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Family Structure and Early Cognitive Outcomes: The Moderating Influence of Paternal Education

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## Abstract

Using data drawn from the first three waves of the Fragile Families and Child Wellbeing Study (FFCWS) ( $N = 1913$ ), this study investigated associations between marriage, cohabitation, and single motherhood and early child cognitive and socioemotional outcomes by asking whether associations typically found in family structure research were consistent across levels of paternal education. Results indicate that children in married parent families scored higher on cognitive tests than those in all types of unwed parent families only when fathers had high levels of education and not when they had medium or low education levels, whereas children in married parent families had better socioemotional outcomes than those in unwed parent families across levels of fathers education. Results suggest that if family structure influences child development, it does so via intrafamilial mechanisms that operate differently across family contexts and developmental domains. Implications of these findings for public policies promoting marriage and coresidence among unwed couples are discussed.

## Family Structure and Early Cognitive Outcomes: The Moderating Influence of Paternal Education

Numerous studies have reported that children growing up with married biological parents have better early cognitive outcomes on average than those of single mothers and unwed cohabiting parents, even when both parents in the cohabiting arrangement are the child's biological ones (Artis, 2007; Brown, 2004; Demuth & Brown, 2004; Dunifon & Kowaleski-Jones, 2002; Manning & Lamb, 2003). Studies have also shown that much of this advantage is mediated or explained by socioeconomic differences among family types (Artis, 2007; Brown, 2004; McLanahan & Sandefur, 1994). However, no studies have examined whether families' socioeconomic characteristics also moderate these average associations. Specifically, no one has investigated the possibility that associations between family type and early cognitive outcomes differ by socioeconomic characteristics such that marriage has a far stronger positive association with child cognitive outcomes relative to single motherhood and cohabitation at higher levels of socioeconomic status than at lower levels. This possibility is important to explore because public efforts to promote marriage are targeted at unwed parents who tend to have fewer socioeconomic resources (Sigle-Rushton & McLanahan, 2002); one way to evaluate the potential efficacy of these efforts is to understand the benefits associated with marriage for those most likely to receive intervention.

The present study addresses this issue by examining whether children of biological married, biological cohabiting, and single parents differ on early language scores within levels of fathers' education. I compare children within levels of fathers' education, rather than matching on a larger number of socioeconomic indicators, for two reasons. First, much of the difference in socioeconomic wellbeing (e.g., poverty status, material hardship) between married and cohabiting families, and between married and single mothers, is attributable to parents' education (Manning & Brown, 2006). Second, other socioeconomic characteristics such as income, employment, and material hardship may be partially endogenous to family structure such that being married may facilitate higher earnings and lower hardship relative to cohabitation and single motherhood through various causal mechanisms (Becker, 1991). By contrast, educational attainment predicts selection into different family structures (Weiss, 1997; Brown, 2004), but is arguably less subject to influence by family structure than earnings, employment, or

hardship. In this way, I allow for processes endogenous to family structure to distinguish married, cohabiting, and single parent families' economic wellbeing, and possibly child cognitive development, while still comparing socioeconomically similar groups. Although both parents' education is relevant to this inquiry, I examine fathers' education because it should be equally or more strongly associated with family income and thus resources invested in children than mothers', at least among coresident couples.

I address two complementary research questions. First, I ask whether fathers' education level moderates the association between family structure and child cognitive development. I hypothesize that larger differences in children's cognitive scores will emerge between married and unwed family types when fathers' have higher education levels than when they have lower education levels and that perhaps differences will *only* emerge at high education levels. Second, I ask *why* this moderation exists. I posit that differences in fathers' money and time investments in children between married and unwed family types will be smaller at lower levels of fathers' education than at higher levels; smaller differences in money and time investments in children in turn will drive smaller differences in children's cognitive outcomes by family structure because these investment differences account, at least in part, for differences in child cognitive outcomes across family types.

To test these hypotheses further, I also investigate whether fathers' education level moderates the association between family structure and children's *socioemotional* outcomes. These analyses should serve as a contrast to those for children's cognitive outcomes because I do not expect fathers' education to moderate this link. Whereas children's cognitive development is strongly associated with investments of money and time in children, and I expect differences among married and unwed families to be larger at higher levels of fathers' education than at lower levels, children's socioemotional development is more strongly associated with family processes that I expect differ between married and unwed families in the same way at higher and lower levels of fathers' education. By investigating whether fathers' education moderates family structure and child development associations, and whether this moderation holds across cognitive and socioemotional outcomes, I explore the possibility that if family structure influences child

development, it does so via intrafamilial mechanisms that operate differently across family contexts and developmental domains.

### *Background Literature*

With the substantial rise in nonmarital childbirth in the U.S. over the last 30 years, research on family structure and child development has turned from studying the impact of divorce on youth to comparing younger children of married parents with those of never-married mothers. Research has found that children born to unwed parents have poorer early outcomes across developmental domains than those born to married parents (Aronson & Huston, 2004; Heiland & Liu, 2006; Osborne, McLanahan, & Brooks-Gunn, 2004; Smith, Brooks-Gunn, & Klebanov, 1997; Teitler, 2001). The difference holds even when unwed parents live together, for research on unwed cohabitation has found that children of married biological parents fare better cognitively and socioemotionally than those of unwed cohabiting parents, even when both parents in the cohabiting union are the biological ones (Artis, 2007; Brown, 2004; Demuth & Brown, 2004; Dunifon & Kowaleski-Jones, 2002; Heiland & Liu, 2006; Osborne, McLanahan, & Brooks-Gunn, 2004). Moreover, children of cohabiting and single parents often do not differ cognitively or behaviorally despite the presence of the biological father in the former family type (Aronson & Huston, 2004; Brown, 2004; Dunifon & Kowaleski-Jones, 2002). Taken together, these studies suggest children of single mothers (never-married or divorced) and unwed cohabiting parents suffer developmentally when compared to those living consistently with their married biological parents.

Only one study I know of has investigated whether these average associations vary by parents' characteristics. Using data from their longitudinal E-Risk Study of parental antisocial behavior and child development, Jaffee and colleagues (2003) examined whether fathers' antisocial behavior moderated associations between parental coresidence and children's behavioral outcomes at age five. They found the longer children spent living with *non-antisocial* fathers (versus living with single mothers), the lower their behavioral problems scores. However, the longer children spent living with fathers who had high

levels of antisocial behavior, the worse their behavioral outcomes. In short, the apparent benefit to children of living in an intact family depended on fathers' psychosocial wellbeing.

*Theoretical Framework: Family Structure and Child Wellbeing*

Children's cognitive development is viewed as the product of inherited ability and parental investment of resources and time in children's learning. In this model, children in married parent families develop better cognitive skills than those of cohabiting and single parents in part because higher incomes allow married parents to invest more in cognitively stimulating resources, such as learning materials, and avoid experiencing disruptive material hardships, such as food insecurity and housing instability (Haveman & Wolfe, 1994; Mayer, 1997). Research also finds that married fathers invest more time in caregiving and other parenting tasks than biological cohabitators (Hofferth & Anderson, 2003), perhaps because cohabitation is a less stable and more ambivalent union than marriage (Brown, 2003), and that single mothers and nonresident fathers spend less time with children than married and cohabiting parents (Sandberg & Hofferth, 2001). These theoretical links between marriage and children's cognitive development have been largely born out in research on family structure and child development. Economic differences between married and unwed families in particular have been shown to account for as much as half of the difference in children's cognitive outcomes among family types (Ackerman, et al., 2001; Brown, 2004; Hanson, McLanahan, & Thomson, 1997; McLanahan & Sandefur, 1994; Ram & Hou, 2003; Thomson, Hanson, & McLanahan, 1994).

Children's socioemotional development is also viewed as the product of inherited traits and parental behavior; however, in this domain it is parents' socioemotional rather than cognitive characteristics, and the socioemotional rather than learning environments they provide, that influence child outcomes. In this view, children in married parent families have better socioemotional outcomes than those of cohabiting and single parents because married mothers and fathers tend to parent children more sensitively (Aronson & Huston, 2004; Ryan, Tolani, & Shannon, 2003), are healthier emotionally (Brown, 2001; Demuth & Brown, 2004; Wilson & Brooks-Gunn, 2001), and interact more harmoniously with one other (Brown, 2003; Nock, 1995) than either cohabiting or single parents. Indeed, family

researchers theorize, and some studies have found, that these socioemotional aspects of the home environment explain little of the difference in cognitive outcomes, but do account for some of difference in children's socioemotional outcomes by family structure (Aronson & Huston, 2004; Demuth & Brown, 2004; McLanahan & Sandefur, 1994; Ram & Hou, 2003).

### *The Moderating Influence of Fathers' Education: Cognitive Outcomes*

As in the Jaffee et al. (2003) study, I examine whether associations between family structure and child wellbeing, and thus the mechanisms hypothesized to link them, hold across different family contexts by investigating the moderating role of paternal characteristics. However, unlike that study I examine fathers' socioeconomic characteristics rather than their psychosocial risks, I differentiate between married and cohabiting two-parent families in light of the documented differences between the two family types, and I examine children's cognitive and socioemotional outcomes. Two explanations are offered for the moderating influence of fathers' education. One invokes causal associations between family structure and child development, whereas another assumes parents select into married and unwed families based on pre-existing characteristics that account in part or full for children's differences across family types. Both causal and non-causal theories imply the same dynamic – fathers' education level will moderate associations between family structure and children's cognitive outcomes but not their socioemotional ones.

The 'causal' hypothesis begins with the premise that marriage is associated with larger gains in men's employment and earnings than cohabitation or single parenthood because it is a more stable and predictable union and because it is a two-parent arrangement. Regarding cohabitation, specialization in household and market labor may evolve more strongly among married than cohabiting parents because marriage implies a longer-term commitment than cohabitation, inspiring fathers particularly to invest time more heavily in the labor market, thereby increasing their earnings (Becker, 1991). Additionally, married fathers may invest more time in their children than cohabiting fathers because the longer-term commitment that marriage implies inspires fathers to make greater investments in their children's human capital development. Indeed, research finds that married fathers invest more time in caregiving and other

parenting tasks than biological cohabitators (Hofferth & Anderson, 2003), perhaps because cohabitation is a less stable and more ambivalent union than marriage (Brown, 2003). Both of these benefits – higher income and greater time investment from fathers – could partially drive positive associations between marriage and children’s cognitive outcomes.

The causal link between marriage and better cognitive outcomes when compared to single motherhood is more straightforward. Fathers living apart from their children do not benefit at all from specialization in labor and household work with their children’s mothers, causing nonresident fathers to invest less time in the labor market and earn less than their married counterparts (Becker, 1991). Even if two parent homes were not uniquely advantageous to men’s earnings, nonresident fathers necessarily invest less time and money in their children’s households than their married counterparts because their income and time are divided between two (or more) homes (McLanahan & Sandefur, 1994). As with cohabitation, both higher household incomes and greater time investments from married fathers could drive positive associations between marriage and children’s cognitive outcomes relative to single motherhood.

However, it is possible that marriage is not associated with substantially greater money and time investments in children at all levels of paternal education. Fathers with low education levels may gain less from marriage in terms of earnings because their earnings potential is more limited to start (see Fisher & Hout, 2006, for an extensive review of earnings differences by education in the U.S.). This is not to suggest fathers with less education gain nothing from marriage, just that they may gain less economically than more educated fathers. If this were true, differences in money investments in children between married and cohabiting, and between married and single parents, would be smaller at lower levels of paternal education. The difference between married, cohabiting, and nonresident fathers’ time investments in children may also be smaller when fathers have lower education levels. Research suggests that less educated fathers tend to spend less time with their children than more educated fathers (Bianchi, 2000; McLanahan, 2004). To the extent that marriage inspires greater time investments in children than



cohabitation and nonresident fatherhood, that difference may be smaller in a group that generally spends less with children.

One could also hypothesize smaller differences in money and time investments across family types among less educated fathers without invoking a causal link between marriage and parental investments. Positive assortative mating on education (Mare, 1991) suggests that among parents with low education levels, the pool of men from which mothers will likely choose has a more restricted and lower range of incomes than among more educated parents. If this were true, the absolute difference in earnings of fathers who select marriage versus those who select cohabitation or nonresident fatherhood may be far smaller in the former group. Regarding fathers' time investments, if fathers who select into marriage also choose to spend more time with their children, you would expect differences by family type to be smaller among less educated fathers to the extent that they spend less time with their children.

Both the causal or non-causal scenarios suggest smaller differences in parents' money and time investment between married and unwed family types at lower paternal education levels than at higher paternal education levels. If investment differences are indeed smaller at lower education levels, and these investments largely differentiate child cognitive outcomes among family types, then differences in children's cognitive outcomes should be smaller at lower versus higher paternal education levels.

#### *The Moderating Influence of Fathers' Education: Socioemotional Outcomes*

As with investments in children's learning, one can invoke causal or non-causal links between marriage and the socioemotional environments parents provide. Marriage could enhance parents' socioemotional wellbeing relative to cohabitation or non-cohabitation because it offers greater emotional security and a more lasting commitment. Being married may also limit parents' engagement in risky behaviors such as drug use, drinking, and criminal activity more than cohabiting or living apart because spouses may have more influence over each others' behavior than other partners, a dynamic sometimes called the 'guardian effect' (Wilson & Oswald, 2002). Differences between married and unwed parents' home environments could also result purely from selection: it is possible that parents with greater

socioemotional wellbeing select into marriage versus cohabitation or non-cohabitation more often because they better are able to form stable and harmonious relationships.

Either way, there is no reason to suspect these mechanisms operate differently at lower versus higher levels of fathers' education. Parents' education should not impact their capacity to benefit socioemotionally from a marital relationship nor should it limit their ability to choose spouses who have more desirable socioemotional characteristics. It is even possible that larger differences between children's socioemotional environments would emerge at lower versus higher levels of paternal education because parents with lower education levels may select into marriage for reasons that are *more* associated with children's socioemotional wellbeing than those with higher education levels. For instance, parents with less education may value their partners' socioemotional characteristics more than those with higher education because they feel these qualities will help them sustain a marriage and co-parent a child in the context of economic hardship. Cultural influences such as religion may also play a stronger role in decisions to marry when the possibilities for choosing a higher earning spouse are more limited, and religiosity is associated with lower levels of other socioemotional risks, such as depression, substance use, and antisocial behavior (Larson, Swyers, & McCullough, 1998). In this scenario, you would expect larger differences between married and unwed families in characteristics such as emotional wellbeing, risky behaviors, and relationship quality at lower levels of paternal education than higher levels. If either equal or greater differences between married and unwed families emerged in their socioemotional environments at lower education levels, equal (or larger) differences in children's socioemotional outcomes should also emerge across family types at lower education levels.

### *The Present Study*

To test these hypotheses, I compare differences in children's early cognitive and socioemotional outcomes across married and unwed families at high, medium, and low levels of fathers' education. To determine if different patterns in children's learning and socioemotional home environments might account for these trends, I compare married and unwed families at different levels of paternal education in terms of families' economic resources (fathers' earnings and total household income), experience of

material hardship, and provision of learning materials in the home, and in terms of fathers' involvement in children's daily lives, because these money and time investments are hypothesized to differentiate children's cognitive development across family types. Relatedly, I compare married and unwed family types at different levels of paternal education in terms of parents' socioemotional wellbeing and relationship quality because these aspects of the child's home environment are hypothesized to differentiate children's socioemotional development across family types.

## Method

### *Data and Sample*

Data were drawn from the Fragile Families and Child Wellbeing Study (FFCWS), a longitudinal birth cohort specifically designed to examine associations between nonmarital childbirth and parent and child outcomes. The FFCWS study has followed 4,898 families since 1998, two-thirds of whom were unwed ( $n = 3,712$ ) and one-third who were married ( $n = 1,186$ ) at the time of the focal child's birth, a ratio that intentionally reverses the proportion of marital to non-marital births in the U.S. to enable powerful comparisons between married and unwed families. Mothers were interviewed in hospitals at the focus child's birth, and biological fathers were interviewed at the hospital or as soon as possible thereafter. Both parents were interviewed again when children were one and three-years old. To choose participating cities, the designers used a stratified random sample of all U.S. cities of 200,000 people or more. Ultimately, 20 cities were selected for participation, two of which are pilot cities for each wave of data collection (see Reichman, Teitler, Garfinkel, & McLanahan, 2001 for a detailed review of the research design).

For inclusion in analytic sample, mothers had to be interviewed at the baseline, one, and three year interviews so that full information was available on family structure over the focal child's first three years ( $N = 3999$ ). The sample was further restricted to cases with either mother or father report of paternal education at baseline ( $N = 3875$ ), full information on mother *and* father race, age at baseline, nativity status, and cognitive ability ( $N = 3219$ ). Of the remaining 3219 families, 1306 did not participate in the In Home substudy at three years during which child cognitive assessments were conducted, leaving an

analytic sample of 1913 for cognitive outcomes. Some of these cases had missing data on children's behavior problems, leaving an analytic sample of 1888 for child socioemotional outcomes.

Demographic characteristics of fathers, mothers, and focal children are presented in Table 1. As would be expected of an exclusively urban sample that over-represented unwed births, fathers and mothers were more likely to be African American (55% of fathers), less likely to have a high school diploma or more (35% of fathers had only a high school diploma and 34% had at least some college), and younger than national norms. Appendix A contains the same sample characteristics adjusted with an analytic weight to render the sample representative of all 1999 births in the cities' policy strata. Note, only cases in the 16 "national" FFCWS cities could be used to generate the weighted statistics ( $N = 1184$ ), rather than cases from the full analytic sample.

### *Measures*

#### *Family Structure*

Families were categorized based on mothers' report of biological parents' relationship status at the three time points. Although the study's hypotheses focuses on three family types – married biological parents, cohabiting biological parents, and single mothers – more than three groups were examined to account for changes in family structure over time. Ultimately, four family types were compared: *Stably Married* ( $n = 427$ ; 22%) (married at all three times); *Stably Cohabiting* ( $n = 398$ ; 21%) (coresident at all time points but unwed at baseline); *Stably Single Mother* ( $n = 412$ ; 22%) (never cohabited with or married father); and *Unstable* arrangements ( $n = 676$ ; 35%) (all other family types). Earlier analyses distinguished between types of unstable arrangements (e.g., divorced, moved into or out of cohabitation) and types of single mothers (e.g., re-partnered, living with relatives); child cognitive and behavioral outcomes did not differ among these groups so they were combined for the sake of parsimony.

#### *Fathers' Education Level*

Fathers' education level was assessed via fathers' report of educational attainment at baseline (or mothers' report of fathers' educational attainment if the father was not interviewed). Fathers were coded *High Education* (34%) if they had a high school degree and attended at least some college, *Medium*

*Education* (35%) if they had only a high school degree or GED, and *Low Education* (31%) if they had less than a high school degree and no GED. Fathers were relatively evenly distributed across these groups. Ideally, analyses would also distinguish between those with a college degree and only some college given the likely sheepskin effect on earnings of a college degree (Jaeger & Page, 1996), however, too few fathers' in the analytic sample reported completing college for reliable estimations by family structure.

Fathers differed in their educational levels across family structure in expected ways (see Table 1). Married fathers were most likely to have completed at least some college (67%), whereas fathers in the stably cohabiting group were most likely to have only a high school degree (35%) or less (34%). Fathers in the stably single mother and unstable groups were also most likely to have only a high school degree (42% and 39%, respectively) or less (38% and 37%, respectively). Despite these differences, enough fathers were in each family structure by father education group to allow us to examine differential associations between family type and child outcomes separately by father education level.

Not surprisingly, fathers were unequally distributed by race and ethnicity across family structure and father education subgroups. Among married fathers, White men dominated the high educated group (60%), whereas African American and Hispanic fathers dominated the medium and low educated groups (70% of medium and 82% of low). White fathers represented a minority in all unwed groups, with the fewest in the single mother group at all education levels (see Appendix C for White versus African American distributions of each cell). Both mothers' and fathers' race and ethnicity were controlled in all analyses to prevent racial and ethnic differences in children's outcomes from biasing differences by family structure. Note, family structure and father education subgroups were more *evenly* distributed racially and ethnically in the unweighted analytic sample than in the weighted national sample (see Appendix C for weighted distributions), no doubt due to the oversampling of unwed and, thus, minority parents in the FFCWS. The implications of examining non-representative subgroups to the study's generalizability are discussed in the results and discussion sections.

### *Child Outcomes*

*Child cognitive outcomes.* To assess cognitive development, children were administered the Peabody Picture Vocabulary Test-Third Edition (PPVT-III) in their homes by trained assessors during the three year In Home interview. The PPVT-III is a widely used measure of receptive language skills with good reliability and validity (Dunn & Dunn, 1997). It is scored to resemble an IQ test with a mean of 100 and a standard deviation of 15, however, the sample mean was lower than nationally norms ( $M = 86.5$ ,  $SD = 16.8$ ; see Table 2). Raw scores were standardized for each child's age to account for the range in children's age in months at the time of the three year assessment.

*Child behavioral outcomes.* Mothers were asked 26 questions from the Age 2/3 Child Behavior Checklist about the focal child's internalizing and externalizing behavior problems in the three year interview (CBCL; Achenbach, 1992). These items comprise the Anxious/Depressed (hereafter, *Internalizing* behaviors) and Aggressive (hereafter, *Externalizing* behaviors) subscales. To compute subscale scores, mothers' responses to each item (0 = *not true of my child*; 1 = *sometimes/somewhat true*; 2 = *very/often true*) were summed and averaged (Internalizing:  $\alpha = 0.69$ ; Externalizing:  $\alpha = 0.86$ ). For cases missing data on some items, the raw score was multiplied by [the total number of scale items/total number of case items]. Cases needed to have valid responses on at least 75% of items in a subscale to be included. Means and standard deviations are reported in Table 2.

#### *Home Learning Environment: Parents' Money and Time Investments*

*Economic resources.* To compare families' economic resources across family types, the average of *fathers' earnings* at one and three years and the average of the *household income-to-poverty ratio* at all three time points were examined, as well as the total number of *material hardships* experienced between baseline and one year and between one and three years (e.g., went hungry, was evicted; range = 0 to 22). The natural log of the income-to-poverty ratio and a dichotomized version of the material hardship index (*High Hardship* = 3+ hardships and *Low Hardship* = < 3 hardships) were used in multivariate analyses because both variables were highly skewed. Household income was used in multivariate models rather than fathers' earnings because it more accurately captures the economic resources available to children, particularly those living apart from their fathers.

Parents' investment in the child's learning environment was assessed via mothers' report of 10 dichotomous questions from the three year In Home interview about the presence of learning materials in the home such as toys and books for children ( $M = 9.07$ ;  $SD = 1.09$ ; range = 0-10;  $\alpha = 0.56$ ). Items comprised the language stimulation subscale of the Home Observation for Measurement of the Environment (HOME) (Caldwell & Bradley, 1984), a widely used observational assessment of children's developmental environments. Because the scale was highly skewed it was recoded to *stimulating environment* (score of 9 or 10) or not (< 9).

*Father involvement.* Two measures of fathers' involvement with the focal child were used to assess fathers' time investment in children: fathers' *activities* with and *level of responsibility* for the child as reported by mothers at one and three years (see Table 4). Fathers' *activities* were measured with 10 items at one year and 13 items at three years asking mothers how many days a week the father engaged in various activities with the child, such as feeding and playing ( $\alpha = 0.94$  at one year;  $\alpha = 0.96$  at three years). Fathers' *responsibility* was measured at both times with four items asking how often the mother could count on the father to assume responsibilities such as taking the child to the doctor/places she needs to go (1 = *never*; 4 = *often/always*) ( $\alpha = 0.89$  at one year;  $\alpha = 0.91$  at three years). Scores from both times are averaged to create a total *father activities* scale and *total father responsibility* scale.

#### *Home Socioemotional Environment*

*Parents' socioemotional wellbeing.* To compare parents' socioemotional wellbeing across family structure, four socioemotional characteristics were examined: parents' religiosity, depressive symptoms, substance abuse, and, for fathers only, history of incarceration (see Table 4). Parents were coded *religious* if they reported at baseline attending religious services several time a month or more. Fathers were determined to have high levels of depressive symptoms if they scored 16 or higher on the Center for Epidemiologic Studies Depression Scale – Short Form (CESD-SF; Radloff, 1977) at baseline, a 12-item scale asking fathers how many days per week they experienced depressive symptoms such as feeling bothered by things that do not usually bother them and having a poor appetite (range 0 to 36;  $M = 7.51$ ;

SD = 7.01;  $\alpha = 0.86$ ); mothers were coded as being depressed if they had experienced a major depressive episode in the year after the focal child's birth (using criteria from the Composite International Diagnostic Interview – Short Form; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). Parents were coded as having a substance abuse problem if either they reported at baseline that alcohol or drug use interfered with their daily lives, employment, or relationships. Fathers' history of incarceration was assessed via fathers' or mothers' report of whether father had ever been in jail or prison by three years. Notably, forty-two percent of fathers in the analytic sample had been incarcerated by that time. For the sake of parsimony, only fathers' socioemotional characteristics are reported because trends by family structure and fathers' education for mothers' characteristics were identical to fathers'. Percentages for the full sample and by family structure and father education are reported in Table 4.

*Parents' relationship quality.* Parental relationship quality was assessed via mothers' report of father *supportiveness* and *conflict with the father* at one year (or at baseline if the parents were not romantically involved at one year). Supportiveness was based on four items asking mothers how often the father 1) is fair and willing to compromise; 2) expresses love and affection; 3) insults or criticizes you (reverse coded); and 4) encourages you. Mothers could respond *often* (= 3), *sometimes* (= 2), or *never* (= 1). Conflict was based on seven items asking mothers how often the father 1) insults or criticizes you; 2) isolates you from friends/family; 3) tries to prevent you from going to work/school; 4) withholds money; 5) slaps or kicks you; 6) hits you with a fist; and 7) forces sex, with responses identical to the supportiveness scale. Both scales were summed and averaged. Both had moderate to high reliability ( $\alpha = 0.70$  for supportiveness;  $\alpha = 0.88$  for conflict). Means and standard deviations are reported in Table 4.

#### *Covariates*

All multivariate models included a set of covariates that predict child cognitive and behavioral outcomes and are exogenous to family structure but may vary by family type. These include maternal race (three indicators for African American, Hispanic, and other race with White omitted), paternal race (1 = same race as mother; 0 = different race), maternal age in years at child's birth, paternal age in years at



child's birth, maternal education (less than high school = 1; at least high school = 0), and mother nativity status (1 = born in the U.S.; 0 = born elsewhere), all measured at baseline. Mothers' and fathers' scores on a cognitive test, the similarities subtest of the WAIS-R (Wechsler, 1981), measured at three years, were also entered into each model. Child characteristics that may predict outcomes were also included: child sex (1 = boy; 0 = girl), low birthweight status (1 = <2500g at birth; 0 = >2500g), and whether child was mothers' firstborn (1 = firstborn; 0 = other parity).

## Results

### *Does Fathers' Education Level Moderate Associations Between Family Structure and Child Outcomes?*

*Bivariate results.* Table 2 displays results from one-way ANOVAs of each child outcome by family type for the full sample and for children whose fathers had high, medium, and low levels of education separately. In the full sample, children of stably married parents had significantly higher PPVT-III scores than those of stably cohabiting parents, stably single mothers, and unstable arrangements and no differences emerged among children across unwed family types. However, within education subgroups differences in PPVT-III scores between children of married and unwed parents emerged *only* among those whose fathers had high education levels, whereas among those with medium and low educated fathers, no significant differences emerged across family types. These patterns suggest fathers' education moderates family structure associations with child cognitive outcomes in the expected direction.

In the full sample, results for children's socioemotional outcomes were similar to those for cognitive scores. Children of stably married parents had significantly fewer internalizing and externalizing behavior problems than those of stably cohabiting parents, stably single mothers, and unstable arrangements. No differences in behavior problems emerged across unwed family types. However, these patterns obtained at all levels of fathers' education. Specifically, children of stably married parents had fewer behavior problems than those of all unwed family types within each education subgroup, even though children of medium and low educated fathers had more behavior problems on

average than those of high educated fathers. These patterns suggest fathers' education does not moderate family structure associations with child socioemotional outcomes.

*Multivariate results.* Next, OLS regression models were run with each child outcome as the dependent variable and three indicator variables for family type, with stably married as the omitted reference category, and two indicator variables for father education level, with some college as the omitted reference category, entered as key independent variables. All father, mother, and child characteristics exogenous to family structure were entered as covariates. In Model 1, I estimated main associations between family structure, and father education, and each child outcome. In Model 2, I tested formally whether fathers' education level moderated associations between family structure and child outcomes by entering six variables interacting each non-omitted family type with each non-omitted education level.

Table 3 displays results from full sample OLS models predicting children's PPVT scores. In Model 1, children of stably cohabiting and unstable families scored about 2.5 points lower on the PPVT than those of stably married parents. Children of stably single mothers did not score significantly lower on the PPVT than those of stably married parents with covariates controlled. Children of fathers with medium and low levels of education scored 2.1 and 4.4 points lower on the PPVT than those of high educated fathers, which were both significant differences. When the six interaction terms were entered into Model 2, all interactions were positive and significant (the interaction between stably single mother and low father education was significant only at the trend level). Positive signs indicated that the negative associations between unwed family types and child cognitive outcomes were weaker or non-existent among children of medium and low educated fathers. Indeed, in models run separately by education subgroup (see Table 5), family type coefficients were only negative and significant in models predicting PPVT scores in the high father education subgroup, whereas family type coefficients were positive and non-significant in the medium and low education subgroups.

Table 3 also displays results from full sample OLS models predicting children's CBCL scores. In Model 1, coefficients for stably cohabiting, stably single, and unstable were positive and significant for

internalizing and externalizing behavior problems, indicating children in all unwed family types scored higher than those of stably married parents with covariates held constant. Additionally, children of fathers with low education levels scored slightly higher on both subscales than those of high educated fathers, but that difference was significant only for internalizing behaviors. No significant behavioral differences emerged between children of medium and high educated fathers. However, in Model 2 predicting each behavioral score, no significant interactions between family type and father education emerged. These findings essentially replicate patterns in bivariate analyses suggesting fathers' education moderates family structure associations with child cognitive outcomes, but not associations between family structure and child socioemotional outcomes.

*Why Does Fathers' Education Level Moderate Associations Between Family Structure and Child Outcomes?*

*Bivariate results.* Table 4 displays mean differences across family types on all family process variables hypothesized to account for differences in children's cognitive and socioemotional outcomes by family structure. Mean differences are reported for the full sample and by father education level so that patterns by family type can be compared across education subgroups. As hypothesized, differences in parents' economic resources among family types were larger in the high father education subgroup than in the medium or low education subgroups. Specifically, although married parent families had higher father earnings and household income-to-poverty ratios than unwed family types at each father education level, the differences between married and unwed parents' earnings and income were much larger within the high educated subgroup (e.g., \$37,970 difference in fathers' earnings and 2.33 difference in income-to-poverty ratio between married and cohabiting parent families) than within the medium (e.g., \$14,786 difference in fathers' earnings and 0.97 difference in income-to-poverty ratio between married and cohabiting parent families) or low educated subgroups (e.g., \$8,946 difference in fathers' earnings and 0.51 difference in income-to-poverty ratio between married and cohabiting parent families). Differences between married and unwed families on the other two measures of economic resources, high material hardship and stimulating environment, not only were larger but also were only significant within the high

father education subgroup. Taken together, these patterns support the hypothesis that differences in children's cognitive outcomes between married and unwed parent families emerge only within the high father education subgroup in part because large differences between married and unwed parent families' economic resources only emerge in this subgroup.

However, differences across family types in fathers' involvement with the focal child did not follow this pattern. First, no differences emerged between married and cohabiting fathers in the full sample or any education subgroup in fathers' engagement with or responsibility for their children. Rather, fathers who did not live with their children (those in single mother families) or lived with them inconsistently (those in unstable arrangements) were less engaged and responsible than married and cohabiting fathers. Second, these patterns emerged at every education level. These findings suggest that the moderating influence of fathers' education level on associations between family structure and child cognitive outcomes had little to do with patterns in fathers' time investments in children.

Although fathers' education level did not moderate associations between family structure and child socioemotional outcomes, I still examined mean differences in parents' socioemotional characteristics and relationship quality, indicators of the home environment hypothesized to account for differences in children's socioemotional outcomes by family structure (see Table 4; results for mothers' characteristics available upon request). On each socioemotional indicator – percent religious, percent with depressive symptoms, percent with a substance abuse problem, and percent ever incarcerated – married fathers reported greater well-being than all unwed fathers. On most indicators, cohabiting fathers had better outcomes than fathers in single mother or unstable families. Patterns for parents' relationship quality were similar in that full sample differences by family type obtained at all levels of fathers' education. Married and cohabiting mothers reported similar levels of supportiveness and conflict in their relationships with the father, and mothers in single or unstable arrangements reported lower support and higher conflict than mothers in both coresident family types.

*Multivariate results.* Finally, I ran separate OLS models for each education subgroup predicting child PPVT scores with indicators for family type as key independent variables (and all covariates

entered). Models were run only for cognitive outcomes because no father education by family structure interactions were significant in full sample models predicting socioemotional outcomes. Results from these models are displayed in Table 5. As the significant interaction terms in full sample models suggested, main associations between family type and child PPVT scores were strikingly different across subgroups. Within the high father education subgroup, coefficients for all unwed family types were negative and significant in Model 1, reflecting mean differences between scores in married and unwed families of approximately 40% of a standard deviation over and above father, mother, and child characteristics. Within the medium and low education subgroup, however, no coefficients for unwed family types were significant.

Aspects of the home environment thought to account partially for cognitive outcome differences by family type – household income, high material hardship, stimulating environment, and father involvement – were entered in Model 2 to determine if these variables accounted for PPVT score differences by family type similarly in each education subgroup. However, because differences emerged among family types only in the high father education subgroup, only the high education model is discussed. Both household income and stimulating environment were significantly associated with children's PPVT scores in the expected direction. However, post-hoc Wald tests comparing the three family type coefficients jointly and independently across Models 1 and 2 were non-significant, suggesting that entering these variables as a set did not meaningfully reduce differences by family type. Thus, although economic resources and stimulating materials differed by family structure in the high education subgroup, these differences may not account for much of the difference in children's PPVT scores across family types. Notably, material hardship and father involvement variables were not associated with children's PPVT scores in any education subgroup.

#### *Generalizability of Findings*

By design, the FFCWS oversampled unwed births in large U.S. cities (see Vu, 2003 for a description of the sampling process and comparison of unweighted and weighted sample characteristics). This oversample benefited the present study because it allowed for a more equal distribution of cases

across family structure and education subgroups than one could obtain with a similarly sized nationally representative sample, thus enabling more powerful comparisons among the subgroups of interest. However, this design also meant that the study over-represented births to African American women and somewhat under-represented births to White and Hispanic women. Comparing the demographic characteristics listed in Table 1 (unweighted) to those in Appendix A (weighted) highlights this over-representation. The oversample could have biased results if the moderating influence of fathers' education only held for African American families. I ran one-way ANOVAs of each child outcome by family type and fathers' education separately for children with White, African American, and Hispanic mothers to investigate this threat. Among both White and African American families, children's PPVT scores differed by family type in the high father education but not the medium or low subgroup, suggesting the results were not biased by the over-representation of African American mothers. However, no differences emerged by family type at any education level among Hispanic families, suggesting the under-representation of Hispanic families could have inflated differences by family type.

## Discussion

The substantial rise in births to unwed parents over the last 30 years has sparked considerable political attention, most notably attempts by the federal government to encourage the formation of two-parent, specifically married, families. These initiatives were motivated in part by the substantial body of research documenting associations between unwed cohabitation, single motherhood and poorer child developmental outcomes (Sigle-Rushton & McLanahan, 2004). To promote marriage on the basis of these associations, however, assumes marriage benefits children across family contexts. However, findings from this study suggest marriage is not associated with better early cognitive outcomes in all contexts. Specifically, children in married and unwed family types differed cognitively only when fathers had high levels of education and not at all when they had medium or low education levels. In response to the question of why this inconsistency might emerge, we found parents' economic resources differed much more between married and unwed families at higher levels of fathers' education than at lower levels. These patterns suggest average differences in children's outcomes between married and unwed families

may overestimate the potential benefit of encouraging marriage among socioeconomically disadvantaged families, at least for children's cognitive development.

One way to interpret these findings is that marriage has, in the language of the causal inference literature, 'heterogeneity in treatment effects' (Morgan & Winship, 2007). That is, there may be differences between those who benefit and do not benefit from marriage that influence individuals' decisions to marry in the first place. We know from demographic research on family structure that married parents have higher education levels and greater economic resources on average than unwed parents (Jackson, Tienda, & Huang, 2001). The present study suggests children benefit more from marriage in terms of their cognitive outcomes when parents have higher education levels, which jibes with the notion that children of those most likely to marry are the ones most likely to benefit from their parents' being married. The Jaffee et al. (2003) study on coresidence with antisocial fathers could be interpreted similarly. We know married parents are less likely to be depressed and exhibit antisocial behavior than unwed parents (Brown, 2000; Wilson & Brooks-Gunn, 2001). Jaffee and colleagues found children of socioemotionally healthy fathers benefited far more from their parents' coresidence than those of less healthy fathers in terms of socioemotional development, again suggesting children of those most likely to marry are also the ones most likely to benefit from their parents' being married. This interpretation indicates there is positive selection into the "treatment" of marriage: those most likely to marry benefit the most from it, or at least their children do.

By invoking the concept of "treatment effects," I do not mean to imply a causal link between marriage and child wellbeing. As I clarify earlier, my hypotheses do not hinge on causal associations between family structure and child outcomes. Furthermore, I fully acknowledge that my methodology does not allow for causal interpretations despite my inclusion of important exogenous covariates. Rather than argue marriage has different "effects" or benefits for children in different subpopulations, one could alternatively argue that if the pre-existing characteristics that motivate parents to select marriage differentiate children's development across family types, then marriage should not be as strongly associated with children's well-being within subpopulations who are less likely to select into it. Within

these subpopulations, the mechanism driving positive associations between marriage and child well-being – the selection of more socioeconomically or socioemotionally advantaged parents into the arrangement – is not operative. The findings from the present study, as well as those from Jaffee and colleagues, could also be interpreted in this way.

Whether one ascribes a causal or non-causal interpretation to the findings, however, both studies suggest that any heterogeneity in associations between marriage and child well-being may vary by developmental domain. The present study found that positive associations between marriage and child cognitive development turned on parents' socioeconomic characteristics (fathers' education, specifically), but that associations between marriage and children's socioemotional development did not. Jaffee and colleagues found that positive associations between parents' coresidence and children's socioemotional development turned on parents' socioemotional characteristics (fathers' antisocial behavior, specifically). That study did not examine children's cognitive outcomes, but it is possible their findings would not have obtained in that developmental domain.

These variations make sense after considering the developmental psychology literature on how unique aspects of family environment influence child cognitive and socioemotional development. Families' economic wellbeing, measured as household income and material resources, has more strongly and consistently predicted children's cognitive and academic outcomes than their socioemotional ones (Duncan & Brooks-Gunn, 1997; Guo & Harris, 2000; Linver, Brooks-Gunn, & Kohen, 2002; Yeung, Linver, & Brooks-Gunn, 2002). By contrast, parents' psychosocial risks, such as depression, harsh parenting, and marital conflict, have been strongly linked to children's development of emotional and behavioral problems (Downey & Coyne, 1990; Erel & Burman, 1995; Linver et al., 2002), but strong links have not been made to their cognitive development. Thus, it follows that positive associations between marriage and children's cognitive well-being manifest only when parents can capitalize on, or simply possess, those qualities that most strongly influence cognitive development, and that benefits to children's socioemotional well-being emerge only when both parents can establish the kinds of home environments that enhance socioemotional development.



Although this study lends support to the notion that the heterogeneity exists in associations between marriage and child well-being, neither it nor the Jaffee et al. (2003) study can offer generalizable evidence of its findings. Neither study was representative of its national population because both oversampled births to disadvantaged parents, either socioeconomically (the FFCWS) or socioemotionally (the E-Risk Study). Future research aiming to replicate these or similar findings should use larger, nationally representative datasets to rule out the possibility that sample characteristics are driving the moderating effects. Despite this limitation, both studies suggest future research on family structure and child wellbeing should consider that it may not be marriage per se that is associated with benefits to child development but the familial contexts in which marriages occur and that benefits associated with marriage may depend on their familial context.

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Table 1

*Unweighted Sample Characteristics by Family Structure*

	Total	Married	Cohabiting	Single	Unstable	
	<i>N</i> =1913	<i>n</i> =427	<i>n</i> =398	<i>n</i> =412	<i>n</i> =676	
	100%	22.3%	20.8%	21.5%	35.3%	<i>F</i> / $\chi^2$
<i>Father Characteristics</i>						
Father Education						***
Less than HS	30.6	10.1	34.4	37.9	37.0	
HS/GED	35.2	22.7	35.2	41.5	39.4	
Some College	34.1	67.2	30.4	20.6	23.7	
Father Race						***
White Non-Hispanic	20.1	49.7	17.8	5.3	11.8	
Black Non-Hispanic	55.0	25.1	47.5	78.6	63.9	
Hispanic	21.0	19.7	30.7	12.9	21.2	
Other	3.9	5.6	4.0	3.2	3.1	
Father Age at Baseline	27.5 (7.1)	32.1 (6.3)	27.0 (6.4)	25.7 (7.7)	25.8 (6.4)	***
Father Cognitive Score	6.7 (2.3)	7.4 (2.8)	6.6 (2.7)	6.4 (2.5)	6.4 (2.5)	***
<i>Mother Characteristics</i>						
Mother Education						***
Less than HS	30.8	9.6	30.4	38.4	39.9	
HS/GED	31.6	19.0	38.2	35.9	33.0	
Some College	37.6	71.4	31.4	25.7	27.1	
Mother Race						***
White Non-Hispanic	22.9	48.7	22.5	8.7	15.4	
Black Non-Hispanic	52.8	23.9	43.3	76.9	61.8	
Hispanic	21.1	19.7	32.4	12.9	20.3	
Other	3.3	7.7	1.8	1.5	2.5	
Mother Born in US	91.6	80.8	90.0	97.8	95.7	***
Mother Age at Baseline	25.0 (6.0)	29.7 (5.4)	24.3 (5.5)	23.2 (5.5)	23.4 (5.2)	***
Mother Cognitive Score	7.0 (2.5)	8.0 (2.7)	6.9 (2.4)	6.5 (2.5)	6.7 (2.4)	***

	Total	Married	Cohabiting	Single	Unstable	
<i>Child Characteristics</i>						
Child is Male	52.5	52.5	51.0	56.1	51.2	
Child is Firstborn	37.5	37.0	35.9	43.5	35.2	*
Child was Low Birthweight	8.7	4.2	7.8	11.2	10.7	**
Child Age at Assessment (mths)	35.3 (2.2)	34.7 (2.0)	35.1 (2.1)	35.5 (2.4)	35.5 (2.2)	***

*Note.* Sample characteristics reflect actual percentages and means across family structure groups in analytic sample drawn from all 20 cities. Standard deviations are reported in parentheses.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .



Table 2

*Child Cognitive and Behavioral Outcomes at Three Years by Family Structure and Father Education Level*

	Total	Married	Cohabiting	Single	Unstable	F/ $\chi^2$
<i>PPVT-III Scores</i>						
Total Sample	86.5 (16.8)	93.4 <sub>a</sub>	85.4 <sub>b</sub>	84.0 <sub>b</sub>	84.2 <sub>b</sub>	***
High Father Education	92.1 (17.3)	97.8 <sub>a</sub>	88.5 <sub>b</sub>	86.8 <sub>b</sub>	87.4 <sub>b</sub>	***
Medium Father Education	85.2 (15.9)	87.4 <sub>a</sub>	85.5 <sub>a</sub>	83.6 <sub>a</sub>	85.3 <sub>a</sub>	
Low Father Education	81.6 (15.4)	77.2 <sub>a</sub>	82.7 <sub>a</sub>	83.0 <sub>a</sub>	81.0 <sub>a</sub>	
<i>CBCL Scores</i>						
<i>Anxious/Depressed Score</i>						
Total Sample	0.49 (.28)	0.39 <sub>a</sub>	0.50 <sub>b</sub>	0.54 <sub>b</sub>	0.53 <sub>b</sub>	***
High Father Education	0.42 (.26)	0.36 <sub>a</sub>	0.42 <sub>b</sub>	0.51 <sub>b</sub>	0.50 <sub>b</sub>	**
Medium Father Education	0.51 (.29)	0.43 <sub>a</sub>	0.51 <sub>b</sub>	0.53 <sub>b</sub>	0.53 <sub>b</sub>	*
Low Father Education	0.55 (.29)	0.47 <sub>a</sub>	0.56 <sub>ab</sub>	0.58 <sub>b</sub>	0.55 <sub>ab</sub>	+
<i>Aggressive Score</i>						
Total Sample	0.65 (.39)	0.56 <sub>a</sub>	0.66 <sub>b</sub>	0.72 <sub>b</sub>	0.68 <sub>b</sub>	***
High Father Education	0.59 (.34)	0.54 <sub>a</sub>	0.58 <sub>ab</sub>	0.72 <sub>c</sub>	0.63 <sub>abc</sub>	**
Medium Father Education	0.67 (.42)	0.57 <sub>a</sub>	0.70 <sub>b</sub>	0.69 <sub>b</sub>	0.68 <sub>b</sub>	+
Low Father Education	0.70 (.39)	0.61 <sub>a</sub>	0.70 <sub>ab</sub>	0.75 <sub>b</sub>	0.70 <sub>ab</sub>	

*Note.* Means and percentages with different subscripted letters reflect significant pairwise contrasts within education subgroups at  $p < .05$  with bonferroni adjustments.

+ $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Table 3

*OLS Regressions Predicting Child Cognitive and Behavioral Outcomes from Family Structure and Father Education*

	<b>Cognitive</b>				<b>Behavioral</b>							
	PPVT				Anxious/Depressed				Aggressive			
	(1)		(2)		(1)		(2)		(1)		(2)	
	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>
<i>Family Structure</i>												
(Stably Married)	--		--		--		--		--		--	
Stably Cohabiting	-2.43	1.19 *	-5.62	1.73 **	0.06	0.02 **	0.03	0.03	0.05	0.03 +	0.01	0.04
Stably Single	-1.87	1.28	-5.15	2.02 *	0.10	0.02 ***	0.13	0.04 ***	0.10	0.03 **	0.14	0.05 **
Unstable	-2.49	1.14 *	-5.57	1.64 **	0.09	0.02 ***	0.12	0.03 ***	0.05	0.03 +	0.04	0.04
<i>Father Education</i>												
(Some College+)	--	--	--	--	--	--	--	--	--	--	--	--
HS/GED	-2.06	0.93 *	-5.86	1.86 **	0.03	0.02	0.06	0.03 +	0.03	0.02	0.01	0.05
<HS	-4.36	1.05 ***	-12.61	2.62 ***	0.04	0.02 *	0.04	0.05	0.04	0.03	0.02	0.07
<i>Fam Struct X Father Ed</i>												
Cohab X HS/GED			10.44	3.17 **			0.06	0.06			0.06	0.08
Cohab X <HS			5.10	2.64 *			0.02	0.05			0.09	0.07
Single X HS/GED			10.80	3.30 **			0.00	0.06			-0.02	0.08
Single X <HS			4.56	2.74 +			-0.06	0.05			-0.06	0.07
Unstable X HS/GED			8.99	2.98 **			-0.03	0.05			0.01	0.07

	Cognitive				Behavioral							
	PPVT				Anxious/Depressed				Aggressive			
	(1)		(2)		(1)		(2)		(1)		(2)	
	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>
Unstable X <HS			5.89	2.38 *			-0.05	0.04			0.03	0.06
<i>Father Characteristics</i>	YES		YES		YES		YES		YES		YES	
<i>Mother Characteristics</i>	YES		YES		YES		YES		YES		YES	
<i>Child Characteristics</i>	YES		YES		YES		YES		YES		YES	
<i>N</i>	1913		1913		1885		1885		1888		1888	
<i>R-squared</i>	0.18		0.19		0.10		0.10		0.050		0.05	
<i>F-value</i>	22.81 ***		17.98 ***		11.20 ***		8.70 ***		5.19 ***		4.13 ***	

Note. +*p* < .10; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Table 4

*Differences in Parental Investments, Father Behavior, Father Socioemotional Characteristics, and Parental Relationship Quality by Family Structure and Father Education Level*

	Total	Married	Cohabiting	Single	Unstable	F/ $\chi^2$
<i>Parental Investments</i>						
Total						
Fathers' Earnings	\$37,095.3 (85,876.3)	\$76,991.8 <sub>a</sub>	\$34,068.9 <sub>b</sub>	\$19,561.2 <sub>c</sub>	\$24,291.8 <sub>bc</sub>	***
HH Income-to-Poverty	2.05 (2.12)	4.11 <sub>a</sub>	1.83 <sub>b</sub>	1.12 <sub>c</sub>	1.45 <sub>d</sub>	***
High Economic Hardship (%)	30.6	14.5	31.4	35.9	37.0	***
Stimulating Environment (%)	79.5	89.9	79.8	73.7	76.1	***
High Father Education						
Fathers' Earnings	\$64,426.5 (135,492.4)	\$96,519.7	\$58,549.6	\$25,412.7	\$32,029.6	***
HH Income-to-Poverty	3.38 (2.83)	4.95 <sub>a</sub>	2.62 <sub>b</sub>	1.58 <sub>c</sub>	2.11 <sub>bc</sub>	***
High Economic Hardship (%)	23.7	9.4	27.3	45.9	35.0	***
Stimulating Environment (%)	89.0	94.4	88.4	84.3	82.1	***
Medium Father Education						
Fathers' Earnings	\$26,700.0 (41,319.2)	\$39,722.6	\$24,936.6	\$19,740.9	\$27,355.4	**
HH Income-to-Poverty	1.56 (1.28)	2.66 <sub>a</sub>	1.69 <sub>b</sub>	1.05 <sub>c</sub>	1.42 <sub>b</sub>	***
High Economic Hardship (%)	34.4	28.9	32.9	33.3	38.0	
Stimulating Environment (%)	77.4	84.4	80.6	73.2	75.9	
Low Father Education						
Fathers' Earnings	\$18,514.4 (18,493.8)	\$30,726.1 <sub>a</sub>	\$21,779.5 <sub>b</sub>	\$16,131.9 <sub>c</sub>	\$16,092.2 <sub>c</sub>	***
Income-to-Poverty	1.13 (0.86)	1.79 <sub>a</sub>	1.28 <sub>b</sub>	0.93 <sub>c</sub>	1.07 <sub>bc</sub>	**
High Economic Hardship (%)	33.8	16.3	33.6	33.3	37.2	+
Stimulating Environment (%)	71.2	71.4	71.3	68.6	72.7	

	Total	Married	Cohabiting	Single	Unstable	F/ $\chi^2$
<i>Father Behavior</i>						
Total						
Father Engagement	3.23 (1.75)	4.08 <sub>a</sub>	4.29 <sub>a</sub>	1.57 <sub>b</sub>	3.08 <sub>c</sub>	***
Father Responsibility	3.14 (0.84)	3.59 <sub>a</sub>	3.62 <sub>a</sub>	2.37 <sub>b</sub>	3.05 <sub>c</sub>	***
High Father Education						
Father Engagement	3.58 (1.61)	4.21 <sub>a</sub>	4.24 <sub>a</sub>	1.51 <sub>b</sub>	3.03 <sub>c</sub>	***
Father Responsibility	3.33 (0.72)	3.61 <sub>a</sub>	3.70 <sub>a</sub>	2.40 <sub>b</sub>	3.04 <sub>c</sub>	***
Medium Father Education						
Father Engagement	3.05 (1.77)	3.80 <sub>a</sub>	4.28 <sub>a</sub>	1.55 <sub>b</sub>	3.09 <sub>c</sub>	***
Father Responsibility	3.05 (0.87)	3.54 <sub>a</sub>	3.55 <sub>a</sub>	2.32 <sub>b</sub>	3.08 <sub>c</sub>	***
Low Father Education						
Father Engagement	3.06 (1.84)	3.83 <sub>a</sub>	4.34 <sub>a</sub>	1.64 <sub>b</sub>	3.10 <sub>c</sub>	***
Father Responsibility	3.05 (0.89)	3.56 <sub>a</sub>	3.62 <sub>a</sub>	2.41 <sub>b</sub>	3.04 <sub>c</sub>	***
<i>Father Socioemotional Characteristics</i>						
Total						
Religious (%)	30.0	49.0	20.7	31.4	22.6	***
Depressive Symptoms (%)	15.1	6.6	14.3	24.0	16.3	***
Substance Problem (%)	9.4	4.2	6.8	15.8	10.4	***
Ever Incarcerated (%)	42.4	11.7	36.2	57.8	56.1	***
High Father Education						
Religious (%)	39.4	51.9	23.1	42.3	28.4	***
Depressive Symptoms (%)	10.2	6.0	7.8	23.9	12.9	***
Substance Problem (%)	5.1	3.8	1.0	9.4	8.1	**
Ever Incarcerated (%)	23.0	5.9	22.3	41.2	44.4	***
Medium Father Education						
Religious (%)	27.0	46.7	17.4	30.7	22.4	***
Depressive Symptoms (%)	15.0	8.9	13.0	22.2	14.4	*
Substance Problem (%)	8.9	4.1	10.0	13.5	7.1	**

	Total	Married	Cohabiting	Single	Unstable	F/ $\chi^2$
Ever Incarcerated (%)	46.1	19.6	38.6	57.3	52.6	***
<b>Low Father Education</b>						
Religious (%)	22.9	35.7	22.0	26.3	19.2	+
Depressive Symptoms (%)	20.8	4.9	21.5	25.8	20.3	*
Substance Problem (%)	14.9	7.0	8.8	21.8	15.2	**
Ever Incarcerated (%)	59.7	32.6	46.0	67.3	67.2	***
<hr/> <i>Parents' Relationship Quality</i> <hr/>						
<b>Total</b>						
Supportiveness	2.49 (0.47)	2.66 <sub>a</sub>	2.61 <sub>a</sub>	2.27 <sub>b</sub>	2.42 <sub>c</sub>	***
Conflict	1.18 (0.28)	1.10 <sub>a</sub>	1.11 <sub>a</sub>	1.26 <sub>b</sub>	1.22 <sub>b</sub>	***
<b>High Father Education</b>						
Supportiveness	2.55 (0.43)	2.66 <sub>a</sub>	2.62 <sub>a</sub>	2.29 <sub>b</sub>	2.41 <sub>b</sub>	***
Conflict	1.14 (0.23)	1.09 <sub>a</sub>	1.10 <sub>a</sub>	1.28 <sub>b</sub>	1.20 <sub>b</sub>	***
<b>Medium Father Education</b>						
Supportiveness	2.47 (0.49)	2.66 <sub>a</sub>	2.60 <sub>a</sub>	2.30 <sub>b</sub>	2.41 <sub>c</sub>	***
Conflict	1.18 (0.29)	1.10 <sub>a</sub>	1.11 <sub>a</sub>	1.25 <sub>b</sub>	1.22 <sub>b</sub>	***
<b>Low Father Education</b>						
Supportiveness	2.44 (0.48)	2.65 <sub>a</sub>	2.61 <sub>a</sub>	2.22 <sub>b</sub>	2.43 <sub>c</sub>	***
Conflict	1.21 (0.32)	1.12 <sub>a</sub>	1.13 <sub>a</sub>	1.27 <sub>b</sub>	1.24 <sub>b</sub>	***

*Note.* Means and percentages with different subscripted letters reflect significant pairwise contrasts at  $p < .05$  with bonferroni adjustments.

+ $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Table 5

*OLS Regressions Predicting Child PPVT Scores from Family Structure, Separately by Father Education*

	High Father Education				Medium Father Education				Low Father Education			
	(1)		(2)		(1)		(2)		(1)		(2)	
<i>Family Structure</i>												
(Stably Married)	--	--	--	--	--	--	--	--	--	--	--	--
Stably Cohabiting	-6.43	1.87 **	-5.30	1.91 **	0.78	2.10	1.90	2.09	4.41	2.72	5.06	2.72 +
Stably Single	-6.20	2.25 **	-5.04	2.85 +	0.90	2.15	1.76	2.46	4.89	2.83	3.88	3.03
Unstable	-6.64	1.86 ***	-5.52	2.05 **	1.72	1.96	2.92	1.99	2.69	2.68	3.16	2.72
<i>Parental Investments</i>												
Income-to-Poverty (ln)			3.47	1.02 **			2.41	0.91 **			1.55	0.92 +
High Economic Hardship			1.99	1.56			0.06	1.23			-0.49	1.34
Stimulating Environment			1.25	0.76 *			1.56	0.53 **			1.32	0.47 **
<i>Father Behavior</i>												
Father Engagement			-0.27	0.63			-0.77	0.55			-0.97	0.58
Father Responsibility			-0.35	1.44			0.24	1.13			0.36	1.19
<i>Father Characteristics</i>	YES		YES		YES		YES		YES		YES	
<i>Mother Characteristics</i>	YES		YES		YES		YES		YES		YES	
<i>Child Characteristics</i>	YES		YES		YES		YES		YES		YES	
R-squared	0.21		0.23		0.12		0.15		0.10		0.13	
F-value	10.04 ***		8.64 ***		5.51 ***		5.34 ***		3.93 ***		3.81 ***	

Note .  $N = 653$  for High education model;  $N = 674$  for medium model;  $N = 586$  for low model.

+ $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Appendix A

*Weighted Sample Characteristics by Family Structure*

	Total	Married	Cohabiting	Single	Unstable	
Unweighted N <sup>a</sup>	<i>N</i> =1913	<i>n</i> =427	<i>n</i> =398	<i>n</i> =412	<i>n</i> =676	
Weighted Proportion <sup>b</sup>	<i>N</i> =1184	0.57	0.13	0.10	0.20	<i>F</i> / $\chi^2$
<i>Father Characteristics</i>						
Father Education						***
Less than HS	0.23	0.11	0.38	0.40	0.40	
HS/GED	0.31	0.26	0.36	0.44	0.35	
Some College	0.46	0.63	0.25	0.16	0.25	
Father Race						***
White Non-Hispanic	0.38	0.53	0.21	0.10	0.20	
Black Non-Hispanic	0.26	0.09	0.42	0.67	0.43	
Hispanic	0.29	0.28	0.34	0.16	0.34	
Other	0.07	0.10	0.03	0.06	0.03	
Father Age at Baseline	29.2 (.48)	31.4 (.72)	27.3 (.69)	23.7 (.93)	26.6 (.65)	***
Father Cognitive Score	6.6 (.20)	6.8 (.33)	6.4 (.21)	6.5 (.28)	6.2 (.24)	
<i>Mother Characteristics</i>						
Mother Education						***
Less than HS	0.24	0.12	0.35	0.50	0.41	
HS/GED	0.34	0.32	0.45	0.32	0.36	
Some College	0.42	0.57	0.20	0.18	0.23	
Mother Race						***
White Non-Hispanic	0.40	0.52	0.28	0.12	0.27	
Black Non-Hispanic	0.24	0.08	0.28	0.68	0.44	
Hispanic	0.27	0.26	0.37	0.18	0.27	
Other	0.09	0.14	0.07	0.01	0.02	
Mother Born in US	0.82	0.74	0.90	0.97	0.91	**
Mother Age at Baseline	26.8 (.40)	29.5 (.60)	24.2 (.57)	20.8 (.69)	23.9 (.44)	***



Mother Cognitive Score      7.4 (.20)    8.0 (.31)      7.0 (.22)    6.32 (.26)    6.53 (.29)    \*\*\*

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*Note.* Sample characteristics were computed with an analytic weight rendering the sample representative of births in 1999 in large U.S. cities.

<sup>a</sup>Unweighted ns reflect total and group sizes in the analytic sample drawn from all 20 cities.

<sup>b</sup>Weighted percentages reflect the nationally representative proportion of each family structure type in the 16 national sample cities.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Appendix B

*Child PPVT Scores at Three Years by Family Structure, Race, and Father Education Level*

	Total	Married	Cohabiting	Single	Unstable	F/ $\chi^2$
<i>Mother is White, Non-Hispanic</i>						
Total	96.1 (16.6)	99.5 <sub>a</sub>	94.1 <sub>b</sub>	94.4 <sub>b</sub>	91.4 <sub>b</sub>	***
High Father Education	98.8 (16.1)	101.0 <sub>a</sub>	93.5 <sub>b</sub>	97.9 <sub>ab</sub>	93.4 <sub>b</sub>	**
Medium/Low Father Education	83.6 (16.3)	83.6 <sub>a</sub>	84.8 <sub>a</sub>	84.1 <sub>a</sub>	82.6 <sub>a</sub>	
<i>Mother is Black, Non-Hispanic</i>						
Total	83.1 (15.5)	89.8 <sub>a</sub>	81.8 <sub>b</sub>	82.4 <sub>b</sub>	82.5 <sub>b</sub>	***
High Father Education	86.2 (16.5)	93.9 <sub>a</sub>	83.1 <sub>b</sub>	84.7 <sub>b</sub>	84.3 <sub>b</sub>	**
Medium/Low Father Education	82.2 (15.3)	81.2 <sub>a</sub>	82.2 <sub>a</sub>	82.4 <sub>a</sub>	82.2 <sub>a</sub>	
<i>Mother is Hispanic</i>						
Total	84.0 (16.3)	83.1 <sub>a</sub>	83.7 <sub>a</sub>	86.2 <sub>a</sub>	83.9 <sub>a</sub>	
High Father Education	89.7 (16.7)	90.5 <sub>a</sub>	90.3 <sub>a</sub>	88.5 <sub>a</sub>	88.7 <sub>a</sub>	
Medium/Low Father Education	82.1 (15.3)	79.6 <sub>a</sub>	83.0 <sub>a</sub>	83.3 <sub>a</sub>	81.4 <sub>a</sub>	

*Note.* Means with different subscripted letters reflect significant pairwise contrasts at  $p < .05$  with bonferroni adjustments.

\*\* $p < .01$ ; \*\*\* $p < .001$ .

Appendix C

*Racial Distribution of Family Structure by Father Education Cells*

	Married	Cohabiting	Single	Unstable
<i>Unweighted</i>				
High Father Education (% White/% Black)	59.6/18.5	30.8/37.6	10.6/70.6	20.6/57.5
Medium Father Education (% White/% Black)	30.9/40.2	20.9/55.4	8.8/80.8	14.3/66.8
Low Father Education (% White/% Black)	16.3/23.3	16.9/36.0	7.7/76.3	13.2/59.2
<i>Weighted</i>				
High Father Education (% White/% Black)	0.66/0.04	0.38/0.27	0.00/0.72	0.21/0.37
Medium Father Education (% White/% Black)	0.36/0.19	0.22/0.38	0.10/0.74	0.34/0.46
Low Father Education (% White/% Black)	0.05/0.10	0.27/0.22	0.19/0.61	0.25/0.47