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Coparenting Moderates the Association between Firstborn Children's Temperament and Problem Behavior across the Transition to Siblinghood

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Abstract

The contribution of individual (i.e., negative reactivity) and environmental (i.e., coparenting) characteristics in predicting firstborns' adjustment after a sibling's birth were examined. Mothers, fathers, and firstborn children from 241 families participated in a family freeplay to assess coparenting interactions before the birth of the second child and parents completed questionnaires on children's temperamental characteristics and behavior problems. Children's externalizing problems significantly increased from pre- to post-birth. Children, on average, did not display more internalizing problems following the infant sibling's birth; however, children high in negative reactivity were more sensitive to undermining coparenting behavior and displayed greater internalizing behaviors across the transition to siblinghood. Negatively reactive children also displayed increases in externalizing behavior across the transition to siblinghood when parents showed high levels of undermining coparenting and low levels of supportive coparenting. Supportive coparenting appeared to be a protective factor in the face of this transition for negatively reactive children in families where parents engaged in high levels of undermining coparenting. Findings suggest that both individual and environmental factors play an important role in firstborns' adjustment to an infant sibling's birth. Parents of temperamentally sensitive children may benefit from participating in workshops geared towards improving coparenting partnerships prior to the birth of the second child.

Keywords

behavior problems; siblings; coparenting; temperament; birth of a sibling

The transition to siblinghood is a normative family transition that involves welcoming an infant sibling into the home and can be a disruptive and stressful event in children's lives. Previous research on the transition to siblinghood has shown that some firstborns experience strong reactions to the infant's arrival (Dunn & Kendrick, 1982; Legg, Sherick, & Walland, 1974; Stewart, Mobley, Van Tuyl, & Salvador, 1987). For instance, Dunn, Kendrick, and MacNamee (1981) interviewed mothers 2 to 3 weeks after the birth of their second child and found that 50% of the mothers reported that their firstborn children were more tearful and clingy, 25% were more withdrawn, 93% were more demanding, and over 75% reported their children were more negative toward them after the sibling's birth. Stewart et al. (1987) also found that mothers reported more firstborn anxiety and aggression 1 month after the

sibling's birth. Although suggestive, mothers' retrospective reports of increased problem behavior after the birth may be a reflection of the mothers' mood in the midst of caring for two young children than an actual indication of true behavioral change. Based on maternal reports collected before and after the sibling's birth, Gottlieb and Mendelson (1990) did find that firstborn girls' distress increased significantly 1 month after the sibling's birth. The first aim of this investigation was to examine firstborns' adjustment to the transition to siblinghood by examining changes in internalizing and externalizing behavior problems from pre-birth to 1-month post-birth. We expected that children, on average, would exhibit increases in behavior problems after the sibling's birth.

We were interested in examining firstborns' adjustment 1 month after the sibling's arrival in light of research that suggests that firstborns' initial reactions to an infant sibling may be predictive of sibling relationship quality 1 year later (Kendrick & Dunn, 1982). For example, firstborn children who were more welcoming toward the infant sibling within the month following the sibling's arrival engaged more positively with the sibling at 14 months whereas more demanding firstborns displayed more negative behavior toward mothers and siblings 1 year later. Even though increases in firstborns' behavior problems have been observed, not all children experience distress when an infant sibling is introduced into the family. One of the main goals of this investigation was to understand the variability in children's initial reactions to an infant sibling (Volling, 2005; 2012) in an effort to identify which children would be expected to experience adjustment problems across a commonly experienced family transition.

Developmental models, including the bioecological model (Bronfenbrenner & Ceci, 1994) and the developmental psychopathology perspective (Sroufe & Rutter, 1984), underscore the role that person characteristics and the social environment play in shaping individual trajectories. Ellis and colleagues (Ellis, Boyce, Belsky, Bakersmans-Kranenburg, & van Ijzendoorn, 2011) argued that behaviorally reactive children are more vulnerable in the face of environmental stress due to biological differences in the stress response system. Although these children may be at an increased risk for poor outcomes under stressful conditions, positive environmental factors may be protective (Luthar, Cicchetti, & Becker, 2000). Bronfenbrenner (1988) argued that the family environment is the most proximal context for young children and thus, this study was informed by a family systems perspective (Cox & Paley, 2003; Minuchin, 1985) which highlights the interdependent nature of the family subsystems and their influence on development. The transition to siblinghood provides a unique opportunity to apply Bronfenbrenner's (1988) person-process-context model to examine the contributions of enduring characteristics (i.e., temperament) and family relationships (i.e., coparenting behavior) on firstborns' adjustment to a potentially stressful transition (i.e., a change in family structure).

Children's Temperament as a Vulnerability Factor

Temperament has been conceptualized as one of the most important individual differences factors that shapes and defines developmental trajectories (Nigg, 2006; Rothbart, Posner, & Hershey, 1995). Temperament refers to biologically-based individual differences in reactivity and regulation (Rothbart & Bates, 1998) that are relatively stable throughout childhood (Stifter, Putnam, & Jahromi, 2008). Empirical research has consistently demonstrated that temperamental difficulty is associated with higher rates of maladjustment and problem behavior (Eisenberg et al., 2009; Lemory, Essex & Smider, 2002). Individuals high on negative reactivity tend to respond to novel situations with more anger and frustration (Bates, 1989) and are less adept at regulating negative emotions (Eisenberg, Fabes, Guthrie, & Rieser, 2000). Moreover, children reacting with more anger and

frustration to novel situations appear to have a more difficult time recovering from distress and as a result, are less easily soothed (Szabó et al., 2008).

Children with certain temperamental characteristics, such as negative reactivity, appear to be more susceptible to environmental changes (Belsky & Pluess, 2009; Ellis et al., 2011) and may be at heightened risk for poor developmental outcomes during the transition to siblinghood. For instance, Dunn et al. (1981) found that firstborns' negative mood was associated with more anxious behavior in the month after the sibling's birth, and Thomas, Birch, Chess, and Robbins (1961) reported that children with highly reactive temperaments had more difficulties after the birth. Thus, the second aim of this study was to examine temperament as a predictor of children's internalizing and externalizing behaviors across the transition to siblinghood. We expected that more negatively reactive children would exhibit more problems after the sibling's birth.

Not all children who are easily frustrated and less easily soothed, however, will display increased problem behavior following the arrival of an infant sibling. Existing research on the transition to siblinghood suggests that family factors may ease this transition for firstborn children (Volling, 2012). For example, observations of mothers' positive involvement with their firstborns and maternal reports of more harmonious marriages prior to the arrival of the infant predicted higher attachment security scores for firstborns post-birth (Teti, Sakin, Kucera, Corns, & Eisen, 1996). Further, prenatally distressed daughters were less distressed after the birth when mothers reported high levels of support toward their daughters (Gottlieb & Mendelson, 1990). These studies suggest that family factors may influence, and possibly moderate the effect of temperamental reactivity, on children's behavioral reactions across the transition to siblinghood.

Coparenting Behavior as a Moderator of Children's Reactivity

Coparenting involves parents' coordination of their parenting and is characterized by parents supporting and/or undermining one another (Katz & Gottman, 1996). Coparenting behavior can be distinguished from marital quality (McHale, 1995; Kolak & Volling, 2007) and individual parenting behavior (Belsky, Putnam, & Crnic, 1996; Karreman, van Tuijl, van Aken, & Deković, 2008). A recent meta-analysis suggested that coparenting has broad implications for children's adjustment (Teubert & Pinquart, 2010). Supportive coparenting predicted infants' attachment security (Brown, Schoppe-Sullivan, Mangelsdorf, & Neff, 2010) whereas undermining coparenting predicted preschoolers' externalizing problems (McHale & Rasmussen, 1998; Schoppe, Mangelsdorf, & Frscho, 2001). Even though there is strong evidence linking coparenting behavior to young children's outcomes, this is the first study to use observations of coparenting before the birth to predict firstborns' adjustment during the transition to siblinghood.

Minuchin (1974) argued that coparenting or the family's "executive subsystem" fulfills a guiding, organizational role within the family context. In families with young children, the coparenting partnership is a relatively new and developing subsystem with the family. Even so, how parents navigate this partnership can have profound implications for the family as a whole. For example, positive coparenting behavior has been shown to buffer toddler-aged children, especially girls, from the potentially detrimental impact of family stress (Kolak & Vernon-Feagans, 2008). The introduction of a second child into the family system can be conceptualized as a source of stress for families; and thus, this investigation sought to understand whether coparenting behavior prior to the second child's arrival would predict firstborn children's adjustment following the transition. Given that some children are negatively impacted by the birth of an infant sibling (Dunn & Kendrick, 1982; Dunn et al., 1981), mothers' and fathers' successful coordination of their parenting efforts may be

especially critical to children's positive adjustment across this transition. Conversely, parents engaged in hostile and undermining coparenting may put children at a heightened risk for poor outcomes.

Coparenting may also interact with children's temperamental reactivity to predict adjustment. Research consistently finds that parenting behavior moderates the association between temperamental characteristics and children's outcomes (Bates, Pettit, Dodge, & Ridge, 1998; Szabó et al., 2008); however, little attention has been given to coparenting as a moderator. A recent study by Schoppe-Sullivan, Weldon, Cook, Davis, and Buckley (2009) found that supportive coparenting was a protective factor for 4-year-old preschool children with low effortful control. These children were less likely to develop externalizing behavior problems 1 year later when coparenting was supportive. Similarly, we expected that high levels of supportive or low levels of undermining coparenting behavior would protect temperamentally vulnerable children (i.e., high negative reactivity) from increased behavior problems during the transition to siblinghood. Conversely, the sensitivity to context argument suggests that temperamentally vulnerable children may be more sensitive to environmental changes (Ellis et al., 2011). Given the empirical evidence that illustrates the negative impact of interparental conflict on children's behavioral outcomes (Cummings & Davies, 1995; Cummings & Wilson, 1999), we specifically hypothesized that highly reactive children would be at risk for increased behavior problems across the transition to siblinghood when their parents displayed high levels of undermining or low levels of supportive coparenting behavior. Thus, the final aim of this investigation was to examine the interactive role that child characteristics and environmental factors play in the prediction of firstborns' adjustment shortly after the infant's birth.

The Present Study

The purpose of this research was to gain a better understanding of the impact the transition to siblinghood has on firstborns' behavior. First, we expected, on average, that children's internalizing and externalizing problems would increase from pre-birth to 1-month post-birth (Armentrout, 1995). Second, we hypothesized that negatively reactive children would be at increased risk for poor adjustment following the birth (Dunn et al., 1981; Thomas et al., 1961). We anticipated, however, that coparenting would moderate associations between firstborns' negative reactivity and increased behavior problems across this transition such that supportive coparenting would be protective whereas undermining coparenting may heighten the risk for temperamentally vulnerable children (Belsky et al., 1996; Schoppe-Sullivan et al., 2009). When testing our hypotheses, we controlled for a number of factors, including child's age, parental education, and marital satisfaction, that might account for the observed associations.

Method

Participants

Participants for this study were 241 two-parent Midwestern families enrolled in a longitudinal investigation of changes in family functioning and firstborn children's adjustment following the birth of a second child. Families participated in five timepoints of data collection starting in the last trimester of the mother's pregnancy with the second child (prenatal) and were re-contacted at 1, 4, 8, and 12 months after the infant's birth. Data for the current report are drawn from the prenatal (Time 1) and 1-month (Time 2) timepoints. Parents were eligible to participate if they met the following criteria: (a) mothers were expecting their second child; (b) biological fathers were living with mothers; (c) firstborn children were between the ages of 1 and 5 by the expected arrival date of the infant; and (d) both children were free of physical or developmental disabilities. Families were recruited

through obstetric clinics, childbirth classes, flyers, and advertisements in local newspapers and a regionally-distributed parenting magazine.

The recruited sample included 131 female and 110 male children who were 30 months, on average, and ranged in age from 12 months to 69 months at the sibling's birth. Eighty-five percent of the mothers identified as European American, 5.4% as African American, 2.9% as Asian or Asian American, 3.7% as Hispanic, and 2.5% as Other. Eighty-six percent of the fathers identified as European American, 5.0% as African American, 3.7% as Asian or Asian American, 2.9% as Hispanic, 0.4% as American Indian or Alaskan Native and 2.9% as Other. Couples were married an average of 5.8 years, $SD = 2.7$. Mothers ranged in age from 19 to 42 years, $M = 31.6$ years; $SD = 4.2$, and fathers ranged in age from 23 to 53 years, $M = 33.2$ years; $SD = 4.8$. Annual family income ranged from 10,000 to over 150,000, $M = 75,000$ to 79,999. Sixteen percent of mothers completed a high school degree or some college, 38% a Bachelor's degree, and 46% a professional degree. Less than 1% of fathers had not completed a high school degree, 20% a high school degree or some college, 37% a Bachelor's degree, and 42% a professional degree.

Of the 241 families who enrolled in this study, 223 families were retained (92.5%) at 1 month. Attrition was primarily due to parents' time constraints; however, other reasons for withdrawal from the study were also indicated (i.e., one couple was uncomfortable with being videotaped, the newborn in one family was hospitalized for several weeks following the birth). Two families no longer met the eligibility requirements (i.e., couple separated, infant stillborn) at the 1-month timepoint. Fourteen additional families were missing data on one or more of the study variables. The percent of missingness revealed that 3.1% of the sample had missing values on 2 of the study variables, 1.3% had missing values on 3 variables, and 0.9% had missing values on 4 and 5 variables. To determine whether these data were missing completely at random, Little's (1988) Chi-Square Test of MCAR was conducted. Based on this test, $\chi^2(60) = 69.39$, $p = .19$, we fail to reject the null hypothesis that the data are missing completely at random. Given the data appear to be missing completely at random, we omitted these 14 families from the analyses for the current report. Thus, the analytic sample was comprised of 209 families with complete data at Time 1 and Time 2. Sample demographics for the analytic sample were similar with one exception. Parents with complete data were more educated than parents without complete data, $F(1, 240) = 4.49$, $p < .05$ for mothers, and $F(1, 240) = 6.45$, $p < .05$ for fathers; therefore, mothers' and fathers' education were included as covariates in the regression models.

Procedure

Time 1 consisted of two home visits during the last trimester of the mother's pregnancy. During Visit 1, mothers, fathers, and firstborn children were videotaped for 25 minutes. For the first 10 minutes, parents were asked to play with their child "as you normally would if you were all together." The second 10 minutes consisted of each parent playing independently with the child for 5 minutes while the other parent "sat back," and remained present, but uninvolved. Finally, parents were asked to resume playing together as a family for the remaining 5 minutes. For the purposes of this report, the first 10 minutes and final 5 minutes of family freeplay, where mother, father, and child played together, was coded for coparenting behaviors. Family freeplay paradigms of a similar duration have been used by others to observationally assess coparenting (McHale, 1995; Schoppe-Sullivan, Mangelsdorf, Frosch, & McHale, 2004). At the end of Visit 1, mothers and fathers were given packets that included questionnaires about children's temperament and behavior problems. Parents were asked to complete their packets independently and these were collected at Visit 2, generally conducted within 2 weeks after Visit 1.

Time 2 consisted of one home visit approximately 1 month after the birth of the second child and included videotaped family observations, a parent interview about family and child care responsibilities, and the infant's behavior. Prior to the visit, mothers and fathers were sent questionnaire packets including the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) to assess children's externalizing and internalizing behavior problems.

Measures

Children's temperament—Mothers and fathers completed scales of the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, & Hershey, 1994) to assess firstborns' temperament: a) the 13-item anger/frustration scale ($\alpha = .77$ for mothers and $.73$ for fathers, “gets quite frustrated from doing something he or she wants to do”) and b) the 13-item soothability scale ($\alpha = .77$ for mothers and $.73$ for fathers, “calms down quickly following an exciting event”). Mothers' and fathers' subscales were significantly correlated for anger/frustration, $r = .54$, $p < .001$, and soothability, $r = .47$, $p < .001$, and were averaged. The anger/frustration and soothability composites were also significantly correlated, $r = -.51$, $p < .001$; thus, soothability was reverse coded and summed with anger/frustration to create a negative reactivity score (see also Blair, Denham, Kochanoff, & Whipple 2004; Garon & Moore, 2007). Children high on negative reactivity displayed high levels of irritability and were difficult to comfort when distressed.

Observed coparenting behavior—For each 5-minute interval of the 15 minutes of videotaped family freeplay, six dimensions of coparenting behavior – cooperation, pleasure, interactiveness, displeasure, coldness, and competition – were coded by trained raters using 5-point rating scales (1 = *very low* to 5 = *very high*) developed by Schoppe-Sullivan and her colleagues (Schoppe et al., 2001; Schoppe-Sullivan et al., 2004). Members of the 5-person coding team were randomly assigned to code either the positive (cooperation, pleasure, interactiveness) or negative dimensions (displeasure, coldness, competition). Intraclass correlation coefficients assessing interrater reliability (calculated for 20% of the sample) ranged from .72 to .90. The ratings for each dimension were summed across the three 5-minute intervals; the means and standard deviations for these dimensions were similar to those observed in other non-clinical samples (Schoppe-Sullivan, et al., 2004, 2009). The data were then reduced using principal components analysis with varimax rotation (see Schoppe-Sullivan et al., 2004, 2009). Consistent with this research, two components were found. Component 1 (Eigenvalue = 2.35; 39.10% variance) was characterized by high loadings for pleasure (.847), cooperation (.718), and interactiveness (.710) and was named supportive coparenting. Component 2 (Eigenvalue = 1.54; 25.65% variance) was characterized by high loadings for displeasure (.890), competition (.731), and coldness (.633) and was named undermining coparenting. Following Schoppe-Sullivan's research (2009), uncorrelated factor scores for these two components were extracted and used for subsequent analyses.

Children's behavior problems—Mothers and fathers completed the Child Behavior Checklist (CBCL 1.5 – 5 years; Achenbach & Rescorla, 2000) prenatally and 1 month following the sibling's birth which yielded 2 scores: internalizing and externalizing problems (α 's ranged from .77 to .89). Mothers' and fathers' reports were significantly correlated, internalizing problems, $r = .26$, $p < .001$; $r = .39$, $p < .001$, and externalizing problems, $r = .34$, $p < .001$; $r = .43$, $p < .001$, at the prenatal and 1-month timepoint, respectively. To reduce single reporter bias, robust composites were created by averaging across mothers' and fathers' subscales within each timepoint (Rushton, Brainerd, & Pressley, 1983).

Marital Satisfaction—Mothers and fathers completed the 3-item Kansas Marital Satisfaction Scale (Schumm, Nichols, Schectman, & Grigsby, 1983) at the prenatal

timepoint. Mothers' ($\alpha = .94$) and fathers' scales ($\alpha = .92$) were significantly correlated, $r = .58$, $p < .001$, and were averaged to create one score representing marital satisfaction. This variable was included as a covariate in the regression models.

Results

Descriptive statistics for all study variables and the correlations among these variables are presented in Table 1. Negative reactivity, assessed prenatally, was positively correlated concurrently and longitudinally with children's internalizing and externalizing problems. Coparenting behavior was not significantly associated with behavior problems at either timepoint nor was it significantly correlated with prenatal scores of children's negative reactivity.

Firstborns' age, gender, and the gender constellation of the sibling dyad (same-sex sibling pairs vs. opposite-sex sibling pairs) were examined as potential covariates for the regression models described below. Age was positively associated with 1-month internalizing problems, $r = .22$, $p < .01$, and was included as a covariate in subsequent regression models. No group differences were found for firstborns' gender or gender constellation of the sibling dyad on any of the study variables so these variables were dropped from further consideration.

Family demographics, including parents' education, household income, and ethnicity, were also examined as potential covariates. Household income and parent ethnicity were not related to behavior problems; thus, these variables were not included as covariates in the regression models. Even though parents' education was not related to children's behavior problems, mothers' and fathers' education were retained as covariates because education differences emerged for parents with and without complete data at both timepoints.

Finally, because we were interested in examining the unique role that coparenting processes plays in firstborns' adjustment, marital satisfaction was considered as a covariate. Marital satisfaction was negatively associated with internalizing problems, $r = -.19$, $p < .01$, and externalizing problems, $r = -.23$, $p < .01$, at 1 month, and was included as a covariate in the regression models.

The data analyses were conducted in two steps. First, repeated measures ANCOVAs were conducted to examine change in firstborn children's internalizing and externalizing behaviors from Time 1 to Time 2. Second, two hierarchical regression models were conducted to examine the combined contribution of children's negative reactivity and coparenting behavior at Time 1 in the prediction of children's behavior problems (i.e., internalizing problems, externalizing problems) at Time 2. Firstborns' age, mothers' education, fathers' education, marital satisfaction, and prenatal (Time 1) behavior problems were entered in Step 1; by including prenatal behavior problems we tested whether negative reactivity and coparenting behavior predicted change in the corresponding behavior over the transition to siblinghood. Negative reactivity, supportive coparenting, and undermining coparenting were entered together in Step 2. The interaction terms, negative reactivity $\times$ supportive coparenting and negative reactivity $\times$ undermining coparenting, were entered in Step 3. Following the suggestion of an anonymous reviewer, we included the 3-way interaction, negative reactivity $\times$ undermining coparenting $\times$ supportive coparenting. The 3-way interaction and the interaction term, undermining coparenting $\times$ supportive coparenting, were entered in Step 4. Negative reactivity was centered prior to the creation of the interaction terms; however, the coparenting variables already had means of zero and it was not necessary to center them. Significant interactions were graphed and probed using procedures outlined by Aiken and West (1991).

Change in children's behavior problems from Time 1 to Time 2

Repeated measures ANCOVAs were conducted to examine mean change in children's behavior problems from Time 1 to Time 2 with firstborns' age as a covariate. A significant time effect, $F(1, 207) = 5.20, p < .05$, indicated that firstborn children, on average, displayed significantly more externalizing problems over time, Time 2, $M = 12.31$ ($SD = 5.87$), Time 1, $M = 10.84$ ($SD = 5.51$). Mean change in children's internalizing problems was not significant.

Predicting children's behavior problems

In an effort to address individual differences in children's behavioral change, hierarchical regression models were utilized to test whether children's negative reactivity at Time 1 was associated with increases in behavior problems and whether coparenting behavior moderated the association between negative reactivity and children's behavior problems. Results are reported in Table 2. The final model for internalizing problems explained a significant 60% of the variance. Negative reactivity predicted increases in internalizing problems from Time 1 to Time 2. This association was qualified by a significant interaction between negative reactivity and undermining coparenting. Figure 1 displays the interaction. Simple slopes analyses revealed that the slope of the line reflecting high levels (i.e., 1 SD above the mean) of undermining coparenting was significantly different from zero, $b = 1.09, t = 4.01, p < .001$, whereas the slope of the line depicting low levels (i.e., 1 SD below the mean) of undermining coparenting was not significantly different from zero, $b = .13, t = .54, p = .59$. Children's negative reactivity was associated with greater increases in internalizing behaviors over time when their parents were high on undermining coparenting prenatally. Conversely, there was no association between negative reactivity and internalizing problems when undermining coparenting was low.

The final model for externalizing problems explained a significant 61% of the variance (see Table 2). Negative reactivity did not predict increases in externalizing problems from Time 1 to Time 2. The 2-way interactions reflecting negative reactivity and coparenting behavior were not significant either; however, the 3-way interaction representing negative reactivity, undermining coparenting, and supportive coparenting was significant. Figure 2 illustrates the interaction. Simple slopes analyses revealed that the slopes of the lines representing low levels of undermining coparenting, $b = -.27, t = -.58, p = .56$ with low supportive coparenting and $b = .73, t = 1.43, p = .15$ with high supportive coparenting, were not significantly different from zero. The slope of the line reflecting high levels of undermining coparenting and low levels of supportive coparenting was significantly different from zero, $b = 1.36, t = 2.54, p = .01$, whereas the slope of the line depicting high levels of undermining coparenting and high levels of supportive coparenting was not significantly different from zero, $b = .23, t = .40, p = .69$. Children's negative reactivity was associated with greater increases in externalizing behaviors over time when their parents were high on undermining coparenting and low on supportive coparenting. Conversely, there was no association between negative reactivity and externalizing problems when undermining coparenting was low, regardless of levels of supportive coparenting, or when undermining coparenting was high and supportive coparenting was high.

Discussion

Our investigation sheds light on several aspects of firstborns' adjustment across the transition to siblinghood. First, we examined changes in firstborn children's externalizing and internalizing problem behavior across this period. Second, we simultaneously examined the role that individual (i.e., temperament) and contextual (i.e., coparenting) factors played in firstborns' adjustment. The current study addressed many of the shortcomings of past

research on the transition to siblinghood. Instead of relying on post-birth accounts of children's adjustment, we included pre-birth and post-birth assessments of firstborns' behavior problems to examine actual change over time. Further, we utilized both maternal and paternal reports of internalizing and externalizing problems and averaged their responses to create robust composites. Finally, our design included mixed methods wherein we combined home observations of coparenting with parent reports of temperament to predict behavior problems.

Consistent with previous research which utilized prenatal and postnatal measures to examine change in firstborns' behavior (Gottlieb & Mendelson, 1990; Gullicks & Crase, 1993; Nadelman & Begun, 1982; Teti et al., 1996) we found increases in children's externalizing behavior problems over the transition to siblinghood. Children may be actively testing the shifting family boundaries that inherently accompany the inclusion of an infant into the home. As parents devote caregiving time to the newborn, firstborns may begin acting out because they are jealous of the attention their infant siblings are receiving. Parents may be particularly sensitive to children's displays of externalizing behaviors because these types of behavior (i.e., acting out, aggression, noncompliance, defiance) are more noticeable and difficult to manage than internalizing problems. Our hypothesis that firstborns' internalizing problems would increase, on average, across the transition to siblinghood was not supported even though previous research suggested that some children become more withdrawn and anxious following the birth of a sibling (Dunn et al., 1981; Stewart et al., 1987). Broadband dimensions of internalizing problems, however, may not have adequately captured changes in more specific aspects of children's anxiety or withdrawal. Therefore, we examined mean changes in the anxiety and withdrawal subscales of the CBCL, but again we found no evidence of increases in these individual dimensions from Time 1 to Time 2 for the sample as a whole. Indeed, the regression model for internalizing problems illustrated that only a small subset of children experience increases in internalizing behaviors and this appears to be dependent on their temperamental characteristics and their home environments.

By including firstborns' pre-birth behavior problems in our regression models, we were able to examine the extent to which individual and contextual factors predicted *change in* children's behavior problems across the transition to siblinghood. Consistent with previous research (Dunn et al., 1981; Thomas et al., 1961), we found that negative reactivity predicted increased internalizing behaviors 1 month after the sibling's birth; however, this finding was qualified by an interaction between negative reactivity and coparenting behavior. In line with the sensitivity to context argument (Ellis et al., 2011), negatively reactive children showed increases in internalizing problems across the transition to siblinghood when they were exposed to high levels of undermining coparenting before the birth. This finding can be further understood by drawing on the emotional security hypothesis (Cummings & Davies, 1995; Cummings & Wilson, 1999) which suggests that interparental conflict may undermine children's emotional security and the extent to which children feel safe within the family environment. Emotional insecurity, in turn, may negatively impact children's behavior and their social interactions. Undermining coparenting behavior, which is marked by higher levels of competition, displeasure, and coldness between parents, may work in a similar fashion to threaten children's emotional security. Given research illustrating decreases in attachment security to mothers (Teti et al., 1996) and increases in harsh maternal discipline (Baldwin, 1947; Dunn & Kendrick, 1980) following the birth of a sibling, exposure to hostile and competitive coparenting may be especially detrimental for firstborns. Undermining coparenting could further exacerbate the impact that changing parent-child relationships have for negatively reactive firstborns in that they show more withdrawal and anxiety within the month following the arrival of the sibling.

Although negative reactivity did not uniquely predict increased externalizing problems as hypothesized, we found that negatively reactive children were at a heightened risk for increased externalizing problems across the transition to siblinghood when parents displayed high levels of undermining coparenting and low levels of supportive coparenting before the birth. This finding again provides support for the notion that some children may be more sensitive to certain environmental conditions (Ellis et al., 2011). This finding is also in line with previous research showing links between coparenting conflict and externalizing problems (Katz & Low, 2004; McHale & Rasmussen, 1998; Schoppe et al. 2001). Interestingly, negatively reactive children did not display increased externalizing problems if their parents engaged in high levels of supportive coparenting. Thus, supportive coparenting buffered negatively reactive children from the detrimental impact of undermining coparenting on behavior problems across the transition to siblinghood. Schoppe-Sullivan et al. (2009) also found that supportive coparenting was protective for children who were more temperamentally vulnerable.

Controlling for marital satisfaction in our regression analyses enabled us to highlight the unique role that coparenting dynamics play in the prediction of firstborns' adjustment. Yet, further research is needed to identify other child and family factors, such as individual parenting practices, that may account for increases in behavior problems during this transition. Given that mother and child interactions are negatively impacted by the birth of a sibling (Dunn & Kendrick, 1980), it may be especially important to consider how mothers' and fathers' individual parenting behavior may be related to increases in externalizing problems during this transition. At present, we do not have observational data available on parent-child interactions.

Even though over 200 families participated in this study, there are several limitations that need to be considered. Because of our interest in fathers, biological fathers had to be resident in the home in order for the family to participate in this study. The sample was also predominantly European-American and middle-class so it would be informative to learn how parents in lower income and financially stressed families coparent and whether coparenting was influential in supporting temperamentally vulnerable children's adjustment to the transition to siblinghood. Parenting and family-level processes may take on even greater importance in families with less financial means. For example, Baydar et al. (Baydar, Hyle, & Brooks-Gunn, 1997) reported that the birth of a sibling had a longer lasting effect on children's academic performance and their self-perceptions in elementary school if they were in economically disadvantaged families.

Coparenting interactions were only assessed prior to the birth so we were unable to address whether children's increasing problems could be attributed to changes in coparenting across the transition to siblinghood. This transitional period may set in motion a variety of changes within the family, including shifts in parents' roles and responsibilities, which may interfere with parents' ability to support one another's parenting efforts. We suspect that strained coparenting interactions may become further compromised after the second child's birth and research is needed to assess changes in family processes and how these changes are linked to firstborns' adjustment throughout the year following the sibling's arrival (Volling, 2012).

The transition to siblinghood can be a life-changing transition for young children, and although there is variability in how children react and adjust to changes in their environments, this investigation underscored the role that children's temperament and family-level processes play in children's adjustment. Specifically, findings suggested that children with certain biological proclivities may be at a greater risk for poor adjustment within certain family contexts. Children high in negative reactivity appeared to be particularly sensitive to how parents express discontent with one another and each other's

parenting efforts. These findings suggest that intervention efforts geared at easing the transition to siblinghood should take children's temperamental differences into account. By identifying temperamentally vulnerable children (i.e., high in negative reactivity) and their parents, selective interventions could be designed to specifically meet the needs of these families. In addition to teaching parents how to negotiate coparental conflicts and decrease displays of negative emotions as they transition to parenthood (Shapiro & Gottman, 2005), these efforts should consider including a component in their curriculum that focuses on children's temperament characteristics. Giving parents a greater appreciation of the individual differences in children's temperament and helping them develop strategies to specifically meet the needs of their children's characteristics may be beneficial. This seems to be especially important in light of recent research that found reciprocal relations between early child difficult temperament and coparenting behavior across the first year of parenting (Davis, Schoppe-Sullivan, Mangelsdorf, & Brown, 2009). Couples who are better able to support one another when parenting a difficult child may help children adjust to novel and potentially stressful situations such as the birth of a sibling. Finally, positive alterations to the environment, including bolstering positive coparenting interactions, may be yet another means of increasing children's sense of security and better emotional adjustment across the transition to siblinghood (Feinberg, Kan, & Goslin, 2009). In sum, the current findings underscore the importance of mothers and fathers working together in their parenting roles to help ease their children's adjustment difficulties after the arrival of a second child.

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Figure 1.

Undermining coparenting moderates the association between children's negative reactivity and change in parents' reports of children's internalizing problems from Time 1 to Time 2

Figure 2.

Children's negative reactivity, undermining coparenting, and supportive coparenting interact to predict change in parents' reports of children's externalizing problems from Time 1 to Time 2

Table 1Intercorrelations among child negative reactivity, coparenting behavior, and child problem behavior ($n = 209$)

	1.	2.	3.	4.	5.	6.	7.
Time 1 (Prenatal)							
1. Negative Reactivity	-						
2. Supportive Coparenting ^a	-.08	-					
3. Undermining Coparenting ^a	.01	.00	-				
4. Internalizing Problems	.47*	.02	-.06	-			
5. Externalizing Problems	.56*	.00	.01	.53*	-		
Time 2 (1-Month)							
6. Internalizing Problems	.46*	.01	-.07	.74*	.51*	-	
7. Externalizing Problems	.47*	-.01	.00	.41*	.76*	.61*	-
<i>M</i>	-.77	.00	.00	6.50	10.84	6.83	12.31
<i>SD</i>	1.07	1.00	1.00	3.74	5.51	4.09	5.87

^aFactor scores derived from principal components analysis.* $p < .001$

Table 2

Regressions testing coparenting as a moderator of the associations between children's negative reactivity and problem behavior ($n = 209$)

	β	ΔR^2	ΔF
1-Month Internalizing Problems			
Step 1: Child Age	-.02	.56	51.55***
Mother Education	-.08		
Father Education	.08		
Marital Satisfaction	-.10*		
Prenatal Internalizing Problems	.66***		
Step 2: Child Negative Reactivity	.16**	.02	2.67*
Supportive Coparenting	-.02		
Undermining Coparenting	-.03		
Step 3: Negative Reactivity $\times$ Supportive Coparenting	.00	.02	2.83*
Negative Reactivity $\times$ Undermining Coparenting	.13**		
Step 4: Undermining Coparenting $\times$ Supportive Coparenting	.01	.00	.70
Negative Reactivity $\times$ Undermining Coparenting $\times$ Supportive Coparenting	-.04		
<i>Final Model: $R^2 = .60$; $F(12, 196) = 24.03$***</i>			
1-Month Externalizing Problems			
Step 1: Child Age	-.04	.60	59.91***
Mother Education	-.04		
Father Education	-.03		
Marital Satisfaction	-.13		
Prenatal Externalizing Problems	.70***		
Step 2: Child Negative Reactivity	.09	.00	.78
Supportive Coparenting	-.02		
Undermining Coparenting	-.02		
Step 3: Negative Reactivity $\times$ Supportive Coparenting	-.01	.00	.71
Negative Reactivity $\times$ Undermining Coparenting	.05		
Step 4: Undermining Coparenting $\times$ Supportive Coparenting	-.03	.01	6.26*
Negative Reactivity $\times$ Undermining Coparenting $\times$ Supportive Coparenting	-.12*		
<i>Final Model: $R^2 = .61$; $F(12, 196) = 26.34$***</i>			

*
 $p < .05$

**
 $p < .01$

 $p < .001$