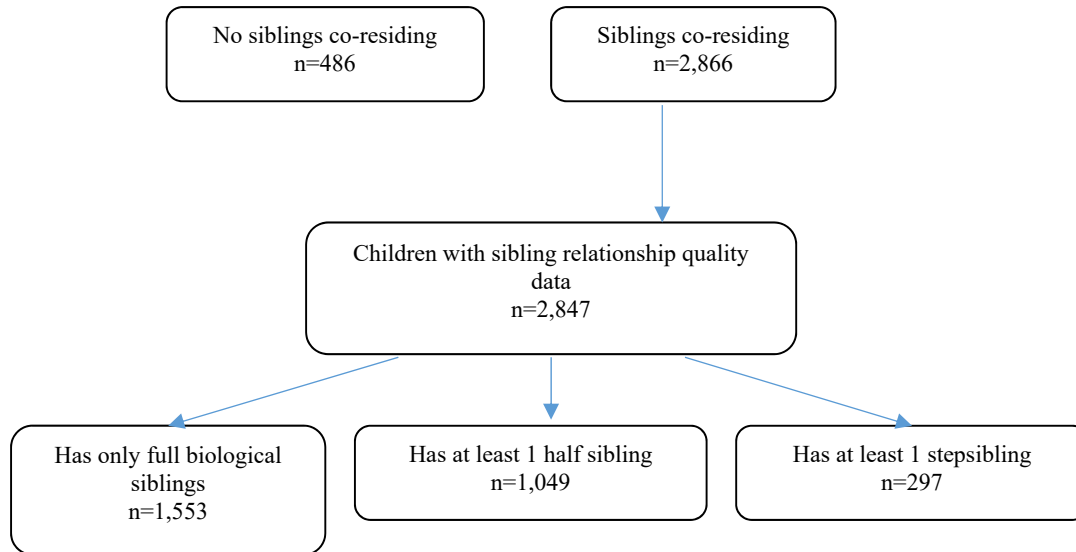
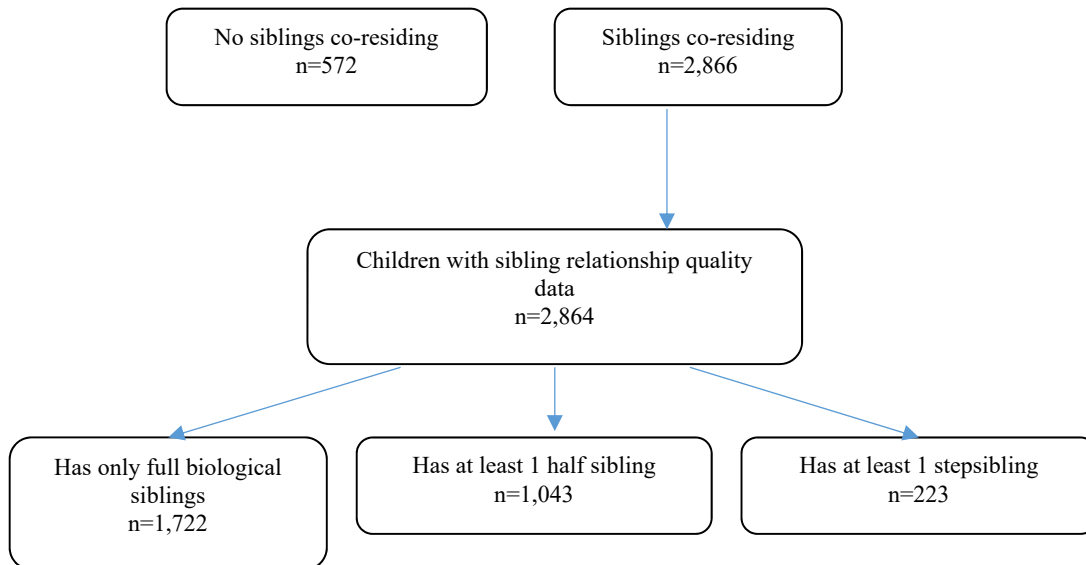


Figure 10. Sibling breakdown for age 15 sample



Appendix C

Table 51. Regression estimates for externalizing behaviors on sibling relationship quality at age 9.

	Externalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.224 (0.140)	-0.231 (0.140)	-0.087 (0.138)	-0.111 (0.138)	-0.050 (0.139)
Family structure at baseline (ref: Married)					
Single	1.402*** (0.355)	1.110** (0.377)	0.886* (0.379)	0.727 (0.445)	0.471 (0.452)
Cohabiting	1.084** (0.356)	0.872* (0.367)	0.779* (0.366)	0.624 (0.420)	0.509 (0.421)
Externalizing behaviors age 5	0.397*** (0.020)	0.392*** (0.020)	0.395*** (0.019)	0.389*** (0.020)	0.383*** (0.020)
Family instability		0.288* (0.124)	0.307* (0.124)	0.268* (0.125)	0.221 (0.128)
Child/Sibling characteristics					
Child female			-1.025** (0.321)	-1.029** (0.322)	-0.965** (0.322)
Total number of siblings			0.157 (0.143)	0.094 (0.145)	0.091 (0.145)
Half sibling present			-0.007 (0.339)	0.020 (0.342)	-0.046 (0.345)
Step sibling present			-0.108 (0.632)	-0.085 (0.633)	-0.061 (0.632)
Older sibling present			0.153 (0.301)	0.258 (0.329)	0.300 (0.329)
Siblings all female			0.910* (0.435)	0.902* (0.435)	0.905* (0.435)
Siblings all male			0.374 (0.410)	0.344 (0.411)	0.377 (0.410)
Mother's race (ref: White)					
Black				-1.275** (0.423)	-1.163** (0.423)
Hispanic				-1.694*** (0.506)	-1.591** (0.505)
Other				0.077 (0.802)	0.087 (0.800)
Mother's age				-0.023	-0.024

				(0.030)	(0.030)
Mother's education (ref: College graduate)					
Mother less than HS				0.320	0.304
				(0.654)	(0.654)
Mother HS graduate				0.137	0.109
				(0.615)	(0.615)
Mother some college				-0.191	-0.218
				(0.581)	(0.581)
Household poverty				-0.153*	-0.137
				(0.078)	(0.078)
Quality of other family relationships					
Child close to mother					-0.748*
					(0.332)
Child close to father					-0.489
					(0.311)
Mother's relationship quality with father					-0.127
					(0.101)
Intercept	1.483	1.472	0.944	3.223*	4.373**
	(1.068)	(1.067)	(1.097)	(1.595)	(1.644)
R ²	0.169	0.171	0.195	0.202	0.207
n	2407	2407	2245	2239	2236

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 52. Regression estimates for externalizing behaviors on sibling relationship quality at age 9.

	Externalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.257 (0.140)	-0.260 (0.140)	-0.113 (0.140)	-0.143 (0.141)	-0.089 (0.142)
Family structure (ref: Stably married)					
Stably single	1.746** (0.614)	1.769** (0.613)	1.848** (0.629)	1.871** (0.709)	1.455* (0.739)
Stably cohabiting	0.965 (0.793)	0.960 (0.792)	0.935 (0.780)	0.885 (0.834)	0.685 (0.835)
Unstably single	1.708*** (0.412)	0.932 (0.503)	0.941 (0.506)	0.937 (0.581)	0.725 (0.592)
Unstably cohabiting	1.530*** (0.405)	0.979* (0.454)	1.117* (0.456)	1.119* (0.527)	0.964 (0.534)
Unstably married	1.665** (0.623)	0.980 (0.672)	1.407* (0.670)	1.484* (0.690)	1.316 (0.701)
Externalizing behaviors age 5	0.400*** (0.020)	0.396*** (0.020)	0.397*** (0.020)	0.392*** (0.020)	0.389*** (0.020)
Family instability		0.410** (0.153)	0.335* (0.153)	0.303 (0.155)	0.268 (0.157)
Child/Sibling characteristics					
Child female			-1.088*** (0.326)	-1.103*** (0.326)	-1.038** (0.327)
Total number of siblings			0.205 (0.144)	0.144 (0.147)	0.128 (0.147)
Half sibling present			-0.093 (0.345)	-0.063 (0.347)	-0.078 (0.350)
Step sibling present			-0.131 (0.641)	-0.135 (0.642)	-0.106 (0.641)
Older sibling present			0.062 (0.306)	0.246 (0.334)	0.273 (0.334)
Siblings all female			0.769 (0.439)	0.771 (0.440)	0.773 (0.439)
Siblings all male			0.268 (0.417)	0.244 (0.418)	0.274 (0.418)
Mother's race (ref: White)					
Black				-1.341** (0.427)	-1.208** (0.428)
Hispanic				-1.593**	-1.498**

				(0.510)	(0.510)
Other				0.274	0.284
				(0.819)	(0.818)
Mother's age				-0.032	-0.033
				(0.030)	(0.030)
Mother's education (ref: College graduate)					
Mother less than HS				0.087	0.093
				(0.677)	(0.677)
Mother HS graduate				-0.190	-0.192
				(0.636)	(0.636)
Mother some college				-0.562	-0.563
				(0.600)	(0.600)
Household poverty				-0.126	-0.119
				(0.080)	(0.080)
Quality of other family relationships					
Child close to mother					-0.835*
					(0.336)
Child close to father					-0.399
					(0.316)
Mother's relationship quality with father					-0.058
					(0.105)
Intercept	1.226	1.337	0.759	3.281*	4.298*
	(1.070)	(1.070)	(1.121)	(1.628)	(1.692)
R ²	0.182	0.184	0.203	0.21	0.214
n	2317	2317	2180	2174	2172

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 53. Regression estimates for internalizing behaviors on sibling relationship quality at age 9.

	Internalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.079 (0.114)	-0.078 (0.114)	-0.003 (0.110)	0.005 (0.111)	0.041 (0.112)
Family structure at baseline (ref: Married)					
Single	0.351 (0.288)	0.404 (0.306)	0.220 (0.303)	0.471 (0.356)	0.286 (0.362)
Cohabiting	0.293 (0.290)	0.331 (0.299)	0.173 (0.293)	0.383 (0.336)	0.295 (0.337)
Internalizing behaviors age 5	0.490*** (0.029)	0.491*** (0.029)	0.502*** (0.028)	0.490*** (0.028)	0.486*** (0.028)
Family instability		-0.051 (0.101)	-0.035 (0.098)	-0.006 (0.100)	-0.056 (0.103)
Child/Sibling characteristics					
Child female			0.020 (0.257)	0.013 (0.257)	0.043 (0.258)
Total number of siblings			-0.224* (0.114)	-0.238* (0.116)	-0.230* (0.116)
Half sibling present			0.304 (0.271)	0.331 (0.273)	0.248 (0.276)
Step sibling present			0.441 (0.505)	0.467 (0.506)	0.456 (0.506)
Older sibling present			-0.240 (0.241)	-0.407 (0.263)	-0.382 (0.263)
Siblings all female			0.760* (0.348)	0.773* (0.348)	0.764* (0.348)
Siblings all male			0.026 (0.327)	-0.046 (0.328)	-0.047 (0.328)
Mother's race (ref: White)					
Black				-0.908** (0.338)	-0.858* (0.339)
Hispanic				-0.574 (0.404)	-0.527 (0.405)
Other				0.370 (0.641)	0.360 (0.640)
Mother's age				0.052* (0.024)	0.051* (0.024)
Mother's education (ref: College graduate)					

Mother less than HS				0.191	0.139
				(0.523)	(0.523)
Mother HS graduate				-0.057	-0.119
				(0.492)	(0.492)
Mother some college				-0.366	-0.436
				(0.465)	(0.465)
Household poverty				-0.102	-0.092
				(0.062)	(0.062)
Quality of other family relationships					
Child close to mother					-0.525*
					(0.266)
Child close to father					-0.100
					(0.249)
Mother's relationship quality with father					-0.163*
					(0.080)
Intercept	3.182***	3.187***	3.491***	2.889*	3.918**
	(0.868)	(0.868)	(0.877)	(1.274)	(1.314)
R ²	0.123	0.123	0.148	0.154	0.159
n	2407	2407	2245	2239	2236

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 54. Regression estimates for internalizing behaviors on sibling relationship quality at age 9.

	Internalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship quality	-0.110 (0.112)	-0.110 (0.112)	-0.021 (0.111)	-0.016 (0.111)	0.012 (0.112)
Family structure (ref: Stably married)					
Stably single	0.777 (0.490)	0.775 (0.491)	0.702 (0.497)	1.192* (0.561)	0.869 (0.585)
Stably cohabiting	0.541 (0.636)	0.541 (0.636)	0.465 (0.619)	0.760 (0.660)	0.616 (0.662)
Unstably single	0.449 (0.328)	0.523 (0.402)	0.506 (0.400)	0.914* (0.459)	0.735 (0.469)
Unstably cohabiting	0.553 (0.324)	0.605 (0.364)	0.531 (0.361)	0.912* (0.418)	0.773 (0.423)
Unstably married	1.057* (0.498)	1.122* (0.539)	1.261* (0.530)	1.509** (0.546)	1.330* (0.556)
Internalizing behaviors age 5	0.500*** (0.028)	0.500*** (0.028)	0.508*** (0.028)	0.497*** (0.028)	0.494*** (0.028)
Family instability		-0.039 (0.122)	-0.095 (0.121)	-0.075 (0.122)	-0.106 (0.124)
Child/Sibling characteristics					
Child female			-0.049 (0.258)	-0.066 (0.258)	-0.029 (0.259)
Total number of siblings			-0.191 (0.114)	-0.201 (0.116)	-0.202 (0.116)
Half sibling present			0.226 (0.273)	0.243 (0.275)	0.206 (0.277)
Step sibling present			0.420 (0.507)	0.422 (0.508)	0.415 (0.508)
Older sibling present			-0.263 (0.242)	-0.364 (0.264)	-0.344 (0.265)
Siblings all female			0.640 (0.347)	0.652 (0.348)	0.646 (0.348)
Siblings all male			-0.007 (0.330)	-0.078 (0.331)	-0.069 (0.331)
Mother's race (ref: White)					
Black				-0.916** (0.338)	-0.854* (0.340)
Hispanic				-0.621	-0.580

				(0.404)	(0.404)
Other				0.500	0.487
				(0.649)	(0.648)
Mother's age				0.043	0.042
				(0.024)	(0.024)
Mother's education (ref: College graduate)					
Mother less than HS				0.123	0.095
				(0.535)	(0.536)
Mother HS graduate				-0.141	-0.180
				(0.503)	(0.503)
Mother some college				-0.576	-0.615
				(0.475)	(0.476)
Household poverty				-0.062	-0.059
				(0.063)	(0.063)
Quality of other family relationships					
Child close to mother					-0.543*
					(0.267)
Child close to father					-0.059
					(0.251)
Mother's relationship quality with father					-0.105
					(0.083)
Intercept	3.108***	3.098***	3.371***	2.864*	3.753**
	(0.857)	(0.857)	(0.887)	(1.289)	(1.340)
R ²	0.139	0.139	0.157	0.164	0.167
n	2317	2317	2180	2174	2172

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 55. Regression estimates for externalizing behaviors on sibling relationship conflict at age 9.

	Externalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship conflict	0.355*	0.353*	0.525***	0.511***	0.501***
	(0.152)	(0.152)	(0.150)	(0.150)	(0.150)
Family structure at baseline (ref: Married)					
Single	1.450***	1.158**	0.962*	0.787	0.541
	(0.357)	(0.379)	(0.380)	(0.445)	(0.452)
Cohabiting	1.122**	0.913*	0.848*	0.684	0.563
	(0.358)	(0.369)	(0.366)	(0.420)	(0.421)
Externalizing behaviors age 5	0.393***	0.388***	0.388***	0.384***	0.378***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Family instability		0.287*	0.308*	0.272*	0.223
		(0.124)	(0.124)	(0.125)	(0.128)
Child/Sibling characteristics					
Child female			-1.074***	-1.075***	-1.002**
			(0.322)	(0.322)	(0.322)
Total number of siblings			0.177	0.116	0.109
			(0.143)	(0.145)	(0.145)
Half sibling present			0.002	0.023	-0.039
			(0.339)	(0.342)	(0.345)
Step sibling present			-0.109	-0.082	-0.064
			(0.631)	(0.632)	(0.631)
Older sibling present			0.108	0.184	0.223
			(0.301)	(0.330)	(0.330)
Siblings all female			0.964*	0.950*	0.948*
			(0.435)	(0.436)	(0.435)
Siblings all male			0.364	0.332	0.360
			(0.409)	(0.411)	(0.410)
Mother's race (ref: White)					
Black				-1.156**	-1.074*
				(0.423)	(0.423)
Hispanic				-1.604**	-1.524**
				(0.506)	(0.505)
Other				0.173	0.172
				(0.802)	(0.800)
Mother's age				-0.017	-0.019
				(0.030)	(0.030)
Mother's education (ref: College graduate)					

Mother less than HS				0.322	0.316
				(0.654)	(0.653)
Mother HS graduate				0.119	0.100
				(0.615)	(0.614)
Mother some college				-0.171	-0.196
				(0.582)	(0.581)
Household poverty				-0.155*	-0.142
				(0.078)	(0.078)
Quality of other family relationships					
Child close to mother					-0.757*
					(0.330)
Child close to father					-0.456
					(0.310)
Mother's relationship quality with father					-0.132
					(0.100)
Intercept	-0.060	-0.089	-0.542	1.477	2.921
	(1.030)	(1.029)	(1.053)	(1.559)	(1.619)
R ²	0.169	0.171	0.198	0.205	0.21
n	2397	2397	2236	2230	2230

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 56. Regression estimates for externalizing behaviors on sibling relationship conflict at age 9.

	Externalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship conflict	0.368*	0.363*	0.497**	0.479**	0.468**
	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)
Family structure (ref: Stably married)					
Stably single	1.833**	1.855**	1.937**	1.930**	1.507*
	(0.616)	(0.615)	(0.629)	(0.708)	(0.738)
Stably cohabiting	0.974	0.968	0.963	0.897	0.691
	(0.795)	(0.794)	(0.780)	(0.833)	(0.834)
Unstably single	1.768***	1.002*	1.051*	1.026	0.812
	(0.414)	(0.506)	(0.508)	(0.582)	(0.593)
Unstably cohabiting	1.580***	1.038*	1.213**	1.200*	1.033
	(0.407)	(0.456)	(0.458)	(0.528)	(0.535)
Unstably married	1.678**	1.004	1.447*	1.513*	1.333
	(0.624)	(0.674)	(0.670)	(0.690)	(0.701)
Externalizing behaviors age 5	0.396***	0.392***	0.391***	0.387***	0.383***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Family instability		0.403**	0.325*	0.295	0.261
		(0.153)	(0.153)	(0.155)	(0.157)
Child/Sibling characteristics					
Child female			-1.149***	-1.161***	-1.079***
			(0.327)	(0.327)	(0.327)
Total number of siblings			0.223	0.166	0.146
			(0.144)	(0.147)	(0.147)
Half sibling present			-0.092	-0.067	-0.073
			(0.345)	(0.347)	(0.350)
Step sibling present			-0.139	-0.137	-0.117
			(0.641)	(0.641)	(0.641)
Older sibling present			0.019	0.174	0.205
			(0.306)	(0.335)	(0.335)
Siblings all female			0.820	0.817	0.815
			(0.440)	(0.441)	(0.440)
Siblings all male			0.245	0.220	0.255
			(0.417)	(0.418)	(0.418)
Mother's race (ref: White)					
Black				-1.220**	-1.117**
				(0.428)	(0.428)
Hispanic				-1.512**	-1.437**

				(0.511)	(0.510)
Other				0.357	0.355
				(0.820)	(0.818)
Mother's age				-0.025	-0.028
				(0.030)	(0.030)
Mother's education (ref: College graduate)					
Mother less than HS				0.080	0.102
				(0.677)	(0.676)
Mother HS graduate				-0.205	-0.200
				(0.636)	(0.635)
Mother some college				-0.547	-0.543
				(0.601)	(0.600)
Household poverty				-0.130	-0.124
				(0.080)	(0.080)
Quality of other family relationships					
Child close to mother					-0.851*
					(0.335)
Child close to father					-0.373
					(0.316)
Mother's relationship quality with father					-0.061
					(0.105)
Intercept	-0.466	-0.357	-0.751	1.499	2.779
	(1.031)	(1.030)	(1.074)	(1.591)	(1.665)
R ²	0.182	0.184	0.205	0.212	0.217
n	2308	2308	2172	2166	2166

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 57. Regression estimates for internalizing behaviors on sibling relationship conflict at age 9.

	Internalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship conflict	-0.059 (0.123)	-0.059 (0.123)	0.063 (0.120)	0.065 (0.120)	0.062 (0.120)
Family structure at baseline (ref: Married)					
Single	0.318 (0.290)	0.374 (0.308)	0.218 (0.304)	0.478 (0.357)	0.300 (0.363)
Cohabiting	0.272 (0.291)	0.312 (0.301)	0.174 (0.294)	0.390 (0.337)	0.307 (0.338)
Internalizing behaviors age 5	0.492*** (0.029)	0.493*** (0.029)	0.502*** (0.028)	0.490*** (0.028)	0.485*** (0.028)
Family instability		-0.055 (0.101)	-0.038 (0.099)	-0.008 (0.100)	-0.054 (0.103)
Child/Sibling characteristics					
Child female			0.011 (0.258)	0.007 (0.258)	0.047 (0.258)
Total number of siblings			-0.216 (0.114)	-0.229* (0.116)	-0.227 (0.116)
Half sibling present			0.293 (0.272)	0.323 (0.274)	0.247 (0.277)
Step sibling present			0.432 (0.506)	0.459 (0.507)	0.451 (0.506)
Older sibling present			-0.263 (0.241)	-0.438 (0.265)	-0.403 (0.265)
Siblings all female			0.760* (0.349)	0.774* (0.350)	0.766* (0.349)
Siblings all male			0.011 (0.328)	-0.060 (0.329)	-0.051 (0.329)
Mother's race (ref: White)					
Black				-0.900** (0.340)	-0.855* (0.340)
Hispanic				-0.573 (0.406)	-0.526 (0.406)
Other				0.360 (0.643)	0.361 (0.642)
Mother's age				0.052* (0.024)	0.051* (0.024)
Mother's education (ref: College graduate)					

Mother less than HS				0.156	0.142
				(0.524)	(0.524)
Mother HS graduate				-0.092	-0.120
				(0.493)	(0.492)
Mother some college				-0.397	-0.435
				(0.466)	(0.466)
Household poverty				-0.103	-0.090
				(0.062)	(0.062)
Quality of other family relationships					
Child close to mother					-0.513
					(0.265)
Child close to father					-0.086
					(0.250)
Mother's relationship quality with father					-0.162*
					(0.081)
Intercept	3.074***	3.081***	3.349***	2.775*	3.878**
	(0.840)	(0.840)	(0.846)	(1.251)	(1.299)
R ²	0.122	0.123	0.148	0.154	0.159
n	2397	2397	2236	2230	2230

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

Table 58. Regression estimates for internalizing behaviors on sibling relationship conflict at age 9.

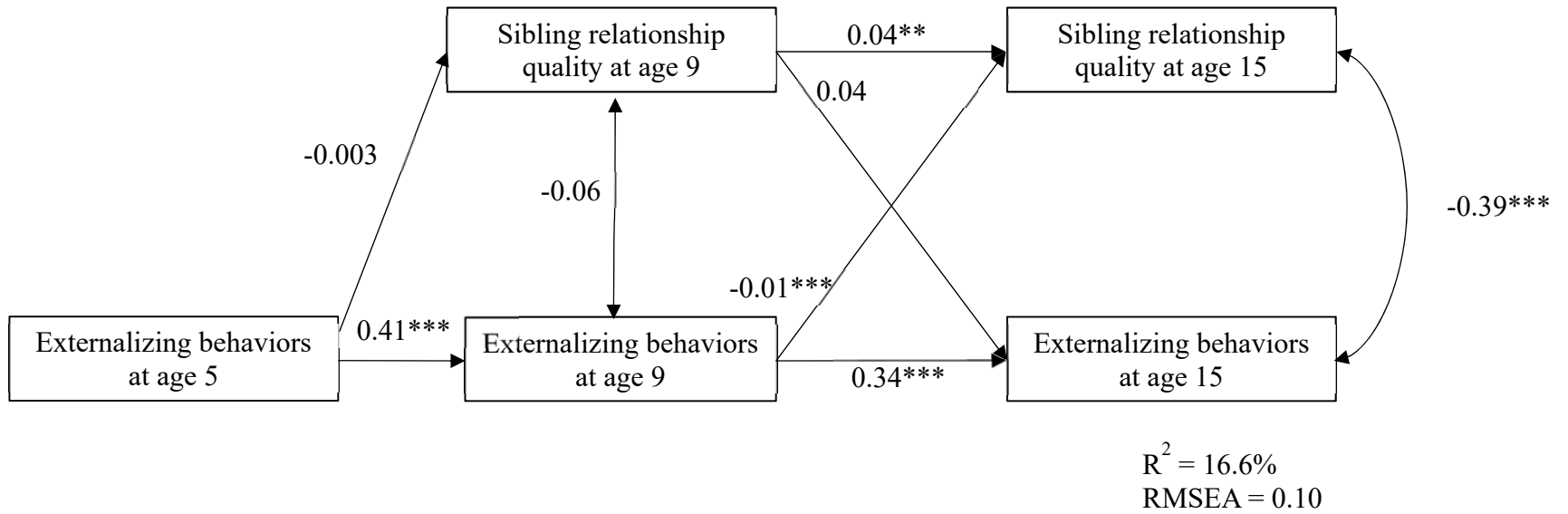
	Internalizing behaviors at age 9				
	Model 1	Model 2	Model 3	Model 4	Model 5
Sibling relationship conflict	-0.029 (0.121)	-0.029 (0.121)	0.054 (0.120)	0.051 (0.121)	0.047 (0.121)
Family structure (ref: Stably married)					
Stably single	0.747 (0.492)	0.745 (0.492)	0.688 (0.498)	1.188* (0.561)	0.879 (0.586)
Stably cohabiting	0.500 (0.638)	0.500 (0.638)	0.443 (0.620)	0.749 (0.661)	0.617 (0.663)
Unstably single	0.408 (0.330)	0.484 (0.405)	0.494 (0.403)	0.914* (0.461)	0.747 (0.471)
Unstably cohabiting	0.527 (0.326)	0.581 (0.366)	0.525 (0.363)	0.915* (0.419)	0.784 (0.425)
Unstably married	1.027* (0.499)	1.095* (0.540)	1.243* (0.532)	1.497** (0.547)	1.326* (0.557)
Internalizing behaviors age 5	0.501*** (0.028)	0.502*** (0.028)	0.508*** (0.028)	0.497*** (0.028)	0.493*** (0.028)
Family instability		-0.040 (0.123)	-0.097 (0.121)	-0.077 (0.123)	-0.106 (0.125)
Child/Sibling characteristics					
Child female			-0.060 (0.259)	-0.074 (0.259)	-0.027 (0.260)
Total number of siblings			-0.183 (0.115)	-0.191 (0.117)	-0.198 (0.117)
Half sibling present			0.216 (0.274)	0.235 (0.275)	0.203 (0.278)
Step sibling present			0.411 (0.508)	0.414 (0.509)	0.408 (0.509)
Older sibling present			-0.281 (0.243)	-0.387 (0.266)	-0.358 (0.266)
Siblings all female			0.640 (0.349)	0.652 (0.349)	0.645 (0.349)
Siblings all male			-0.021 (0.331)	-0.090 (0.332)	-0.074 (0.331)
Mother's race (ref: White)					
Black				-0.907** (0.340)	-0.849* (0.340)
Hispanic				-0.621	-0.580

				(0.405)	(0.405)
Other				0.486	0.485
				(0.650)	(0.650)
Mother's age				0.044	0.043
				(0.024)	(0.024)
Mother's education (ref: College graduate)					
Mother less than HS				0.085	0.094
				(0.536)	(0.536)
Mother HS graduate				-0.179	-0.185
				(0.504)	(0.504)
Mother some college				-0.608	-0.616
				(0.476)	(0.476)
Household poverty				-0.063	-0.057
				(0.064)	(0.064)
Quality of other family relationships					
Child close to mother					-0.538*
					(0.266)
Child close to father					-0.049
					(0.252)
Mother's relationship quality with father					-0.104
					(0.083)
Intercept	2.831***	2.820***	3.187***	2.705*	3.654**
	(0.828)	(0.829)	(0.854)	(1.263)	(1.322)
R ²	0.139	0.139	0.157	0.164	0.167
n	2308	2308	2172	2166	2166

Note. Unstandardized coefficients presented. Numbers in the parentheses are SEs. All models control for city of residence.

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

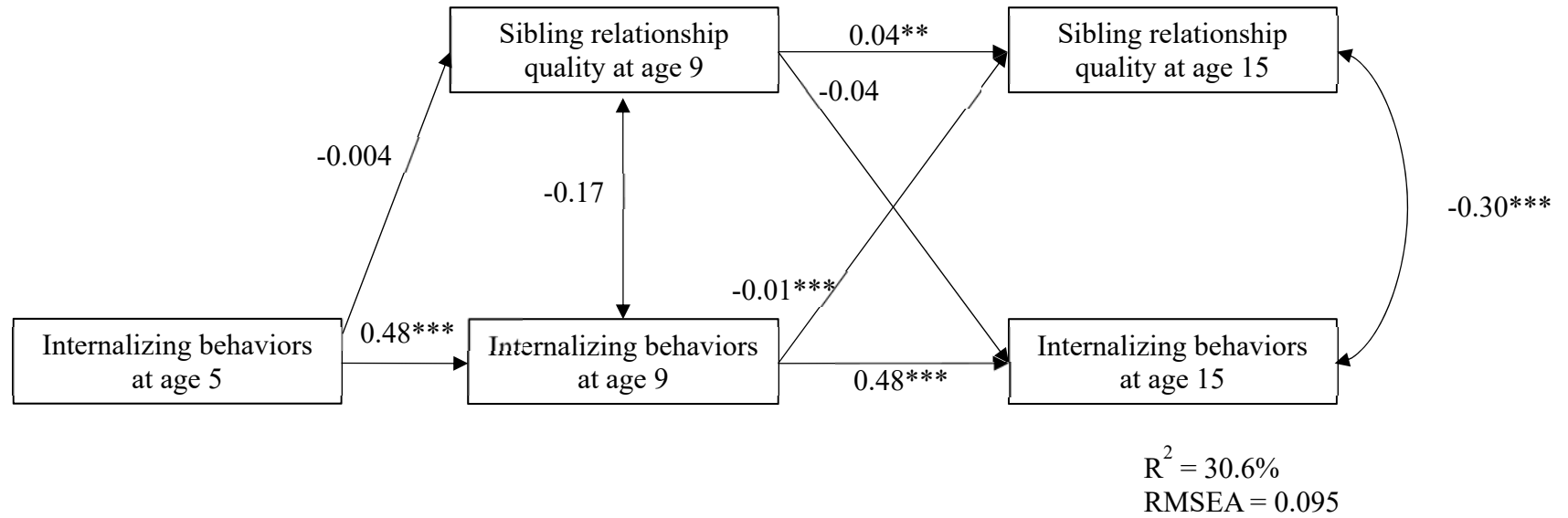
Figure 11. Results from a cross-lagged SEM path model from age 5 to 15 for sibling relationship quality and externalizing behaviors



218

Values shown are standardized coefficients. Model controls for all study covariates and city of residence. $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 12. Results from a cross-lagged SEM path model from age 5 to 15 for sibling relationship quality and internalizing behaviors



Values shown are standardized coefficients. Model controls for all study covariates and city of residence. $p < .05$, ** $p < .01$, *** $p < .001$.

Appendix D

Robustness checks

Table 59. Logistic regression estimates for the top quartile of problem behaviors on sibling relationship quality and conflict at age 9

	Top 25%		
	Externalizing behaviors	Internalizing behaviors	Delinquent behaviors
Sibling relationship quality	1.017 (0.057)	1.019 (0.057)	0.947 (0.046)
Sibling relationship conflict	1.139* (0.068)	1.057 (0.064)	1.518*** (0.082)
Family structure (Ref: Married)			
Single	1.422 (0.267)	1.060 (0.194)	0.995 (0.155)
Cohabiting	1.340 (0.240)	0.987 (0.169)	0.875 (0.127)
Family instability	1.099 (0.054)	0.927 (0.048)	1.037 (0.046)
Child/Sibling characteristics			
Child female	0.691** (0.090)	1.015 (0.132)	0.446*** (0.050)
Total number of siblings	1.013 (0.058)	0.901 (0.054)	0.967 (0.048)
Half sibling present	1.022 (0.138)	1.264 (0.176)	1.084 (0.129)
Step sibling present	0.942 (0.243)	1.516 (0.374)	0.989 (0.217)
Older sibling present	1.023 (0.135)	0.827 (0.109)	1.144 (0.131)
Siblings all female	1.113 (0.202)	1.331 (0.226)	1.118 (0.168)
Siblings all male	1.112 (0.175)	0.940 (0.156)	1.120 (0.159)
Mother's race (ref: White)			
Black	0.579** (0.097)	0.669* (0.112)	2.029*** (0.295)
Hispanic	0.569** (0.116)	0.739 (0.144)	0.705* (0.124)
Other	0.899	0.987	1.284

	(0.288)	(0.300)	(0.348)
Mother's age	0.992	1.021	0.978*
	(0.012)	(0.012)	(0.010)
Mother's education (ref: College graduate)			
Mother less than HS	1.286	1.300	1.033
	(0.361)	(0.343)	(0.234)
Mother HS graduate	1.147	1.068	0.820
	(0.305)	(0.267)	(0.175)
Mother some college	0.997	0.902	0.847
	(0.254)	(0.216)	(0.170)
Household poverty	0.965	0.962	0.957
	(0.033)	(0.031)	(0.026)
Quality of other family relationships			
Child close to mother	0.753*	0.759*	0.731**
	(0.097)	(0.099)	(0.084)
Child close to father	1.041	1.071	0.906
	(0.130)	(0.135)	(0.097)
Mother's relationship quality with father	0.940	0.954	0.973
	(0.037)	(0.038)	(0.034)
Intercept	0.158**	0.329	0.788
	(0.109)	(0.216)	(0.464)
R ²	0.170	0.132	0.150
n	2230	2230	2252

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence and lagged dependent variables.

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

Table 60. Logistics regression estimates for top quartile of problem behaviors on sibling relationship quality at age 15.

	Top 25%		
	Externalizing behaviors	Internalizing behaviors	Delinquent behaviors
Sibling relationship quality	0.818** (0.051)	0.810** (0.053)	0.818*** (0.043)
Family structure (Ref: Married)			
Single	0.968 (0.164)	1.050 (0.189)	1.405* (0.198)
Cohabiting	0.917 (0.150)	1.031 (0.177)	1.371* (0.185)
Family instability	1.057 (0.049)	1.067 (0.053)	1.021 (0.040)
Child/Sibling characteristics			
Child female	0.909 (0.092)	1.325** (0.141)	0.591*** (0.050)
Total number of siblings	1.017 (0.038)	1.003 (0.040)	1.026 (0.031)
Half sibling present	0.959 (0.108)	0.929 (0.113)	1.048 (0.099)
Step sibling present	0.818 (0.160)	1.147 (0.230)	0.903 (0.146)
Mother's race (ref: White)			
Black	1.261 (0.205)	0.520*** (0.085)	1.123 (0.148)
Hispanic	1.067 (0.207)	0.585** (0.111)	0.888 (0.139)
Other	1.128 (0.362)	0.522* (0.172)	0.796 (0.210)
Mother's age	0.988 (0.010)	1.007 (0.011)	0.986 (0.009)
Mother's education (ref: College graduate)			
Mother less than HS	1.518 (0.405)	1.617 (0.429)	1.694* (0.366)
Mother HS graduate	1.238 (0.318)	1.449 (0.367)	1.336 (0.277)
Mother some college	1.401 (0.344)	1.024 (0.249)	1.333 (0.264)
Household poverty	0.949	1.040	0.952

	(0.031)	(0.032)	(0.025)
Quality of other family relationships			
Child close to mother	0.653***	0.753*	0.621***
	(0.069)	(0.083)	(0.055)
Child close to father	0.808	0.682**	0.845
	(0.105)	(0.097)	(0.089)
Mother's relationship quality with father	0.871***	0.863***	0.943
	(0.033)	(0.038)	(0.030)
Intercept	0.605	0.403	3.005*
	(0.328)	(0.224)	(1.322)
R ²	0.208	0.13	0.094
n	2515	2515	2837

Note. Odds ratios presented. Numbers in the parentheses are SEs. All models control for city of residence and lagged dependent variables.

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