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Marital Birth and Early Child Outcomes: The Moderating Influence of Marriage Propensity

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Abstract

Using data from the Fragile Families and Child Well-being Study, the present study tested whether the benefits of a marital birth for early child development diminish as parents' risk of having a nonmarital birth increases (*N* = 2285). It was hypothesized that a child's likelihood of being born to unmarried parents is partly a function of father characteristics that predict his capacity to promote child development. Results partially supported hypothesis. A positive association emerged between parental marriage and cognitive outcomes at age 3 only for children whose parents were likely to be married at the child's birth, suggesting average differences between children in married and unmarried families may overestimate the benefit of marriage in subpopulations most impacted by nonmarital birth.

The substantial rise in births to unmarried parents over the last 40 years, from under 10% in 1960 to 41% in 2008 (Hamilton, Martin, & Ventura, 2010), has sparked considerable political attention, most notably attempts by the federal government to encourage the formation of married parent families. Temporary Assistance to Needy Families (TANF), the welfare component of the 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), had within three of its four explicit goals the reduction of nonmarital births and the encouragement of marriage. Ten years later, the re-authorization of TANF provided $150 million a year for "Healthy Marriage Initiatives" and the Administration for Children and Families (ACF) made available "Healthy Marriage Demonstration Grants" to fund programs aimed at promoting marriage and reducing nonmarital childbirth (Amato & Maynard, 2007).

To motivate these initiatives, supporters often emphasize the benefits of marriage for children, citing a well-documented association – growing up with two married, biological parents is correlated with better cognitive, academic, and behavioral outcomes relative to growing up in all other family types (Parke, 2004; Sigle-Rushton & McLanahan, 2004). Motivating social policy on the basis of this correlation, however, assumes marriage benefits children in all types of families, including those who are the most likely to have a nonmarital birth. Indeed, many of the government-funded programs to promote marriage target this very population by marketing the importance of marital childbirth to low-income adolescents and facilitating marriage through "relationship skills training" for unmarried parents, among other strategies (Amato & Maynard, 2007). This paper assesses the wisdom of targeting these social policy interventions at this population by questioning whether apparent developmental benefits of marriage actually exist for children of parents most likely to be unmarried at the time of childbirth. Surprisingly, this question has never been asked in the empirical literature, nor has it been a notable part of the public debate over marriage promotion (except in the vague notion that the government should only promote "healthy marriages").

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Specifically, the present study tests the hypothesis that the benefits of marriage diminish as parents' risk of having a nonmarital birth increases. This hypothesis assumes that the benefits of marriage for children hinge on fathers' capacity to promote child development because children in unwed families almost always live consistently with their biological mothers and inconsistently or not at all with their biological fathers. It is reasoned that a child's likelihood of being born and raised in a married versus an unmarried family is partly a function of father characteristics, such as education level, cognitive ability, and age, that relate both to the likelihood of his being married at the time of a child's birth and his capacity to promote positive child development. By estimating fathering capacity as the likelihood of having a marital birth based on these characteristics, the study's findings can begin to illuminate whether the government should reasonably promote marriage among those most likely to have a nonmarital birth on the grounds that doing so will enhance child development.

Marriage and Child Development: Background Literature

One of the most widely cited studies on the association between family structure and child well-being is McLanahan and Sandefur (1994), who report that youth growing up with both biological parents have better educational outcomes than those in single mother and stepparent families. Later studies documented similar differences in terms of adolescent behavioral outcomes (Carlson & Corcoran, 2001) and younger children's well-being (Hao & Xie, 2002; Ram & Hou, 2003). With the rise in nonmarital childbirth in the U.S., family structure research turned from studying divorce to studying nonmarital childbirth by comparing developmental outcomes among children born to married versus unmarried mothers. This research largely reaffirmed findings that children born to unmarried parents had poorer outcomes than those born to married ones, but revealed that differences held even when unmarried parents lived together (Artis, 2007; Brown, 2004; Demuth & Brown, 2004; Dunifon & Kowaleski-Jones, 2002; Heiland & Liu, 2006). Moreover, children of unmarried cohabiting and single parents often did 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 that children of unmarried parents, whether living together or separately, have poorer outcomes across developmental domains than those born to and living consistently with married, biological parents.

Marriage and Child Development: Theoretical Framework

Theories from developmental psychology, sociology, and economics all posit that children living with married, biological parents receive greater financial investment from and spend more time with their biological fathers than those in other family types, and that fathers' money and time, in turn, enhance child development. Theoretically, resident fathers invest more of their money and time in their children than nonresident fathers because they do not divide resources between two (or more) households (Becker, 1991; Willis & Weiss, 1985). In principle, children of cohabiting parents should receive more of their fathers' money and time than those of single mothers because they live with their fathers. However, many unmarried parents view cohabitation as a weaker economic and emotional commitment than marriage (Edin & Kefalas, 2005; Reed, 2006), and this conception may make cohabiting fathers less inclined or able to invest their money and time in children (DeLeire & Kalil, 2005; Kenney, 2004). Indeed, much demographic research suggests children of single mothers and cohabiting parents receive fewer money (Argys & Peters, 2003; Jackson, Tienda, & Huang, 2001) and time (Cabrera et al., 2004; Hofferth & Anderson, 2003; McLanahan & Sandefer, 1994; Sandberg & Hofferth, 2001) resources from fathers than those living with married biological parents.

According to research from developmental psychology, these differences in fathers' money and time investments should produce differences in children's cognitive and behavioral outcomes. Higher household incomes allow parents to purchase materials, experiences, and services (such as stimulating learning materials and high quality child care) that foster children's cognitive skills and abilities (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001; Haveman & Wolfe, 1994) and their behavioral well-being (Duncan & Brooks-Gunn, 1997). Fathers' time with children also influences early cognitive and behavioral development. For example, for infants and toddlers, stimulating father-child interactions involve pointing to and naming objects, using complex sentences, and, during toddlerhood, encouraging child speech and logical reasoning, all of which predict children's cognitive growth (Pancsofar & Vernon-Feagans, 2006; Tamis-LeMonda, Cabrera, Shannon, & Lamb, 2004). The quality of both mothers' and fathers' parenting behaviors, specifically their sensitivity (defined as warmth and responsiveness) during parent-child interactions (Cabrera, Shannon, & Tamis-LeMonda, 2007; NICHD ECCRN, 2004) also enhances children's behavioral development. In this view, the loss of some or all of fathers' money or time undermines young children's development by lowering the quality of their early learning and socioemotional environments.

Marriage and Child Development: The Moderating Influence of Fathers' Capacities

It seems obvious that in order for children of married parents to benefit from fathers' financial and time investments, fathers must be able to provide the resources that enhance children's learning, and they must have the capacity to parent in stimulating and sensitive ways. Estimating average associations between marriage and child well-being assumes the existence of an "average father" possessing an "average capacity" to provide this enrichment. However, fathers with weak economic or emotional skills may have little or no capacity to provide this enrichment. In this case, marriage may confer few benefits to children's cognitive or behavioral development relative to single motherhood, cohabitation, or any other family type.

A study by Jaffee and colleagues (2003) offers a prime example of how fathers' "skills" can moderate associations between family structure and child well-being. They theorized that because antisocial behavior is characterized by impulsivity, aggression, and an excessive disregard for others (American Psychiatric Association, 1987), living with an antisocial father would be detrimental to children's behavioral development. Indeed, they found that the longer children lived with fathers who had high levels of antisocial behavior versus living with single mothers, the worse their behavioral outcomes, whereas the longer children spent living with *non-antisocial* fathers, the better their behavioral outcomes. In short, the apparent benefit to children of living in an intact family depended on fathers' capacity to enhance children's behavioral development.

This study's intuition can be applied to the link between marriage and early child cognitive outcomes. For example, fathers' education level should affect their ability to enhance children's early learning and this characteristic should, therefore, moderate the link between marriage and children's cognitive outcomes. Because fathers with lower education levels earn less on average than their more educated counterparts (Becker, 1993), differences in financial investments between married and cohabiting, and between married and single parents, may be smaller at lower levels of paternal education, leading to smaller disparities in cognitive scores. Moreover, the lack of fathers' time investments implied by unmarried parenthood may have a smaller impact on children's cognitive development when fathers have lower education levels to the extent that parental education relates to the quality of parents' linguistic and cognitive stimulation of children (Hart & Risley, 1995; Pan, Rowe, Singer, & Snow, 2005). Overall, this logic and the findings of Jaffee et al. suggest that average differences in children's developmental outcomes between married and single-parent families may overestimate the potential benefit of marriage when fathers lack the capacity to enhance children's early learning or behavioral environments.

Fathers' Capacities and Likelihood of Marital Birth

Demographic research on family structure shows that lower education levels and antisocial behavior are both associated with a higher risk of nonmarital childbirth. Specifically, married fathers have higher education levels on average than unmarried fathers (Jackson et al., 2001) and are less likely to exhibit antisocial behavior and other behavioral problems than unmarried fathers early in the child's life (Brown, 2000; Wilson & Brooks-Gunn, 2001). These trends combined with the logic presented above suggest a broader hypothesis about marriage's heterogeneous associations with child well-being: the benefits associated with parental marriage for early child development are weaker for, and may not apply to, fathers unlikely to marry before childbirth because these fathers may have fewer skills with which to enhance children's early environments.

To develop and refine this hypothesis, this paper considers a broader set of father characteristics, all of which predict nonmarital childbirth and may influence children's developmental environments. Like education level, fathers' age at the child's birth, cognitive ability, history of criminal behavior, emotional well-being, and family structure of origin all predict the likelihood a father will be married at his child's birth (DeKlyen, McLanahan, Brooks-Gunn, & Knab, 2006; Kaye, 2001; Lerman, 1993; Nock, 2007; Wilson & Brooks-Gunn, 2001; Wu & Martinson, 1993). In turn, each of these characteristics could be associated with fathers' capacity to provide material resources, sensitive and stimulating father-child interactions, or both. Younger men may be less able to invest material resources in a child's home because they earn less on average than their older counterparts (Becker, 1993). Younger fathers may also parent in less sensitive and stimulating ways (Berlin, Brady-Smith, & Brooks-Gunn, 2002). Fathers' cognitive ability may function similarly, depressing both fathers' earnings and ability to interact in stimulating ways. Men with histories of conviction and incarceration also have lower average earnings than those without criminal records (Western, Kling, & Weiman, 2001). Poor emotional health may undermine father's motivation and ability to interact with children in sensitive ways (Belsky, 1984) and remain productive in the workforce (French & Zarkin, 1998). Finally, men whose fathers were uninvolved in their early lives tend to parent in less sensitive and stimulating ways (Shannon, Tamis-LeMonda, & Margolin, 2005), perhaps because they had weaker or negative paternal role modeling. Because each of these characteristics is also associated with fathers' risk of having a nonmarital versus marital childbirth, it follows that the benefits associated with parental marriage for early child development may be weaker for, and may not apply to, subgroups less likely to marry before childbirth.

Mothers' Characteristics and the Likelihood of Marital Birth

Although this hypothesis hinges on the moderating effect of fathers' characteristics, to test it one should include mothers' characteristics when estimating the likelihood of marital birth. First, just like fathers, voluminous research demonstrates that characteristics in mothers, including education level, age, cognitive ability, and socioemotional well-being, are associated with marital birth status (e.g., DeKlyen et al., 2006; Jackson et al., 2001). Because the aim of the present study is to determine if the developmental benefits of marriage actually exist for children of parents unlikely to be married at the time of childbirth, marriage propensity must be estimated as accurately as possible; accordingly, one must consider both mother and father characteristics to do so. Second, homogamy exists within couples on the characteristics hypothesized to moderate the influence of marital birth on child outcomes (e.g., Krueger, Moffit, Caspi, Bleske, & Silva, 1998; Mare, 1991); thus, controlling for mothers' characteristics removes potentially meaningful variation in fathers' characteristics. However, having mothers' characteristics predict marital birth along with fathers' controls for their main effect while allowing the estimated interaction between father characteristics and marital birth to capture the full range of men.

The Present Study

The present study uses a two-step approach to testing its hypothesis. First, whether the child was born to and lived consistently with married parents is predicted in a probit model from the set of father and mother characteristics hypothesized to influence both selection into having a marital birth and fathering capacity. Next, probabilities are predicted from this model reflecting the likelihood of a marital birth. By design, assuming that the parent characteristics included here significantly predict marital birth, individuals with higher predicted probabilities will have higher scores on characteristics that positively predict marital birth, whereas those with lower predicted probabilities will have lower scores on those characteristics. Thus, the probabilities create an index – the "marriage propensity index" – that simultaneously reflects the likelihood of a child being born to and living consistently with both biological married parents and fathers' capacity to enhance their children's development.

Second, children's cognitive or behavioral scores are regressed on an indicator for whether they were born to married parents, the marriage propensity index, and a term interacting the two. Because both marital birth and marriage propensity are expected to positively predict child cognitive outcomes, if the hypothesis that parental marriage is more positively associated with optimal child development for those most likely to marry before childbirth is supportable, the interaction between the two should also have a positive value in that model. In the models predicting behavior problems, both marital birth and marriage propensity are expected to negatively predict child outcomes; thus, the interaction should have a *negative* value in that model to support the hypothesis. Any differences between results across outcomes would suggest that associations between marital birth and child well-being are attributable to intrafamilial mechanisms that operate differently across developmental domains.

Method

Data and Sample

Data were drawn from the Fragile Families and Child Well-being 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 unmarried (n = 3,712) and one-third of whom were married (n = 1,186) at the time of the focal child's birth, a ratio that intentionally reversed the proportion of marital to non-martial births in the U.S. at the study's inception. This oversampling makes the FFCWS ideal for the present study because it allows for a more equal distribution of cases across family structure and marriage propensity subgroups than one could obtain with a similarly sized nationally representative sample, thus enhancing comparisons among subgroups of interest. Mothers were interviewed in hospitals at the focal 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 1- and 3-years old. To choose participating cities, the designers used a stratified random sample of all U.S. cities of 200,000 people or more (see Reichman, Teitler, Garfinkel, & McLanahan, 2001 for a detailed review of the research design).

For inclusion in the analytic sample, mothers had to be interviewed at the baseline, 1-, and 3-year time points 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 data on child cognitive outcomes at age three, the first time such data were collected (N = 2285). The restriction reduced the sample because child cognitive outcome data were only gathered if mothers agreed to participate in the In Home sub-study of the larger FFCWS, in which trained interviewer-assessors conducted in-home assessments. Note, of the total 4898 sample, only 78% of fathers were interviewed at baseline, and the analytic sample of 2285 includes families with non-interviewed fathers. These fathers were retained because non-interviewed men were more likely to be unmarried and were more socioeconomically disadvantaged (Teitler, Reichman, & Sprachman 2003), thus excluding them would reduce the number of nonmarital births in the sample and limit analyses to more advantaged fathers. To address missing data on father characteristics, data were multiply imputed via the ICE command in Stata 11.1 (Lunt, 2009; Royston, 2005). The percent of values multiply imputed range from 2.3% for fathers' education to 28.0% for history of criminal behavior. Although 28.0% is large proportion of data to impute, sensitivity analyses revealed that results did not differ substantively when the sample was restricted to cases with valid data on criminal history (available upon request). The first step probit model also includes dummy variables indicating cases with imputed values for each measure to control for any systematic non-response in the father sample.

This final sample represents only 57% of the total sample interviewed at all 3 time points. Fathers included in the analytic sample differed from the full FFCWS sample in the following ways: they were more likely to have a high school degree (37% versus 32%), were younger (27-versus 29-years-old), and scored higher on a test of cognitive ability (see a description of this measure below). They were also less likely to have lived with both parents at age 15 (40% versus 54%), more likely to have been convicted of a crime (24% versus 16%), and reported more depressive symptoms (see below for description of these variables). Differences in mothers' characteristics were similar (available upon request). In sum, fathers and mothers in the analytic sample were more socioeconomically disadvantaged (e.g., less likely to live with both parents at 15) and behaviorally at-risk (higher crime rates and more depressive symptoms) than those excluded, however, they had higher education levels and cognitive ability. Associations between these characteristics and marital birth status will indicate how sample differences may bias the results, and the implications will be addressed in the Discussion.

Unweighted demographic characteristics of fathers, mothers, and focal children are presented in Table 1. Although the analytic sample was more advantaged educationally than the full FFCWS sample, mothers were less likely to have a high school diploma or more (66%) and were younger than national norms, as would be expected of an exclusively urban sample that over-represented unmarried births. They were also more likely to be African American (55%). The distribution of fathers' characteristics was similar. Note, of the 20 FFCWS cities, 16 were among the "national" FFCWS cities for which analytic weights are available that constitute the reduced sample representative of births in large cities during the study years. Analytic weights were not used in analyses because doing so would require dropping a substantial number of cases, particularly in groups most important to my estimation (e.g., less educated married parents, more educated unmarried parents). Instead, models control for all maternal characteristics used to calculate the weights (Vu, 2003), chief among them maternal education level and race.

Measures

Family structure—Focal children were categorized into family structure groups based on mothers' report of biological parents' relationship status at the three time points. Children who were born to married parents and whose mothers reported being married to the biological father at 1- and 3-years were classified in the "Marital Birth" group ($n = 476$; 20.8%). Children born to unmarried parents, regardless of their parents' coresidency status at any time point, were classified in the "Nonmarital Birth" group (n = 1809; 79.2%). A dummy variable for marital birth (= 1) versus nonmarital birth (= 0) was used in multivariate models. Note, some unwed couples had married by the 1- or 3-year interviews (approximately 200). These couples were included in the nonmarital birth group, and sensitivity analyses revealed that findings did not change when they are excluded. Additional analyses distinguished between different types of mothers' unmarried arrangements – consistently cohabited, moved into or out of cohabitation, re-partnered, and lived with relatives. However, neither child cognitive nor behavioral outcomes differed among these groups, nor did the interaction between marital birth and marriage propensity vary among them, so they were combined here for the sake of parsimony. More importantly, public concern focuses on the distinction between marital and nonmarital births, and the crucial difference in child outcomes by family structure are found between children born to and living with married parents and all other family types (Brown, 2004; Ginther & Pollack, 2004).

Finally, children who were born to married parents but whose parents divorced or separated prior to the three-year follow up ($n = 44$) were dropped from analyses. Children in this group were not grouped with those born to and living consistently with married parents because children receive fewer financial and time investments from fathers after divorce or separation (Amato & Keith, 1991) and, thus, do not benefit developmentally from fathers' investments in the same way as children of consistently married parents. They were not included in the unmarried birth group because having spent some time in a married parent family may have increased their access to fathers' investments if only for a short time relative to living with an unmarried parent(s). Because only these two family structures are compared, findings pertain only to this comparison and not to the several others explored in the family structure literature.

Father characteristics—A key strength of the FFCWS for this study is its inclusion of a particularly rich set of father-reported characteristics associated with nonmarital birth and fathers' marriage propensity. These include fathers' education level, age at child's birth, cognitive ability, family structure of origin, own fathers' involvement during childhood, history of criminal behavior, depressive symptoms and religiosity. Most of these characteristics are rarely included in a dataset that also assesses children's development. All measures were based on fathers' reports from the baseline interview, or the 1- or 3-year interview if the question was not asked at baseline. In all cases, the earliest reporting was used because being married could plausibly influence some of these characteristics, at least those that are time-varying such as criminal behavior and depressive symptoms, thus accentuating differences in these characteristics across marital and nonmarital births inappropriately.

For fathers' education level, men were grouped into those who had completed college (the reference category), had attended some college, those who had only a high school degree or GED, and those who had less than a high school degree and no GED based on fathers' reports at baseline or 1-year. Fathers' age was entered in years at the time of the child's birth, based on fathers' age at baseline minus the child's age in months at the baseline interview. Fathers' cognitive ability was assessed via the similarities subtest of the WAIS-R

(Weschler, 1981), a widely-used IQ measure for adults and adolescents, administered via telephone at the time of the three year interview. The WAIS-R similarities subtest assesses abstract verbal reasoning by asking about the commonality between two dissimilar items. The structure of fathers' family of origin was measured as a dichotomous variable that equaled 1 if father lived with both biological parents at age 15 and 0 if he did not based on fathers' reports at baseline. To assess own fathers' involvement during childhood, men were asked at baseline if their fathers were "very involved", "somewhat involved," or "not involved," in their lives growing up, or "did not know father," yielding a scale from 1 to 4 with higher values reflecting greater involvement. Fathers were coded as having a history of criminal behavior if they reported ever being convicted of a criminal offense by 1-year, excluding minor traffic violations. Level of fathers' depressive symptoms were assessed with a 12-item version of the Center for Epidemiological Studies Depression Scale (CESD-SF; Radloff, 1977), administered at baseline, for which the father reported the number of days per week (0 to 7) he experienced different depressive symptoms. Responses to each item were summed. Finally, fathers' level of religiosity, used as a proxy for pro-social behavior, was assessed at baseline by asking fathers how often they attended religious services. Fathers who reported attending more than once a month were coded as "religious" (=1), and fathers who reported attended less often were coded as "non-religious" (=0).

In addition to these characteristics, fathers' parents' highest level of education was included in the first step model, measured with two indicators for less than high school, high school degree or GED, and some college or more as the omitted category. Although I know of no literature documenting that parents' education level predicts men's likelihood of having a nonmarital birth, household income, to which parents' education level is related, does (Lerman, 1993); additionally, parents' own level of education may influence fathers' knowledge of cognitively stimulating parent-child interactions. Means and standard deviations are reported in Table 1.

Mother characteristics—The first step probit model included a set of maternal characteristics that predict child cognitive and behavioral outcomes, are exogenous to family structure, but may vary by family type. These included maternal education level coded as mother has either more or less education than the father, with equal education levels as the reference (because father and mother education level are highly collinear), maternal age in years at child's birth, maternal religiosity, and the structure of mothers' family of origin coded identically to fathers', all measured at baseline. As a measure of verbal skill and ability, mothers' scores on the PPVT (Dunn & Dunn, 1997), administered as part of the three-year In Home interview, were entered. Because mothers' PPVT score taps the same construct, receptive vocabulary, as the child cognitive outcome examined, it should be strongly associated with child cognitive scores and thus a powerful control as well as predictor of marital birth status. A measure of mothers' depressive symptoms was not included because mothers were first asked about their emotional well-being at 1-year, when parenting a newborn as a married versus unmarried mother could influence depression levels. Mothers' parents' level of education was excluded from the final model because the indicators were nonsignificant. Mothers' criminal history was not controlled because too few reported a conviction prior to meeting the father (< 3%).

In addition to these characteristics, maternal race or ethnicity (three indicators for African American, Latina, and other race with White omitted) and mother nativity status (1 = born in the U.S.; 0 = born elsewhere) were controlled, and whether the father was of a different race than the mother in order to account for fathers' race. Marital birth status varies strongly by race or ethnicity (Hamilton et al., 2009), therefore, it is important to include this characteristic in a model predicting marital birth. Mothers were missing valid PPVT scores in 3% of cases in the analytic sample; in these cases missing values were multiply imputed via STATA 11.1's ICE imputation program. Means and standard deviations are reported in Table 1.

Child cognitive outcomes—To assess cognitive development, children were administered the Peabody Picture Vocabulary Test (PPVT) in their homes by trained assessors during the three-year In Home interview. The PPVT is a widely used measure of receptive language skills with good reliability and validity (Dunn & Dunn, 1997). In its administration, children are shown four images on a page and asked to point to the image that is most like the word or term spoken, such as "point to 'sleeping'", and "point to 'crawling'". It is scored to resemble an IQ test with a mean of 100 and a standard deviation of 15, however, the analytic sample mean was lower than national norms (*M* = 85.8, *SD* = 16.7). 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. Means and standard deviations by family structure are reported in Table 1.

Although the PPVT was the only cognitive assessment administered to children at three years, leaving no choice as to the cognitive outcome used in this study, it is ideal for this inquiry. As a measure of receptive vocabulary, the PPVT taps the level of children's language comprehension given their exposure to specific words and concepts, and thus should be strongly influenced by parents' interactions with them (Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Pancsofar & Vernon-Feagans, 2006) and the types of materials available to them at home or in child care (Bradley et al., 2001).

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 constitute 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 = s*ometimes/somewhat true*; 2 = *very/often true*) were summed (Internalizing: $\alpha = 0.69$; Externalizing: $\alpha = 0.86$). The Internalizing subscale ranged from 0 to 19 and Externalizing from 0 to 36, with higher scores representing more behavior problems such as sadness and nervousness (Internalizing) and fighting and bullying (Externalizing). 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. Some cases with PPVT score data were missing data on behavior problems, so models predicting these outcomes do not use the full sample ($n = 2253$ for internalizing; $n = 2252$ for externalizing). Means and standard deviations are reported in Table 1.

Child covariates—Child characteristics that may predict child outcomes, are exogenous to family structure, and may vary by family type were also entered in multivariate models. These included child sex (1 = boy; 0 = girl), low birth weight status (1 < 2500g at birth; 0 = > 2500g), and whether child was the mothers' firstborn (1 = firstborn; 0 = other parity). However, low birth weight status was dropped from final models because it did not alter results once other child covariates were entered. Child age in months at the time of the three-year In Home interview was controlled in models predicting behavioral outcomes because CBCL scores were not standardized by child age at assessment. Means and standard deviations are reported in Table 1.

Analytic Strategy

First, the probability of the focal child's being born to and living with married biological parents was predicted from the set of father and mother characteristics in a probit model.

Predicted probabilities generated from this model were then used as a one-dimensional index of "marriage propensity". Second, each child outcome – cognitive and behavioral – was regressed in an OLS model on the main effects of marital birth and marriage propensity, and the interaction of the two. Although the second step regression models were initially estimated with a continuous marriage propensity index specification (not shown), final models were estimated with marriage propensity entered as a categorical variable because the distributions of married and unmarried parents along the index were too different to render comparisons at each index value meaningful (see Results for details). Specifically, the marriage propensity index was divided into three theoretically meaningful groups and entered as a set of indicator variables as main effects and interacted with marital birth: a "low probability" group with index scores ranging from .00 to .2499, a "moderate" probability group with index scores ranging from .25 to .4499, and a "high" probability group with scores ranging from .50 to .99. This categorization allows for comparisons between fathers with a less than equal chance of having a marital birth (the low and moderate groups) and fathers with an equal or greater than equal chance of having marital birth (the high group). Because social policies promoting marriage assume that marriage would benefit children in families unlikely to have a marital birth, this comparison specifically addresses the wisdom of targeting these social policy interventions at this population. Additionally, comparing the low and moderate probability groups will indicate whether the effects of marriage vary among those more and less unlikely to be married.

Because the marriage propensity index entered in equation (2) was estimated and not observed, it was necessarily measured with sampling error. Because standard errors and confidence intervals produced by a naïve OLS model do not account for the estimated variable, 1,000 replicate bootstraps of the procedure outlined above were estimated using a normal approximation (percentile and bias corrected methods yielded similar inferences). The bootstrap distribution was then used to estimate standard errors and confidence intervals (Mooney & Duval, 1993). Both conventional OLS and bootstrapped standard errors are reported in tables for comparison.

Results

Bivariate Patterns

Table 1 displays mean and percentage point differences by family type for child outcomes, and father, mother, and child characteristics. Children born to and living with both married parents scored 8.4 points higher on the PPVT than those born to unmarried parents, a significant difference of a moderate effect size ($d = .49$). They also scored significantly lower on both the internalizing and externalizing behavior problems scales, differences that were moderate ($d = -.53$ for internalizing) to small in size ($d = -.39$). Fathers and mothers also differed by family type in expected ways on all parent characteristics hypothesized to predict marital birth and influence marriage propensity (see Table 1). For instance, married parents had higher education levels, were older on average, had higher cognitive scores, and were more religious. They were also far more likely to come from an intact family and to have parents who attended at least some college than their unmarried counterparts. Finally, married fathers were two-thirds less likely to have been convicted of a crime than unmarried fathers.

Marriage Propensity Index Results

Results from the first step probit model predicting marital birth from parent characteristics are reported in Table 2. Although married and unmarried fathers differed on all father characteristics, not all characteristics independently predicted marital birth once they were entered simultaneously in the first step. Fathers with less than high school, high school, and some college were all less likely than those with a college degree to have a marital birth. Having been convicted of a crime and greater depressive symptoms were also associated with a lower likelihood of marital birth, whereas being religious was associated with a higher likelihood. Fathers' age was positively associated with marital birth at the trend level. However, neither cognitive score, coming from an intact family, parents' education level, nor own fathers' involvement predicted marital birth over and above the other characteristics. The marginal effects of each characteristic reported in Table 2 indicate that having less than a high school degree or having a criminal history decreased the probability of having a marital birth versus a nonmarital birth in this sample by .21 and .08, respectively. Patterns are similar for mothers' characteristics. Additionally, African American and Latina mothers were less likely to have a marital birth than White mothers, as were couples of different race or ethnicities. Mothers' verbal ability was also positively associated with marital birth. The pseudo R^2 of .44 suggests the model fits the data well and accounts for a substantial proportion of the variation in marital birth.

Next, the probability of having a marital versus nonmarital birth was predicted from this model. In the total sample, predicted probabilities ranged from .00 (non-zero at the fifth decimal place) to .99, with a mean of .21 (*SD* = .28), reflecting that approximately 80% of the sample was unmarried. Ranges were the same for the married and unmarried parents (.00 – .99), although their relative proportions across the marriage propensity index were, not surprisingly, quite different. The mean marriage propensity index for married parents was .55 (*SD* = .32), whereas the mean for unmarried parents was .12 (*SD* = .16). Figure 1 displays these relative distributions. To insure that comparisons between children in married and unmarried families along the propensity index reflected a reasonable number of children from both groups, the index was categorized into theoretically meaningful groups of low, moderate, and high probability fathers. In the low probability group 6% were married (*n* = 102) and 94% unmarried (*n* = 1532), in the moderate probability group 38% were married (*n* = 99) and 62% unmarried (*n* = 189), and in the high probability group 79% were married (*n* = 275) and 21% unmarried (*n* = 88).

Child Outcome Results

Results from the model predicting children's PPVT scores are reported in Table 3. The dummy variable for marital birth in Model 1 replicates the mean difference reported in Table 1 controlling for child birth order and sex (results were identical with child low birth weight status entered so it was removed for the sake of parsimony). In Model 2, marriage propensity was entered as a set of subgroups with the low propensity subgroup omitted. Children of parents in each higher propensity subgroup had significantly higher PPVT scores than those of low propensity parents. Inclusion of these indicators reduced the marital birth to nonsignificance, suggesting that once factors that select parents into marital and nonmarital birth are controlled no main effect of marital birth exists. This model resembles the approach often used in the family structure literature in which observable characteristics that select parents into marriage are held constant in order to estimate the effect of selection bias on average differences.

In Model 3, the interaction between marital birth and each marriage propensity subgroup was entered. The interaction between high propensity and marital birth was positive and significant, indicating that the difference between children's PPVT scores was larger among children of high propensity parents than low propensity parents; specifically, it suggests a 9-point swing in the difference between children's scores in married versus unmarried families from the bottom of the index to the top. The interaction between moderate propensity and marital birth was nonsignificant, indicating that differences between children in married versus unmarried families were of similar magnitudes among these groups. In additional analyses, the High Propensity, rather than Low Propensity, subgroup was omitted to determine if differences between children in married and unmarried families were smaller in both lower propensity subgroups than in the High Propensity group. Indeed, both interaction terms in this model were significant (not shown), indicating that the difference between children's PPVT scores was larger among children of High Propensity parents than among children of both lower propensity parents. Bootstrapped standard errors were larger than those from the naïve OLS, but the two approaches yielded similar inferences. Although the linear specification of the propensity index was not preferred, when entered into the model predicting cognitive outcomes, both the main effect of marriage propensity and the interaction between marriage propensity and marital birth were positive and significant (marriage propensity: $b = 15.54$, $se = 2.75$; marriage propensity × marital birth: $b = 7.42$, $se = 3.56$, in Model 3).

To interpret the magnitude and meaning of the interactions, simple slopes of the marital birth dummy variable were calculated for each marriage propensity subgroup using Model 3 estimates. Figure 2 charts the resulting point estimates with 95% confidence intervals for each estimated slope (calculated from the OLS model, not via bootstrapping because the two approaches did not produce meaningfully different inferences) displayed as ascending and descending dotted lines. The figure shows that only within the High Propensity subgroup (15% of families) was the difference between children in married and unmarried families statistically significant, and that the point estimate in the Low Propensity group was actually negative, although not significantly so. Effect sizes for marital birth ranged from −.04 of a standard deviation at the lowest marriage propensity value (a negligible effect) to .50 at the highest (a moderate effect).

Finally, identical models were run with children's internalizing and externalizing behavior problems as dependent variables. Results from internalizing behaviors regressed on the subgroup specification of marriage propensity are reported in Table 4. Results from models predicting externalizing behaviors were strikingly similar, thus are not displayed for the sake of parsimony (available from author). For both outcomes, no significant interaction emerged between marriage propensity and marital birth. Moreover, the interaction terms were positive in sign, indicating that differences in children's behavior problems by marital birth were actually slightly larger at lower levels of marriage propensity than at higher levels. This trend suggests marriage might be more beneficial for children's behavioral outcomes among families least likely to marry, although the nonsignificant interaction terms render any interpretation only speculative. The average effect size estimated controlling for marriage propensity was −.25 and −.21 (Model 2) for internalizing and externalizing. Figure 3 charts the point estimates for internalizing behaviors for each propensity subgroup, with 95% confidence bands surrounding, calculated identically to those for PPVT scores displayed in Figure 2.

Discussion

This study investigated whether average associations between parental marriage and child well-being would diminish when parents were less likely to have a marital birth, testing the hypothesis that fathering capacity and thus the benefits of marriage for children would be lower in these families. Results indicated that associations between parental marriage and child cognitive outcomes were indeed reserved for children whose parents were more likely to be married at the time of childbirth, at least for cognitive outcomes. This pattern, like similar findings documented in a prior study (Jaffee et al., 2003), suggests average differences in children's outcomes between married and unmarried families may overestimate the potential benefit of marriage to children in subpopulations most impacted by the rise in nonmarital birth. It also calls into question targeting these populations for marriage promotion in the name of child well-being.

However, associations between marriage and children's behavioral development were consistent across different levels of marriage propensity. This distinction may suggest grounds to promote marriage on the basis of children's behavioral well-being. Before drawing this conclusion, it is important to recognize that characteristics related to fathers' human capital (i.e., education level) more strongly predicted marital birth and, thus, most strongly influenced fathers' marriage propensity scores than characteristics related to fathers' socioemotional well-being (e.g., depressive symptoms). To the extent that parents' human capital influences children's learning environments more than their behavioral environments, children's cognitive outcomes may hinge more strongly on marriage propensity. It is also possible that fathers with low marriage propensity scores (and, thus, low human capital) who nonetheless remain stably married possess unmeasured strengths, such as high commitment to family or strong interpersonal skills, which benefit children's behavioral development. Taken together, these findings suggest that positive associations between marriage and children's cognitive well-being manifest far more when fathers possess qualities that strongly influence cognitive development; benefits to children's behavioral well-being may only emerge when fathers can enhance children's behavioral environments, as Jaffee et al. (2003) demonstrate, but the latter capacity may be more common among those unlikely to marry than the former.

The study's analytic strategy assumed empirical links between father characteristics, the likelihood of nonmarital childbirth and, separately, children's development, however, its hypothesis did not suggest why this set of father characteristics would relate to both outcomes. Given the pattern of findings, it is reasonable to hypothesize that these characteristics jointly predict risk of nonmarital birth and children's development because mothers decide to marry men partly on the basis of their perceived fathering capacity. That is, if women cannot find partners with the attributes that constitute fathering capacity, or believe they cannot, women can either forgo motherhood, assuming relatively easy access to birth control or abortion, or they can have a child out-of-wedlock. A qualitative study examining why many low-income mothers have children before marrying suggests that faced with these options women often chose the latter because they consider motherhood a necessary part of life (Edin & Kefalas, 2005). Marriage, on the other hand, should wait until after childbirth to allow time to gauge their relationships' strength, for the odds of divorce are perceived to be high, and the benefits of marriage perceived to be low, when fathers make risky marriage bets. In this view, the likelihood of having a marital (versus nonmarital) birth and fathering capacity covary because mothers may make the former decision after evaluating the latter phenomenon.

This reasoning, along with the present findings, suggests that although programs to encourage marriage may not succeed in their immediate or child developmental goals, programs to enhance unwed fathers' (or fathers'-to-be) human capital or parenting skills may serve both purposes. The 2006 reauthorization of TANF provides funding of up to $50 million each year for activities promoting "responsible fatherhood," including programs to foster men's economic stability and positive parenting (Amato & Maynard, 2007). If effective, these initiatives could simultaneously increase couples' incentive to marry and fathers' capacities to enhance child development by increasing men's marriage propensity.

One could interpret this study's findings to mean that because marriage was associated with better cognitive outcomes among parents highly likely to marry that marriage causally enhances child cognitive development in that subgroup. However, it is entirely possible that unobserved differences exist between married and unmarried families even within this subgroup and that those differences drove the marriage effect. Estimating associations between marriage and children's outcomes at different levels of marriage propensity does not necessarily eliminate the influence of unobserved differences between married and unmarried parents. Rather, this study's approach acknowledges the profound heterogeneity in the distribution of characteristics between married and unmarried parents, a heterogeneity that is not fully accounted for when these variables are controlled as confounding background characteristics (Rubin, 1997). By acknowledging this heterogeneity in the estimated associations between marriage and child outcomes, this study reveals how different distributions may bias the estimation of average associations between marriage and child outcomes that are commonly reported.

This study lends support to the notion that heterogeneity exists in associations between marriage and child well-being and suggests that future research on family structure and child development should acknowledge and explore this heterogeneity. However, the data limit the generalizability of its findings. The FFCWS is not representative of the national population because it oversampled births to disadvantaged parents and the present analyses did not allow for inclusion of national weights. Moreover, the analytic sample had higher levels of education than the full FFCWS sample, and education strongly predicted marriage likelihood. However, if married and unmarried parents at the lowest end of the education distribution were underrepresented, the pattern of results suggests this bias would underestimate the moderating effect of marriage propensity on child cognitive outcomes.

In sum, the present study suggests that the widely-cited correlation between marriage and child well-being belies a more complex descriptive pattern, specifically that the correlation between marriage and better child outcomes may be less relevant for children whose parents are most likely to be unmarried at the time of childbirth. Although the pattern obtained only for cognitive outcomes, the findings still have implications for understanding how meaningful the rise in nonmarital childbirth may actually be for early child development and what the government should do, if anything, to address the demographic shift. Specifically, the present study's findings suggest that if government efforts to promote marriage fail to recognize that parents' characteristics partly determine their marital status, such efforts risk encouraging parents, and parents-to-be, that being married itself will enhance their children's development rather than their combined ability to create positive developmental environments.

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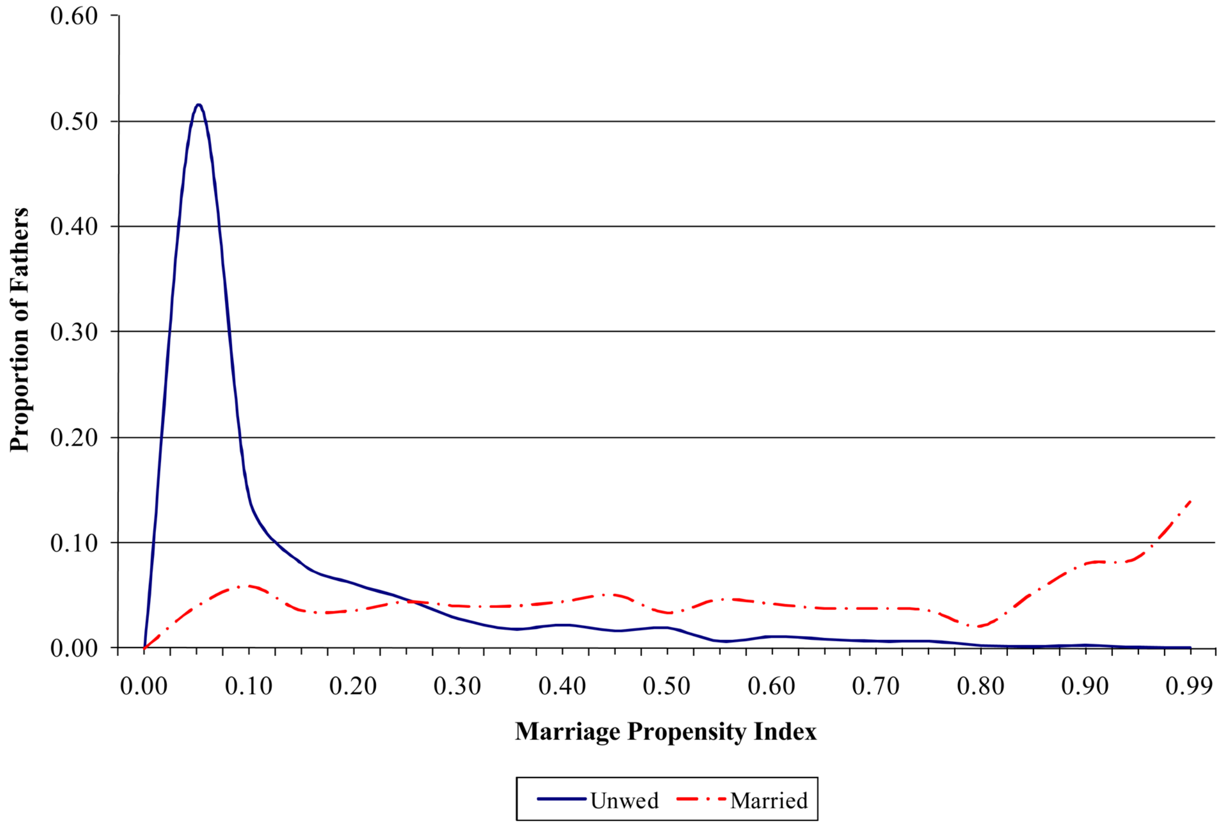

Figure 1.
Marriage propensity index distributions in married and unmarried birth samples.

Figure 2.
Simple slopes for difference in children's age 3 PPVT scores by marital birth status groupings (.00 – .24; .25 – .49; .50 – .99); bars reflect 95% confidence intervals for slope estimates.

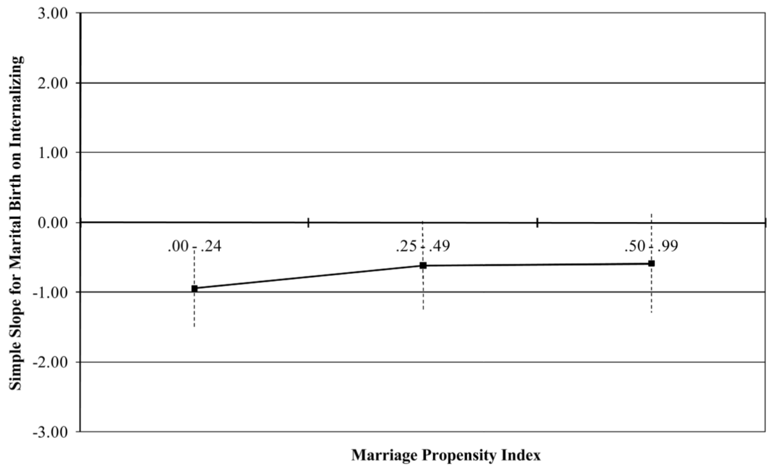

Figure 3.

Simple slopes for difference in children's age 3 internalizing CBCL by marital birth status groupings (.00 – .24; .25 – .49; .50 – .99); bars reflect 95% confidence intervals for slope estimates.

Table 1

Sample Characteristics by Family Type

	Total		Married		Unwed			Range
	N = 2285		*n* = 476		*n* = 1809			
Child Outcomes at age Three								
PPVT Score	85.81	(16.7)	92.44	(18.1)	84.06	(16.0)	***	40 –137
Internalizing Behavior Problems	5.31	(3.0)	4.17	(2.5)	5.62	(3.0)	***	0 – 19
Externalizing Behavior Problems	9.98	(5.9)	8.25	(5.2)	10.45	(6.0)	***	0 – 30
Father Characteristics								
Father has < HS/GED	0.31	--	0.12	--	0.36	--	***	0 – 1
Father has HS/GED	0.38	--	0.24	--	0.42	--	***	0 – 1
Father has Some College +	0.23	--	0.32	--	0.20	--	***	0 – 1
Father has College Degree	0.09	--	0.33	--	0.02	--	***	0 – 1
Father Age in Years	27.37	(7.2)	31.94	(6.5)	26.17	(6.9)	***	15 – 67
Father Cognitive Score (WAIS-R)	6.60	(2.5)	7.33	(2.7)	6.41	(2.3)	***	0 – 15
Father had Intact Family	0.40	--	0.64	--	0.34	--	***	0 – 1
Fathers' Parents <HS/GED	0.20	--	0.18	--	0.20	--		0 – 1
Fathers' Parents HS/GED	0.49	--	0.39	--	0.51	--	***	0 – 1
Fathers' Parents Some College	0.32	--	0.43	--	0.29	--	***	0 – 1
Own Fathers' Involvement	2.97	(0.9)	3.26	(0.9)	2.89	(0.9)	***	1 – 4
Father was Convicted of Felony	0.24	--	0.08	--	0.29	--	***	0 – 1
Father Religiosity	0.29	--	0.49	--	0.24	--	***	0 – 1
Father Depressive Symptoms	13.92	(14.3)	10.09	(10.9)	14.93	(14.9)	***	0 – 72
Mother Characteristics								
Mother has < HS/GED	0.26	--	0.18	--	0.28	--	***	0 – 1
Mother has > Ed than Father	0.28		0.27		0.28			0 – 1
Mother has < Ed than Father	0.26		0.17		0.28		***	0 – 1
Mother and Father have = Ed	0.20		0.38		0.16		***	0 – 1
Mother is White	0.20	--	0.47	--	0.13	--	***	0 – 1
Mother is African American	0.55	--	0.26	--	0.63	--	***	0 – 1
Mother is Latina	0.21	--	0.20	--	0.21	--		0 – 1

	Total		Married		Unwed			Range
	***N* = 2285**		***n* = 476**		***n* = 1809**			
Mother is Other Race	0.03	--	0.08	--	0.02	--	***	0 – 1
Parents' Race Different	0.15	--	0.14	--	0.15	--		0 – 1
Mother Age in Years	24.77	(5.9)	29.45	(5.5)	23.54	(5.4)	***	14 – 44
Mother was Born in US	0.92	--	0.81	--	0.94	--	***	0 – 1
Mother had Intact Family	0.37	--	0.62	--	0.30	--	***	0 – 1
Mothers' Parents <HS/GED	0.23	--	0.20	--	0.24	--	*	0 – 1
Mothers' Parents HS/GED	0.44	--	0.31	--	0.47	--	***	0 – 1
Mothers' Parents Some College +	0.33	--	0.50	--	0.29	--	***	0 – 1
Mothers' Religosity	0.37	--	0.56	--	0.32	--	***	0 – 1
Mother Verbal Ability (PPVT)	89.55	(12.0)	96.35	(12.8)	87.77	(11.1)	***	0 – 139
Child Covariates								
Child is Firstborn	0.38	--	0.36	--	0.38	--		0 – 1
Child is Boy	0.53	--	0.53	--	0.53	--		0 – 1
Child is Low Birthweight	0.09	--	0.05	--	0.10	--	**	0 – 1
Child Age in Months	35.36	(2.3)	34.83	(2.1)	35.5	(2.3)		30 – 45

*Note. N*s for child behavioral outcomes are 2253 and 2252 for internalizing and externalizing.

Standard deviations are in parentheses.

** $p < .01$;

*** $p < .001$ for difference between married and unwed groups.

Table 2

Probit Model Predicting Marital Birth from Parent Characteristics

	b	*se*	*df/dx*
Father Characteristics			
Father < HS/GED	−1.540	0.208	−0.212 ***
Father has HS/GED	−1.043	0.177	−0.169 ***
Father has Some College	−0.713	0.156	−0.103 ***
Fathers' Age	0.014	0.008	0.003 +
Fathers' Cognitive Score	−0.027	0.017	−0.005
Father had Intact Family	0.065	0.098	0.012
Fathers' Parents <HS/GED	0.145	0.127	0.028
Fathers' Parents HS/GED	0.002	0.050	0.020
Own Fathers' Involvement	0.012	0.051	0.000
Father Convicted of Felony	−0.484	0.113	−0.076 ***
Father Religiosity	0.442	0.092	0.091 ***
Father Depressive Symptoms	−0.007	0.003	−0.001 *
Mother Characteristics			
Mother has > Ed than Father	0.110	0.099	0.021
Mother has < Ed than Father	−0.527	0.108	−0.083 ***
Mother is African American	−0.837	0.109	−0.164 ***
Mother is Latino	−0.465	0.123	−0.072 ***
Mother is Other Race	−0.027	0.219	−0.036
Parents' Race Different	−0.217	0.112	−0.034 +
Mother Age in Years	0.049	0.009	0.009 ***
Mother was Born in US	−0.504	0.140	−0.118 ***
Mother had Intact Family	0.200	0.082	0.037 *
Mother Religiosity	0.259	0.091	0.050 **
Mother Verbal Ability (PPVT)	0.016	0.004	0.003 ***
Constant	−1.918	0.576 ***	
LR Chi^2	1018.42 ***		
Pseudo R^2	0.44		

Note. N = 2285; column labeled “df/dx” reports marginal effects.

+ $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$.

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Table 3

OLS Model Regressing Child PPVT Scores on Marriage, Marriage Propensity, and Their Interaction

	(1)		(2)			(3)		
	b	***se***	***b***	***se***	***b.s. se***	***b***	***se***	***b.s. se***
Marital Birth	8.439	0.899***	1.715	1.180	1.159	−0.679	1.649	1.716
Marriage Propensity								
Low Propensity	--	--	--	--	--	--	--	--
Moderate Propensity			5.978	1.184	1.373***	6.943	1.410	1.625***
High Propensity			11.177	1.391	1.526***	5.847	2.263	2.381**
Propensity × Marital Birth								
Moderate Propensity × MB						−0.556	2.676	3.025
High Propensity × MB						9.049	2.966	3.151**
Child is Firstborn	3.100	0.695***	2.823	0.681	0.687***	2.684	0.681	0.686***
Child is Boy	−2.256	0.680**	−2.019	0.669	0.687**	−1.970	0.667	0.685**
Constant	84.052	0.580***	83.017	0.578	0.586***	83.188	0.582	0.591***
F	41.19***		42.02***			32.48***		
Adjusted R^2	0.05		0.09			0.10		

Note. N = 2285; column "se" reports OLS standard errors; column "b.s. se" reports bootstrapped standard errors.

** $p < .01$;

*** $p < .001$.

Table 4

OLS Model Regressing Child Internalizing Scores on Marriage, Marriage Propensity, and Their Interaction

	(1)		(2)			(3)		
	b	***se***	***b***	***se***	***b.s. se***	***b***	***se***	***b.s. se***
Marital Birth	−1.388	0.136***	−0.751	0.184	0.188***	−0.943	0.279	0.300**
Marriage Propensity								
Low Propensity	--	--	--	--	--	--	--	--
Moderate Propensity			−0.934	0.196	0.219***	−0.996	0.238	0.272***
High Propensity			−1.000	0.211	0.220***	−1.142	0.340	0.355**
Propensity × Marital Birth								
Moderate Propensity × MB						0.330	0.428	0.515
High Propensity × MB						0.359	0.458	0.475
Child is Firstborn	−0.092	0.125	−0.073	0.124	0.124	−0.075	0.125	0.124
Child is Boy	0.072	0.123	0.054	0.123	0.127	0.055	0.123	0.127
Child Age in Months	0.099	0.028***	0.086	0.028	0.029**	0.086	0.028	0.029**
Constant	2.115	0.991**	2.698	0.999	1.020**	2.688	1.001	1.022**
F	31.61***		27.65***			20.76***		
Adjusted R^2	0.05		0.06			0.06		

Note. N = 2285; column “se” reports OLS standard errors; column “b.s. se” reports bootstrapped standard errors.

** $p < .01$;

*** $p < .001$.