Extended Abstract

Current research on paternal behavior focuses on different aspects of fatherhood, including antecedents of father involvement and its impact on child development. One of the central questions in empirical research is why are some fathers more involved than others? In light of recent findings about the impact of father involvement for their children's well-being, as well as for processes of paternal growth and maturation and the father's personal development, questions like this are of great importance to researchers.

Father involvement and child temperament

A widely used conceptual framework for the study of parenting processes was introduced by Belsky (1984). According to this model, parenting behavior is determined by parent personal psychological resources, child characteristics, and contextual sources of stress and support. While it has been suggested that characteristics of children that make them more or less difficult to care for shape the quantity and quality of the parental care they receive, little empirical research considers how child characteristics influence parenting behaviors, and the vast majority of studies examine the links between child temperament and mothering, ignoring fathering. The small body of research on the associations between child's temperament and father involvement suggest a direct relationship between the two constructs. It has been shown that fathers of children who are more temperamentally difficult face a more troublesome parenting.

The existing research is limited in important ways. First, key endogenous variables were treated as exogenous predictor variables, thus ignoring bi-directionalities and resulting in estimation bias. Second, previous studies focused on measuring the direct effect of child temperament on father involvement, neglecting other possible types of effects (such as temperament interacting with other predictor variables).

The current study seeks to expand prior work at both the theoretical and empirical levels. On the theoretical side, the current study expands Belsky's (1984) conceptual model. Belsky's (1984) model focuses on the direct impact of constructs and abstracts from the much complex set of relationships surrounding child rearing in a family. The present study seeks to identify this complex set of relationships among key constructs. Two important dimensions are introduced into this new model (Figure 1). First, relationships among endogenous predictor variables are made explicit (father involvement is not only affected by the parental relationship quality, but is also affecting this relationship). Second, in addition to the main effects of child temperament on father involvement, the moderating effects of child's temperament on other key predictor variables (father's role identity and parental relationship quality) are considered.

At the empirical level, this study estimates a model that is consistent with the conceptual model, and a series of hypotheses are tested. The empirical model assesses whether fathers of temperamentally easy children are more likely to be involved in their children's lives than fathers of temperamentally difficult children. Additionally, it addresses the bi-directional relationships between father involvement and parental relationship quality suggested by the conceptual model by estimating a two-stage least squares regression model in which both variables are treated as endogenous. Also, in the

empirical model, child temperament is interacted with other variables so that it is possible to statistically test whether it has any moderating effect, in addition to the main effect.

Guided by the modified conceptual model, this study examined empirically two hypotheses: (1) Fathers of "easy" children are more likely to be involved in their children's lives than fathers of "difficult" children; and (2) Child temperament has a moderating effect on father role identity and the parental relationship quality.

Method

Sample

The present investigation uses data from the Fragile Families and Child Well Being Study. This multi-wave study is intended to provide longitudinal information about unmarried and married parents and their children (Reichman, Teitler, Garfinkel, & McLanahan, 2001). The study follows a representative birth-cohort of 4,898 children born between 1998 and 2000 in twenty cities in the United States with populations over 200,000. Three thousand seven hundred and twelve children were born to unmarried couples and 1,186 to married couples. In-hospital baseline interviews with mothers and fathers were conducted separately, close to the birth of the child. Follow up interviews with both parents were also conducted.

The current study used a sub-sample of the families surveyed in the Fragile Families and Child Well Being Study (N = 1,701). Data are drawn from the first two waves (baseline and one-year surveys). The sample has been restricted in several ways, including the exclusion of non-resident fathers (n = 2,428) because they differ very much from resident fathers in terms of accessibility to their children and therefore their potential involvement.

Measures

Father involvement. At second wave both parents were asked how often in the previous week the father did specific activities with the child (e.g. Playing games, showing physical affection, putting to bed). These items were factor analyzed separately for fathers and mothers, ending in one factor for each parent. Composites were created then separately for fathers and mothers. Scale reliabilities calculated using Cronbach's Alpha were 0.74 for fathers and 0.83 for mothers. Mother and father reports were then averaged into one score (mean= 4.82, SD= 1.15), and centered.

Child's temperament. At second wave both parents reported on how well specific statements describe their child (e.g. Child tends to be shy, often fusses and cries, is very sociable). These items were factor analyzed separately for fathers and mothers, ending in one factor for each parent. Composites were created then separately for fathers and mothers. Scale reliabilities calculated using Cronbach's Alpha were 0.60 for fathers and 0.61 for mothers. Mother and father reports were then averaged into one score (mean= 2.82, SD= 0.78), and centered.

Quality of parental relationship. At wave 2 both parents reported on how frequently the other parent displays specific behaviors (e.g. Expresses affection or love, listens when the other parent needs someone to talk to). These items were factor analyzed separately for fathers and mothers. One factor was enough to describe these data for each parent. These items were averaged to create two composite scores, one for each parent.

The Cronbach's Alpha coefficients were 0.72 for fathers and 0.78 for mothers. Mother and father reports were then averaged into one score (mean= 2.73, SD= 0.29). This parental relationship quality scale was corrected for skewness, and then centered.

Father's role identity. At time of birth fathers reported on their agreement with specific items (e.g. Being a father and raising a child is one of the most fulfilling experiences, I want people to know I have a new child). These items were factor analyzed, resulting in one factor. The items were averaged to obtain one composite score. Cronbach's Alpha reliability coefficient for this scale was 0.71, mean= 3.76, and SD= 0.40. This scale was corrected for skewness, and then centered.

Demographics. A key set of control variables measured at the baseline survey were used in this analysis. Both parents reported about their general health, and about their education. Mothers also reported household income. Finally, dummy variables for the child gender and for the father's race were created for the analysis, as well as a child's age variable.

Analysis

Analyses were conducted using a two-stage least square (2SLS) regression procedure to address the bi-directional relationships between father involvement and parental relationship, treating the two variables as endogenous. The empirical model comprises of a system of two equations including a father involvement equation and a parental relationship quality equation as follows:

$$\begin{aligned} FatherInv &= \alpha + \beta_1 ChildTemp + \beta_2 FatherMother + \beta_3 FatherID + \beta_4 Controls + \varepsilon_1 \\ FatherMother &= \delta + \phi_1 ChildTemp + \phi_2 FatherInv + \phi_3 FatherID + \phi_4 Controls + \varepsilon_2 \end{aligned} \quad (1)$$

where $\alpha, \beta_1, ..., \beta_4, \delta, \phi_1, ..., \phi_4$ are parameters to be estimated and ε_1 and ε_2 are normally distributed error terms.

The primary focus of this study is on estimating the parameters of the first equation. In most empirical studies of developmental processes the endogeneity of some explanatory variables is ignored, resulting in biased estimates of the relationship between key variables and the dependent variable.

To examine whether child temperament has a moderating effect on father role identity and the parental relationship quality two interaction terms were added to the model as follows:

$$\begin{aligned} FatherInv &= \alpha + \beta_1 ChildTemp + \beta_2 FatherMother + \beta_3 FatherID + \beta_4 Controls \\ &\quad + \beta_5 FatherMother \times ChildTemp + \beta_6 FatherID \times ChildTemp + \varepsilon_1 \\ FatherMother &= \delta + \phi_1 ChildTemp + \phi_2 FatherInv + \phi_3 FatherID + \phi_4 Controls + \varepsilon_2 \end{aligned} \quad (2)$$

Results

Descriptive statistics are presented in Table 1. As a first step to analysis, variability in father involvement was examined. Table 2 reports descriptive data on father involvement. The first row of Table 2 reports the mean and standard deviation of the composite measure of father involvement (centered) for the entire sample. The other rows report the mean and standard deviation for several sub-groups of interest. The table reveals substantial variation in father involvement. Fathers of children with a difficult temperament (relative to the mean) are less involved with their children. Fathers that have good relationship with the child's mother are considerably more involved with their children, and to a smaller degree, so are fathers with high role identity. Table 2 also reveals substantial variation in father involvement across ethnic groups, with Hispanic fathers considerably less involved than the average and White and Indian American fathers more involved than fathers from other ethnic groups. The table reveals some variation in father involvement with respect to marital status, and shows little variation across child's gender with a higher father involvement when the child is a boy.

Estimation results of the basic regression model reported in Table 3 were obtained using OLS. First stage results of the 2SLS model are reported in Table 4. A comparison between OLS-based and 2SLS-based estimates is presented in Table 5. In the first column it is suggested that a child's difficult temperament is negatively related to father involvement and that the quality of the parental relationship, as well as the father's role identity are positively related to father involvement. The estimates also suggest important differences between groups. Compared to White fathers, Hispanic fathers are less involved with their children. No such difference was found with respect to Black, Asian, and American-Indian fathers. However, when the parents are of different ethnic groups, fathers tend to be more involved. No differences were found with respect to marital status of parents or to household income. Fathers tend to be more involved when the mother is more educated. Finally, estimation results indicate that fathers tend to be more involved with boys than with girls.

In the third column, comparable 2SLS results are reported. The estimates obtained for the 2SLS model are qualitatively the same as for the OLS model. However, accounting for the endogeneity of the parental relationship quality affects the magnitude of the effects of the key variables. Compared to OLS-based estimates, the impact of child temperament on father involvement is 7% higher, the impact of the parental relationship quality 14% lower, and the impact of the father's role identity is 5% higher. There were no substantial differences in the impact of control variables.

The impact of accounting for the endogeneity of the parental relationship quality is substantial when testing for moderating effects. Columns 2 and 4 on Table 5 report the estimates obtained for the OLS and 2SLS models, respectively. In each of these specifications, two interaction terms were included: (1) Parental relationship quality with child temperament; and (2) Father's role identity with child temperament. These specifications are designed to test the moderating effect of child temperament on either the parental relationship quality or the father's role identity. Estimates based on the OLS model indicated no moderating effect of child temperament. By contrast, 2SLS-based estimates suggest that child temperament has a moderating effect on parental relationship quality, but not on father's role identity.

Discussion

This paper addresses the question of how child temperament is related to father involvement. First, this paper extends the commonly used conceptual model of parenting developed by Belsky (1984). The extended conceptual model makes explicit a more complex and interactive relationship among key constructs. In particular, the extended model describes the interactions among two endogenous variables, namely, father involvement and parental relationship quality, and suggests different paths through which child temperament affects father involvement. Guided by the extended conceptual model, the effect of child temperament on father involvement was examined empirically using data from the Fragile Families and Child Well Being Study. Two hypotheses were tested: (1) Fathers of "easy" children are more likely to be involved in their children's lives than fathers of "difficult" children; and (2) Child temperament has a moderating effect on father role identity and the parental relationship quality. Results from the present study show that temperament is an important factor affecting father involvement, and indicate different pathways of this effect.

A first main finding is that fathers of temperamentally easy children are more likely to be involved in their children's lives than fathers of temperamentally difficult children. A second main finding is that child temperament also predicts father involvement through its moderating effect on the quality of the parental relationship. In general, a good quality of parental relationship increases the degree of father involvement. However, for any given quality of the parental relationship, fathers of children who are temperamentally difficult are less involved when compared to fathers of children who are temperamentally easy. A third main finding is that child temperament has no moderating effect on the association between father's role identity and father involvement. This study identified several contextual factors that affect father involvement. Fathers are more involved with sons than with daughters, when parents are from different ethnic groups, and when the mother is more educated. While there were no substantial differences in father involvement between White, Black, Asian, and American Indian fathers, Hispanic fathers appear to be less involved with their children.

The present study contributes to the literature on father involvement in several ways. First, by extending the commonly used conceptual model proposed by Belsky (1984), this study illuminates the complex interactions between key variables that are used as predictors of father involvement. At the conceptual and empirical levels it is stressed that child temperament serves as a moderator of associations between variables, and that father involvement and the quality of the parental relationship affect one another. A common practice in developmental studies is to treat endogenous variables as exogenous. This study demonstrated that ignoring the endogeneity of the parental relationship quality when predicting father involvement leads to seriously biased estimates of the effect of key variables. Second, while previous studies have investigated predominantly White, middle class, martially intact families, the findings of this study extend the literature on determinants of father involvement by investigating a diverse population.

A remaining open question is whether there are differences in the magnitude of direct and moderating effects of child temperament between diverse groups. Future studies might

examine whether fathers from different ethnic and/or socioeconomic groups perceived and react differently to child temperament.

The findings discussed earlier inform clinical practice about family relationships and parenting. Particularly, they add information about factors that affect the involvement of fathers in their children's lives. Fathers are important figures in their children's lives, well beyond their role as breadwinners and disciplinarians. Father involvement has a great positive impact on their children's well-being, as well as on processes of paternal growth and maturation and the father's personal development. Therefore, knowing what makes some fathers more involved than others is of great importance for clinicians working with families towards increased involvement of fathers.

Figure 1
A Model of Father Involvement

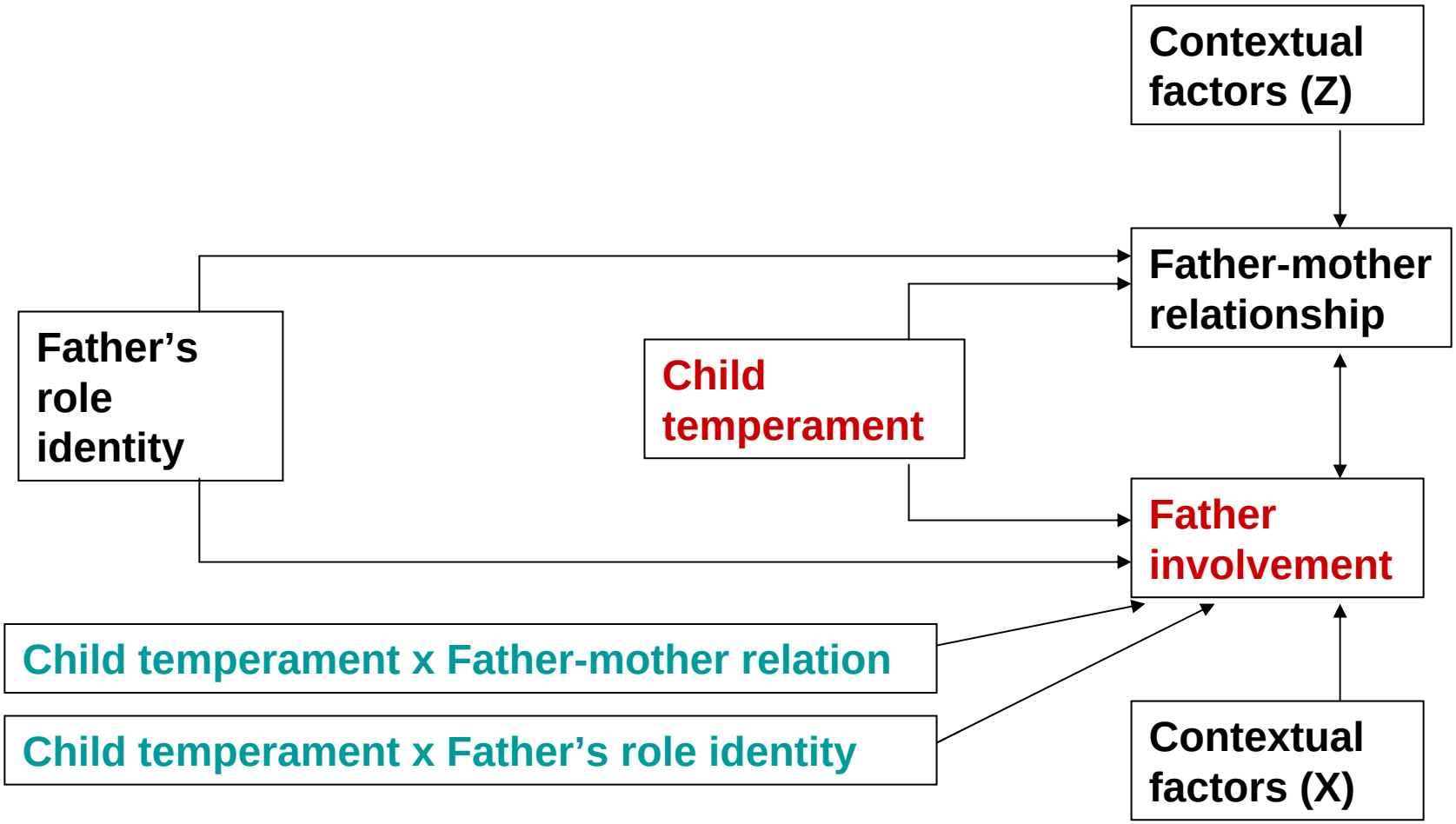

Figure 2
The moderating effect of child temperament on father-mother relationship

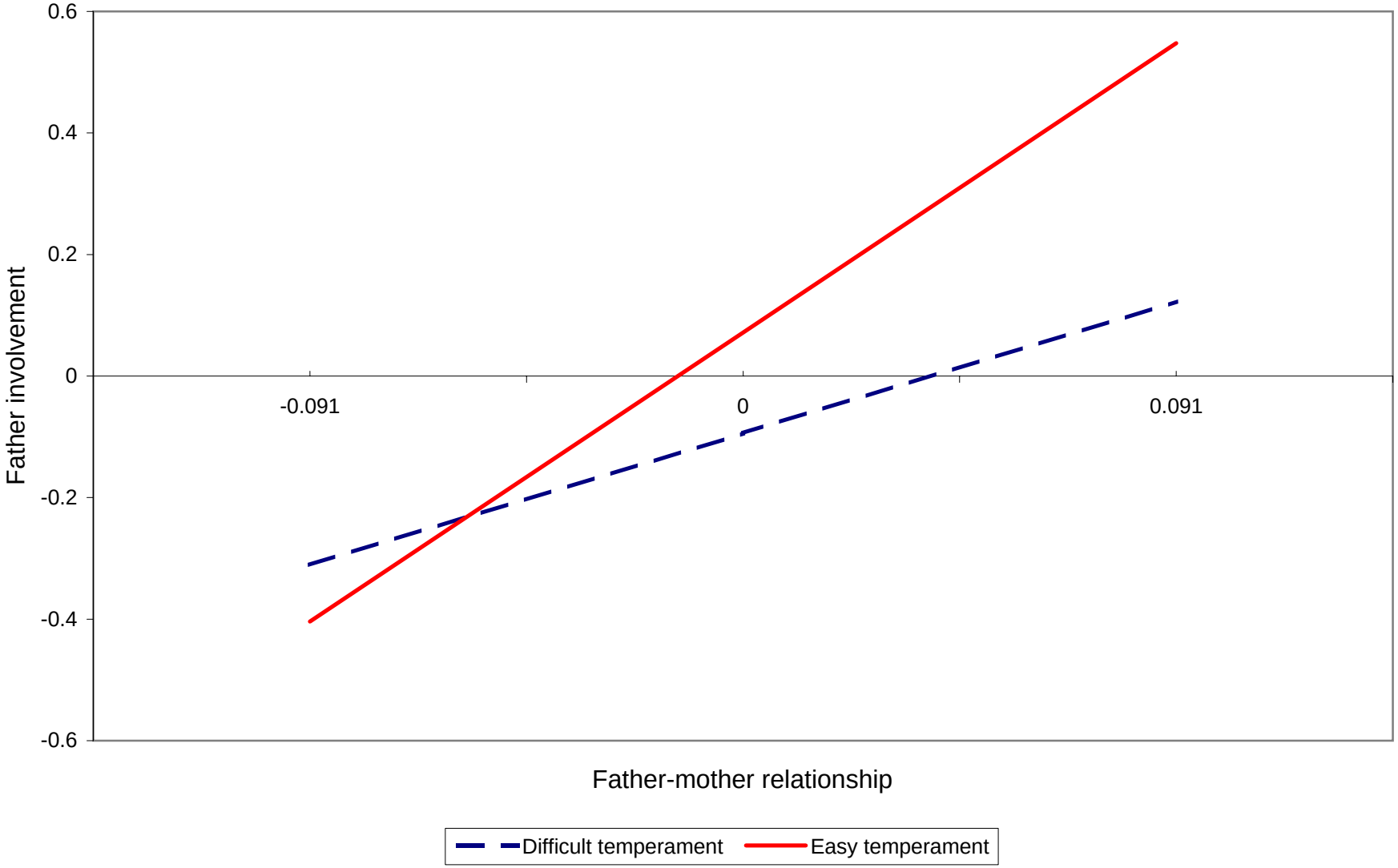

Table 1
Descriptive statistics

Variable	N	Mean	Std. Dev.	Min	Max
Composite father involvement	1701	4.821	1.156	0.000	7.000
Composite temperament	1701	2.819	0.786	1.000	5.000
Composite father-mother relationship	1701	2.727	0.294	1.125	3.000
Composite father role identity	1701	3.766	0.402	1.000	4.000
Father is White (0=no, 1=yes)	1699	0.311	0.463	0.000	1.000
Father is Black (0=no, 1=yes)	1699	0.375	0.484	0.000	1.000
Father is Hispanic (0=no, 1=yes)	1699	0.278	0.448	0.000	1.000
Father is Asian (0=no, 1=yes)	1699	0.031	0.172	0.000	1.000
Father is Native American (0=no, 1=yes)	1699	0.006	0.077	0.000	1.000
Mother and Father are of different race (0=no, 1=yes)	1701	0.116	0.320	0.000	1.000
Father's general health (1=poor, 5=great)	1700	3.992	0.903	1.000	5.000
Mother's general health (1=poor, 5=great)	1700	3.947	0.922	1.000	5.000
Father's education (1=no formal school, 9=graduate)	1700	5.280	1.933	1.000	9.000
Mother's education (1=no formal school, 9=graduate)	1700	5.351	1.898	2.000	9.000
Household income, mother report (1=less than 5K, 9=more than 75K)	1701	5.746	2.326	1.000	9.000
Child's gender (1=girl, 0=boy)	1700	0.480	0.500	0.000	1.000
Child age (average of parents reports) at second interview (in months)	1688	14.884	3.309	9.000	30.000
Parents are married in wave 1 (0=not married, 1=married)	1701	0.443	0.497	0.000	1.000
Parents are married in wave 2 (0=not married, 1=married)	1701	0.551	0.498	0.000	1.000
Parents are married in both waves (0=not married, 1=married)	1701	0.437	0.496	0.000	1.000

Table 2
Variation in father involvement

Population	Obs	Mean	Std. Dev.
All	1701	0.000	1.156
Difficult temperament	866	-0.082	1.143
Good father-mother relationship	840	0.288	-1.060
High father role identity	1105	0.084	1.119
White fathers	528	0.156	-1.068
Black fathers	637	-0.015	1.209
Hispanic fathers	472	-0.165	1.133
Asian fathers	52	0.018	-1.370
Native American fathers	10	0.141	-0.943
Boys	885	0.069	1.101
Married wave 1	754	0.053	1.125
Married wave 2	937	0.072	1.120
Married in both waves	743	0.063	1.119

Notes:
- Father involvement is a composite, centered measure
- Children with difficult temperament are those with an above-the-average value
- Good parental relationship quality are those with an above-the-average value
- Fathers with a high father role identity are those with an above-the-average value

Table 3
Basic regression model
Dependent Variable: Father Involvement

Variable	Coefficient	Std. Error
Temperament	-0.044*	0.022
Father-Mother relationship	4.026**	0.678
Role identity	0.631**	0.245
Black father	0.032	0.076
Hispanic father	-0.141^{+}	0.081
Asian father	-0.096	0.165
Native American father	-0.08	0.370
Parents of different race	0.235**	0.089
Father's Health	0.01	0.032
Father's Education	0.028	0.020
Mother's Health	0.000	0.032
Mother's Education	0.061**	0.021
Household Income	-0.011	0.015
Household Income imputed	-0.117	0.077
Child's Gender	-0.114*	0.055
Child's Age	0.003	0.009
Married at wave 1	-0.486	0.343
Married at wave 2	0.091	0.093
Married at wave 1 and wave 2	0.275	0.354
Constant	-0.369^{+}	0.225
N	1681	
R^2	0.073	
F-Statistic	6.91	
Significance	(0.000)	

Note:

- $^{+}$ indicates p< 0.10, * indicates p< 0.05, and ** indicates p< 0.01.

Table 4
First-stage of 2SLS
Dependent Variable: Father-mother relationship

Variable	Coefficient	Std. Error
Temperament	-0.0034	0.003
Role identity	0.0308^{+}	0.017
Black father	-0.0061	0.005
Hispanic father	0.0047	0.006
Asian father	0.0028	0.012
Native American father	0.0292	0.027
Parents of different race	-0.0168**	0.006
Father's Health	-0.0009	0.002
Father's Education	0.001	0.001
Mother's Health	0.0061**	0.002
Mother's Education	-0.0005	0.001
Household Income	-0.0007	0.001
Household Income imputed	0.0028	0.006
Child's Gender	-0.005	0.004
Child's Age	-0.0007	0.001
Married at wave 1	-0.0056	0.025
Married at wave 2	0.0102	0.007
Married at wave 1 and wave 2	0.0036	0.025
Father-Mother relationship at wave 1	0.5378**	0.026
Constant	-0.0087	0.016
N	1681	
R^2	0.241	
F-Statistic	27.78	
Significance	0.000	

Notes:

- $^{+}$ indicates $p< 0.10$, * indicates $p< 0.05$, and ** indicates $p< 0.01$.

Table 5
OLS vs. 2SLS
Dependent Variable: Father Involvement

	Model			
Variable	**OLS**	**OLS**	**2SLS**	**2SLS**
Temperament	-0.044*	-0.044*	-0.048*	-0.047*
	(0.022)	(0.022)	(0.025)	(0.024)
Father-Mother relationship	4.026**	4.048**	3.447**	3.453**
	(0.678)	(0.678)	(0.297)	(0.297)
Role identity	0.631**	0.651**	0.664**	0.666**
	(0.245)	(0.246)	(0.236)	(0.237)
Black father	0.032	0.031	0.023	0.023
	(0.076)	(0.076)	(0.073)	(0.073)
Hispanic father	-0.141^{+}	-0.142^{+}	-0.141^{+}	-0.139^{+}
	(0.081)	(0.081)	(0.079)	(0.079)
Asian father	-0.096	-0.099	-0.103	-0.107
	(0.165)	(0.165)	(0.16)	(0.16)
Native American father	-0.080	-0.069	-0.082	-0.063
	(0.37)	(0.37)	(0.359)	(0.359)
Parents of different race	0.235**	0.233**	0.226**	0.22**
	(0.089)	(0.089)	(0.086)	(0.086)
Father's Health	0.010	0.010	0.011	0.013
	(0.032)	(0.032)	(0.031)	(0.031)
Father's Education	0.028	0.027	0.029	0.029
	(0.02)	(0.02)	(0.019)	(0.019)
Mother's Health	0.000	0.000	0.006	0.005
	(0.032)	(0.032)	(0.031)	(0.031)
Mother's Education	0.061**	0.061**	0.061**	0.061**
	(0.021)	(0.021)	(0.02)	(0.02)
Household Income	-0.011	-0.012	-0.012	-0.012
	(0.015)	(0.015)	(0.015)	(0.015)
Household Income imputed	-0.117	-0.116	-0.112	-0.113
	(0.077)	(0.078)	(0.075)	(0.075)
Child's Gender	-0.114*	-0.114*	-0.118*	-0.117*
	(0.055)	(0.055)	(0.053)	(0.053)
Child's Age	0.003	0.003	0.003	0.003
	(0.009)	(0.009)	(0.008)	(0.008)
Married at wave 1	-0.486	-0.474	-0.496	-0.510
	(0.343)	(0.343)	(0.333)	(0.333)
Married at wave 2	0.091	0.091	0.102	0.100
	(0.093)	(0.093)	(0.089)	(0.089)
Married at wave 1 and wave 2	0.275	0.264	0.281	0.291
	(0.354)	(0.355)	(0.344)	(0.345)
Father-Mother relationship × Temperament		-0.563		-0.627^{+}
		(0.803)		(0.35)
Role identity× Temperament		-0.227		-0.117
		(0.312)		(0.3)
Constant	-0.369^{+}	-0.366^{+}	-0.395^{+}	-0.391^{+}
	(0.225)	(0.225)	(0.218)	(0.217)
N	1681	1681	1681	1681
R^2	0.073	0.074	0.125	0.126
F-Statistic	6.910	6.310	12.450	11.430
(Significance)	(0.000)	(0.000)	(0.000)	(0.000)

Notes:
- First stage results are not reported for 2SLS models. Specification of the first stage regression included all the main variables (i.e., temperament and role identity), all the control variables, and the instrumental variable father-mother relationship at wave 1.
- $^{+}$ indicates $p< 0.10$, * indicates $p< 0.05$, and ** indicates $p< 0.01$.
- Standard errors in parentheses