Postconception Cohabitation, Household Environment, and Child Development

Jessica Houston Su
University at Buffalo, SUNY
jhsu2@buffalo.edu

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Abstract

Postconception cohabitations—cohabitations formed after the conception of a child but prior to birth— are an increasingly common response to nonmarital pregnancies, yet little is known about how children fare in this type of family structure. Using data from the Fragile Families Study, the current study examined associations between postconception cohabitation and several measures of the household environment and development of children ages 3-11. In terms of economic resources, father involvement, and family stability, children born to postconception cohabitors fared slightly better than children born to unpartnered parents, slightly worse than those born to pre- and postconception married parents, and similarly to those born to preconception cohabitors. Despite these differences in the household environment, children born to postconception cohabitors had similar behavior problems and cognitive test scores compared to children in all other family structures. Results suggest that although this normative and demographic shift is not associated with poorer child development, it may be linked to family instability and limited economic resources.

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The link between marriage and childbearing has weakened over time, as evidenced by dramatic increases in nonmarital childbearing and increasingly diverse family forms (for a review see Smock and Greenland 2010). The increasing nonmarital birth rate does not necessarily imply that all children born to unmarried parents are being raised by single parents, however (Raley 2001). Over the past few decades, increases in nonmarital births have been driven by increases in births to cohabiting couples (Bumpass and Lu 2000; Kennedy and Bumpass 2008). From 2006-2010, 22% of first births were to cohabiting women, compared to just 12% in 2002 (Martinez, Daniels, and Chandra 2012). Cohabiting births accounted for nearly 60% of all nonmarital births in 2006-2008 (Lichter 2012). This suggests that cohabitation has become a more common context in which to raise children, particularly among Hispanics and non-Hispanic whites. Among Hispanics, over two thirds of nonmarital births (70.2%) were to cohabitors, compared to 61.3% among non-Hispanic whites and 37.7% among non-Hispanic blacks (Lichter 2012).

Societal norms about the response to nonmarital pregnancies are also shifting. Recent research provides evidence that cohabitation is an increasingly common reaction to nonmarital pregnancies (Rackin and Gibson-Davis 2012; Raley 2001). The prevalence of postconception, pre-birth (i.e., "shotgun") marriage has decreased dramatically over time. In the early 1960s, 60% of women with nonmarital conceptions married before the birth of their first child, compared to just 23% in the early 1990s (Bachu 1999). At the same time, there has been significant growth in postconception, pre-birth cohabitation. Indeed, postconception cohabitation now outpaces postconception marriage. Estimates from the 2006-2008 National Survey of Family Growth (NSFG) indicate that nearly 21% of single, non-cohabiting women with nonmarital conceptions were in postconception cohabitations at the time of birth, compared to about 7% in postconception marriages (Lichter 2012). For economy of expression, hereafter I refer to relationships formed after conception but before the birth as postconception marriages and cohabitations.

As postconception cohabitations have become more prevalent, particularly among racial and ethnic minorities and low-educated women (Gibson-Davis and Rackin 2012; Lichter 2012), the developmental implications for children have become more important. Research has generally found that children born to cohabiting biological parents fare worse than children born to married biological parents in terms of cognitive tests, behavioral and emotional problems, school engagement, and economic resources (Artis 2007; Brown 2004; Manning and Brown 2006). Furthermore, this research showed that two-parent cohabiting families didn't offer any appreciable benefits for children over other family forms, such as cohabiting step-families, married step-families, or single parents. Although these studies shed light on families with biological cohabiting parents, they did not evaluate whether the timing of the cohabitation relative to conception was relevant to child well-being. It is therefore unclear whether this demographic and normative shift has broader consequences for child well-being. If postconception cohabitation is associated with poorer child well-being, it is possible that disproportionate rates of postconception cohabitation among disadvantaged populations could contribute to the diverging destinies of children from different social classes (McLanahan 2004).

It is also necessary to acknowledge heterogeneity within cohabiting families as it becomes a more common family arrangement. It is possible that postconception cohabitors provide a different home environment than cohabiting couples who were co-residing before having a child. Postconception cohabitations might offer a unique context for parenting because these relationships may be motivated by the impending arrival of a child rather than the deepening commitment of the romantic relationship (Reed 2006). In other words, these relationships might signify a more significant commitment to the role of parent rather than the role of partner. They may be beneficial insofar as they allow parents to more easily share child care, household, and financial responsibilities, but they might also be more fragile and prone to dissolution than relationships formed prior to conception. Alternatively, as postconception cohabitation becomes more common and cultural norms shift, it may be also considered an acceptable environment for childrearing and serve as a functional alternative to postconception marriage (Cherlin 2004). In this context, parents might jointly decide to have a child and begin cohabiting at the same time

(Musick 2007). If this is the case, postconception cohabitors might enjoy the benefits of sharing household and financial responsibilities without the greater risk of relationship dissolution. An examination of postconception cohabitations also facilitates a better understanding of whether the *timing* of the union formation vs. the *type* of union itself is more salient for child well-being.

STUDY OBJECTIVES

The current study begins to answer the call for more attention to children born into cohabiting families with two biological parents (Brown 2004; Manning and Lamb 2003; Manning and Brown 2006) by acknowledging postconception cohabitation as a distinct type of two-parent cohabitation. It complements a small but growing body of research on two-biological-parent cohabitation (Artis 2007; Brown 2004; Manning and Brown 2006) and demographic research on the growing trend of postconception cohabitation (Gibson-Davis and Rackin 2012; Lichter 2012; Rackin and Gibson-Davis 2012) by examining the linkages between postconception cohabitation and children's well-being. Specifically, this study considers the link between the parent's relationship status at birth and several measures of well-being among children ages 3-11 by comparing postconception cohabitation to other family forms, including (a) preconception cohabitation, (b) postconception marriage, (c) preconception marriage, and (d) biological parents who were not married or cohabiting at birth.[1]

Contrasting postconception cohabitation with these family structures addresses four specific research questions. The first research question compares pre- and postconception cohabitors. Are children born to preconception cohabitors any better or worse off than those born to parents who moved in after the conception but before the birth, on average? Because both groups of children experience the same family structure at birth, this comparison allows me to examine whether the *timing* of the union relative to conception has implications for child well-being.

[1] There are likely large racial differences in the relationship between postconception cohabitation and child well-being. Postconception cohabitation is more prevalent among Hispanics and non-Hispanic whites (Lichter, 2012), and there is evidence that the relationship between family structure and child well-being varies by race (Dunifon & Kowaleski-Jones, 2002; Fomby & Cherlin, 2007). Although the analyses in the current study account for race and ethnicity, limited sample size precludes a more detailed analysis of racial differences in the relationship between postconception cohabitation and child well-being.

Next, I examine whether children born to postconception cohabitors fare better or worse than children born to parents in postconception marriages. In both cases, the parents' relationship is formed in response to a nonmarital conception. Postconception marriages have declined dramatically over time while postconception cohabitations have become more prevalent, particularly among populations with low education (Lichter 2012; Rackin and Gibson-Davis 2012), and this contrast allows me to assess the implications of this demographic shift for child well-being. It also allows me to assess the salience of the *type* of union for child well-being.

The third research question examines the well-being of children born to postconception cohabitors relative to children born to parents who married prior to conception, which is considered the "gold standard" for child development and well-being. Do children fare better on average when they are born to parents in a traditional preconception marriage rather than postconception cohabitations?

The fourth research question examines whether children born to postconception cohabitors fare better or worse than parents who do not form a marital or cohabiting relationship. According to recent data, the vast majority of U.S. women who were not cohabiting and unmarried at conception remained single at birth (71.8%) (Lichter 2012). This comparison therefore reveals whether postconception cohabitation is associated with improved child well-being relative to the most common family arrangement for parents with nonmarital conceptions.

PRIOR RESEARCH ON POSTCONCEPTION COHABITATION

A small body of empirical and qualitative research has documented demographic trends and characteristics of postconception cohabitation. These studies provide important information about postconception cohabitation, and the current study builds on this literature by examining the implications of these trends for child well-being.

Norms about nonmarital pregnancies and single parenthood have shifted over time, as evidenced by the decline in postconception marriages and the increase in postconception cohabitations. Drawing on recent data from the 2006-2008 NSFG, Lichter (2012) confirmed that postconception cohabitations are much more common than postconception marriages among women with nonmarital conceptions (21% vs.

7%, respectively). Growth in postconception cohabitation is not evenly distributed across the population, however; it is concentrated among relatively disadvantaged populations. A study by Gibson-Davis and Rackin (2012) demonstrated socioeconomic stratification in the shift toward postconception cohabitation. Their analysis of NSFG data from 1985-2010 revealed that decreases in postconception marriage and increases in postconception cohabitation were concentrated among women with lower levels of education. There is also significant ethnoracial variation in postconception cohabitation; in 2006-2008, 31% of Hispanic, 20% of non-Hispanic white, and 14% of non-Hispanic black women with nonmarital conceptions entered into postconception cohabitations (Lichter 2012).

Drawing on a nationally representative cohort sample of men and women who were ages 12 -16 in 1997, Rackin and Gibson-Davis (2012) examined the characteristics of parents who select into postconception cohabitation and found that, on average, postconception cohabitors were less socioeconomically advantaged compared to married parents, but more advantaged than single parents. Pre- and postconception cohabitors were demographically similar in terms of age at first birth, religious attendance, and education at first birth. They found slight divergence in race and education; postconception cohabitors were more likely to be Hispanic and more likely to be currently enrolled in school.

In addition to examining the characteristics of parents who entered into postconception cohabitation, the authors estimated rates of dissolution among pre- and postconception relationships, which gives some indication of the stability of these relationships. They found slightly higher rates of dissolution among postconception cohabitors overall; 62% of preconception cohabitations and 57% of postconception cohabitations remained intact three years after the birth. This average survival estimate obscures significant fragility among racial and ethnic minorities, however. Among Black parents, 58% of preconception cohabitations remained intact at three years compared to 45% of postconception cohabitations. Among Hispanics, 70% of preconception cohabitations remained intact at three years, compared to just 54% of postconception cohabitations. It is noteworthy that postconception cohabitation

is much more fragile than preconception cohabitation among Hispanics, the racial/ethnic group that is more likely to enter into this type of arrangement.

Qualitative research provides insight into why couples enter postconception cohabitations. A qualitative study drawing on interviews with 44 cohabiting couples with children from the Time, Love and Cash in Couples with Children study found that the vast majority of parents in the sample began cohabiting in response to a nonmarital pregnancy (73%) (Reed 2006). These couples reported that cohabiting allowed them to co-parent while avoiding the commitment of marriage. They enjoyed the practical convenience of sharing parenting and household expenses, but also valued the fact that their relationship could be easily dissolved if necessary. Most couples indicated that they planned to marry eventually, but many also experienced problems with insufficient financial resources, infidelity, domestic violence, or general mistrust.

Taken together, past research suggests that postconception cohabitation is a potentially unique situation relative to the more common scenario in which cohabitation begins prior to conception[2]. Although preconception and postconception cohabitors are demographically comparable, the relationship formation process is potentially dissimilar and may have implications for child well-being. The decision to enter a postconception cohabitation may be framed as a parenting choice, while the decision to form a preconception cohabitation may be viewed as a relationship choice. Postconception cohabitations may be beneficial insofar as they allow parents to more easily share child care, household, and financial responsibilities, but they might also be more fragile and prone to dissolution than relationships formed prior to conception. This household environment may have important implications for child well-being.

Selection bias

Alternatively, it is possible that associations between postconception cohabitation and child well-being are not causal, but are due to factors that are associated with both family structure and child outcomes. In other words, children in postconception cohabitations might experience variations in well-

[2] Estimates from the 2006-2008 NSFG indicate that among births to cohabiting couples, only 21% were to postconception cohabitors (Lichter 2012).

being as a function of their parents' socioeconomic status, race, or other unobserved characteristics rather than the family structure at the time of birth. For example, parents who have a nonmarital conception and enter into a postconception cohabitation may be less stable or family oriented than married parents, and child well-being may be linked to these characteristics rather than the family structure *per se*. Men and women in postconception cohabitations are younger at first birth, have lower educational attainment, and are more likely to be racial or ethnic minorities compared to adults in preconception marriages, but have similar characteristics as those in preconception cohabitations and postconception marriages (Rackin and Gibson-Davis 2012). Given the demographic profile of postconception cohabitors, we might expect children born into this family arrangement to experience poorer well-being relative to those born to married parents, similar well-being relative to those born to preconception cohabitors, and better well-being relative to those born to single parents. If family structure is not a causal mechanism, we would also expect these associations to disappear once we account for the types of people who are likely to enter into these types of family structures.

PRIOR RESEARCH ON COHABITATION AND CHILD WELL-BEING

Prior research has examined associations between cohabitation and child development, but has not differentiated between pre- and postconception cohabitation. As mentioned previously, children born to cohabiting biological parents tend to fare worse than children born to married biological parents, and similar to children with cohabiting step-parents, married step-parents, and single parents in terms of cognitive tests, behavioral and emotional problems, and school engagement (Artis 2007; Brown 2004; Manning and Brown 2006).

Research has also evaluated linkages between cohabitation and the household environment, such as economic resources, the quantity and quality of parenting, and family stability. Although children in cohabiting families generally enjoy more economic resources than children in single-parent families, they have fewer resources when compared to children in married-parent families (Manning and Lichter 1996). This might be due to the fact that parents who enter into cohabiting relationships have lower education, wages, and employment than those who enter into marriages (Sigle-Rushton and McLanahan 2002).

Cohabiting couples are also less likely than married couples to pool their income or maintain joint bank accounts (Addo and Sassler 2010; Oropesa, Landale, and Kenkre 2003). Indeed, cohabiting couples report that limited economic resources are a significant barrier to marriage (Smock, Manning, and Porter 2005).

Research generally suggests that cohabiting parents exhibit slightly more negative parenting behavior compared to married-parent families (Hofferth and Anderson 2003; Thomson, Hanson, and McLanahan 1994). Furthermore, one study found that cohabiting biological fathers spent 3.7 fewer hours per week with their children than married biological fathers (Hofferth and Anderson 2003). Nonetheless, differences in parenting behavior do not seem to explain differences in the cognitive and behavioral development of children in cohabiting and married-parent families (Dunifon and Kowaleski-Jones 2002; Thomson, Hanson, and McLanahan 1994).

There is evidence that cohabiting relationships are less stable relative to marriage overall. Empirical estimates suggest that most children who are born to or ever live in a cohabiting family will experience a change in family structure within a few years (Graefe and Lichter 1999). Indeed, children born to cohabiting parents experience more instability than children born to single parents and married biological parents (Cavanagh and Huston 2006; Raley and Wildsmith 2004). This instability may be attributed to the fact that cohabitation is not as institutionalized as marriage, and commitment to the relationship isn't as strongly reinforced by social norms or laws (Cherlin 2004). Postconception cohabitations may be particularly fragile (Rackin and Gibson-Davis 2012), which may have negative implications for child well-being (Cavanagh and Huston 2008; Fomby and Cherlin 2007; Osborne and McLanahan 2007).

This study's conceptual model links the biological parents' relationship status at birth to later child outcomes, even if the parents do not remain partnered. I argue that the relationship status at birth gives some indication of the family structure trajectory, which has implications for child well-being. Indeed, prior research suggests that family instability is related to family structure at birth (Cavanagh and Huston 2006). If a child is born to parents in a particularly fragile union they are more likely to

experience a great deal of family instability as they grow (Cherlin 2009). This instability is therefore conceptualized as part of the effect of relationship status at birth. Children may witness several relationship transitions, such as the dissolution of their parents' relationship and subsequent re-partnering. These transitions are linked to poor child well-being (Cavanagh and Huston 2006; Cherlin 2009; Fomby and Cherlin 2007), and are not captured by simply observing the parents' current relationship status.

STUDY HYPOTHESES

Prior research and theory informs several hypotheses for the research questions evaluated in this study. The first research question evaluates the well-being of children born to postconception cohabitors relative to those born to preconception cohabitors. This contrast allows me to assess whether the *timing* of the relationship has implications for child well-being. If the impending pregnancy motivated the parents to enter into a more serious relationship than they otherwise would have considered, we might find a negative relationship between postconception cohabitation and child well-being. Mothers facing a nonmarital conception might settle for poorer quality partners if they feel social pressure to live with the child's biological father or want the opportunity to share child care responsibilities. If postconception cohabitation reflects a deepening commitment to the parenting role but not to the adult relationship, it is possible that it is associated with increased family instability and, in turn, poorer child well-being. Alternatively, parents may view cohabitation as an appropriate alternative to marriage and might jointly decide to have a child and begin cohabiting (Musick 2007). Under this scenario we would expect children of pre- and postconception cohabitors to have similar well-being. Moreover, pre- and postconception cohabitors are demographically similar (Rackin and Gibson-Davis 2012) and their children experience the same family structure at birth, which would also suggest no difference in child well-being.

The second research question evaluates postconception cohabitation relative to postconception marriage, and allows me to assess whether the *type* of relationship is salient for child well-being. A preliminary hypothesis is that postconception marriage is associated with improved well-being relative to postconception cohabitation, in part due to increased family stability. Although both relationships are

formed in response to a nonmarital conception, parents who enter into marriages may signal a stronger commitment to their romantic partner. Marriage is a more institutionalized family structure that is strengthened by legal and social norms (Cherlin 2004). Indeed, studies suggest that cohabiting relationships are generally less stable and lower quality than marriages (Osborne and McLanahan 2007; Wu and Musick 2008).

The third research question evaluates postconception cohabitation relative to preconception marriage, which is considered the optimal context for raising children. The initial hypothesis is that preconception marriage is associated with significantly better well-being relative to postconception cohabitors because parents in these marriages tend to have higher socioeconomic status and children benefit from their social and financial resources. Additionally, parents in preconception marriages tend to have more stable unions than postconception cohabitors because their relationships are more institutionalized (Cherlin 2004).

The fourth research question evaluates the well-being of children born to postconception cohabitors relative to those born to parents who did not form a marriage or cohabitation. The initial hypothesis is that cohabitation will be associated with better child well-being compared to these unpartnered parents, in part because this arrangement facilitates a more equitable division of labor in terms of child care and financial responsibilities. In addition, single parents may be more likely to form and dissolve more relationships, exposing children to more partnership transitions and family instability.

METHOD

Data and Sample

Analyses for this paper draw on data from the Fragile Families and Child Well-Being Study (FFCWS). The FFCWS is a longitudinal birth cohort study of 4,898 children born between 1998 and 2000 in 20 large U.S. cities with populations of 200,000 or more people (see Reichman et al. 2001 for a detailed description of the sampling design). The FFCWS includes an oversample of nonmarital births, which provides a unique opportunity to explore postconception cohabitation. Mothers were initially interviewed in the hospital within two days of the focal child's birth, and follow-up interviews were

completed when the focal child was approximately one, three, five, and nine years old. Of particular interest to this analysis, the FFCWS survey collected detailed measures about the parents' relationship history as well as behavioral and cognitive assessments for the focal child at the age 3, 5, and 9 follow-up interviews.

The sample for this study excludes mothers who did not participate in any of the age 3, 5, or 9 follow-up surveys (n=646), did not have a valid response for at least one of the dependent variables evaluated in the analyses (n=94), were missing information about their relationship status at birth (n=353)[3], did not live with the child at least half time (n=219), or if the child's father was deceased (n=87). The eligible sample is n=3,499 unique respondents (71% of sample interviewed at birth). The sample for this study is pooled such that respondents contribute an observation for each wave in which they were interviewed. Each respondent can contribute up to three observations; 70% of the sample contributed 3 observations, 23% contributed two observations (age 3 and 5, age 3 and 9, or age 5 and 9), and 7% contributed only one observation. The total analytic sample is n=8,218 person-year observations.

Sixty five percent of the analytic sample had complete data for all control variables included in the analyses, and missing data were multiply imputed by chained equations (Rubin 1987). Most control variables had very few missing responses (0-3% missing), with the exception of father's age and employment (18-19% missing). Data that were missing due to attrition were not imputed. Respondents with missing data for the children's behavior problems and cognitive test score dependent variables were included in the imputation but excluded from the analytic sample (von Hippel 2007).

Measures

Independent variables. The key independent variable in this analysis is the biological parents' relationship status at the time of the focal child's birth, and the timing of their relationship formation

[3] Relationship status at birth is ambiguous for n=58 respondents. These cases have conflicting information in the variable for relationship status at birth (constructed by the FFCWS based on respondent reports and household roster at the baseline interview) and the start date of their marriage or cohabitation (respondent reported date at the age 1 follow-up interview). The discrepant cases reported being married or cohabiting at baseline, but at the age 1 interview reported that the relationship started after the baseline interview. I have classified these cases as "not

relative to conception. This categorical variable indicates whether, at the time of the birth, the child's parents were in a (a) postconception cohabitation (defined below), (b) preconception cohabitation, (c) postconception marriage, (d) preconception marriage, or (e) not married or cohabiting. This variable is coded using a constructed variable that reflects the mother and father's relationship status at the time of the child's birth, the start date of the mother and father's cohabitation or marriage, and the child's birth date. The constructed variable for relationship status at birth combines information from the mother about her marital status, cohabitation status (including information from a household roster), and a description of her current relationship with the child's father. The start date of cohabitation or marriage is collected at the age 1 follow-up interview; mothers who were cohabiting with or married to the child's father at birth or at the age 1 interview were asked to report the date they started living together or got married. The child's birth date is proxied by the baseline interview date, which took place in the hospital within two days of the child's birth. Following prior research (Rackin and Gibson-Davis 2012; Raley 2001), postconception cohabitation is defined as a cohabiting relationship between the child's biological parents that was formed zero to seven months before the child's birth and remained intact at the time of birth. Preconception cohabitation is defined as cohabitation that began 8 or more months prior to the birth of the focal child. Similarly, postconception marriages were formed zero to seven months prior to the child's birth and preconception marriages were formed eight or more months before the child's birth.

There is some potential error in the conceptualization of these relationship measures because we do not know the actual date of conception. For example, if parents begin cohabiting immediately after finding out about a pregnancy (around four weeks gestation) they could be erroneously categorized as preconception cohabitors, resulting in artificially low estimates of postconception cohabitation. If a child is born prematurely, parents could be incorrectly categorized as postconception cohabitors, resulting in inflated estimates of postconception cohabitation. Nevertheless, this coding approach is the best approximation of relationship formation relative to conception given that the conception date is not

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married/cohabiting at birth" to retain as much sample as possible. Regression results do not significantly change when these cases are excluded from the sample.

available. The slippage is likely minimal, and this method of identifying pre- and postconception relationships has been used in prior research (Bachu 1999; England, Wu, and Shafer 2012; Ginther and Zavodny 2001; Rackin and Gibson-Davis 2012; Raley 2001).

There is also some potential measurement error in the reported dates of cohabitation. Cohabitation is a less institutionalized family structure than marriage, and the start and end dates may be more fluid (Manning and Smock 2005). As a result, couples may have difficulty pinpointing the date they began cohabiting. There are also some concerns about the quality of retrospective reports of cohabitation in surveys, which may lead to artificially low cohabitation rates (Hayford and Morgan 2008). Indeed, prior research demonstrated that about 12% of Fragile Families survey respondents revised their reports about cohabitation between the baseline and age 1 follow-up surveys (Teitler, Reichman, and Koball 2006). Nonetheless, there is reason to believe that the measure of postconception cohabitation in the current study is a valid metric for the research objectives. The current study's measure of cohabitation relies on both contemporaneous and retrospective reports, which is in line with the recommendation of Teitler and colleagues (2006). Furthermore, the retrospective report is lagged only one year for parents in postconception relationships, which minimizes concern about the quality of retrospective data. Finally, reports may be more accurate for parents in postconception relationships because the beginning of their cohabitation is linked to the pregnancy, a significant milestone. If respondents do under-report cohabitation, the results will provide a conservative estimate of the relationship between postconception cohabitation and child well-being.

Note that there is some heterogeneity within the group of mothers who were not married or cohabiting at the time of birth. For example, mothers in this group had varying degrees of contact with the child's biological father at the time of birth: 68% of these parents were "visiting" with the biological father (romantically involved but not cohabiting), 15% were friends, and 17% had little to no contact. Although unlikely, it is also possible that these mothers were in a relationship with someone other than the biological father at the time of birth. For these reasons I intentionally refer to this group as "not married or cohabiting" with the child's biological father rather than "single."

Dependent variables. Child well-being is assessed with several variables that measure child development and household environment. Child behavior is measured with the *anxious/depressed* and *aggressive* subscales of the Child Behavior Checklist (CBCL) (Achenbach 1992; Achenbach and Rescorla 2000). Mothers are asked to rate their child's behavior in the past two months by indicating whether each item is never true (0), somewhat or sometimes true (1), or very true or often true (2). The anxious/depressed scale consists of items such as being fearful, clingy, feeling unloved, or feeling sad, and the aggressive scale consists of items such as being defiant, arguing, being disobedient, and destroying things. The items are averaged to create the overall scale, with higher values indicating more behavior problems.

Child's cognitive development is assessed with the Peabody Picture Vocabulary Test (PPVT). The child's PPVT score is standardized by age. Note that the sample size for the child's PPVT score is smaller than the mother-reported CBCL measures; only about 78% of FFCWS respondents who completed the in-home interview also completed the activity booklet, which included the child's PPVT assessment.

Economic resources are measured with a continuous variable of *household income* in the year prior to the child assessment, expressed in thousands of dollars. Household income includes the respondent's income as well as the income of everyone else who lives with the respondent, which should capture the income of a cohabiting partner. There is also a dichotomous variable that indicates whether the mother received *welfare* benefits in the prior year.

The *Aggravation in Parenting* scale is derived from questions in the Parenting Stress Inventory (Abidin 1995). Mothers report how strongly they agree with items such as "being a parent is harder than I thought it would be" and "I feel trapped by my responsibilities as a parent" using a four-point scale that ranges from 1=strongly agree and 4=strongly disagree. Responses were reverse-coded and averaged so that higher scores indicate increased aggravation in parenting.

Father involvement is a mother report of how often the father spent one or more hours per day with the child over the past month using a 1-5 scale where 1 indicates "*(nearly) every day*" and 5

indicates "*not at all*." The scale is reverse-coded so a higher score indicates more frequent father involvement.

Relationship dissolved is a dichotomous variable that indicates whether parents who were married or cohabiting at the time of the child's birth had dissolved their relationship at the time of the child's assessment (at age 3, 5, and/or 9). Parents who dissolved their marriage or cohabitation were coded as "1," and parents who did not dissolve a marriage or cohabitation were coded as "0." Parents who were not married or cohabiting at birth are not included in this measure because they did not have a relationship to dissolve at baseline.

Partner transitions are the number of the mother's romantic partnership changes between the child's birth and the time of child assessment. Following the approach employed by Osborne and McLanahan (2007), this variable captures the formation and dissolution of romantic relationships and is not limited to coresidential relationships. For example, if the child's biological parents were dating at the child's birth and cohabiting at the age 1 interview, the mother did not experience a partner transition. If the mother was cohabiting with the biological father at the age 1 interview and had a new partner at the age 3 interview, she experienced two transitions: the dissolution of the relationship with the biological father and the formation of the relationship with the new partner. Mothers who reported having a child with a new partner between interviews but were not in a relationship at either wave are coded as having two transitions (the beginning and ending of that relationship).

Note that partner transitions are coded based on the relationship status reported at each wave. The FFCWS did not collect information about partnerships that began and ended between interviews until the age 5 follow-up interview. To maintain consistency across waves I estimated partnership transitions based on the reported relationships at each wave. As a result, this variable might undercount the number of partnership transitions and therefore provides a conservative estimate of family stability[4].

[4] To get a sense of the degree to which the estimation method undercounts relationship transitions, I compared the estimated average partnership transitions to the self-reported partners between waves at age 5 and age 9. At the age 5 interview, respondents self-reported an average of 0.51 partners between age 3 and age 5, while the estimated partnership transitions based on relationship status at each wave yielded an average of 0.46 transitions. At the age 9

Control variables.

The analyses adjust for characteristics that are potentially associated with both postconception cohabitation and child well-being. Adjusting for these characteristics allows me to assess whether selection into postconception cohabitation and other family types can explain any initial associations between family structure and child well-being. *Mother's race/ethnicity* is measured with a categorical variable that indicates whether she is white (referent), black, Hispanic, or some other race. Mother's and father's *age at birth* is measured with continuous variables for age at the time of the focal child's birth. Mother's and father's *education* at the child's birth is measured with categorical variables that indicate whether they had less than a high school education (referent), a high school diploma or GED, some college, or a college degree or graduate work. *Welfare receipt* is measured with a dichotomous variable that is coded "1" if the mother received public assistance in the year prior to the child's birth. Mother's cognitive ability is measured at the age 3 follow-up interview using a subset of the Similarities subtest of the Wechsler Adult Intelligence Scale – Revised (*WAIS-R*). Correct items are summed to create the overall score, with higher scores indicating higher cognitive ability. *Father's employment* at the time of the child's birth is measured with a categorical variable that indicates whether the father was unemployed (referent), worked 1-34 hours per week, 35-44 hours per week, or 45 or more hours per week. *Household income* in the year prior to the birth is measured in thousands of dollars. A dichotomous variable indicates whether the *child is male*. There is also a variable for the *child's age* at the time of assessment; this variable ranges from 2.5 to 11 years old, although most interviews were conducted when the children were approximately 3, 5, and 9 years old. A continuous variable indicates the number of *children under age 18 in the household* at the time of the focal child's birth. All control measures were collected at the baseline interview with the exception of child's age at assessment and the mother's cognitive test scores, which were not collected until the age 3 follow-up interview.

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interview, respondents reported an average of 0.68 partners between age 5 and age 9, and the estimated partnership transitions is 0.56 (results not shown).

Supplemental analyses further adjust for the mother's *relationship status* at the time of child assessment. A categorical variable indicates whether the mother was married to the child's biological father, married to another partner, cohabiting with the child's biological father (referent), cohabiting with another partner, or not married or cohabiting.

Analytic strategy

These analyses rely on Ordinary Least Squares (OLS) regressions to examine the relationship between postconception cohabitation and several metrics of child well-being, using clustered standard errors to account for the fact that data are pooled across the age 3, age 5, and age 9 assessments. In equation (1), Y_{it} is the child well-being outcome of child *i* at time *t*, the vector $RELATIONSHIP_{i0}$ represents a series of four variables that capture the mother's relationship status at the time of the focal child's birth (postconception cohabitation (referent), preconception cohabitation, postconception marriage, preconception marriage, not married/cohabiting), and the vector Z_{i0} represents a series of control variables measured at the child's birth (described above). Note that the models predicting household income and odds of welfare receipt also control for these measures in the year prior to the child's birth. This helps to isolate changes in the household's economic resources after the birth of the child.

$$Y_{it} = \alpha + \beta_{1\text{-}4}RELATIONSHIP_{i0} + \mathbf{Z}_{i0}\,\gamma_{5\text{-}24} + e_{it} \quad (1)$$

These multivariate regressions provide insight into the relationship between family structure and child well-being, but there are some limitations to this approach. These models cannot support causal inference and can only estimate associations between family structure at birth and different metrics of child well-being. Although the models adjust for a rich set of background and demographic characteristics, they rely on the assumption that selection is fully captured by observable characteristics and are therefore susceptible to omitted variable bias. For example, if there are unobserved characteristics that are linked to both selection into family structure and child well-being the estimates will be biased. Although fixed effects models are one possible alternative approach that could account for selection bias due to unobservable fixed characteristics, this type of model is not appropriate for the

research question because the key independent variable-- relationship status at the time of birth-- does not vary over time. Therefore, OLS regressions are an appropriate approach for estimating non-causal associations between family structure at birth and child well-being.

RESULTS

Descriptive statistics

Descriptive statistics for the full sample are presented in Table 1. Five percent of mothers were in postconception cohabitations at the time of the focal child's birth, while 26% were cohabiting at the time of conception. Postconception marriages (2%) were less prevalent than postconception cohabitations, and 22% of mothers were married at the time of conception. Most mothers (45%) were not married or cohabiting at the time of the child's birth. Minorities are overrepresented in the sample; almost half of the mothers in the sample are Black, 26% are Hispanic and 22% are White. The sample is also skewed toward low-educated and low-income parents; about two thirds of mothers and fathers had a high school degree or less education at the time of the focal child's birth, and 36% of mothers reported receiving welfare benefits in the year before the child's birth.

Table 2 presents descriptive statistics by the biological parents' relationship status at birth. In this table, the asterisks indicate statistically significant differences from postconception cohabitors. Overall, parents in postconception and preconception cohabitations had similar characteristics in terms of race, welfare receipt, and father's education. They also had similar rates of relationship dissolution and romantic partner transitions. Compared to preconception cohabitors, mothers in postconception cohabitations were slightly younger at the time of birth, had slightly more education, higher income in the year prior to the child's birth, and fewer children under age 18 in the household.

Postconception cohabitors were less advantaged than parents in pre- and postconception marriages overall. Compared to those who were married at the time of birth, mothers in postconception cohabitations were more likely to be ethnic or racial minorities and more likely to have received welfare benefits in the year before the child's birth. Postconception cohabitors were also younger at the time of birth, had less education, and lower household income. Fathers in postconception cohabitations had less

education, were more likely to be unemployed, and were less involved with their children relative to fathers in pre- and postconception marriages. Postconception cohabitations were also more fragile than marriages, with more relationship dissolutions and romantic partner transitions.

Finally, postconception cohabitors were more advantaged compared to those who were not married or cohabiting with the biological father at the focal child's birth. Specifically, mothers in postconception cohabitations were less likely to have received welfare in the year before the child's birth, and had higher household income on average compared to mothers who were not married or cohabiting. Mothers in postconception cohabitations were more likely to be white or Hispanic and less likely to be black compared to unpartnered mothers. Fathers in postconception cohabitations had more education, were less likely to be unemployed, and more likely to work full-time compared to fathers who were not married or cohabiting. Fathers in postconception cohabitations were more involved with their children, and mothers experienced fewer romantic partner transitions compared to unpartnered parents.

Regression models

Table 4.3 summarizes the results from multivariate regressions predicting children's behavior problems, children's cognitive test scores, household economic resources, parenting behavior, and family stability. The regression coefficients for the relationship status variables present the average difference in child well-being relative to postconception cohabitors.

The first research question asks whether children born to postconception cohabitors fare better or worse compared to the children of preconception cohabitors. The results in Table 3 indicate that children of pre- and postconception cohabitors had similar development and household environments. There were no statistically significant differences in behavior problems, cognitive test scores, household economic resources, parenting behavior, and family stability. One exception is that mothers who began cohabiting prior to conception reported slightly less aggravation in parenting on average, although this coefficient is only marginally significant ($p < .10$). Also note that the R^2 statistic for this model is quite low, so the model explains only a small amount of variation in parenting aggravation. One potential explanation for higher levels of parenting aggravation among postconception cohabitors is that they may be more likely

to have an unintended birth, which is associated with poorer parental psychological well-being and less support and communication between parents (Bronte-Tinkew et al. 2009; Su 2012). With the exception of this variation in parenting aggravation, the *timing* of the cohabitation relative to conception does not appear to be salient for child well-being.

The second research question compares well-being among children born to parents in postconception cohabitations and postconception marriages. The results were mixed. Results in Table 3 suggest that children born to parents in postconception cohabitations and postconception marriages experienced similar behavior problems. Surprisingly, children born to parents in postconception marriages had slightly lower PPVT scores on average compared to children born to postconception cohabitors, after adjusting for background characteristics such as the parents' education and mother's cognitive ability. It is worth noting that the naïve model indicates that these children had statistically similar PPVT scores (see Appendix Table 1 or the difference in mean PPVT scores in Table 2). In a supplementary analysis in which I incrementally added controls (not shown), this negative association emerged after adjusting for mother's and father's education, child's age, and child's sex. Despite this small advantage in cognitive test scores, children born to postconception cohabiting parents experienced poorer household environments relative to children of postconception married parents. Mothers in postconception marriages had lower odds of welfare receipt, fewer romantic partner transitions, and lower odds of relationship dissolution compared to mothers in postconception cohabitations. In sum, the *type* of postconception relationship is associated with cognitive test scores, the mother's economic resources, and family stability, although marriage is not positively associated with all of these factors, contrary to preliminary hypotheses.

The third research question asks whether children born to postconception cohabitors fare worse than children born to parents in preconception marriages. Children born to preconception married parents demonstrated slightly less anxious behavior ($p < .10$), but similar aggressive behavior and PPVT scores. Preconception married parents had significantly higher household income ($5,682 more annual income, on average) and lower odds of welfare receipt. Children born to preconception married parents also

experienced more father involvement and family stability relative to children of postconception cohabitors. These results suggest that preconception marriage is associated with a higher quality household environment and fewer child behavior problems compared to postconception cohabitations.

The fourth research question compares postconception cohabitation to families in which the biological parents were not married or cohabiting at the time of birth, which is the most common arrangement for parents with nonmarital conceptions. These results suggest that postconception cohabitation is not associated with children's behavior problems or cognitive test scores relative to remaining unpartnered. Unpartnered parents did experience poorer household environments compared to postconception cohabitors, however. Specifically, unpartnered parents had lower household income, higher odds of welfare receipt, less father involvement, and more romantic partner transitions compared to postconception cohabitors. In sum, postconception cohabitation is associated with a higher quality household environment relative to parents who are unpartnered.

Sensitivity Tests

Recall that this study's conceptual model links relationship status at birth to child development and the household environment. To determine whether relationship status at birth has a unique association with these measures, I added controls for the mother's relationship status at the time of child assessment. The results are robust and yield similar findings (see Appendix Table 1). Although current relationship status is linked to the household environment and child development, relationship status at birth continues to have independent associations with these metrics of well-being. The R^2 statistics are quite similar compared to the original models, which suggests that current relationship status does not explain significantly more variation in the dependent variables.

Another sensitivity analysis limited the sample to mothers and first-born focal children. Sixty percent of mothers in the analytic sample had older biological children at the time of the focal child's birth; excluding them yields a sample of n= 3,249 person-year observations with first births. It is possible that a nonmarital pregnancy is a stronger motivation to form a postconception relationship among first-time mothers, which is consistent with this study's theoretical assumptions. Parents who have older

children were not motivated to start cohabiting by their previous pregnancies, which suggests that other factors may have prompted their relationship formation. Mothers with older children may have additional considerations in deciding whether to form a relationship, particularly if their older children have different fathers[5]. Mothers must consider their relationship with the older children's' biological father(s) as well as the relationship between the new partner and the older children. Additionally, fathers who form postconception cohabitations with mothers who have older children may have different characteristics than those who do not have any other children. From the perspective of the children, a child born to postconception cohabitors who have older children may be entering a family with biological siblings or a blended family with half-siblings, and this family composition may have implications for child well-being.

Appendix Table 6 summarizes the results of regressions predicting child development and household environment among the sample of first births. Results from the sample of first births yield the same general conclusions as the total sample, with a few caveats. The results relative to preconception cohabitors are consistent with one exception: the sample of first-born children indicates that preconception cohabitors had significantly lower income compared to postconception cohabitors, while the full sample indicates that they were statistically similar. The results relative to postconception married parents are also consistent, although the coefficient for PPVT scores no longer reaches the threshold of statistical significance in the sample of first births. Preconception married parents had statistically similar household income and odds of welfare receipt as children of postconception cohabitors in the sample of first births, while results from the total sample reached traditional thresholds of statistical significance indicating the preconception married parents had more economic resources.

DISCUSSION

Postconception cohabitation is an increasingly common response to nonmarital pregnancies (Lichter 2012; Rackin and Gibson-Davis 2012), yet little is known about how children fare in this type of

[5] At the age 1 interview, a little more than half of mothers who had older children at the time of the focal child's birth reported having children by someone other than the focal child's biological father. This gives some indication

family structure. The current study compliments a small but growing body of research on families with two biological cohabiting parents (Artis 2007; Brown 2004; Manning and Brown 2006), as well as demographic research on the growing trend of postconception cohabitation (Gibson-Davis and Rackin 2012; Lichter 2012; Rackin and Gibson-Davis 2012) by examining the relationship between postconception cohabitation and child well-being among children age 3-11. Specifically, I evaluated the behavioral and cognitive development and household environment of children born to parents in postconception cohabitations relative to those born to parents in preconception cohabitations, parents in pre- or postconception marriages, and parents who were not married or cohabiting

Taken together, the evidence suggests that young children born to parents in postconception cohabitations experienced similar degrees of behavior problems and cognitive test scores compared to children in other family structures. These findings are contrary to the initial hypotheses, which posited that postconception cohabitation would be associated with poorer child development compared to preconception cohabitors and pre- and postconception marriages, but better development compared to unpartnered parents. Nevertheless, the findings are similar to prior research that found that children in two-parent-cohabiting families fared similarly as children in cohabiting step-families, married step-families, and single parents (Artis 2007; Brown 2004; Manning and Brown 2006) (although the current study evaluated family structure at birth rather than the current family structure).

Results from this study provide some indication about the relationship formation process and the meaning of cohabitation for the parents included in the sample. The first research question evaluated postconception cohabitation relative to preconception cohabitation, which speaks to the relevance of the *timing* of the cohabitation relative to conception for child well-being. Evidence suggests that the timing is not a relevant distinction in terms of child development, economic resources, and family stability. The initial hypothesis that preconception cohabitors would have more stable relationships than postconception cohabitors was not supported; pre- and postconception cohabitors experienced a similar number of romantic partner transitions and likelihood of relationship dissolution. This might suggest that

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of the prevalence of multipartner fertility at the focal child's birth.

postconception cohabitors make their relationship and fertility decisions jointly. In other words, the decision to enter into a postconception cohabitation might be framed as both a commitment to the parenting role and the partnership role.

The second research question evaluated whether the *type* of postconception relationship, marriage or cohabitation, was relevant for child well-being. This comparison provides some insight into the implications of the demographic and cultural shift away from postconception marriage in favor of postconception cohabitation. Results indicate that children born to postconception cohabitors and postconception married parents had similar degrees of problem behavior, but children of postconception married parents had slightly lower cognitive test scores. This is somewhat surprising given prior research that associates marriage with better child development. Nonetheless, the current study revealed some important differences in the household environment of postconception cohabitors and postconception married parents, which suggest that cohabitation is still not equivalent to marriage. Postconception marriages were associated with lower odds of welfare receipt, fewer romantic partner transitions, and lower odds of relationship dissolution. It is not surprising that postconception marriages were more stable, given that marriage is a more institutionalized family structure that is reinforced by legal and social norms (Cherlin 2004).

The third and fourth research questions evaluated postconception cohabitation relative to preconception marriage and unpartnered parents, respectively. Although children born to preconception married parents had access to greater financial resources, more father involvement, and more family stability, results suggested that they had similar degrees of anxious behavior problems and cognitive test scores as children of postconception cohabitors. In the same vein, children born to unpartnered parents had similar behavior problems and cognitive test scores compared to children born to postconception cohabitors, despite having fewer economic resources, less father involvement, and less family stability. These findings are contrary to the initial hypotheses, which posited that children born to postconception cohabitors would fare worse than those born to married parents, but better than those born to unpartnered parents.

These results suggest that the shift from postconception marriage to postconception cohabitation may not have broader consequences in terms of child development, at least among this study's largely racial and ethnic minority sample of young children. Why is postconception cohabitation unrelated to children's behavioral and cognitive development relative to other family structures, despite being associated with increased family instability, a risk factor for poor developmental outcomes? One potential explanation is related to the fact that cohabitation is an increasingly normative context for childrearing. As cohabitation has become more common, norms about the "legitimation" of nonmarital births have relaxed, as reflected by the decline in postconception marriage and the concomitant increase in postconception cohabitation. Perhaps parents who are likely to form postconception cohabitations today would have been more likely to enter into postconception marriages when social norms about marriage were more stringent.

Another potential explanation is related to this study's large racial and ethnic minority sample. Although prior research links family instability to poorer developmental outcomes for children overall, there is evidence that the effect may vary by race (Cavanagh and Huston 2006; Fomby and Cherlin 2007). Specifically, family structure transitions were associated with poorer well-being for white children, but not for black children (Fomby and Cherlin 2007). Given that 40% of postconception cohabitors in the current study's sample are Black and 34% are Hispanic, it is possible that racial differences in the relationship between family instability and child well-being can explain why postconception cohabitation is not associated with children's behavioral and cognitive development. Because increases in postconception cohabitation are concentrated among racial and ethnic minorities, acknowledging racial variation in the relationship between family structure and child development is crucial to understanding the implications of this shift.

Finally, it's possible that differences in economic resources and family stability between postconception cohabitors and postconception married parents may have longer term implications for children's behavioral and cognitive development that have not yet emerged among the current study's sample of 3-11 year old children. Future research on an older adolescent and young adult sample might

be able to further interrogate the longer term implications of postconception married and postconception cohabiting family environments.

This study has several limitations that merit attention. Although the analyses draw on rich data that provide a unique opportunity to examine postconception cohabitation and child well-being, the sample is not nationally representative. The Fragile Families study is a birth cohort study designed to be representative of children born between 1998-2000 in large cities with populations of 200,000 or more when weighted with sampling weights. The current study draws on measures from the in-home component of the survey, however, and the Fragile Families study does not provide sampling weights that account for the additional attrition in this survey. The results should therefore not be generalized to a national population, and the demographic composition of the sample should contextualize the findings. Nonetheless, this sample provides a unique opportunity to examine the implications of postconception cohabitation among the population that has seen the most growth in this type of family structure. Finally, it is possible that cohabitation rates are underestimated in the sample, which provides a conservative estimate of the relationship between postconception cohabitation and makes the results susceptible to type II error (failure to reject a false null hypothesis).

This study sheds light on the relationship between postconception cohabitation, child well-being, and household characteristics, but also highlights avenues for future research. Although the current study suggests that children born to postconception cohabitors experience similar behavioral and cognitive development as children in other family structures, on average, it does not address whether these arrangements have varying effects by race/ethnicity or socioeconomic status. For example, it is possible that postconception cohabitation is associated with poorer well-being than postconception marriage among relatively disadvantaged children, but not more affluent children. Research finds that the shift from postconception marriages to postconception cohabitations is driven by low-educated women and hypothesizes that this dynamic might reinforce inequality among disadvantaged children (Gibson-Davis and Rackin 2012). Future research should evaluate whether the link between postconception cohabitation

and child well-being varies by education or socioeconomic status to shed light on the implications of this stratification.

As more couples choose to cohabit in response to a nonmarital pregnancy, it is important to understand the implications of this family structure for children. Given that growth in postconception cohabitation is concentrated among low-educated mothers and racial/ethnic minorities, it is possible that this demographic shift could reinforce the inequalities of children born into different social classes. Results from this study suggest that the shift toward postconception cohabitation may not have consequences for children's behavioral and cognitive development, at least among the large racial and ethnic minority sample evaluated in this study. This does not imply that postconception cohabitation is an ideal family structure, however. Children born to postconception cohabitors experience fewer economic resources, less father involvement, and more family instability compared to married parents. These characteristics may further compound the relative disadvantage of children born to unmarried parents.

Table 1. Demographic and family characteristics for total sample

Variable	Person-Year Obs	Mean or %	Std. Dev.
Parents' relationship status at birth			
Postconception cohabitation	8218	0.05	
Preconception cohabitation	8218	0.26	
Postconception marriage	8218	0.02	
Preconception marriage	8218	0.22	
Not married/cohabiting	8218	0.45	
Mother's race			
White	8218	0.22	
Black	8218	0.49	
Hispanic	8218	0.26	
"Other" race	8218	0.03	
Mother's age at birth	8218	25.15	6.00
Mother's education at birth			
Less than high school	8218	0.32	
High school/GED	8218	0.31	
Some college	8218	0.26	
College or more	8218	0.11	
Welfare receipt (year before birth)	8218	0.36	
Mother's WAIS-R score	8218	6.83	2.66
Father's age at birth	8218	27.43	7.01
Father's education at birth			
Less than high school	8218	0.32	
High school/GED	8218	0.37	
Some college	8218	0.21	
College or more	8218	0.11	
Father's employment at birth			
Unemployed	8218	0.13	
Works 1-34 hours/week	8218	0.16	
Works 35-44 hours/week	8218	0.38	
Works 45+ hours/week	8218	0.32	
Child is male	8218	0.52	
Child's age at assessment	8208	5.85	2.72
HH income (year before birth)	8218	32.71	31.87
Kids <18 in HH	8218	1.25	1.31

Table 1. (continued)

Current relationship status (measured at child assessment)			
Mother married to bio dad	8119	0.32	
Mother married to partner (not bio dad)	8119	0.05	
Mother cohabits with bio dad	8119	0.15	
Mother cohabits with partner (not bio dad)	8119	0.10	
Mother is not married or cohabiting	8119	0.37	
Dependent variables (measured at child assessment)			
Child's aggressive behavior	8095	0.47	0.37
Child's anxious behavior	8136	0.32	0.29
Child's PPVT score	6830	91.16	16.20
HH income	8208	40.34	47.35
Welfare receipt	8218	0.28	
Aggravation in Parenting	8207	2.16	0.68
Father involvement	8208	3.39	1.72
Parents' union dissolved (among married/cohabiting at birth)	4524	0.35	
Number of romantic partner transitions	8208	1.20	1.48

Table 2. Demographic and family characteristics by mother's relationship status at birth

	Postconception cohabitation			Preconception cohabitation			
Variable	Person-Year Obs	Mean	Std. Dev.	Person-Year Obs	Mean	Std. Dev.	
Mother's race							
White	385	0.23		2150	0.19		†
Black	385	0.40		2150	0.44		
Hispanic	385	0.34		2150	0.34		
"Other" race	385	0.03		2150	0.03		
Mother's age at birth	385	22.20	4.14	2150	24.67	5.61	***
Mother's education at birth							
Less than high school	385	0.38		2150	0.37		
High school/GED	385	0.28		2150	0.35		**
Some college	385	0.31		2150	0.25		*
College or more	385	0.03		2150	0.03		
Welfare receipt (year before birth)	385	0.40		2137	0.41		
Mother's WAIS-R score	385	6.97	2.32	2150	6.49	2.62	**
Father's age at birth	385	24.41	5.97	2150	27.17	6.70	***
Father's education at birth							
Less than high school	385	0.35		2150	0.37		
High school/GED	385	0.37		2150	0.39		
Some college	385	0.23		2150	0.21		
College or more	385	0.06		2150	0.03		*
Father's employment at birth							
Unemployed	385	0.12		2150	0.13		
Works 1-34 hours/week	385	0.13		2150	0.09		*
Works 35-44 hours/week	385	0.46		2150	0.43		
Works 45+ hours/week	385	0.29		2150	0.34		*
Child is male	385	0.49		2150	0.49		
Child's age at assessment	385	5.71	2.68	21440	5.85	2.74	
HH income (year before birth)	385	30.93	27.23	2150	26.62	23.09	**
Kids <18 in HH	385	0.79	1.04	2150	1.24	1.30	***
Current relationship status (measured at child assessment)							
Mother married to bio dad	383	0.26		2115	0.25		
Mother married to partner (not bio dad)	383	0.03		2115	0.04		
Mother cohabits with bio dad	383	0.27		2115	0.31		
Mother cohabits with partner (not bio dad)	383	0.09		2115	0.09		
Mother is not married or cohabiting	383	0.35		2115	0.31		
Dependent variables (measured at child assessment)							
Child's aggressive behavior	381	0.48	0.36	2111	0.47	0.37	
Child's anxious behavior	385	0.33	0.29	2121	0.33	0.30	
Child's PPVT score	316	91.92	14.83	1785	89.46	15.45	**
HH income	385	37.19	29.52	2144	32.62	27.42	**
Welfare receipt	385	0.23		2150	0.28		

Aggravation in Parenting	385	2.18	0.65	2144	2.12	0.68	†
Father involvement	385	3.81	1.52	2144	3.72	1.59	
Parents' union dissolved (among married/cohabiting at birth)	384	0.51		2133	0.50		
Number of romantic partner transitions	385	1.04	1.31	2144	1.01	1.42	

Asterisks indicate statistically significant difference from postconception cohabitation

**** p<0.001, ** p<0.01, * p<0.05, † p<0.10*

Table 2. Demographic and family characteristics by mother's relationship status at birth (continued)

	Postconception marriage				Preconception marriage				Not married/cohabiting			
Variable	Person-Year Obs	Mean	Std. Dev.		Person-Year Obs	Mean	Std. Dev.		Person-Year Obs	Mean	Std. Dev.	
Mother's race												
White	177	0.29			1837	0.48		***	3669	0.11		***
Black	177	0.29		*	1837	0.24		***	3669	0.66		***
Hispanic	177	0.29			1837	0.22		***	3669	0.21		***
"Other" race	177	0.14		***	1837	0.06		*	3669	0.02		
Mother's age at birth	177	25.33	5.83	***	1837	29.63	5.38	***	3669	23.49	5.52	***
Mother's education at birth												
Less than high school	177	0.14		***	1837	0.14		***	3669	0.38		
High school/GED	177	0.23			1837	0.18		***	3669	0.35		**
Some college	177	0.39		†	1837	0.29			3669	0.23		**
College or more	177	0.25		***	1837	0.39		***	3669	0.03		
Welfare receipt	177	0.22		***	1837	0.09		***	3669	0.47		**
Mother's WAIS-R score	177	7.96	2.66	***	1837	7.84	2.79	***	3669	6.45	2.50	***
Father's age at birth	177	26.92	6.09	***	1837	31.91	6.24	***	3669	25.68	6.68	***
Father's education at birth												
Less than high school	177	0.15		***	1837	0.15		***	3669	0.37		
High school/GED	177	0.37			1837	0.22		***	3669	0.43		*
Some college	177	0.33		*	1837	0.28		*	3669	0.17		**
College or more	177	0.16		***	1837	0.35		***	3669	0.03		***
Father's employment at birth												
Unemployed	177	0.07		†	1837	0.04		***	3669	0.18		**
Works 1-34 hours/week	177	0.08			1837	0.07		**	3669	0.25		***
Works 35-44 hours/week	177	0.45			1837	0.41		†	3669	0.32		***
Works 45+ hours/week	177	0.39		*	1837	0.48		***	3669	0.23		*
Child is male	177	0.43			1837	0.55		*	3669	0.54		
Child's age at assessment	177	5.91	2.76		1837	5.75	2.71		3665	5.91	2.71	
HH income (year before birth)	177	47.96	35.21	***	1837	60.43	40.90	***	3669	21.84	21.24	***
Kids <18 in HH	177	0.62	0.93	†	1837	1.11	1.19	***	3669	1.41	1.38	***

Table 2. Demographic and family characteristics by mother's relationship status at birth (continued)

	Postconception marriage				Preconception marriage				Not married/cohabiting			
Variable	Person-Year Obs	Mean	Std. Dev.		Person-Year Obs	Mean	Std. Dev.		Person-Year Obs	Mean	Std. Dev.	
Current relationship status (measured at child assessment)												
Mother married to bio dad	177	0.73		***	1828	0.85		***	3616	0.09		***
Mother married to partner (not bio dad)	177	0.05			1828	0.03			3616	0.06		**
Mother cohabits with bio dad	177	0.00		***	1828	0.00		***	3616	0.13		***
Mother cohabits with partner (not bio dad)	177	0.03		*	1828	0.02		***	3616	0.16		***
Mother is not married or cohabiting	177	0.19		***	1828	0.10		***	3616	0.56		***
Dependent variables (measured at child assessment)												
Child's aggressive behavior	175	0.44	0.36		1816	0.39	0.32	***	3612	0.50	0.39	
Child's anxious behavior	175	0.28	0.23	†	1821	0.27	0.25	***	3634	0.33	0.31	
Child's PPVT score	142	94.16	15.01		1428	98.86	17.43	***	3159	88.42	15.06	***
HH income	177	63.06	64.60	***	1837	77.14	73.94	***	3665	25.64	24.33	***
Welfare receipt	177	0.11		***	1837	0.07		***	3669	0.40		***
Aggravation in Parenting	177	2.13	0.62		1836	2.12	0.64		3665	2.20	0.71	
Father involvement	177	4.17	1.36	**	1837	4.41	1.15	***	3665	2.60	1.70	***
Parents' union dissolved (among married/cohabiting at birth)	177	0.31		***	1830	0.16		***	--	--	--	
Number of romantic partner transitions	177	0.53	0.93	***	1837	0.32	0.85	***	3665	1.79	1.54	***

Asterisks indicate statistically significant difference from postconception cohabitation

**** p<0.001, ** p<0.01, * p<0.05, † p<0.10*

Table 3. Summary of regression results predicting child's behavior problems, child's cognitive test scores, economic resources, parenting behavior, and family stability

Variable	Child's aggressive behavior *β (SE)*	Child's anxious behavior *β (SE)*	Child's PPVT score *β (SE)*	Household income *β (SE)*	Welfare receipt *OR (SE)*	Aggra-vation in parenting *β (SE)*	Father involve-ment *β (SE)*	Romantic partner transitions *β (SE)*	Relation-ship Dissolved [1] *OR (SE)*
Postconception cohabitation at birth (referent)									
Preconception cohabitation at birth	0.007	0.005	-1.485	-1.557	1.104	-0.082†	-0.097	0.011	0.956
	(0.023)	(0.017)	(1.086)	(1.780)	(0.186)	(0.047)	(0.111)	(0.105)	(0.171)
Postconception marriage at birth	0.008	-0.023	-3.664*	5.363	0.593†	-0.020	0.204	-0.353**	0.571†
	(0.039)	(0.025)	(1.661)	(4.647)	(0.184)	(0.076)	(0.166)	(0.131)	(0.174)
Preconception marriage at birth	-0.028	-0.032†	-1.468	5.682**	0.612**	-0.058	0.266*	-0.334**	0.360***
	(0.025)	(0.018)	(1.204)	(2.104)	(0.117)	(0.050)	(0.115)	(0.107)	(0.073)
Not married/cohabiting at birth	0.029	0.012	-1.036	-4.267*	1.474*	-0.018	-1.068***	0.624***	--
	(0.023)	(0.017)	(1.059)	(1.749)	(0.243)	(0.045)	(0.110)	(0.103)	--
Observations	8,088	8,129	6,820	8,208	8,208	8,207	8,208	8,208	4,522
Adjusted R^2/Pseudo R^2	0.247	0.217	0.245	0.438	0.219	0.037	0.225	0.255	0.193

Note. All models control for mother's race, mother's age at birth, mother's education, mother's welfare receipt in the year before birth, mother's cognitive ability, father's age at birth, father's education, father's employment, child's sex, child's age at assessment, household income in the year before birth, and number of children under age 18 in the household. OR = Odds Ratio

Robust standard errors in parentheses

[1] Among respondents married or cohabiting at child's birth.

**** p<0.001, ** p<0.01, * p<0.05, † p<0.10*

Appendix Table 1. Summary of regression results predicting child's behavior problems, child's cognitive test scores, economic resources and parenting behavior, controlling for current relationship status

Variable	Child's aggressive behavior *β*	Child's anxious behavior *β*	Child's PPVT score *β*	Household income *β*	Welfare receipt *OR*	Aggravation in parenting *β*	Father involvement *β*
Relationship status at birth							
Postconception cohabitation at birth (referent)							
Preconception cohabitation at birth	0.006	0.003	-1.475	-1.975	1.087	-0.083†	-0.114
	(0.023)	(0.017)	(1.076)	(1.704)	(0.184)	(0.047)	(0.075)
Postconception marriage at birth	0.018	-0.015	-4.576**	1.634	0.758	-0.007	-0.099
	(0.039)	(0.025)	(1.677)	(4.497)	(0.238)	(0.076)	(0.108)
Preconception marriage at birth	-0.015	-0.022	-2.521*	1.049	0.825	-0.040	-0.184*
	(0.025)	(0.018)	(1.227)	(2.122)	(0.162)	(0.052)	(0.080)
Not married/cohabiting at birth	0.021	0.010	-1.052	-1.798	1.339†	-0.041	-0.434***
	(0.023)	(0.017)	(1.053)	(1.689)	(0.222)	(0.046)	(0.077)
Current relationship status							
Cohabiting with bio dad (referent)							
Married to bio dad	-0.021	-0.028*	2.723***	5.113***	0.582***	-0.010	-0.073†
	(0.016)	(0.012)	(0.715)	(1.284)	(0.067)	(0.032)	(0.038)
Married to partner (not bio dad)	0.005	-0.001	0.411	5.281**	0.927	0.028	-2.885***
	(0.021)	(0.017)	(0.972)	(2.045)	(0.137)	(0.045)	(0.071)
Cohabiting with partner (not bio dad)	0.018	-0.025†	1.593*	-3.451**	1.371**	0.080*	-2.730***
	(0.018)	(0.013)	(0.775)	(1.195)	(0.157)	(0.035)	(0.055)
Not married/cohabiting at birth	0.018	-0.010	1.220*	-10.031***	1.256*	0.080**	-2.263***
	(0.014)	(0.011)	(0.609)	(0.934)	(0.114)	(0.028)	(0.043)
Observations	8,001	8,043	6,736	8,119	8,119	8,118	8,119
Adjusted R^2/Pseudo R^2	0.247	0.218	0.248	0.453	0.226	0.0392	0.565

Note. All models control for mother's race, mother's age at birth, mother's education, mother's welfare receipt in the year before birth, mother's cognitive ability, father's age at birth, father's education, father's employment, child's sex, child's age at assessment, household income in the year before birth, and number of children under age 18 in the household. OR = Odds Ratio

Robust standard errors in parentheses; *** *p<0.001,* ** *p<0.01,* * *p<0.05,* † *p<0.10*

Appendix Table 2. Summary of regression results predicting child's behavior problems, child's cognitive test scores, economic resources, parenting behavior, and family stability, among first-born children

Variable	Child's aggressive behavior	Child's anxious behavior	Child's PPVT score	Household income	Welfare receipt	Aggravation in parenting	Father involvement	Romantic partner transitions	Relationship Dissolved [1]
	β	*β*	*β*	*β*	*OR*	*β*	*β*	*β*	*OR*
Postconception cohabitation at birth (referent)									
Preconception cohabitation at birth	-0.017	0.012	-1.224	-5.297*	1.077	-0.136*	-0.061	-0.022	0.873
	(0.032)	(0.024)	(1.478)	(2.459)	(0.285)	(0.059)	(0.161)	(0.159)	(0.211)
Postconception marriage at birth	-0.048	-0.037	-2.610	1.998	0.521	-0.039	0.223	-0.460*	0.478†
	(0.051)	(0.034)	(2.168)	(5.770)	(0.241)	(0.094)	(0.233)	(0.186)	(0.190)
Preconception marriage at birth	-0.052	-0.024	-1.569	2.523	0.549	-0.084	0.303†	-0.426**	0.270***
	(0.035)	(0.028)	(1.789)	(3.193)	(0.219)	(0.068)	(0.174)	(0.164)	(0.081)
Not married/cohabiting at birth	-0.010	0.008	-0.232	-6.851**	1.724*	-0.088	-1.064***	0.452**	--
	(0.031)	(0.023)	(1.412)	(2.390)	(0.438)	(0.056)	(0.158)	(0.150)	--
Observations	3,219	3,236	2,695	3,267	3,267	3,267	3,267	3,267	1,634
Adjusted R^2/Pseudo R^2	0.257	0.198	0.271	0.414	0.201	0.039	0.240	0.248	0.197

Note. All models control for mother's race, mother's age at birth, mother's education, mother's welfare receipt in the year before birth, mother's cognitive ability, father's age at birth, father's education, father's employment, child's sex, child's age at assessment, household income in the year before birth, and number of children under age 18 in the household. OR = Odds Ratio

Robust standard errors in parentheses

[1] Among respondents married or cohabiting at child's birth.

*** *p<0.001*, ** *p<0.01*, * *p<0.05*, † *p<0.10*

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