

The Effects of the Family Foundations Prevention Program on Coparenting and Child Adjustment: A Mediation Analysis

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Abstract Behavioral and emotional problems are common in early childhood and put children at risk for developing more serious problems. This study tested the mediating mechanisms through which a universal coparenting intervention implemented during the transition to parenthood led to reduced child adjustment problems at age 3 and explored child gender as a potential moderator. One hundred sixty-nine heterosexual couples expecting their first child were randomly assigned to a control condition or Family Foundations, a series of eight classes that targeted the coparenting relationship. Data were collected through videotaped triadic mother–father–child interaction tasks when the child was 1 and 3 years of age. Separate longitudinal path analyses for mothers and fathers tested coparenting competition and positivity as mediators of program effects on child adjustment problems. Significant mediated effects for coparenting competition were found for fathers with both sons and daughters and for mothers with sons but not for mothers with daughters. These effects accounted for between 39 and 55 % of the intervention’s impact on child adjustment problems. Coparenting positivity did not mediate program effects. These results support the use of a prevention approach to reduce coparenting competition and enhance child adjustment and provide information that can be used to refine theory.

Keywords Coparenting · Early childhood · Mediation · Preventive efficacy · Transition to parenthood

Early childhood is a critical period during which children develop the self-regulatory and social-emotional competencies necessary for successfully navigating the social and academic challenges of school (Blair and Diamond 2008). Nevertheless, the prevalence of behavioral and emotional problems among young children in the general population is high: approximately 15 % of parents report that their 1- to 3-year-old children exhibit behavioral or emotional problems in the subclinical or clinical range, and these problems present parenting challenges and risk for persistent problems (Briggs-Gowan et al. 2001). Longitudinal research has shown that children who have behavioral and/or regulatory difficulties in the early years of life are at risk for developing more serious problems later on, such as antisocial behavior or school failure (Breslau et al. 2009; Caspi et al. 1996). Thus, prevention in early childhood is a key strategy to reduce behavioral and emotional problems and promote children’s positive development later in life.

In order to design and implement effective preventive interventions, researchers must first identify causal, malleable factors in the development of child behavioral and emotional problems. As the primary socialization environment for young children, the family is often targeted in intervention efforts. Many programs focus on parenting, such as the Nurse–Family Partnership (Olds et al. 1998) and Incredible Years (Webster-Stratton and Reid 2003), both of which have demonstrated evidence for positive impacts on children and their families in randomized trials. Questions remain, however, about the specific mechanisms that account for long-term program effects.

The current study focused on Family Foundations (FF), a preventive intervention for first-time parents (Feinberg et al. 2009, 2010; Feinberg and Kan 2008) that was grounded in theory suggesting that enhancing the emerging coparenting relationship would have a long-term, positive impact on family functioning and child well-being (Feinberg 2003; McHale

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and Rasmussen 1998; Schoppe et al. 2001). We used a mediation analysis to test theoretical predictions by examining whether FF induced changes in a distal outcome—child adjustment problems 3.5 years after baseline—through its more proximal effects on mothers' and fathers' coparenting relationships. We also explored child gender as a moderator of the mediation pathways.

Targeting the Coparenting Relationship During the Transition to Parenthood

For many couples, the birth of the first child is associated with increases in parental stress and depression and decreases in marital quality (Lawrence et al. 2008; Perren et al. 2005). Perhaps one of the most daunting tasks during the transition to parenthood is for mothers and fathers to navigate the new challenge of working together as a parenting team. Coparenting, or how parents coordinate and support one another in their parental roles, is a multidimensional construct that includes both positive (e.g., support of the coparent and cooperation) and negative (e.g., competition for the child's attention and disagreement over child rearing) aspects (Feinberg 2002, 2003). Coparenting is a central family process that appears to mediate the associations between parent adjustment, couple relationship quality, and parenting (Feinberg 2003; Margolin et al. 2001). How parents adapt during the transition to parenthood and learn to work together (or not) as coparents also has implications for children's well-being (McHale and Rasmussen 1998; Schoppe et al. 2001; Teubert and Pinquart 2010). Empirical work has demonstrated that the influence of coparenting quality on parenting and child outcomes is even stronger than that of more general couple relationship quality (Feinberg et al. 2007).

Grounded in the literature on the transition to parenthood and the primacy of emerging coparenting dynamics for both parent and child adjustment, FF targets the coparenting relationship as a leverage point for promoting positive family functioning and child outcomes (Feinberg 2003). It is common for new parents to experience the transition as challenging (Perren et al. 2005), and many parents are open to education and support and motivated to change during this period (Duvall 1977; Feinberg 2002). FF consists of four prenatal and four postnatal psychoeducational, skills-based classes for couples that focus on building a solid coparenting foundation. Parents learn strategies for conflict management, problem solving, and effective communication, all in the context of working together as a coparenting team. The content emphasizes the importance of building each other's parenting confidence, maintaining a sense of closeness between the partners, and learning how to promote attachment security. The program is universal and is delivered through childbirth education departments at local hospitals, an approach that provides a

non-stigmatizing setting, normalizes new parents' experiences, and facilitates recruitment. The goal is to provide mothers and fathers with a brief dose of support, education, and skill building just before and just after their first child is born to prevent the development of problematic coparenting patterns.

Prior reports on the impacts of a randomized trial of FF have demonstrated positive, sustained effects in a number of different domains (Feinberg et al. 2009, 2010; Feinberg and Kan 2008). Most relevant to the current paper, parents in the intervention group showed declines in coparenting competition and undermining and increases in positive coparenting at 6, 12, and 36 months after the child's birth (Feinberg et al. 2009, 2010; Feinberg and Kan 2008). FF has also been shown to improve child adjustment, with increases in self-soothing and healthy sleep patterns in infancy (Feinberg et al. 2009; Feinberg and Kan 2008) and reductions in behavioral problems, particularly for boys, at age 3 (Feinberg et al. 2010). These findings demonstrate efficacy of FF for improving both coparenting and child outcomes, but do not explain the mechanisms underlying the program's effects. The current study used a mediation framework to explore coparenting positivity and coparenting competition as intervening variables in the effects of FF on child adjustment problems at age 3.

Mediation, Moderation, and Implications for Theory and Practice

A critical step in prevention research is to examine the processes underlying program impacts and to understand the conditions that enhance or diminish efficacy and effectiveness (Kraemer et al. 2002). On a theoretical level, data from randomized control trials are valuable because they provide strong evidence for causal processes that have only been hypothesized or demonstrated with correlational data (Cowan and Cowan 2002). We identified coparenting as a target for intervention based on prior correlational (including longitudinal) work which showed links to both parenting and child adjustment (McHale and Rasmussen 1998; Schoppe et al. 2001). By studying a longitudinal chain in which participation in FF induces changes in coparenting, which in turn leads to changes in child adjustment problems, we can shed light on how family processes impact children with a high degree of confidence. We examined two dimensions of coparenting, positivity and competition, allowing us to test the unique impact of each dimension on child adjustment.

Understanding the intervening variables in an intervention has practical implications as well. Mediation models that include multiple mediators, as in this study, can help to pinpoint the "core components" of the intervention and tease apart the influences that particular program elements have on the outcomes of interest (MacKinnon et al. 2007). Program developers can use the information gained through

mediation analysis to improve the intervention by enhancing elements that do not have the desired effect or eliminating those that might be unnecessary (Hafeman and Schwartz 2009). Such insights are important to funders who are interested in the maximum return on investment, and to busy families who likely prefer efficient prevention and intervention services.

In addition to mediation, moderation analyses designed to test whether a program is more beneficial for certain types of families are necessary to fully understand a program's effects. Given our previous reports showing that FF has a stronger impact on behavior problems (but not social–emotional competence) in boys than in girls (Feinberg et al. 2010), we tested child gender as a moderator of the mediation pathways to illuminate potential reasons for differential program effects. One possible explanation is that parents with sons engage in more coparenting conflict than parents with daughters (Margolin et al. 2001; McHale 1995). This may be because, on average, fathers tend to be more involved with parenting sons than daughters (Raley and Bianchi 2006), creating more opportunities for coparenting conflict. Second, child gender may moderate the link between poor coparenting relationship quality and child behavior problems, as some studies have shown that this association is stronger for boys than for girls (O'Leary and Vidair 2005; Reid and Crisafulli 1990). Davies and Lindsay (2001) have proposed a “differential reactivity” model, suggesting that boys react to coparenting difficulties with externalizing symptoms and behavior dysregulation, whereas girls react with anxiety or other internalizing symptoms. They suggest that gender socialization may explain this effect, if boys are rewarded for expressing themselves in ways that signal assertiveness and independence, and girls are taught to express themselves in ways that preserve interpersonal harmony. The gender differences are not always consistent, however, as a recent meta-analysis found no differences by child gender (Teubert and Pinquart 2010). We aim to further clarify these conflicting findings by investigating child gender differences in the context of an experimental design.

The Current Study

This study built on previous research showing that FF had positive impacts on coparenting and child outcomes by addressing two goals. First, we explored the mechanisms underlying program impacts by examining whether the effects of FF on child adjustment problems at age 3 were mediated by mothers' and fathers' positive coparenting and/or coparenting competition at age 1. Extending our prior reports of program impacts on parent-reported child outcomes at age 3 (Feinberg et al. 2010), here we used observational measures from videotaped triadic mother–father–

child interactions. We tested separate models for mothers and fathers, given evidence that coparenting may operate differently depending on parent gender (Feinberg and Kan 2008; Lindsey and Caldera 2006). We included the two coparenting dimensions as mediators in the same model, allowing us to look at the unique and joint effects of each dimension. Although positive and negative dimensions of coparenting tend to be inversely related, both theoretical and empirical work suggests that they represent distinct aspects of coparenting (Feinberg 2003; Schoppe et al. 2001). Our measure of child adjustment problems included a range of behaviors that may be considered challenging or difficult for parents to manage: anger, resistance to control, high activity, and low sustained attention (Mathiesen and Sanson 2000). In light of the documented gender differences in effects of FF on child outcomes as well as other correlational work showing unique patterns of association between coparenting and child adjustment for girls and boys, our second goal was to examine child gender as a moderator of the mediation processes.

Method

Participants

Participants were 169 heterosexual couples recruited through childbirth education programs at hospitals located in two medium-sized cities in Pennsylvania. To be eligible for the study, parents were required to be 18 years of age or older, living together, and expecting their first child. Of the eligible families, 23 % agreed to participate (see Feinberg and Kan (2008) for further details on recruitment). Most couples (82 %) were married at pretest and 54 % of mothers gave birth to sons. On average, mothers were 28.33 (SD=4.93) and fathers were 29.76 years of age (SD=5.58). Nearly all participants were non-Hispanic White (91 % of mothers and 90 % of fathers). Most families were working or middle class, as reflected by average annual family income, $M=\$65,000$ (SD=\$34,372). Mothers had completed an average of 15.06 years of education (SD=1.82) and fathers 14.51 years (SD=2.19). Although the sample is not representative of all US families, the demographic characteristics approximate those from the larger geographic area from which the sample was drawn.

Procedures

Data were collected in home interviews during which parents completed questionnaires and families participated in videotaped interactions. Pretest (time 1) occurred when the mother was pregnant (average weeks of gestation was 22.90, SD=5.30). After pretest, couples were randomly assigned to the intervention ($n=89$) or no-treatment control

condition ($n=80$). The randomization procedure yielded equivalent groups, as there were no differences between couples in the intervention and control conditions on a range of pretest variables, including age, income, education, marital status, weeks of gestation, mental health, and relationship quality (see Feinberg and Kan 2008).

The no-treatment control group received a mailing about selecting high-quality childcare. Couples assigned to the intervention condition received the FF program in small groups of six to ten couples. Mothers and fathers attended four prenatal and four postnatal classes together. Each session lasted for 2 h and was led by a pair of group leaders (one woman and one man) and involved didactic presentations, exercises, role playing, and behavioral rehearsal. Observer ratings suggested high implementation fidelity, with an average of 95 % of the curriculum content delivered as planned. Using a 5-point scale (1=*not clear* and 5=*extremely clear*), observers rated group leaders' clarity of presentation as 4.73 (SD=0.15) on average, indicating that the quality of implementation also was high. On average, mothers attended 5.50 sessions and fathers attended 5.38 sessions. Approximately 80 % of couples came to at least three of the four prenatal classes and 60 % came to at least three of the four postnatal classes.

The current analyses used data from the follow-up assessments when the child was 1 year of age (approximately 1.5 years after pretest (time 2)) and 3 years of age (approximately 3.5 years after pretest (time 3)). As part of the home interviews at times 2 and 3, parents and children participated in two triadic videotaped interactions. First, parents and their child engaged in a joint free play session using a limited set of toys provided by the interviewer. Free-play observations were 12 min at time 2 and 10 min at time 3. In the second interaction, parents were asked to teach their child to accomplish a set of tasks designed to be challenging for most children (e.g., building a tower of blocks at time 2 and completing an alphabet puzzle at time 3). The second interaction lasted for 6 min at time 2 and 8 min at time 3. Couples in both conditions received equivalent honoraria for their participation at each wave, and no additional financial incentives were provided for attending the intervention sessions.

Of the original 169 families who enrolled in the study, data from four families (two intervention and two control) were not utilized in the analyses because of child medical problems. An additional 20 families did not contribute data at one or both of the follow-up waves (11 refused the videotaped procedure, 8 couples were divorced or separated, and 1 videotape from a family with twins could not be coded). There was some attrition, including 13 families at time 2 and 26 at time 3 who declined to participate or could not be reached. Because of our analytic procedures and accommodation for missing data, the analysis included all families

who were randomly assigned at time 1, but to summarize the available data: 132 families provided observed coparenting data at time 2 and 128 families provided observed child adjustment data at time 3.

Attrition Analysis To test whether there was differential attrition across the three waves of data collection, we estimated a series of logistic regression models to examine whether attrition in either the control or intervention condition was related to a set of key background characteristics. The only variable (modestly) related to study participation was mother's education (for details, see Feinberg et al. 2010); as such, all models controlled for maternal education.

Measures

Five undergraduate and graduate students (four females and one male) were trained to rate the videotaped interactions using a global coding system of 5- to 7-point scales. In the current analyses, we used ratings of coparenting (coded separately for mothers and fathers) at time 2 and child adjustment problems at time 3. The coding scheme was created for the project and adapted from prior work (Blair et al. 2008; Margolin et al. 2004; McHale et al. 2001; Zahn-Waxler et al. 1994). Coders were blind to experimental condition and one experienced coder served as the criterion coder. Coparenting was double coded and child adjustment problems was single coded (with 15 % of the cases coded by at least two coders to assess reliability), and final scores were created by averaging across coders and across the free play and teaching tasks.

Coparenting Coparenting competition was rated on a 6-point scale (1=*no instances of competition* and 6=*excessive jockeying for child's love and attention*) and ranged from minor instances of competition (e.g., briefly drawing the child's attention away from the other parent, one parent overriding the other) to multiple displays of intense competition that indicated that the parent was primarily interested in being the "director" and unwilling to step aside for his or her partner. Coparenting positivity was an aggregate of warmth and cooperation. Warmth was coded on a 7-point scale (1=*does not show signs of warmth* and 7=*high levels of warmth are displayed frequently*) and included verbal (e.g., positive comments indicating respect or empathy) and nonverbal (e.g., touching and smiling) expressions of affection directed toward the partner. Cooperation was coded on a 5-point scale (1=*parent carries through his or her own agenda or sits quietly without joining in* and 5=*multiple, clear instances of facilitating, building, or supporting the partner*) and measured parents' tendency to synchronize their parenting behaviors. Scores were standardized and averaged to form an overall coparenting positivity rating.

Mothers' and fathers' coparenting ratings were correlated, $r = 0.55$, $p < 0.001$ for competition, and $r = 0.73$, $p < 0.001$ for positivity. Interrater intraclass correlations ranged from 0.71 to 0.87 across mothers, fathers, and coparenting dimensions.

Child Adjustment Problems Child adjustment problems was an aggregate comprised of four dimensions: anger (expressions of frustration, annoyance, or irritation), activity (intensity, frequency, and duration of motor activity), resistance to control (child's tendency to oppose parental requests), and sustained attention (child's tendency to remain involved and interested in the tasks; reverse coded). Higher scores indicated more anger, activity, resistance to control, and a lower degree of sustained attention. Scores on these four subscales were standardized and averaged to create a single indicator of child adjustment problems. Interrater intraclass correlations ranged from 0.62 (resistance to control) to 0.89 (activity) across the four scales, and α for the overall scale was 0.69 with an asymptotically distribution-free 95 % confidence interval of 0.61–0.77 (Maydeu-Olivares et al. 2007).

Control Variables All models controlled for maternal education and parent reports of social desirability, which was assessed at time 1 with 33 items (e.g., "I am always courteous, even to people who are disagreeable," Crowne and Marlowe 1964) and was included to control for potential demand characteristics due to being observed and taking part in the intervention condition. Parents received a 1 for responding "yes" and a 0 for responding "no" to each item and the scale was created by summing the items. α was 0.73 (95 % CI=0.67–0.80) for mothers and 0.68 (95 % CI=0.61–0.76) for fathers.

Results

Analysis Plan

We used path analysis to test multiple mediator models separately for mothers and fathers (see Fig. 1). Analyses were conducted using Mplus 6.1 which enabled full-information maximum-likelihood techniques that could accommodate missing data. The models tested whether effects of FF on observed child adjustment problems at time 3 were mediated by program-induced changes in coparenting competition and coparenting positivity observed at time 2. Given that the pretest occurred before the child was born, it was not possible to collect baseline measures of coparenting or child adjustment to include as covariates. Models controlled for maternal education and parents' social desirability. All possible correlations between variables measured at the same point in time were specified in the model, as was the direct effect from condition to child adjustment problems, resulting in saturated models.

To assess the mediated effects, we used a bias-corrected bootstrap test which provides confidence interval limits for the specific indirect effects in multiple mediator models. It is preferred over other available methods for testing mediation due to its lower type 1 error rate and high power to detect mediation (MacKinnon et al. 2004). In the case of significant mediation, we calculated the proportion-mediated measure as described by Tein et al. (2006).

To test for moderation by child gender, we conducted a series of two-group (daughters vs. sons) path analyses. In the first model, all parameters (i.e., regression estimates, means, intercepts, and variances) were estimated freely for families with daughters and sons. Then, we constrained the five paths pertaining to the mediation effects (paths a_1 , a_2 , b_1 , b_2 , and c in Fig. 1) to be equivalent across daughters and sons. A Chi-square difference test was used to compare the unconstrained and constrained models. For any significant result, we proceeded to examine gender differences in each of the five mediation paths.

Table 1 shows descriptive statistics broken down by condition and child gender. Bivariate correlations can be found in Table 2. Few significant bivariate correlations between experimental condition and the mediators and outcome emerged; however, a direct association between the outcome and the independent variables is not a necessary condition for mediation (Shrout and Bolger 2002).

Path Analysis for Mothers

The Chi-square difference test comparing the unconstrained model with zero degrees of freedom to the model where the mediation path coefficients were constrained to be equal across families with daughters and sons was significant, $\chi^2(5) = 12.52$, $p = 0.03$. This indicated that the fit of the constrained model was significantly poorer, and that the mediation effect was different for families with daughters vs. sons. To further probe the gender differences, we tested a series of models in which we constrained one path at a time to be equal across girls and boys and examined the Chi-square differences between the unconstrained and constrained models. Results indicated that there was a significant gender difference in path a_1 , $\chi^2(1) = 6.70$, $p = 0.01$, and trend-level differences in paths b_1 , $\chi^2(1) = 2.68$, $p = 0.10$, and c , $\chi^2(1) = 3.45$, $p = 0.06$.

As shown in Table 3, for mothers with sons, random assignment to the FF condition was linked to significantly lower coparenting competition when the child was 1 year of age (path a_1). In turn, lower coparenting competition was associated with fewer child adjustment problems 2 years later, when the child was 3 years of age (path b_1). For mothers with sons, the mediated, or indirect, effect for intervention condition predicting child adjustment problems through coparenting competition was -0.22 (95 % CI=

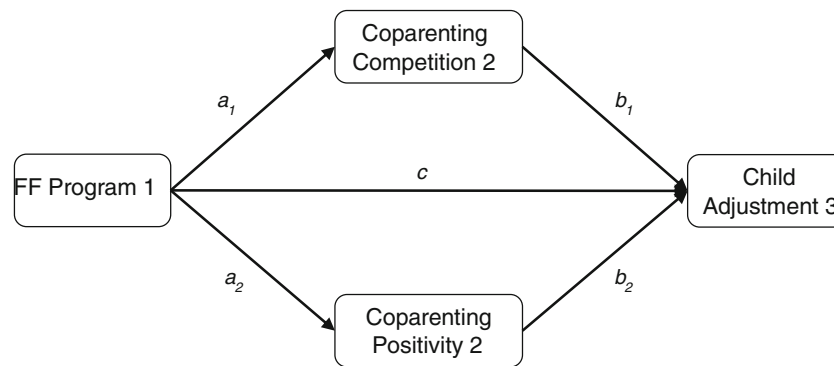


Fig. 1 Path model testing the impact of FF on child adjustment problems at age 3, as mediated through coparenting competition and positivity observed when the child was 1 year of age. The model also

included the correlation between coparenting competition and positivity, and maternal education and parent reports of social desirability as control variables (paths not pictured for clarity)

–0.40 to –0.10). The proportion of the total effect accounted for by this mediated effect was 39 %. There was no significant mediation effect through coparenting competition for mothers with daughters.

There was not a significant program impact on mothers' coparenting positivity (path a_2) or in the path from mothers' coparenting positivity to child adjustment problems (path b_2) for families with daughters or sons. Accordingly, there were no significant unique mediated program effects through mothers' coparenting positivity. The proportion of the total effect of FF on child adjustment problems mediated through both competition and positivity together was 40 % for mothers with sons and 7 % for mothers with daughters.

Path Analysis for Fathers

The Chi-square difference test comparing the unconstrained and constrained models to test for child gender differences was not significant, $\chi^2(5)=5.48$, $p=0.36$, suggesting that the model was the same for fathers with sons and fathers with daughters; therefore, we constrained the paths to be equal across girls and boys. Fathers who were in the FF condition

showed lower levels of coparenting competition at time 2 (path a_1), which was linked with fewer child adjustment problems at time 3 (path b_1 ; see Table 3). The mediated effect for intervention condition predicting child adjustment problems through coparenting competition was –0.06 (95 % CI= –0.17 to –0.01). The proportion of the total effect accounted for by the mediated effect through competition was 55 %. Similar to mothers, there was no significant intervention effect on fathers' coparenting positivity (path a_2) and no association between fathers' coparenting positivity and child adjustment problems (path b_2). The proportion of the total effect of FF on child adjustment problems mediated through competition and positivity together was 59 %.

Discussion

This study tested coparenting competition and positivity as potential mediators of the impact of FF on child adjustment problems 3.5 years after baseline, and explored child gender as a moderator of the mediated effects. The results revealed that coparenting competition mediated the effects of FF on

Table 1 Means and standard deviations for study variables, by condition and child gender

Variable	Intervention				Control			
	Son		Daughter		Son		Daughter	
	M	SD	M	SD	M	SD	M	SD
Mother								
Coparenting competition T2	1.77	0.74	1.90	0.71	2.36	0.93	1.88	0.64
Coparenting positivity T2 ^a	0.30	0.73	0.17	0.96	–0.03	0.97	0.08	0.70
Father								
Coparenting competition T2	2.12	0.73	2.26	0.78	2.54	0.92	2.27	0.62
Coparenting positivity T2 ^a	–0.07	0.69	–0.14	0.65	–0.16	0.83	–0.15	0.72
Child adjustment problems T3 ^a	0.13	1.00	–0.12	0.63	0.05	0.59	–0.07	0.70

T2 = time 2, T3 = time 3

^aStandardized variables

Table 2 Bivariate correlations among the study variables

	1	2	3	4	5	6
Experimental condition	–	–0.07	–0.03	–0.15	0.04	0.01
Maternal education T1	–0.07	–	0.06	–0.19*	0.12	–0.19*
Social desirability T1	–0.07	–0.01	–	0.10	–0.04	0.01
Coparenting competition T2	–0.20*	–0.12	–0.04	–	–0.21*	0.28**
Coparenting positivity T2	0.13	0.01	–0.04	–0.10	–	–0.20*
Child adjustment problems T3	0.01	–0.19*	0.10	0.24*	–0.06	–

Correlations for mothers are presented below the diagonal, and correlations for fathers are presented above the diagonal (*N* ranges from 128 to 165). Intervention=1; control=0

T1 = time 1, T2 = time 2, T3 = time 3

p*<0.05; *p*<0.01

child adjustment problems, controlling for maternal education and social desirability. Moderation analyses showed that competition was a significant mediator of program effects for fathers regardless of child gender and for mothers with sons, but not for mothers with daughters. In the context of coparenting competition, positivity did not emerge as a unique mediator of program impacts. These findings support the use of a universal coparenting program during the transition to parenthood to enhance family relationships, and suggest that this approach also may help to reduce the incidence of child adjustment problems. This study also provides information that can be used to refine theories pertaining to family processes and to improve family-focused interventions.

Coparenting as a Mediator of the Impacts of FF on Child Adjustment Problems

Our findings for coparenting competition are consistent with past theoretical and correlational research that suggests that young children, particularly boys, may react to hostile interparental interactions by acting out (O’Leary and Vidair 2005; Schoppe et al. 2001; Teubert and Pinquart 2010). Our results showed that couples who were randomly assigned to the FF program exhibited less coparenting competition approximately 1.5 years after random assignment.

This early reduction in coparenting competition was linked to fewer child adjustment problems 2 years later, controlling for maternal education and social desirability. It is important to note that it is not possible to establish causality in the second pathway, from coparenting competition to child adjustment problems, because parents were not randomly assigned to levels of coparenting competition and therefore, there may be confounders of the mediator-to-outcome relationship (Coffman and Kugler 2012). Despite this limitation, our exploration of this process in the context of a longitudinal experimental design provides further evidence to support a positive link between coparenting competition and child adjustment problems.

Our analysis testing child gender as a moderator revealed that coparenting competition acted as a mediator for all parent–child dyad combinations except mothers with daughters. This result is somewhat consistent with our previous reports showing that FF had significant impacts on boys’, but not girls’ behavior problems (Feinberg et al. 2010). This study extended these findings by identifying differential program effects on mothers’ coparenting competition as a potential explanation of *why* the program did not work as well to reduce behavior problems in girls as it did for boys.

There were child gender differences in both of the pathways involving mothers’ coparenting competition. The

Table 3 Standardized path coefficients (β) and standard errors (SE) for mother and father models

Parent	a_1		a_2		b_1		b_2		c	
	β	SE	β	SE	β	SE	β	SE	β	SE
Mother with daughter	0.05	0.18	0.05	0.23	0.07	0.12	–0.09	0.12	–0.10	0.19
Mother with son	–0.35**	0.19	0.18	0.21	0.39**	0.11	–0.03	0.11	0.22	0.23
Father	–0.17*	0.13	0.05	0.13	0.25**	0.09	–0.15	0.10	0.03	0.13

Significant differences emerged for sons and daughters in the mother model, so estimates are listed separately by child gender. No significant child gender differences were found for fathers

p*<0.10, *p*<0.01

moderation results for the first path, from intervention condition to coparenting competition (path a_1), indicated that there was a significant program impact on mothers' competition in families with sons but not in families with daughters. Inspection of the raw means (Table 1) indicated that the intervention effect for boys was due to a reduction in mothers' competition to roughly the same average level as mothers with daughters. Consistent with previous research (Margolin et al. 2001; McHale 1995), control families with sons showed higher competition than those with daughters. This may be because fathers tend to be more involved in parenting sons than daughters (Raley and Bianchi 2006), allowing for more opportunities for interparental disputes. Mothers with sons may simply have more room to move on coparenting competition, but these findings also suggest that mothers with sons benefitted from the materials on preparing couples for managing coparenting difficulties, perhaps by teaching them to work with their partners rather than attempting to compete with them.

Moderation results for the second path, from coparenting competition to child adjustment problems (path b_1), showed that the program-induced reduction in mothers' competition predicted fewer adjustment problems in boys, but not girls. Our measure of child adjustment problems was composed mostly of behaviors on the externalizing spectrum, including anger, resistance to control, and high activity. Thus, these results lend support to the differential reactivity model, which hypothesizes that responses to negative interparental exchanges are manifested through externalizing symptoms in boys but not girls (Davies and Lindsay 2001; O'Leary and Vidair 2005).

The nonsignificant effects in this study also provide useful information. Coparenting positivity, a theoretical mediator targeted by FF, did not emerge as a significant mediator of the program's impact on child adjustment problems. The first path—from intervention condition to coparenting positivity (path a_2)—was not significant in this analysis, indicating that there were no differences between the intervention and control groups on coparenting positivity. Furthermore, inconsistent with correlational work (McHale and Rasmussen 1998; Schoppe et al. 2001; Teubert and Pinquart 2010), we found no association between either parent's coparenting positivity and child adjustment problems.

A number of factors might account for these null results. It could be that coparenting positivity is less malleable than competition, that the program elements designed to promote supportive and cooperative coparenting relationships did not effectively do so, or that parents found the information on preventing negative coparenting dynamics, like competition, to be more salient and easier to apply. It is important to note that, in contrast to most previous studies, our analysis included both positive and negative coparenting dimensions in the same model. Thus, our effects represent the *unique* contributions of each of these coparenting

dimensions to child adjustment problems. It may be that a greater proportion of variance in child adjustment problems is accounted for by negative coparenting, resulting in diminished associations between positive coparenting and child adjustment problems in multivariate models. Finally, it is possible that the observed measure of positivity did not capture meaningful variability in the construct, making it difficult to detect program impacts and associations with child adjustment problems.

Implications for Practice

Mediation and moderation analyses can be used to provide feedback about how to improve intervention programs. But, interpretation and application to program content revision and implementation should be done with caution. The findings in this study suggest that the program components that target coparenting competition should be considered "core" elements, as the program was able to reduce competition, which in turn led to fewer child adjustment problems. Thus, future iterations of FF should retain the material related to competition and ensure that it is delivered with high fidelity. Are we able then to draw the conclusion that the material in the program promoting coparental warmth and cooperation can be eliminated? We do not think that conclusion is warranted, given that theory and empirical work emphasize the importance of a positive, supportive coparenting relationship (Feinberg 2003; Schoppe et al. 2001). It is important to note that we do not know if the material aimed at reducing competition would have been as effective without the accompanying material promoting warmth and support. It would not be advisable to focus solely on reducing negative coparenting behaviors at the expense of ignoring the potential benefits of positive behaviors without stronger evidence. Nonetheless, it would be worthwhile to re-examine the exercises targeting coparenting warmth and cooperation, as the program did not improve these coparenting dimensions—at least as measured through videotaped observations.

The nonsignificant results for mothers with daughters also are informative. Even if FF were able to reduce mothers' competition in families with daughters to the same extent that it did in families with sons, the results suggest that this would not help to reduce girls' adjustment problems, as evidenced by the lack of association between these two constructs (path b_2). That said, it is possible that curtailing mothers' competitive coparenting behaviors might lead to improvements in other domains of girls' adjustment not measured in this study, such as internalizing symptoms (as predicted by the differential reactivity model), or social functioning. Reducing mothers' coparenting competition could also have positive implications for mothers' and fathers' well-being, such as by decreasing depression and stress, and enhancing couple relationship quality (Feinberg

2002). Thus, it would be helpful to have evidence about the impact of mothers' coparenting competition on a range of parent and child outcomes. Moreover, such information for both mother and father behaviors in son and daughter triads would inform which intervention targets to prioritize for which parent–child gender configurations. In this sense, the results here are illustrative of how a comprehensive analysis could inform more precise intervention targeting.

Finally, it may be worthwhile for FF to address the potential for differential effects in families with sons vs. daughters during the intervention classes. This could be accomplished by presenting information about the role of child gender in interparental dynamics, suggesting that parents with sons pay special attention to competition and conflict, and encouraging fathers with daughters in particular to be active (co)parents. If part of the explanation for the lack of intervention effects for mothers with daughters is that fathers in these families are less involved, FF and other programs could teach specific strategies for coping and staying engaged in parenting even if parents feel they have less to contribute or feel excluded.

Limitations and Conclusions

In considering the results above, several limitations should be noted. Although a range of education and income levels were represented in the sample, most parents were relatively well-educated and the majority were non-Hispanic White, limiting the generalizability of the findings. Currently, a second trial of FF with a larger, more diverse sample is underway as well as a trial with low-income, minority teen parents. Second, although reductions in coparenting competition accounted for a relatively large proportion of variance of the program effect on child adjustment problems (39 % for mothers with sons and 55 % for fathers), there is still a good deal of residual variance. The remaining program effects might be due to program-induced changes in other factors, such as parenting or parent adjustment, or unmeasured effects, such as social support from the group leaders and/or other couples in the group. Studying the effects of these factors is a direction for future research. Third, we relied on observational measures of coparenting and child adjustment problems, but the use of parent reports and multi-informant designs would provide important replications of the findings. In addition, models that are able to capture how mothers and fathers play off each other during coparenting exchanges (e.g., actor–partner or sequential behavior models) would contribute to our understanding of this complex family dynamic.

By including two different dimensions of coparenting in our mediation models, this study provided insight on how to improve the efficacy of FF; particularly, by retaining the content related to coparenting competition and enhancing the material on coparenting positivity. Our experimental

design and statistical models, however, were not able to pinpoint exactly which parts of the intervention were effective. For example, we do not know whether it was the group discussions, role playing exercises, didactic presentations, or some combination of these elements that were effective at reducing coparenting competition. Other types of experimental designs, such as those that randomly assign participants to receive certain combinations of different program components would allow for a more fine-grained examination of exactly which components influenced outcomes (Collins et al. 2005).

Despite the limitations, our analyses represent an important step toward understanding the mechanisms underlying positive impacts of FF on child adjustment problems at age 3. We were able to confirm that these effects were, at least in part, due to reductions in coparenting difficulties as hypothesized. Given the relatively high rates of behavior and emotional problems in early childhood (Briggs-Gowan et al. 2001) and their potential to lead to more serious problems later on, these findings are noteworthy. They suggest that a relatively brief preventive intervention, strategically delivered during a period of major family transition, can have lasting impacts on both coparenting and, in part through this mechanism, on child adjustment.

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Conflict of Interest Dr. Feinberg created the Family Foundations program and is the owner of a private company, Community Strategies, which sells the Family Foundations program in DVD format and disseminates the class series curriculum (www.FamFound.net). Dr. Feinberg's financial interest is periodically reviewed and any potential conflicts managed by the Institutional Review Board and the Conflict of Interest Committee at Pennsylvania State University.

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