# Child Wellbeing in Two-Parent Families: Influences of Parental Characteristics, Relationships, and Behaviors

Lawrence M. Berger
University of Wisconsin--Madison

Sara S. McLanahan
Princeton University

March 2012

*Fragile Families Working Paper: 11-13-FF*

Note: Lawrence Berger (lmberger@wisc.edu) is Associate Professor of Social Work and Faculty Affiliate at the Institute for Research on Poverty at the University of Wisconsin-Madison. Sara McLanahan (mclanaha@princeton.edu) is William S. Tod Professor of Sociology and Public Affairs at Princeton University. The Fragile Families and Child Wellbeing Study is funded by NICHD grant numbers R01HD36916, R01HD39135, and R01HD40421, as well as a consortium of private foundations and other government agencies. This research supported by NICHD grant number K01HD054421 (to Berger) and by funding from the Institute for Research on Poverty and the Waisman Center (NICHD grant number P30 HD03352) at the University of Wisconsin-Madison . We thank Maria Cancian, Tom DeLeire, and seminar participants at the Center for Demography and Ecology at the University of Wisconsin-Madison, the West Coast Poverty Center at the University of Washington-Seattle, and the French National Institute for Demographic Studies (Institut national d'études démographiques) for helpful comments and advice. Address for correspondence: Lawrence M. Berger, University of Wisconsin-Madison, School of Social Work, 1350 University Avenue, Madison, WI 53706.

## ABSTRACT

Using data from the Fragile Families and Child Wellbeing Study, we examine differences in child outcomes by family type, defined by the marital and biological status of the parents who live with a child. We find that parents' marital status is associated with both cognitive skills and behavior problems, with most of the difference attributable to differences in family characteristics at birth. In contrast, fathers' biological status is associated with behavior problems in complex ways. Whereas social-father families have fewer resources than biological-father families, which is associated with greater behavior problems, they also have higher quality relationships and parenting behaviors, which are associated with fewer behavior problems. Results from Blinder-Oaxaca decompositions suggest that differences in children's cognitive skills are driven primarily by differences in family characteristics and behaviors, whereas differences in children's behavior problems are driven primarily by differences in the influence of (returns to) family characteristics, relationships, and behaviors.

High rates of divorce, non-marital fertility, and multi-partnered fertility in the United States in recent decades have led to growing diversity and complexity in family arrangements. As a result, the father figures in children's lives are increasingly likely to consist of nonresident or cohabiting biological fathers, as well as resident social fathers, defined here as men who are married to or cohabiting with a child's mother, but are not related to the child by blood. (Kreider, 2008). Thus, whereas the label "two-parent family" once referred to families in which two married adults were living with their joint biological children, today this label also includes families with cohabiting biological parents and families with a married or cohabiting social parent.

Recent studies indicate that children who live in both social-father families and cohabiting parent families exhibit poorer average developmental outcomes than those who live with their (married) biological parents (Artis, 2007; Brown, 2004a, 2006; Hofferth, 2006; Manning & Lamb, 2003). Exactly why co-residence with a social father or residence in a cohabiting family is associated with adverse child outcomes is unclear, although multiple hypotheses have been proposed. To begin with, mothers who select into a social-father family tend to be less advantaged than those in a stable coresident relationship with the biological father of their children; likewise mothers who cohabit, in general, tend to be less advantaged than mothers who are married. Such disadvantage is apparent in both the characteristics of the mothers themselves (education, employment) and, more generally, in their level of economic resources (Bzostek, McLanahan, & Carlson, in press; Manning & Brown, 2006; McLanahan & Sandefur, 1994). Second, men who become social fathers or who cohabit with (rather than marry) their partner tend to be less advantaged, on average, than those who partner with childless women and those who marry their partner (Hofferth, 2006; Hofferth & Anderson, 2003;

Manning & Brown, 2006). This finding may reflect the fact that single mothers face a lower quality pool of men from which to choose a partner than childless women. Alternatively, financial stability may be viewed as a precondition to marriage but not cohabitation (Edin & Kefalas, 2005). Third, co-residence with a social father or residence in a cohabiting family may be a marker of past or ongoing family instability, which is associated with adverse developmental outcomes for children (Fomby &Cherlin, 2007; Magnuson &Berger, 2009; Osborne & McLanahan, 2007; Cooper, Osborne, Beck, & McLanahan, in press). These hypotheses imply that associations between residing in a social-father or cohabiting family and adverse child outcomes reflect the characteristics of the parents who select into particular families and the family experiences (instability) that precede or characterize such families, rather than being driven by residence in the family type itself.

Residence in a social-father or cohabiting-parent family may also directly influence child wellbeing. One potential reason is that parental investments, family relationships, and parenting behaviors may be of lower quality in these families than in married two-biological parent families (Artis, 2007; Berger, Carlson, Bzostek, & Osborne, 2008; Brown, 2006; Hofferth, 2006; Hofferth & Anderson, 2003). It is also possible that identical investments, relationships, and behaviors yield fewer benefits in the context of a social-father or cohabiting-parent family. For example, the same behavior (e.g. reading to a child) may have a different influence when performed by a married or cohabiting, social or biological father because children respond differently to each. Likewise, returns to maternal investments may differ by family type. To date, the evidence regarding the relative strength of these hypotheses has been inconsistent, although each has received some empirical support. However, it is rare that all of these factors are simultaneously examined in the same study. Furthermore, the final hypothesis—that returns to

identical investments, behaviors, or relationships may differ for children in biological- and social-father, married and cohabiting families—has received virtually no attention.

This paper uses data from the Fragile Families and Child Wellbeing Study (FFCW) to examine these hypotheses. We begin by investigating the extent to which differences in cognitive skills and behavior problems among 5 year-old children living in different types of families are associated with differences in characteristics, relationships, and behaviors between family types. We then decompose the mean difference between family types in each outcome into the proportion explained by differences between family types in characteristics, relationships, and behaviors and the proportion explained by differences between family types in the influence of ("returns to," "effects of," "associations of") these factors on (with) the outcomes. The primary contribution of our work is the use of Blinder-Oaxaca decomposition techniques to explicitly examine whether family characteristics, relationships, and behaviors yield different returns with regard to child wellbeing in various family types and to separate these influences from the effects of compositional differences in characteristics, relationships, and behaviors between family types. These questions have not been addressed in the existing literature.

In addition, few existing studies have simultaneously examined the role of as wide an array of characteristics, relationship and coparenting practices, and behaviors for both mothers *and* fathers (Carlson & Magnuson, 2011; Hofferth, 2006; Nelson, 2004) as those included in our analyses. We also investigate whether returns to marital status are similar or different for children living with biological and social fathers (Smock, 2000). Only a few of the existing studies that focus on differences in child outcomes by marital status have focused on social-father families, and the results of these studies have been inconsistent (Artis, 2007; Brown, 2004a; Hofferth, 2006; Manning & Lamb, 2003). Finally, our sample includes a large proportion

of low-SES and minority families. Given that children from these families are disproportionately likely to live with social fathers and in cohabiting-parent families, it is crucial to understand how they respond to these family environments.

### *How Might Characteristics and Relationships Differ by Family Type?*

Both the characteristics of the individuals selecting into particular family types—two-biological-parent or social-father, married or cohabiting—and the relationships and behaviors in which these individuals engage may differ considerably. As discussed above, the individuals who form and remain in stable families consisting of two (married) biological parents and their joint children tend to be more advantaged than those who select into other family types. By comparison, those comprising cohabiting biological-father families and social-father families tend to be disadvantaged in ways that are negatively correlated with child wellbeing. In general, cohabiting and social-father families also tend to have fewer economic resources and to receive less social support than married and biological-father families, perhaps both as a result of such social selection and also because they are both less stable and less "institutionalized" family forms (Berger & Langton, 2011; Brown, 2004a, 2006; Eggebeen, 2005; Hofferth & Anderson, 2003; Hofferth, 2006; Manning & Lamb, 2003; Manning & Lichter, 1996; Manning, Smock, & Majumdar, 2004). Whereas social selection has been shown to play a large role in associations between family structure and child outcomes (Foster & Kalil, 2007), it does not appear to fully explain these links (Sigle-Rushton & McLanahan, 2004). In addition, recent research using FFCW suggests that, at least among mothers who have a nonmarital birth, the vast majority of those who repartner do so with a man who has greater economic capacity than their child's biological father (Bzostek et al., in press). Thus, we may expect fewer differences in the biological and social fathers in our sample than has been found in prior work.

With regard to relationships and behaviors, men's roles as partners and parents are closely linked, such that the quality of a father's parenting is likely to parallel the quality of his relationship with a child's mother (Furstenberg & Cherlin, 1991; Carlson, Pilkauskas, McLanahan, & Brooks-Gunn, 2011). In turn, the degree to which parents engage in positive interactions with one another and are able to effectively collaborate in parenting activities is likely to influence child wellbeing. Indeed, couples with higher quality relationships tend to also engage in higher quality parenting, whereas the parenting behaviors of couples with lower quality or stressful relationships tend to reflect these factors (Carlson et al., 2011). At the same time, couples may choose to cohabit instead of marrying if they view their relationship as unlikely to last (of a low quality) and, in the case of social-father families, if the social father has a limited willingness to invest in his partner's children or to fully support her investments in them (Brown, 2006; Berger et al., 2008). For the most part, existing evidence suggests that, on average, biological- and social-father families have similar levels of mother-father relationship quality (Adamsons, O'Brien, & Pasley, 2007; Hanson, McLanahan, & Thomson, 1996); differences in relationships quality between married and cohabiting (largely biological) parents are small (Brown, 2004b; Carlson, 2007; Carlson et al., 2011); mother-father relationship quality is positively correlated with father involvement (Adamsons et al., 2007), father-child relationship quality (Fine & Kurdek, 1995; King, 2006) and child well being (Hanson et al., 1996; King, 2006); and, adverse associations between social-father family type and child outcomes are only slightly mediated by mother-father relationship quality (Hanson et al., 1996; King, 2006).

Additionally, given that partnering and parenting tend to constitute a "package deal" for men (Furstenberg & Cherlin, 1991; Townsend, 2002), mother-father relationship quality and co-parenting practices are likely to be positively correlated as well as interrelated with father-child

relationships and parenting behaviors. Independent of mother-father relationship quality, however, co-parenting may differ by family type in that social and cohabiting fathers are likely to have less responsibility and authority in the family than biological and married fathers (Cherlin, 1978; Cherlin & Furstenberg, 1994; Furstenberg & Cherlin, 1991). The empirical literature to date has largely focused on co-parenting among (co-resident and non-co-resident) biological parents. Research on co-resident biological parents suggests that there is a positive association between co-parenting and child development, even after adjusting for mother-father and parent-child relationship quality (Carlson & Magnuson, 2011).

The few studies to examine co-parenting among social-father families have produced mixed results. For example, Hofferth and colleague's (2007) bivariate analyses of data from both the PSID and NLSY97 suggest that married biological fathers take on more responsibility for parenting than social fathers. In contrast, Berger and colleagues (2008), using FFCW data and regression analyses, find that (particularly married) social fathers engage in shared responsibility for parenting and cooperation in parenting at levels that are equal to or greater than those of (married and cohabiting) biological fathers.

Turning to parenting behaviors, research has consistently linked higher levels of involvement by resident (married) biological fathers with better child outcomes; however, far less is known about potential links between cohabiting- and social-father involvement and child wellbeing (Carlson & Magnuson, 2011). Theoretically, parent-child relationships are likely to be stronger in married biological-father families than in social-father and cohabiting biological-father families both because social fathers lack a genetic motivation to invest in children (Daly & Wilson, 2000) and because social-father (Cherlin, 1978; Cherlin & Furstenberg, 1994; Furstenberg & Cherlin, 1991) and cohabiting families (Nock, 1995) tend to be characterized by

parental role ambiguity and instability. As such, obligations to children are less clear in these families than in married biological-father families. It is also possible that mothers will invest less in their biological children when living with a social-father because the social-father relationship may require time, attention, or resources from her that she would otherwise devote to her child(ren). Each of these factors suggests that parenting practices in social parent families will be of lower quality than those in two-biological-parent families (Coleman et al. 2000; Marsiglio & Hinojosa 2010).

Results from empirical work have generally been consistent with these expectations. Resident biological fathers tend to be more involved with children than resident social fathers and married biological fathers tend to be more involved than their unmarried counterparts (Berger & Langton, 2011; Hofferth et. al., 2007; Hofferth & Anderson, 2003). Mothers in social-father families also tend to exhibit poorer parenting behaviors than those living with their child's biological father (Berger, 2007) and mothers in cohabiting-parent families exhibit lower quality parenting than those in married-parent families (Klausli & Owen, 2009). However, there are exceptions to this general pattern. Most notably, recent analyses from FFCW suggest that (particularly married) social fathers engage in child rearing behaviors that are equivalent to or of higher quality than those of biological fathers (Berger et al., 2008; Gibson-Davis, 2008). In addition, the few existing studies that have examined the mediating role of fathering behaviors across biological- and social-father families have found relatively small effects (Bzostek, 2008; Hofferth, 2006).

*How Might Returns to Characteristics and Relationships Differ by Family Type?*

In addition to differences in characteristics, relationships, and behaviors between biological- and social-father, married and cohabiting families, it is also possible that the returns

to these factors may differ with regard to their influence on children's cognitive skills and behavior problems. This may occur for two reasons. First, there may be differences in social capital between family types. As described by Coleman (1988), social capital represents the processes through which human capital is created or transferred. Human capital may be differentially transferred by family type given differences in obligations and expectations, trust, family processes, information channels, social and kin networks, social norms, and social organization. Social-father and cohabiting-parent families tend to take the form of more "open" or fluid social structures than biological-father and married-parent families. The former are characterized by less well-defined boundaries and more complex interrelationships such that kin and social networks are less likely to share mutual goals. Furthermore, given that social-father family formation involves a change in household structure and, often, a residential move, pre-existing social relationships may be strained or broken. Similarly, the instability associated with cohabitation may have adverse consequences for social and kin networks. On the whole, then, weaker social capital among social-father families compared to biological-father families and weaker social capital among cohabiting-parent families compared to married-parent families, in the form of lower quality or less tightly-knit relationships (among parents, children, kin, community) and more fragile ties through which to create or transmit human capital may limit the efficient and productive facilitation of skills to children. As such, we may expect a weaker link between, for example, parents' educational achievement and children's achievement in social-father and cohabiting-parent families than in biological-father and married-parent families. Likewise, we may expect that parents will be less efficient at socializing children in the former family types.

Second, children may respond differently to identical parental behaviors in the context of

a biological- or social-father, married- or cohabiting-parent family. The extent to which children accept social fathers (and particularly cohabiting social fathers) as legitimate parental figures, feel close to them, and view them as "family" is often limited (Hetherington et al., 1999). As such, social fathers' relationships with children tend to be characterized by considerable role ambiguity, and social fathers' authority may be more often called into question. Relative to children's relationships with their biological father, their relationships with social fathers are more likely to evoke jealousy, competition, resentment, guilt, and conflicting feelings with regard to loyalty, as well as to lack a sense of "we-ness" (Marsiglio, 2004). For these reasons, social fathers' efforts to establish closeness are often rebuffed (Hetherington et al., 1999). Furthermore, children's relationships with their mother may be strained by her new partnership. Thus, parental investments may have a lesser influence on children's development in social- than in biological-father families. The instability associated with cohabitation may also negatively influence children's reactions to parental investments, and this may be particularly true with regard to cohabiting social-father families.

We are aware of only one existing study to investigate whether identical behaviors differentially influence child outcomes by family type. Using FFCW data to examine links between father type and child health and behavior, Bzostek (2008) examines the interaction between social father (versus biological father) presence and a measure of father involvement (the mean number of days per week the father engaged in 8 activities) and finds no differences by father type in the association of father involvement with any of the outcomes (the interaction term is never significant). Her approach, however, tests only whether there is a difference in the return to a single measure and only between biological and social fathers. In contrast, our analyses test whether there is an average difference in the returns to the full set of observed

characteristics, relationships, and behaviors, net of differences in the distribution of these factors between family types. Furthermore, we examine these differences by both father biological status and parental marital status.

## METHOD

### *Participants*

Our data are drawn from FFCW, a population-based, longitudinal birth cohort study of 4,898 children born between 1998 and 2000 in large U.S. cities (see Reichman et al., 2001). The study design incorporated a three-to-one over-sample of non-marital-to-marital births. As such, the sample includes large proportions of Black, Hispanic, and low-income children, children with nonresident fathers, and children whose families are relatively socioeconomically disadvantaged. These children are also disproportionately likely to experience family structure transitions and family complexity relative to the average child in the U.S.

FFCW interviewed families in person at the time of the focal child's birth and by telephone when the child was approximately 1, 3, and 5 years old. In each interview, parents provided information about family characteristics, resources, and functioning. Subsequent to the age 3 and 5 interviews, families were invited to participate in an in-home assessment of parenting and child wellbeing through both a questionnaire and interviewer observed items. Parents who refused an in-home visit were asked to complete the questionnaire portion of the module by telephone. Our outcome variables are drawn from the age 5 in-home assessments.

We utilized multiple imputation techniques to impute values for all variables with missing data for the full FFCW sample of 4,898 children. Specifically, we imputed 10 complete datasets using Stata's ICE program. We then limited our sample to observations of children living with their biological mother and either their biological father or a social father at the time

of the age 5 interview. Across the 10 imputed datasets (totaling 48,980 observations) we excluded 1,567 (3.2%) observations (ranging from 122 to 195 observations per dataset) of children who were not living with their biological mother at least half-time and an additional 19,880 (41.6% of the original sample) observations (1,895 to 2,081 per dataset) of children who were living with a single-mother at the time of the interview. This resulted in a potential analysis sample of 27,533 observations (2,695 to 2,817 per dataset). We then followed Von Hippel's (2007) recommendation that cases that originally had missing data on the outcome measures be deleted from the sample after all missing data have been imputed.

Our analyses focus on four outcomes (described below) comprised of the child's scores on the Peabody Picture Vocabulary Test (PPVT), the Woodcock-Johnson Letter-Word Recognition Test (WJ-LW) and the internalizing and externalizing behavior problems subscales of the Child Behavior Checklist (CBCL). The sample sizes for models using the PPVT and WJ-LW, which must be completed in person, are considerably smaller than those for internalizing and externalizing behavior problems, which can be completed by telephone. A total of 17,642 observations (1,762 to 1,767 per dataset) met our sample inclusion criteria and had non-missing values on at least one outcome; respectively, 13,422 (1,341 to 1,343 per dataset), 13,525 (1,351 to 1,354 per dataset), and 17,509 (1,749 to 1,753 per dataset) met our sample inclusion criteria and had non-missing scores for the PPVT, WJ-LW, and behavior problems measures.

### *Measures*

*Cognitive skills and behavior problems.* Cognitive skills are assessed by a child's scores on the PPVT (Dunn & Dunn, 1997) and the WJ-LW (Woodcock & Johnson, 1990) at approximately age 5. The PPVT assesses receptive vocabulary; the WJ-LW assesses both children's ability to recognize letters and words and their ability to match words to pictures. Each

has been widely used to measure children's language and cognitive ability. Each must be administered in person. Behavior problems are assessed by the internalizing and externalizing behavior problems subscales of the CBCL (Achenbach, 1991). The CBCL is a commonly used measure of children's behavior problems. It is completed by the adult respondent to the survey, typically the child's mother, and can be administered by telephone. The externalizing behavior problems subscale ($\alpha = .86$) included in the age 5 FFCW in-home assessment consists of 30 items assessing aggressive and delinquent behaviors. The internalizing behavior problems subscale ($\alpha = .75$) consists of 23 items assessing anxious/depressed and withdrawn behaviors. To ease the interpretation of our estimates, we have standardized each of the outcome variables to have a mean of 0 and a standard deviation of 1.

*Family structure.* In our primary OLS specification, we measure family structure with two dichotomous variables indicating: (1) whether the family includes a social father to the focal child (27% of our analysis sample) as opposed to a biological father (73%); and (2) whether the focal child's mother is married to (58%) as opposed to cohabiting with (42%) the father. Likewise, our Blinder-Oaxaca decompositions assess differences between all biological- and all social-father families, controlling for whether the mother is married to (versus cohabiting with) the resident father, as well as differences between all married and all cohabiting families, controlling for whether the resident father is a social (versus biological) father. This allows us to explicitly estimate how both differences in the prevalence of marriage between biological- and social-father families and differences in returns to marriage between these family types are associated with variation in child outcomes, as well as how differences in the prevalence of social fathers between married and cohabiting families and differences in returns to social father presence between family types are associated with variation in child outcomes.

Additionally, in an extension of our primary OLS specification, we consider four dichotomous variables indicating whether: (1) the focal child's biological father is coresident and married to the child's mother (51%); (2) the biological father is cohabiting with (but not married to) the mother (22%); (3) the social father is coresident and married to the mother (6%); and (4) the social father is cohabiting with the mother (21%). Married biological-father family is the reference group in these models.

*Covariates.* Our primary analyses include three groups of mother-reported covariates representing family characteristics, family experiences, and family relationships and behaviors measured at three time points. *Family characteristics at the focal child's birth,* which are assumed to be exogenous selection factors, include the biological parents' relationships status, the mother's race/ethnicity, the mother's age, whether the mother was born in the US, the mother's educational attainment, whether the mother had experienced multiple partner fertility (measured at age 1), the mother's report of both her father's and her mother's mental health problems history (measured at the age 3 core interview and assumed to be exogenous proxies for maternal mental health), child sex, and whether the child was born with a low birth weight. *Family experiences between the focal child's birth and age 5*, which are assumed to be endogenous, consist of the number of family structure transitions experienced by the child, the duration of the mother-partner (biological or social father) co-residence, and the total number of residential moves experienced by the child.

*Family characteristics, relationships, and behaviors at focal child age 5*, which are also assumed to be endogenous, include the number of children and adults in the household, the logarithm of household income, the (biological or social) father's age, the father's educational attainment, whether the father has children with another partner (besides the mother), whether

the father has children (other than the focal child) with the mother, whether the father has a limiting health or mental health condition, whether the father has ever been incarcerated, the father's overall treatment of the mother, the quality of coparenting between the mother and father, the frequency with which the mother and father spank the focal child, the extent to which the mother and father are engaged with the focal child, and the mother's depressive symptoms level.

The father's overall treatment of the mother is operationalized by the mean score ($\alpha$ = .81 and .73 for biological and social fathers; 1-3 points) for 16 items ranging from "he is fair and willing to compromise when you have a disagreement" to "he hits you with a fist or an object that could hurt you." Quality of coparenting is assessed by the mean score of three measures: shared responsibility for parenting, which consists of the mean score (1-4 points) of 2 items measuring the frequency with which the father looks after the focal child and the frequency with which he takes the child to appointments such as daycare or the doctor; participation in household chores, which is represented by the mean score (1-4 points) on 2 items measuring the frequency with which the father runs errands for the mother and the frequency with which he fixes things around the house or helps make the home look nicer; and cooperation in parenting, which constitutes the mean score ($\alpha$ = .89 and .74; 1-3 points) on 6 items assessing the extent to which the father acts like the kind of parent the mother would want for her child, can be trusted to take good care of the child, respects the mother's schedules and rules for the child, supports the mother in the way she wants to raise the child, talks with the mother about problems related to raising the child, and can be counted on to look after the child for a few hours. Spanking frequency consists of a single item for each parent reflecting the frequency with which the parent spanked the child in the last month (0-4 points). Engagement with the focal child is assessed by

the mean number of days per week ($\alpha$ = .69 for mothers and .89 and .83 for biological and social father, respectively; 0-7 points) that the relevant parent participates in each of 8 activities with the child, including singing songs or nursery rhymes, reading stories, telling stories, playing inside with toys, telling the child he/she appreciated something the child did, playing outside in the yard with the child, taking the child on outings, and watching TV or a video with the child. The mother's depressive symptoms ($\alpha$ = .95; 0-8 points) are measured by the Composite International Diagnostic Interview-Short Form (CIDI-SF) (Kessler, et al., 1998). For ease of presentation, we standardized all non-dichotomous relationship and behaviors measures to have a mean of 0 and a standard deviation of 1.

*Analytic strategy*

To examine associations of family type with child cognitive skills and behavior problems, we estimate a series of ordinary least squares (OLS) regressions for each outcome. We use Stata's MICOMBINE program to produce these estimates utilizing the 10 imputed datasets. We first estimate a simple model in which we regress each outcome on indicators for social-father family and married-parent family. In three subsequent models, we sequentially add the family characteristics at the focal child's birth, family experiences between the focal child's birth and age 5, and family characteristics, relationships, and behaviors at age 5. This allows us to examine changes in the coefficients on the family type indicators as each set of covariates is progressively included in the model and, thereby, to determine how each set of factors serves to alter the estimated associations between family type and child cognitive skills or behavior problems. The full model takes the form:

$$Y_i = \beta_0 + \beta_{SF}SF_i + \beta_{MAR}MAR_i + \boldsymbol{\beta}_{FC}\mathbf{FC}_i + \boldsymbol{\beta}_{FE}\mathbf{FE}_i + \boldsymbol{\beta}_{FCRB}\mathbf{FCRB}_i + \varepsilon_i \qquad (1)$$

where $Y_i$ is cognitive skills or behavior problems for child *i*, SF is an indicator that the resident

father is a social father to the focal child; and MAR is an indicator that the father is married to the focal child's mother. $\beta_{SF}$ is interpreted as the mean difference in the outcome between children living with their biological father and those living with a social father, holding marital status and family characteristics, relationships, and behaviors constant; $\beta_{MAR}$ is interpreted as the mean difference in the outcome between children living with married and cohabiting parents, holding father biological status and family characteristics, relationships, and behaviors constant. **FC** is a vector of family characteristics at the focal child's birth; **FE** is a vector of family experiences between the focal child's birth and age 5; **FCRB** is a vector of family characteristics, relationships, and behaviors at age 5; and $\varepsilon$ is the error term.

We also estimate an extension to this model in which we replace the indicators for social-father family (SF) and married-parent family (MAR) with four family type indicators that account for both father type and marital status. Thus, rather than estimating $\beta_{SF}$ and $\beta_{MAR}$, we estimate $\beta_{COH\ BF}$, $\beta_{MAR\ SF}$, and $\beta_{COH\ SF}$, where the reference group is married biological-father families. We then test whether there is a difference in the marriage-cohabitation gap in the outcome between biological- and social-father families with a Wald test that $(\beta_{COH\ BF} - \beta_{MAR\ BF}) = (\beta_{COH\ SF} - \beta_{MAR\ SF})$, where $\beta_{MAR\ BF}$ has been normalized to 0 (as the reference category).

The second step in our analysis is to examine the extent to which each set of covariates explains variation in child outcomes by estimating its marginal contribution to the adjusted R-squared of the full model. The marginal contribution of each set of covariates is computed by estimating variants of the full model in which we sequentially omit the set (but include all others), then calculate the percentage change in the adjusted R-squared when the set is reintroduced to the model.

The final step in our analysis uses Blinder-Oaxaca decomposition methods (Blinder

1973; Oaxaca 1973) to examine the extent to which differences in cognitive skills and behavior problems between children living with biological and social fathers, and also between children living with married and cohabiting parents, are due to differences in observable characteristics, relationships, and behaviors of the individuals in each family type compared to differences in returns to these factors across family types. Consider the model:

$$Y_{ij} = \boldsymbol{X}_{ij}\boldsymbol{\beta}_j + \varepsilon_{ij} \quad (2)$$

where $Y_{ij}$ is cognitive skills or externalizing behavior problems for child *i* in group *j* (either a biological- or social-father family or a married- or cohabiting-parent family), $\boldsymbol{X}_{ij}$ is a vector of observed predictors (marital status or father biological status and the covariates) and a constant, $\boldsymbol{\beta}_j$ is a vector of slope parameters and the intercept for group *j*, and ε is the error term. Separate regressions are estimated for each group. We must then make an assumption regarding which model represents the "true" structural model of associations of the characteristics, relationships, and behaviors with the outcomes that would exist in the absence of differences in returns to these factors (coefficients) between the two groups, such that the associated estimates (coefficients) from that (the "true") model are those that would be expected for both groups if there were no differences in returns. We assume that the models for biological-father families and for married-parent families represent the "true" structural models and that, ideally, returns to characteristics, relationships, and behaviors of social-father families would be equivalent to those for biological-father families and that those for cohabiting-parent families would be equivalent to those for married-parent families. This is a reasonable assumption given that: (1) in general, two-biological-parent and married-parent families continue to be considered the preferred family types and those that are best for children, and (2) several bodies of theory imply that biological and married families' characteristics, relationships, and behaviors are likely to be more

efficiently transferred to children and to elicit more receptivity from children than social and cohabiting families' characteristics, relationships, and behaviors. Given this assumption, the difference in child cognitive skills or behavior problems between biological- (*BF*) and social-father (*SF*) families, for example, is:

$$\bar{Y}_{BF} - \bar{Y}_{SF} = \bar{X}_{BF}^{'}\hat{\beta}_{BF} - \bar{X}_{SF}^{'}\hat{\beta}_{SF} \quad (3)$$

where the between group difference in the outcome is separated into a component that is due to group differences in the predictors ($\bar{X}$) and a component that is due to group differences in returns to the predictors ($\hat{\beta}$). The decomposition then takes the following form:

$$\bar{Y}_{BF} - \bar{Y}_{SF} = (\bar{X}'_{BF} - \bar{X}'_{SF})\hat{\beta}_{BF} - \bar{X}'_{SF}(\hat{\beta}_{BF} - \hat{\beta}_{SF}) \quad (4)$$

such that $(\bar{X}'_{BF} - \bar{X}'_{SF})\hat{\beta}_{BF}$ represents the proportion of the difference in the outcome that is due to mean differences in the predictors (commonly termed the "explained" component) and $\bar{X}'_{SF}(\hat{\beta}_{BF} - \hat{\beta}_{SF})$ represents the proportion of the difference in the outcome that is due to the difference in the coefficients or returns to the predictors (the "unexplained" component). We perform the same decomposition for married- and cohabiting-parent families using the married-parent family model as the reference model.

To test the robustness of our results with regard to the assumption that the biological-father and married-parent family models represent the "true" underlying structural model, we re-estimated each model under the assumption that the "true" underlying model is a pooled model of the two groups when estimated with the inclusion of a group indicator variable (Elder, Goddeeris, & Haider, 2010). Results (not shown) were consistent with those from our primary decomposition models. Finally, we caution that the decomposition results are no more likely to reflect causal estimates than are the OLS results. That is, differences in the coefficients between the biological- and social-father family models may be biased by omitted variables.

# RESULTS

## *Descriptive statistics*

Descriptive statistics for the outcome measures are presented in Table 1. The raw data reveal that the mean PPVT and WJ-LW scores for children living in a biological-father family at age 5 are .32 and .20 standard deviations (SDs) higher than those for children in a social-father family. Children living with their biological father also exhibit an average of .16 SDs fewer internalizing and .29 SDs fewer externalizing behavior problems. Turning to marital status, children in married-parent families have average cognitive skills scores that are .50 and .33 SDs higher on the PPVT and WJ-LW than those of children in cohabiting-parent families. The former also exhibit, on average, .24 and .29 SDs fewer internalizing and externalizing behavior problems. Considering both father biological status and parental marital status, we see that children in married biological-father families have higher PPVT and WJ-LW scores than children in each of the other family types. Mean cognitive skills scores for children in the other family types do not significantly differ from one another, with the exception that children in cohabiting social-father families have lower PPVT scores than those in married social-father families. Children in married biological-father families have fewer internalizing behavior problems than those in cohabiting biological-father and cohabiting social-father families. They also have fewer externalizing behavior problems than those in all other family types. In addition, children in cohabiting social-father families have more externalizing behavior problems than those in cohabiting biological-father families.

A potential explanation for these differences is that characteristics, relationships, and behaviors between these family types differ in systematic ways that are related to children's cognitive skills and behavior problems. The descriptive statistics shown in Table 2 confirm that

there are such differences. For example, social-father families are generally less advantaged than biological-father families: the focal child's parents are less likely to have been married (or even romantically involved) at the birth, and they have younger and less educated mothers whose parents had more mental health problems. Children in social father families have also experienced more family structure transitions and residential moves, and a much shorter duration of father coresidence. At age 5, their families have less income and more children than those of children in biological-father families; also, their mothers have higher levels of depressive symptoms and engage in more frequent spanking. However, several differences favor social-father families: these families score .37 and .20 SDs higher in terms of how the father treats the mother and coparenting quality, and social fathers engage in considerably (.41 SDs) less spanking than do biological fathers. There are no differences by family type in mother or father engagement with the focal child.

Considering differences between married- and cohabiting-parent families, we find that married-parent families are more advantaged in terms of the vast majority of observed characteristics and that children in married-parent families have experienced less instability. At the same time, we see no differences between cohabiting- and married-parent families in terms of parenting behaviors and relationships at age 5, with the sole exception that married fathers engage in more frequent spanking than do cohabiting fathers. We take these differences in characteristics, relationships, and behaviors into account in the regression and decomposition models for which results are discussed below.

### *OLS Regressions*

Table 3 presents our OLS regression results. Model 1 is a regression of the (standardized) cognitive skills or behavior problems score on the indicators for father type and marital status,

without controls. On average, we see that, holding marital status constant, children living with a social father have PPVT scores that are .12 SDs (marginally significant at $p < .10$) lower and externalizing behavior problems that are .21 SDs higher than those of children living with their biological father. Children in married-parent families have PPVT and WJ-LW scores that are .45 and .30 SDs higher, and internalizing and externalizing behavior problems that are .20 and .18 SDs lower, than children in cohabiting-parent families (holding father biological status constant).

Model 2 controls for family characteristics at the focal child's birth. Doing so reduces the coefficients for social-father family to nonsignificance for all four outcomes and the coefficients for married-parent family to nonsignificance for both behavior problems measures. It also attenuates the coefficients for married-parent family substantially with regard to cognitive skills (from .45 to .18 SDs for the PPVT and from .30 to .16 SDs for the WJ-LW). These finding support the argument that much of the difference by family type is due to selection into different family structures. Model 3 adds family experiences between the focal child's birth and age 5. The addition of these covariates has very little influence on the social-father or married family coefficients. Model 4 adds family characteristics, relationships, and behaviors at age 5. As in Model 3, the addition of these covariates has little influence on the social-father family coefficients for cognitive skills or on the married-parent family coefficients for behavior problems or the PPVT. However, they serve to attenuate the married-parent family coefficient for the WJ-LW by about a third and to reduce it to nonsignificance. Moreover, the new variables have a large suppressor effect with regard to the social-father family coefficients for behavior problems, such that the magnitude of these coefficients more than doubles and become statistically significant. In fact, the social-father family coefficients in Model 4 are considerably larger than those in the simplest model (Model 1). This finding implies that, were it not for

relatively high quality age 5 characteristics, relationships, and behaviors among social-father families, the behavior problems gaps between children in biological- and social-father families would be much greater. Indeed, an examination of the coefficients for the age 5 covariates (not shown) reveals that several factors that favor social-father families, including the father's overall treatment of the mother, coparenting quality, and less frequent spanking by both mothers and fathers are strongly associated with fewer child behavior problems.

The final panel of Table 3 presents the results from the extension of the full model (Model 4) in which we employ family type indicators that constitute a full interaction between father biological status and parental marital status. For cognitive skills, both cohabiting biological-father and cohabiting social-father families are associated with lower PPVT scores relative to married biological-father families; however, PPVT scores do not differ for children in married biological-father and married social-father families. We also find no differences in PPVT scores between children living in any of the other family types; nor do we find any differences in WJ-LW scores by family type. Turning to behavior problems, we find that children living in both married and cohabiting social-father families have greater internalizing and externalizing behavior problems than those living in married and cohabiting biological-father families. However, there are no differences by marital status for children in either a biological- or social-father family.

Finally, we conducted Wald tests of whether the marriage-cohabitation difference for biological-father families was equal to the marriage-cohabitation gap for social-father families. In all cases, the test was not significant, suggesting that the magnitude of the gap in each outcome between children living in married and cohabiting biological-father families does not differ from the gap between children living in married and cohabiting social-father families. In

short, the influence of marriage appears to be the same in biological- and social-father families.

*Explanatory Power of Characteristics and Relationships*

Table 4 presents a summary of the marginal contribution of each set of covariates to the adjusted R-squared of the full model. This allows for an explicit examination of the extent to which each set of characteristics, relationships, and behaviors explains variation in child cognitive skills and behavior problems. When interpreting these results, it is important to keep in mind that the marginal contribution of each set of variables is calculated after controlling for all other covariates (including those that are endogenous). This implies that we are measuring the explanatory power of the direct effect of each set of variables, but not necessarily any indirect effects that function through other variables that are already included in the model. These results suggest several interesting patterns. First, we see that, after controlling for all of the covariates, the family structure variables contribute very little additional explanatory power, especially with regard to cognitive skills. Second, family characteristics at the focal child's birth contribute considerable explanatory power, particularly with regard to cognitive skills. Third, after accounting for family structure, family characteristics at the focal child's birth, and family characteristics, relationships, and behaviors at age 5, family experiences (instability) between birth and age 5 offer no additional explanatory power. Finally, family characteristics, relationships, and behaviors at age 5 contribute considerable explanatory power with regard to both cognitive skills and behavior problems. Furthermore, family characteristics at age 5 are more important than family relationships and behaviors at age 5 with regard to cognitive skills, whereas relationships and behaviors are more important for behavior problems. Family characteristics at age 5 account for increases in adjusted R-squared of 11% and 24% for the PPVT and WJ-LW, whereas relationships and behaviors account for 1% (nonsignificant) and 7%

increases. By contrast, characteristics account for 21% and 12% increases in adjusted R-squared for internalizing and externalizing behavior problems, whereas family relationships and behaviors account for 26% and 43% increases. As noted above, the fathers' overall treatment of the mother, coparenting quality, and spanking frequency appear to be particularly important in this regard.

### *Blinder-Oaxaca decompositions*

The results from our Blinder-Oaxaca decompositions are shown in tables 5 (decomposition by father's biological status) and 6 (decomposition by parental marital status).Whereas the OLS results presented thus far are useful for understanding how differences in characteristics, behaviors, and relationships may help to explain gaps in child outcomes by family type, they do not provide insight into whether children are differentially influenced by these factors in different family types. Our decomposition analyses explicitly address this possibility. The top panel of each table presents the mean difference between family types for each outcome. The bottom panels show decomposition results for Model 2, which adjusts for either marital status or father's biological status and family characteristics at the focal child's birth, Model 3, which adds family experiences between the focal child's birth and age 5, and Model 4, which adds family characteristics, relationships, and behaviors at age 5.

The overall pattern of results in Table 5 suggests that differences in child cognitive skills by father's biological status largely reflect differences in characteristics, relationships, and behaviors between family types rather than differences in returns to these factors. For example, the Model 4 decompositions for the PPVT and WJ-LW suggests that 61% and 86% of the mean difference in cognitive skills is due to differences in characteristics, relationships, and behaviors, whereas only 39% and 14% respectively is due to differences in returns to these factors. In

contrast, differences in behavior problems by father's biological status are largely due to differences in returns to family characteristics, relationships, and behaviors. Indeed, the results from Model 4 indicate that 204% of the difference in internalizing behavior problems and 104% of the difference in externalizing behavior problems is due to differences in returns to characteristics, relationships, and behaviors, whereas -104% and -4% of the gap is due to differences in these factors between family types. This means that, were social-father families to have the same characteristics, relationships, and behaviors as biological-father families, all else equal, then children in social-father families would exhibit .33 and .30 SDs *more* internalizing and externalizing behavior problems than those in biological-father families, whereas were social-father families to realize the same returns to (coefficients for) characteristics, relationships, and behaviors as biological-father families, all else equal, then children in social-father families would exhibit .17 and .02 SDs *fewer* behavior problems than those in biological-father families. On the whole there are greater (aggregated) returns to the full set of characteristics, relationships, and behaviors, in terms of reduced behavior problems, among biological-father families than among social-father families. Furthermore, a comparison of coefficients from the separate biological-father and social-father regression models (not shown) reveals that, for example, higher maternal education is more strongly associated with lower levels of internalizing behavior problems in biological-father families than in social-father families, that family income is more strongly associated with fewer internalizing and externalizing behavior problems in biological-father families than in social-father families, and that maternal depression has a stronger association with greater internalizing and externalizing behavior problems in social-father families than in biological-father families. However, there are a few exceptions to this general pattern. Most notably, both the father's overall treatment of the

mother and coparenting quality are more strongly associated with fewer behavior problems in social-father families than in biological-father families. The fact that the portion of the mean difference in behavior problems due to differences in characteristics, relationships, and behaviors is negative indicates that (and is typically the case when) the group with worse mean behavior problems (social fathers) possesses a relative advantage with regard to some of the observable covariates (Sinning, Hahn, & Bauer, 2008). As noted above, for instance, social-father families exhibit better behaviors and relationships, on average, in the areas of the father's overall treatment of the mother, coparenting quality, and spanking frequency, whereas biological-father families are characterized by higher levels of income and parental (particularly maternal) education.

In contrast to the decomposition results by father's biological status, those by marital status (Table 6) reveal that the mean difference between married- and cohabiting-parent families in all of the cognitive skills and behavior problems measures is mostly due to mean differences in family characteristics, relationships, and behaviors between family types, as opposed to differences in returns to these factors between family types. The proportion of the mean difference in the outcome between married and cohabiting families that is explained by differences in family characteristics, relationships, and behaviors is 78% for the PPVT, 88% for the WJ-LW and 118% and 79% for internalizing and externalizing behavior problems.

## DISCUSSION

Consistent with prior research, our results show that: (1) there are considerable differences in characteristics, relationships, and behaviors across family types (Berger et al., 2008; Bzostek et al., 2007; Gibson-Davis, 2008; Hofferth & Anderson, 2003; Hofferth, 2006; Manning & Brown, 2006; Manning & Lichter, 1996; McLanahan & Sandefur, 1994); (2)

children living with their married biological parents tend to have greater cognitive skills and fewer behavior problems than children living in other family types (Artis, 2007; Brown, 2004a; Hofferth, 2006); and (3) children living in other family types (cohabiting biological-father and married or cohabiting social-father families) tend to have similar levels of cognitive skills and behavior problems (Artis, 2007; Brown, 2004a; Hofferth, 2006; Manning & Lamb, 2003). At the same time, we find that differences in cognitive skills and behavior problems between (married) biological-father families and the other family types are not always large (nor statistically significant) and vary considerably depending on the covariates included in the regression models.

Our first aim was to investigate the extent to which differences in cognitive skills and behavior problems reflect differences in characteristics, relationships, and behaviors between families, and to examine which of these factors are most important in accounting for differences in child outcomes. On the whole, we find that adjusting for the full set of covariates accounts for most of the association between family type and cognitive skills but little of the association between family type and behavior problems. An examination of the influence of each set of covariates, however, tells a more complex story.

As expected, family characteristics at the focal child's birth play a large explanatory role with regard to each outcome. Their inclusion in the regression models results in a considerable attenuation of the associations of both social-father family and married-parent family with both cognitive skills and behavior problems. In contrast, family instability since birth does not account for any the association for either cognitive or behavioral outcomes once these characteristics are controlled. That the role of family characteristics is particularly large with regard to cognitive skills is not surprising given that these characteristics include parent

education and family structure at birth, which are known to be strongly association with adult cognitive ability. The fact that family characteristics do not negate the association between social-father family and behavior problems once parental characteristics, relationships, and behaviors at age 5 are included in the model reflects two counteracting influences: social-father families are worse off than biological-parent families with respect to family characteristics at birth (as well as family income at age 5), but better off with respect to parental relationships and behaviors at age 5. In short, were it not for the relatively high quality of parental relationships and behaviors (and, to a lesser extent, characteristics) in social-father families (Berger et al., 2008), children in these families would have considerably higher levels of behavior problems. Future research should further explore this hypothesis.

The role of family relationships and behaviors differs considerably across outcomes. We find very little evidence linking age 5 family relationships and behaviors to child cognitive skills. Indeed, these factors have significant explanatory power only with regard to the WJ-LW (but not the PPVT), and the magnitude thereof is quite small (accounting for just a 7% increase in adjusted R-squared). In contrast, age 5 family relationships and behaviors play a particularly strong explanatory role with regard to behavior problems (increasing adjusted R-squared by 26% and 43% for internalizing and externalizing behavior problems). That the decomposition results for behavior problems by father's biological status change from largely reflecting differences in family characteristics at the focal child's birth in Model 2 to largely reflecting returns to family characteristics, relationships, and behaviors in Model 4 is consistent with both the observed change in the OLS results between models 2 and 4 for behavior problems and the findings of our analyses of explanatory power (Table 4), which show that age 5 family characteristics, relationships, and behaviors are particularly important for behavioral outcomes.

We also examined whether marriage is differentially associated with child outcomes in biological- and social-father families and found no significant difference in the marriage-cohabitation gap between children living with a biological or social father for any outcome. Prior research has not established a consistent pattern of evidence in this area (Artis, 2007; Brown, 2004a; Hofferth, 2006; Manning & Lamb, 2003; Smock, 2000), and prior studies have often lacked substantial samples of lower-SES families. Our results suggest that, at least among the relatively disadvantaged families in the FFCW sample, the marriage premium is similar for children in biological-father families and those in social-father families with regard to the cognitive skills and behavior problems measures used in this study.

Our second aim was to examine the extent to which differences in cognitive skills and behavior problems between children in biological- and social-father families and those in married- and cohabiting-parent families are due to differences in the characteristics, relationships, and behaviors between family types compared to differences in returns to these factors between family types. We find consistent evidence that differences in cognitive skills are predominantly driven by differences in characteristics (at both birth and age 5) of the individuals comprising these family types rather than by differences in returns to these factors. This finding holds true for differences in cognitive skills both by father's biological status and by parental marital status. Although there are considerable differences in the average characteristics, relationships, and behaviors between biological- and social-father families, as well as between married- and cohabiting-parent families, these characteristics, relationships, and behaviors have similar associations with cognitive skills in all family types. This finding, in concert with our finding that family characteristics are more closely linked to cognitive skills than are family relationships and behaviors, implies that differences in cognitive skills by family type largely

reflect social selection. We reach the same general conclusion with regard to differences in behavior problems between children in married- and cohabiting-parent families.

In contrast, however, we find that differences in behavior problems between children in biological- and social-father families primarily reflect differences in returns to family characteristics, relationships, and behaviors, suggesting that, for behavior problems, differences in family processes matter. This finding may reflect that social capital is lower in social-father families than in biological-father families or that children respond differently to investments in each family type. At the same time, we cannot discount that these differences also reflect omitted variable bias. Given that ours is the first study to decompose differences in child outcomes into differences in characteristics, relationships, and behaviors versus differences in returns to these factors, it will be important for future research to more fully examine whether and how variation in social capital and family processes across family types may influence the transmission of human capital to children. Along these lines, it will also be important for future research to seek a better understanding of what drives differences in parental behaviors (and, potentially, children's responses to them) across family types. For example, we find that mothers in social-father families engage in more frequent spanking than those in biological-father families. However, it is unclear whether this reflects lower socioeconomic status among mothers in social-father families, whether these mothers engage in physical discipline to discourage social fathers from doing so, or whether they take on the role of disciplinarian in social-father families because, unlike biological fathers, social fathers are less apt to do so.

Several limitations of our analyses warrant consideration. First, we examine only static, short-term cognitive and behavioral outcomes for children at age 5 and do not take a dynamic approach to changes in family structure over time and their influence on child wellbeing.

Although we find static differences in child outcomes by family type, it is possible that these associations may, at least in part, be related to relatively recent family structure transitions given that sample children are still young and that a large proportion were born to unmarried parents. To the extent that these associations are linked to transitions in family type, rather than to residence in a particular family type, they may fade over time. As such, our estimates may overestimate adverse associations between social-father family type and child wellbeing (or underestimate any positive influences of social-father families). Notably, however, accounting for observed family instability has little influence on our findings once family characteristics at the focal child's birth are taken into account. It is also possible that the high quality relationships observed among social-father families reflect a "honeymoon" effect, which may fade over time, given that these romantic partnerships are, on average, relatively new. At the same time, it may be that the high quality relationships among social-father families indicate that mothers are selective in choosing social fathers for their children. This hypothesis is consistent with recent findings by Bzostek and colleagues (in press) which suggest that mothers tend to "trade-up" when choosing new partners as well as those by Berger and colleagues (2008) which imply that the social fathers in this sample appear to engage in relatively high quality parenting behaviors. Unfortunately, however, our analyses cannot disentangle these possibilities. It will therefore be important for future studies to examine the long-term associations of both family type and family transitions with child outcomes, particularly in a context of high rates of both social-father and cohabiting families, which tend to be less stable than (particularly two-biological) married-parent families (Manning, Smock, & Majumdar, 2004; Osborne & McLanahan, 2007). Also, younger children may be more likely than older children to form bonds with social fathers (Bray, 1999), which may be reflected in our results.

Second, our behavior problems measures are reported by mothers. As such, it is possible that our estimates reflect variation in mothers' perceptions of child behavior in different family types rather than true differences in child behavior between families. Likewise, we utilize only maternal reports of father attributes and behaviors; our results may therefore be biased to the extent that mothers systematically differ in their reporting of the characteristics and behaviors of resident biological and social fathers. Third, our relationship measures are limited in scope and may lack the sensitivity or specificity to fully capture differences between family types in multifaceted aspects of intra-family processes. Fourth, there may be considerable heterogeneity in effects that is obscured in our analyses. In particular, the relations of interest may differ by SES as well as child gender and race/ethnicity. Fifth, like most studies in this area, we model children's developmental outcomes as a function of family characteristics, relationships, and behaviors and do not consider potential bi-directionality in these relations, such that child cognitive skills or behavior problems may also influence parent-child relationships and parental behaviors (Carlson & Magnuson, 2011). For example, there is likely to be a reciprocal relationship between parent-child conflict and externalizing behavior problems (Burt, McGue, Krueger, & Iacono, 2005). Finally, as noted above, although our models take advantage of the wide range of detailed individual and family characteristics, relationship, and behavior measures that are available in FFCW, as with all observational studies it is possible that our estimates are biased by omitted factors.

Despite these caveats, our analyses offer new evidence regarding the potential influence of family characteristics, relationships, and behaviors on associations of family type with cognitive skills and behavior problems for young children from primarily disadvantaged families. On the whole, we find that parental marriage is positively associated with child

cognitive outcomes and negatively associated with child behavior problems at age 5. In both instances, most of the association is due to differences in parental characteristic at birth, suggesting that selection into different family types is largely responsible for differences in child outcomes. We also find that the gains associated with living with married parents are similar for children biological- and social-father families.

The story for father biological status is more complex. Whereas father biological status is not associated with cognitive outcomes at age 5, living with a social father is linked to behavior problems, but in offsetting ways. On the one hand, social-father families have lower socioeconomic status than biological-father families, which is associated with greater behavior problems; one the other hand, social-father families also exhibit high quality relationships and parenting behaviors, which are associated with fewer behavior problems. In addition, the aggregate returns to parental characteristics, relationships and parenting behaviors tend to be more favorable for children in biological-father families than those in social-father families; that is, children living with their biological father are less negatively affected by low resources and, overall, more positively affected by good relationships and behaviors. However, we also identify several important exceptions to this general pattern, in particular, high quality parental relationships and coparenting are associated with greater reductions in child behavior problems in social-father families than in biological-father families. Future research should further examine the potential mediating or suppressor roles of family relationships and behaviors, both over time and for more diverse groups of children in terms of both age and socioeconomic status. It should also seek additional information on the processes through which characteristics, relationships, and behaviors may differentially influence children's behavior in various family types.

## REFERENCES

Achenbach, T.M. (1991). *Manual for the Child Behavior Checklist /4-18 and 1991 Profile.* Burlington, VT: University of Vermont, Department of Psychiatry.

Adamsons, K., O'Brien, M., & Pasley, K. (2007). An Ecological approach to father involvement in biological and stepfather families. *Fathering,* 5, 129-147.

Artis, J. E. (2007). Maternal cohabitation and child well-being among kindergarten children. *Journal of Marriage and Family,* 69, 222-236.

Berger, L. M. (2007). Socioeconomic factors and substandard parenting. *Social Service Review,* 81(3), 485-522.

Berger, L. M., Carlson, M. J., Bzostek, S. H., & Osborne, C. (2008). Parenting practices of resident fathers: The role of marital and biological ties. *Journal of Marriage and Family*, 70, 625-639.

Berger, L. M., & Langton, C. (2011). Young disadvantaged men as fathers. *Annals of the American Academy of Political and Social Science,* 635, 56-75.

Blinder, A. S. (1973). Wage discrimination: Reduced form and structural estimates. *The Journal of Human Resources,* 8, 436-455.

Bray, J. H. (1999). Stepfamilies: The intersection of culture, context, and biology. *Monographs of the Society for Research on Child Development*, 64, 210-218.

Brown, S. L. (2004a). Family structure and child well-being: The significance of parental cohabitation. *Journal of Marriage and Family, 66*, 351-367.

Brown, S. L. (2004b). Moving from cohabitation to marriage: Effects on relationship quality. *Social Science Research,* 33, 1-19.

Brown, S. L. (2006). Family structure transitions and adolescent well-being. *Demography* 43 (3): 447–61.

Burt, S. A., McGue, M., Krueger, R. F., & Iacono, W. G. (2005). How are parent-child conflict and childhood externalizing symptoms related over time? Results from a genetically informative cross-lagged study. *Development and Psychopathology*, 17, 145-165.

Bzostek, S. (2008). Social fathers and child well-being. *Journal of Marriage and Family,* 70, 950-961.

Bzostek, S. H., McLanahan, S., & Carlson, M.J. (in press). Mothers' repartnering after a nonmarital birth. *Social Forces*.

Carlson, M.J. (2007). Trajectories of couple relationship quality after childbirth: Does marriage matter? Working paper #2007-11-FF. Princeton University, Center for Research on Child Wellbeing.

Carlson, M. J., & Magnuson, K.A. (2011). Low-income fathers' influence on children. *Annals of the American Academy of Political and Social Science*, 635, 95-116.

Carlson, M. J., Pilkauskas, N., McLanahan, S. S., & Brooks-Gunn, J. (2011). Couples as partners and parents over children's early years. *Journal of Marriage and Family,* 73, 317-334.

Cherlin, A. (1978). Remarriage as an incomplete institution. *American Journal of Sociology, 84*, 634-650.

Cherlin, A. J., & Furstenberg, F. F., Jr. (1994). Stepfamilies in the United States: A reconsideration. *Annual Review of Sociology, 20,* 359-381.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.

Coleman, M., Ganong, L. & Fine, M. (2000). Reinvestigating remarriage: Another decade of

progress. *Journal of Marriage and the Family, 62*, 1288 - 1307.
Cooper, C.E., Osborne, C.A., Beck, A.N., & McLanahan, S. S. (in press). Partnership instability, school readiness, and gender disparities. *Sociology of Education.*
Daly, M., & Wilson, M. I. (2000). The Evolutionary psychology of marriage and divorce. In L. J. Waite (Ed.), *The ties that bind: Perspectives on marriage and cohabitation* (pp. 91-110). New York: Aldine de Gruyter.
Dunn, L.M. and L.M. Dunn (1997). *Examiner's Manual for the Peabody Picture Vocabulary Test, Third Edition.* American Guidance Services, Inc. Elder, T. E., Goddeeris, J.H., & Haider, S.J. (2010). Unexplained gaps and Oaxaca-Blinder decompositions. *Labour Economics*, 17, 284-290.
Edin, K., & Kefalas, M. (2005). *Promises I can keep: Why poor women put motherhood before marriage.* Los Angeles: University of California Press.
Eggebeen, D. J. (2005). Cohabitation and exchanges of support. *Social Forces* 83 (3): 1097–1110.
Elder, T. E., Goddeeris, J. H., & Haider, S.J. (2010). Unexplained gaps and Oaxaca–Blinder decompositions. *Labour Economics*, 17, 284–290.
Fine, M. A. & Kurdek, L.A. (1995). Relation between marital quality and (step)parent-child relationship quality for parents and stepparents in stepfamilies. *Journal of Family Psychology*, 9, 216-223.
Fomby, P. & Cherlin, A. J. (2007). Family instability and child well-being. *American Sociological Review*, 72, 181-204.
Foster, E. M., & Kalil, A. (2007). Living arrangements and children's development in low-income white, black, and Latino families.*Child Development*, 78, 1657-1667.
Furstenberg, F. F., & Cherlin, A. (1991). *Divided families: What happens to children when parents part*. Cambridge: Harvard University Press.
Gibson-Davis, C. (2008). Family structure effects on maternal and paternal parenting in low-income families. *Journal of Marriage and Family*, 70, 452-465**.**
Hanson, T. L., McLanahan, S. S., & Thomson, E. (1996). Double jeopardy: Parental conflict and stepfamily outcomes for children. *Journal of Marriage and Family*, 58, 141-154.
Hetherington, E. M., Henderson, S. H., & Reaiss, D., in collaboration with Anderson, E. R., Bridges, M., Chan, R. W., Insabella, G. M., Jodl, K. M., Jungmeen, E., Mitchell, A. S., O'Connor, T. G., Skaggs, M. J., & Taylor, L. C. (1999). Adolescent siblings in stepfamilies: Family functioning and adjustment. With commentary by J. H. Bray. *Monographs of the Society for Research in Child Development*, 64.
Hofferth, S. L. (2006). Residential father family type and child well-being: Investment versus selection. *Demography, 43*, 53-77.
Hofferth, S. L., & Anderson, K.G. (2003). Are all dads equal? Biology versus marriage as a basis for paternal investment. *Journal of Marriage and Family*, 65, 213-232.
Hofferth, S. L., Cabrera, N., Carlson, M., Coley, R.L., Day, R. & Schindler, H. (2007). Resident father involvement and social fathering. In S. L. Hofferth & L. M. Casper (Eds.), *Handbook of measurement issues in family research* (pp. 335-374). Mahwah, NJ: Lawrence Erlbaum.
Kessler, R., Andrews, G. , Mroczek, D., Ustun, T., & Wittchen, H. U. (1998). The World Health Organization Composite International Diagnostic Interview Short Form (CIDI-SF). *International Journal of Methods in Psychiatric Research*, 7, 171-185.
King, V. (2006). The antecedents and consequences of adolescents' relationships with stepfathers and nonresident fathers. *Journal of Marriage and Family*, 68, 910-928.
Klausli, J. F., & Owen, M. T. (2009). Stable maternal cohabitation, couple relationship quality,

and characteristics of the home environment in the child's first two years. *Journal of Family Psychology*, 23, 103-106.
Kreider, R. M. (2008). *Living arrangements of children: 2004.* U.S. Census Bureau, Current Population Reports, P70-114, Washington, DC.
Magnuson, K. & Berger, L.M. (2009). Associations of family structure states and transitions with children's wellbeing during middle childhood. *Journal of Marriage and Family*, 71, 575-591.
Manning, W. D., & Brown, S. (2006). Children's economic well-being in married and cohabiting parent families. *Journal of Marriage and Family*, 68, 345-362.
Manning, W. D., & Lamb, K. A. (2003). Adolescent well-being in cohabiting, married, and single-parent families. *Journal of Marriage and Family*, 65, 876-893.
Manning, W. & Lichter, D.T. (1996). Parental cohabitation and children's economic well-being. *Journal of Marriage and the Family*, 58, 998-1010.
Manning, W. D., Smock, P. J., & Majumdar, D. (2004). The relative stability of cohabiting and marital unions for children. *Population Research and Policy Review*, 23, 135-159.
Marsiglio, W. (2004). When stepfathers claim stepchildren: A conceptual analysis. *Journal of Marriage and Family*, 66, 22-39.
Marsiglio, W. & Hinojosa, R. (2010). Stepfathers' lives: Exploring the social context and interpersonal complexity. In M. Lamb (Ed.) *The Role of the Father in Child Development, Fifth Edition*. Hoboken, NJ: John Wiley & Sons, Inc.
McLanahan, S., & Sandefur, G. (1994). *Growing Up with a Single Parent: What Hurts? What Helps?* Cambridge, MA: Harvard University Press.
Nelson, T. J. (2004). Low-income fathers. *Annual Review of Sociology*, 30, 427-451.
Nock, S. L. (1995). A comparison of marriages and cohabiting relationships. *Journal of Family Issues*, 16, 53-76.
Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review*, 14, 693-709.
Osborne, C., & McLanahan, S. (2007). Partnership instability and child wellbeing. *Journal of Marriage and Family*, 69, 1065-1083.
Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile Families: Sample and design. *Children and Youth Services Review*, 23, 303-326.
Sigle-Rushton, W., & McLanahan, S. (2004). Father absence and child well-being: A critical review. In D. P. Moynihan, T. M. Smeeding, & L. Rainwater (Eds.), *The Future of the Family* (pp. 116-155). New York: Russell Sage Foundation.
Sinning, M., Hahn, M., & Bauer, T. K. (2008). The Blinder-Oaxaca decomposition for nonlinear regression models. *The Stata Journal*, 8, 480-492.
Smock, P. J. (2000). Cohabitation in the United States: An appraisal of research, themes, findings, and implications. *Annual Review of Sociology*, 26, 1-20.
Townsend, N. W. (2002). *The Package Deal: Marriage, Work and Fatherhood in Men's Lives*. Philadelphia: Temple University Press.
Von Hippel, P. T. (2007). Regression with missing Ys: An improved strategy for analyzing multiply imputed data. *Sociological Methodology*, 37, 83-117.
Woodcock, R.W., & Johnson, M.B. (1990). *Manual for the Woodcock-Johnson Tests of Achievement-Revised.* Allen, TX: RCL Enterprises.

Table 1: Descriptive statistics for cognitive skills and externalizing behavior problem, overall and by father type

| | All Biological-Father Families | All Social-Father Families | All Married-Parent Families | All Cohabiting-Parent Families | Married Biological-Father Families | Cohabiting Biological-Father Families | Married Social-Father Families | Cohabiting Social-Father Families |
|---|---|---|---|---|---|---|---|---|
| PPVT | 0.09 | -0.23[a] | 0.23 | -0.27[b] | 0.26 | -0.25[c] | -0.02[c] | -0.29[ce] |
| | (1.01) | (0.94) | (0.98) | (0.96) | (0.98) | (0.97) | (0.87) | (0.95) |
| Obs. per imputed dataset | 966 - 968 | 375 - 377 | 725 - 726 | 616 - 617 | 645 - 646 | 321 - 322 | 80 - 81 | 295 - 296 |
| Woodcock-Johnson | 0.06 | -0.14[a] | 0.15 | -0.18[b] | 0.18 | -0.18[c] | -0.07[c] | -0.17[c] |
| | (1.04) | (0.88) | (1.07) | (0.88) | (1.08) | (0.89) | (0.90) | (0.88) |
| Obs. per imputed dataset | 971 - 973 | 380 - 383 | 729 - 730 | 622 - 624 | 646 - 647 | 325 - 326 | 83 - 84 | 297 - 299 |
| Internalizing behavior problems | -0.04 | 0.12[a] | -0.09 | 0.13[b] | -0.11 | 0.12[c] | 0.07 | 0.13[c] |
| | (0.98) | (1.03) | (0.95) | (1.05) | (0.94) | (1.06) | (1.01) | (1.04) |
| Obs. per imputed dataset | 1277 - 1279 | 472 - 467 | 1009 - 1011 | 740 - 743 | 898 - 900 | 379 - 380 | 111 - 112 | 361 - 364 |
| Externalizing behavior problems | -0.08 | 0.21[a] | -0.11 | 0.15[b] | -0.14 | 0.05[c] | 0.08[c] | 0.25[cd] |
| | (0.95) | (1.09) | (0.91) | (1.10) | (0.90) | (1.04) | (0.91) | (1.14) |
| Obs. per imputed dataset | 1277 - 1279 | 472 - 467 | 1009 - 1011 | 740 - 743 | 898 - 900 | 379 - 380 | 111 - 112 | 361 - 364 |

Note: Means (and standard deviations) presented. All measures have been standardized to have a mean of 0 and standard deviation of 1 in the full sample. The number of observations per imputed dataset are: 1341 to 1343 for the PPVT, 1351 to 1354 for the Woodcock-Johnson, and 1749 to 1753 for internalizing and externalizing behavior problems.

[a]Differs from biological-father families at $p<0.05$.

[b]Differs from married-parent families at $p<0.05$.

[c]Differs from married-parent biological father families at $p<0.05$.

[d]Differs from cohabiting biological-father families at $p<0.05$.

[e]Differs from married social-father families at $p<0.05$.

Table 2: Descriptive statistics for covariates, overall and by father's biological status

| | Biological-Father Families | Social-Father Families | Married-Parent Families | Cohabiting-Parent Families |
|---|---|---|---|---|
| *Family structure at focal child age 5:* | | | | |
| Biological-father family | | | 0.89 | 0.51[b] |
| Social-father family | | | 0.11 | 0.49[b] |
| Married-parent family | 0.70 | 0.24[a] | | |
| Cohabiting-parent family | 0.30 | 0.76[a] | | |
| *Family characteristics at focal child's birth:* | | | | |
| Married | 0.45 | 0.07[a] | 0.57 | 0.03[b] |
| Cohabiting | 0.39 | 0.33[a] | 0.28 | 0.51[b] |
| Dating | 0.02 | 0.10[a] | 0.03 | 0.05[b] |
| Not romantically involved | 0.15 | 0.50[a] | 0.12 | 0.41[b] |
| White | 0.31 | 0.17[a] | 0.37 | 0.14[b] |
| Black | 0.34 | 0.59[a] | 0.31 | 0.55[b] |
| Hispanic | 0.31 | 0.23[a] | 0.28 | 0.30 |
| Another race | 0.04 | 0.02[a] | 0.05 | 0.02 |
| Mother's Age | 26.74 | 22.83[a] | 27.31 | 23.46[b] |
| | (6.16) | (4.75) | (6.07) | (5.31) |
| US born | 0.78 | 0.95[a] | 0.79 | 0.87[b] |
| Less than high school education | 0.27 | 0.41[a] | 0.22 | 0.44[b] |
| High school education | 0.25 | 0.35[a] | 0.24 | 0.33[b] |
| More than high school education | 0.27 | 0.22[a] | 0.30 | 0.21[b] |
| Multiple partner fertility (age 1) | 0.26 | 0.46[a] | 0.25 | 0.40[b] |
| Mother's father MH problems (age 3) | 0.58 | 0.76 | 0.53 | 0.75 |
| | (1.71) | (1.77) | (1.71) | (1.74) |
| Mother's mother MH problems (age 3) | 0.80 | 1.07[a] | 0.81 | 0.96 |
| | (1.93) | (2.27) | (1.91) | (2.18) |
| Child female | 0.48 | 0.45 | 0.47 | 0.48 |
| Child low birth weight | 0.08 | 0.12[a] | 0.07 | 0.12[b] |
| *Family experiences between focal child's birth and age 5:* | | | | |
| Number of family structure transitions | 0.32 | 1.54[a] | 0.34 | 1.08[b] |
| | (0.65) | (0.79) | (0.69) | (0.92) |
| Duration of mother-partner co-residence (months) | 106.31 | 23.53[a] | 104.87 | 55.12[b] |
| | (47.81) | (19.79) | (53.87) | (44.83) |
| Total residential moves | 1.53 | 2.58[a] | 1.52 | 2.21[b] |
| | (1.66) | (1.93) | (1.60) | (1.97) |
| *Family characteristics, relationships, and behaviors at focal child age 5:* | | | | |
| Number of children | 2.56 | 2.73[a] | 2.57 | 2.66 |
| | (1.25) | (1.48) | (1.26) | (1.40) |
| Number of adults | 2.22 | 2.15 | 2.17 | 2.25[b] |
| | (0.70) | (0.64) | (0.60) | (0.78) |
| Income (ln) | 10.45 | 9.72[a] | 10.65 | 9.71[b] |
| | (1.24) | (1.41) | (1.05) | (1.47) |
| BF/SF age | 34.41 | 29.85[a] | 34.88 | 30.85[b] |
| | (7.08) | (7.04) | (6.97) | (7.22) |
| BF/SF less than high school | 0.27 | 0.08[a] | 0.19 | 0.26[b] |
| BF/SF high school | 0.29 | 0.67[a] | 0.30 | 0.52[b] |
| BF/SF more than high school | 0.25 | 0.19[a] | 0.27 | 0.18[b] |
| BF/SF has children with other woman | 0.29 | 0.52[a] | 0.26 | 0.47[b] |
| BF/SF other children with mom | 0.81 | 0.33[a] | 0.79 | 0.52[b] |
| BF/SF has limiting condition | 0.05 | 0.09[a] | 0.06 | 0.07 |
| BF/SF ever incarcerated | 0.22 | 0.19 | 0.15 | 0.30[b] |
| BF/SF treatment of mother | -0.10 | 0.27[a] | 0.01 | -0.02 |

| | | | | |
|---|---|---|---|---|
| (standardized) | (1.06) | (0.78) | (0.95) | (1.07) |
| Coparenting quality (standardized) | -0.05 | 0.15[a] | 0.02 | -0.01 |
| | (0.99) | (0.99) | (0.95) | (1.05) |
| Mother spanking frequency | -0.05 | 0.15[a] | -0.03 | 0.06 |
| (standardized) | (0.98) | (1.06) | (0.99) | (1.02) |
| Mother engagement with child | -0.02 | 0.06 | 0.01 | -0.01 |
| (standardized) | (1.00) | (1.00) | (1.00) | (1.00) |
| BF/SF spanking frequency | 0.12 | -0.29[a] | 0.09 | -0.11[b] |
| (standardized) | (1.08) | (0.68) | (1.06) | (0.92) |
| BF/SF engagement with child | -0.02 | 0.05 | -0.02 | 0.03 |
| (standardized) | (0.98) | (1.05) | (0.98) | (1.03) |
| Mother depressive symptoms | -0.04 | 0.11[a] | -0.03 | 0.04 |
| (standardized) | (0.93) | (1.15) | (0.95) | (1.06) |
| Observations per imputed dataset | 1283 - 1285 | 479 - 484 | 1015 – 1017 | 747 - 751 |

Note: Means (and standard deviations) presented for continuous variables; percentages presented for dichotomous variables. The total number of observations per imputed dataset ranges from 1762 - 1767.
[a]Differs from biological-father families at $p<0.05$.
[b]Differs from married-parent families at $p<0.05$.

Table 3: OLS regressions results

| | PPVT | Woodcock-Johnson | Internalizing Behavior Problems | Externalizing Behavior Problems |
|---|---|---|---|---|
| *Model 1: Family structure at focal child age 5* | | | | |
| Social-father family | -0.12+ | -0.07 | 0.07 | 0.21*** |
| | (0.06) | (0.07) | (0.06) | (0.06) |
| Married-parent family | 0.45*** | 0.30*** | -0.20*** | -0.18*** |
| | (0.06) | (0.06) | (0.05) | (0.05) |
| *Model 2:Add family characteristics at focal child's birth* | | | | |
| Social-father family | -0.09 | -0.03 | 0.09 | 0.10 |
| | (0.06) | (0.07) | (0.06) | (0.06) |
| Married-parent family | 0.18** | 0.16* | -0.04 | -0.08 |
| | (0.06) | (0.07) | (0.06) | (0.06) |
| *Model 3: Add family experiences between focal child's birth and age 5* | | | | |
| Social-father family | -0.10 | 0.02 | 0.15+ | 0.12 |
| | (0.08) | (0.09) | (0.08) | (0.08) |
| Married-parent family | 0.18** | 0.15* | -0.05 | -0.07 |
| | (0.06) | (0.07) | (0.06) | (0.06) |
| *Model 4: Add family characteristics, relationships, and behaviors at focal child age 5* | | | | |
| Social-father family | -0.13 | -0.03 | 0.35*** | 0.32*** |
| | (0.09) | (0.09) | (0.09) | (0.09) |
| Married-parent family | 0.15* | 0.10 | -0.00 | -0.04 |
| | (0.06) | (0.07) | (0.06) | (0.06) |
| *Model 4, Extension: Full model, father type interacted with marriage* | | | | |
| Cohabiting biological-father family | -0.16* | -0.11 | 0.03 | 0.03 |
| | (0.07) | (0.08) | (0.07) | (0.07) |
| Married social-father family | -0.16 | -0.07 | 0.40**[a] | 0.30*[a] |
| | (0.13) | (0.13) | (0.12) | (0.12) |
| Cohabiting social-father family | -0.28* | -0.13 | 0.35***[a] | 0.36***[a] |
| | (0.10) | (0.11) | (0.10) | (0.10) |
| *Wald test (p-value):* $\beta_{COH\ BF} = (\beta_{COH\ SF} - \beta_{MAR\ SF})$ | 0.771 | 0.685 | 0.530 | 0.800 |
| Observations per imputed dataset | 1341 – 1343 | 1351 - 1354 | 1749 – 1753 | 1749 - 1753 |

Note: Coefficients (and standard errors) from OLS regressions estimated across 10 imputed datasets are presented. The outcome variables have been standardized to have a mean of 0 and a standard deviation of 1. The specific variables in each category are listed in Table 2. +p<0.10; *p<0.05; **p<0.01; ***p<0.001.
[a]Differs from "Cohabiting biological-father family" at p<0.05.

Table 4: Contributions of explanatory variables to Adjusted $R^2$

| | PPVT | Woodcock-Johnson | Internalizing Behavior Problems | Externalizing Behavior Problems |
|---|---|---|---|---|
| Family structure | 0.016* | 0.002 | 0.057*** | 0.047*** |
| Family characteristics at birth | 0.315*** | 0.281*** | 0.138*** | 0.042+ |
| Family experiences between birth and age 5 | -0.004 | 0.010 | -0.002 | 0.010 |
| Family characteristics and relationships at age 5 | 0.117*** | 0.321*** | 0.630*** | 0.644*** |
| Family characteristics at age 5 | 0.106*** | 0.243*** | 0.213*** | 0.116*** |
| Family relationships and behaviors at age 5 | 0.008 | 0.069*** | 0.261** | 0.432*** |
| Observations per imputed dataset | 1341 - 1343 | 1351 - 1354 | 1749 - 1753 | 1749 - 1753 |

Note: Results are based on regressions presented in Model 4 of Table 3. The marginal contribution to Adjusted $R^2$ is assessed in each of the 10 imputed datasets by estimating the model without the set of variables indicated in the first column, but including all other variables, then calculating the percentage difference in the $R^2$ when the set of variables is and is not included in the model. The figures presented above represent the mean marginal contribution to Adjusted $R^2$ across the 10 imputed dataset. The $R^2$for the full model ranges from 0.260 to 0.268, 0.169 to 0.175, 0.138 to 0.145, and 0.148 to 0.156 across the 10 datasets for the PPVT, Woodcock-Johnson, internalizing behavior problems, and externalizing behavior problems, respectively. The variables included in each set are listed in Table 2. Wald test of joint significance of the set of variables in the full model: +p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 5: Blinder-Oaxaca decompositions by father's biological status

| | PPVT | Woodcock-Johnson | Internalizing Behavior Problems | Externalizing Behavior Problems |
|---|---|---|---|---|
| *Mean difference:* | | | | |
| Biological-father family | 0.09 | 0.06 | -0.04 | -0.08 |
| | (0.03) | (0.03) | (0.03) | (0.03) |
| Social-father family | -0.23 | -0.14 | 0.12 | 0.21 |
| | (0.05) | (0.05) | (0.05) | (0.05) |
| Difference | 0.33*** | 0.20*** | -0.16** | -0.29*** |
| | (0.06) | (0.06) | (0.06) | (0.06) |
| *Model 2 decomposition:* | | | | |
| Difference due to characteristics, | 0.23*** | 0.18*** | -0.10* | -0.19*** |
| Relationships, and behaviors | (0.05) | (0.05) | (0.04) | (0.04) |
| Percent | 71.3% | 88.3% | 64.6% | 65.1% |
| Difference due to returns to | 0.09 | 0.02 | -0.06 | -0.10 |
| chars, rels, and behaviors | (0.07) | (0.07) | (0.07) | (0.07) |
| Percent | 28.7% | 11.7% | 35.4% | 34.9% |
| *Model 3 decomposition:* | | | | |
| Difference due to characteristics, | 0.25** | 0.22*** | -0.03 | -0.19** |
| Relationships, and behaviors | (0.08) | (0.08) | (0.07) | (0.07) |
| Percent | 75.6% | 106.7% | 18.4% | 64.2% |
| Difference due to returns to | 0.08 | -0.01 | -0.13 | -0.10 |
| chars, rels, and behaviors | (0.09) | (0.09) | (0.09) | (0.09) |
| Percent | 24.4% | -6.7% | 81.6% | 35.8% |
| *Model 4 decomposition:* | | | | |
| Difference due to characteristics, | 0.20* | 0.17+ | 0.17* | 0.01 |
| Relationships, and behaviors | (0.09) | (0.10) | (0.08) | (0.08) |
| Percent | 61.3% | 85.9% | -104.3% | -4.2% |
| Difference due to returns to | 0.13 | 0.03 | -0.33*** | -0.31*** |
| chars, rels, and behaviors | (0.10) | (0.11) | (0.09) | (0.09) |
| Percent | 38.7% | 14.1% | 204.3% | 104.2% |
| Observations per imputed dataset | 1341 - 1343 | 1351 - 1354 | 1749 - 1753 | 1749 - 1753 |

Note: Results based on models estimated across 10 imputed datasets. Biological-father family coefficients are the reference coefficients. Figures may not sum perfectly due to rounding. The outcome variables have been standardized to have a mean of 0 and a standard deviation of 1. Model 1 controls only for marital status, Model 2 adds family characteristics at the focal child's birth, Model 3 adds family experiences between focal child's birth and age 5, and Model 4 adds family characteristics and relationships at focal child age 5. The specific variables in each category are listed in Table 2. +p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 6: Blinder-Oaxaca decompositions by marital status

| | PPVT | Woodcock-Johnson | Internalizing Behavior Problems | Externalizing Behavior Problems |
|---|---|---|---|---|
| *Mean difference:* | | | | |
| Biological-father family | 0.23 | 0.15 | -0.09 | -0.11 |
| | (0.04) | (0.04) | (0.03) | (0.03) |
| Social-father family | -0.27 | -0.18 | 0.13 | 0.15 |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Difference | 0.50*** | 0.33*** | -0.22*** | -0.26*** |
| | (0.05) | (0.05) | (0.05) | (0.05) |
| *Model 2 decomposition:* | | | | |
| Difference due to characteristics, | 0.34*** | 0.21*** | -0.20*** | -0.17*** |
| Relationships, and behaviors | (0.05) | (0.06) | (0.05) | (0.04) |
| Percent | 68.3% | 64.3% | 88.1% | 65.8% |
| Difference due to returns to | 0.16* | 0.12 | -0.03 | -0.09 |
| chars, rels, and behaviors | (0.07) | (0.07) | (0.07) | (0.07) |
| Percent | 31.7% | 35.7% | 11.9% | 34.2% |
| *Model 3 decomposition:* | | | | |
| Difference due to characteristics, | 0.34*** | 0.22*** | -0.18*** | -0.16*** |
| Relationships, and behaviors | (0.05) | (0.06) | (0.05) | (0.04) |
| Percent | 68.6% | 68.8% | 82.3% | 62.5% |
| Difference due to returns to | 0.16* | 0.10 | -0.04 | -0.10 |
| chars, rels, and behaviors | (0.07) | (0.08) | (0.07) | (0.07) |
| Percent | 31.4% | 31.2% | 17.7% | 37.5% |
| *Model 4 decomposition:* | | | | |
| Difference due to characteristics, | 0.39*** | 0.29*** | -0.26*** | -0.21*** |
| Relationships, and behaviors | (0.06) | (0.06) | (0.05) | (0.05) |
| Percent | 77.9% | 87.7% | 117.6% | 78.9% |
| Difference due to returns to | 0.11 | 0.04 | 0.04 | -0.06 |
| chars, rels, and behaviors | (0.07) | (0.08) | (0.07) | (0.07) |
| Percent | 22.1% | 12.3% | -17.6% | 21.1% |
| Observations per imputed dataset | 1341 - 1343 | 1351 - 1354 | 1749 - 1753 | 1749 - 1753 |

Note: Results based on models estimated across 10 imputed datasets. Married-parent family coefficients are the reference coefficients. Figures may not sum perfectly due to rounding. The outcome variables have been standardized to have a mean of 0 and a standard deviation of 1. Model 1 controls only for father biological status, Model 2 adds family characteristics at the focal child's birth, Model 3 adds family experiences between focal child's birth and age 5, and Model 4 adds family characteristics and relationships at focal child age 5. The specific variables in each category are listed in Table 2. +p<0.10; *p<0.05; **p<0.01; ***p<0.001.