

Explaining the Long Reach of Prenatal Behaviors and Attitudes in Unmarried Men at Birth on Father Engagement in Early and Middle Childhood and Adolescence

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The current study examined three research questions: (a) Are unmarried at birth fathers' prenatal and birth-related behavioral, attitudinal, and identity adjustments directly related to father engagement in child-related activities during early childhood and father-child closeness in middle childhood and adolescence? (b) Do father engagement in child-related activities during early childhood, coresidence, and coparenting at age 5 mediate the association between unmarried fathers' prenatal and birth-related variables and father-child relationship in middle childhood and adolescence? (c) Do father-child closeness, coresidence, and coparenting in middle childhood mediate the association between fathers' prenatal and birth-related variables and father-child relationship during adolescence? Using a subsample of Fragile Families and Child Wellbeing data ($N = 2,647$), we found support for our hypotheses that fathers' prenatal and birth-related variables significantly predicted father-child engagement during early childhood and father-child closeness during middle childhood and adolescence, although not all prenatal and birth-related variables are related to outcomes during each stage of childhood development. Father involvement and coparenting cooperation significantly mediated the associations among fathers' prenatal and birth-related variables and father-child closeness at ages 9 and 15. Our findings indicate that researchers, practitioners, and policymakers should take advantage of the prenatal period and direct resources to facilitate and strengthen prospective unmarried fathers' early relationships with their partners and children.

Public Significance Statement

This study found that fathers who are unmarried at the time of their child's birth are more engaged and have closer relationships with their children when they provide tangible support to the mother during the pregnancy, are present at the birth, establish paternity establishment, and to a lesser extent have positive attitudes about the pregnancy and developing a commitment to fatherhood. Researchers, practitioners, and policymakers should take advantage of this period and direct some of their resources to facilitate and strengthen prospective fathers' early relationships with their partners and children.

Keywords: coparenting, father involvement, Fragile Families and Child Wellbeing, presence at birth, unmarried fathers

Decades of research have shown that the early relationships children have with their caregivers are unequivocally the most influential on their development (Breiner et al., 2016). Young children

develop in a network of relationships including relationships with their caregivers, which shape virtually all aspects of development (Cabrera et al., 2017). Early relationships begin before the child is

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There has not been any prior dissemination of the findings of this study. The authors of this article have complied with APA ethical standards in the treatment of the Fragile Families and Child Wellbeing sample. Data for this study are available from Princeton University at <https://fragilefamilies.princeton.edu>. The work associated with this article has not been preregistered.

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born and, hence, have enduring long-term effects on children's development through adolescence and beyond (Cardenas et al., 2021). When a caregiver spends quality time with and is responsive to their children's needs, and when those adults show support and respect for each other, regardless of their marital status, a strong family foundation is created that supports children's later learning, health, and relationships (McGuire, 2015).

The role that fathers play in their children's lives and in the family has received increasing attention over the last few decades (Cabrera et al., 2018; Schoppe-Sullivan & Fagan, 2020). Fathers who are engaged with their children, responsive to their needs, and form close bonds with them contribute in multiple ways to healthy child development (for review, see Palkovitz, 2019). Yet, there are many factors that challenge fathers' capacity to support their children's development. Biological fathers who are unmarried when their child is born are at higher risk than almost any other group of men for low levels of paternal involvement with children (Congressional Research Service, 2021). Although many unmarried couples cohabit when their children are born, a substantial number of mothers and fathers end their relationship shortly after the birth of the child (Carlson & McLanahan, 2004), and when this happens, fathers often become less involved with their children (Tach et al., 2010). For example, nationally representative data showed that 39% of nonresident biological fathers reported seeing their children several times or not at all in the year prior to the interview (Jones & Mosher, 2013). Although children reared in households with low levels of father involvement can be just as well-adjusted as children reared in households with higher levels of paternal involvement, many of them are at greater risk for less than optimal development (Choi et al., 2018). Thus, it is important to understand factors that support the involvement of unmarried fathers.

There is still much that is unknown about predictors of unmarried fathers' involvement with children. Researchers have found that unmarried fathers' prenatal and birth-related behaviors (e.g., attending prenatal visits, attendance at the birth), attitudes (e.g., pregnancy wantedness), and fatherhood identity are longitudinally related to father involvement with children (Adamsons & Pasley, 2016; Bellamy et al., 2015; Cabrera et al., 2008; Lindberg et al., 2017; Mincy et al., 2005), but these studies have examined only one or two of these variables in a given study, rather than incorporating multiple variables. Thus, it is difficult to know which variables are most important for predicting later father involvement. We build on these earlier studies by including a broad range of fathers' prenatal and birth-related variables to predict later father involvement with children. In addition, few studies have examined the longitudinal associations among these prenatal and birth-related variables and father involvement in later years (e.g., adolescence). The handful of studies examining these variables have mostly assessed father involvement with children during early or middle childhood (Adamsons & Pasley, 2016; Cabrera et al., 2008; Tamis-LeMonda et al., 2009). Research that incorporates a broad range of prenatal and birth-related variables has the potential to guide policy and programs designed to support unmarried fathers' involvement from conception through the entirety of childhood.

Framed within the life course theoretical perspective (Elder, 1998) and identity theory (Pasley et al., 2014), we use data from the Fragile Families and Child Wellbeing study (FFCW) and ask: (a) Are unmarried at birth fathers' prenatal and birth-related behavioral, attitudinal, and identity adjustments directly related to

father engagement in child-related activities during early childhood and father-child closeness in middle childhood and adolescence? (b) Do father engagement in child-related activities during early childhood, coresidence, and coparenting at age 5 mediate the association between unmarried fathers' prenatal and birth-related variables and father-child relationship in middle childhood and adolescence? (c) Do father-child closeness, coresidence, and coparenting in middle childhood mediate the association between fathers' prenatal and birth-related variables and father-child relationship during adolescence?

Theoretical Foundations

The life course perspective suggests that individuals' lives are constantly changing, and these changes follow trajectories that have developmental implications for the individual and others with whom he or she is involved (Elder, 1998). Becoming a parent is a major life transition that can set a man on a course of being an involved father or an uninvolved father, depending on his commitment to parenting, his relationship with his partner, and his own social behaviors (Cabrera et al., 2008). Depending on social and historical circumstances, these life transitions may be stressful or exciting and may lead to positive or negative changes that can set the father on a trajectory of more or less involved parenting (Elder, 1998).

An important tenet of the life course perspective is the concept of timing of life events (Elder, 1998). Timing is the point during a transition when an individual acts. Being involved early (i.e., prenatally) affords a man the opportunity to develop a relationship with his unborn child, which may strengthen his commitment and engagement over time. Men make behavioral and attitudinal adjustments when expecting a new child (Katz-Wise et al., 2010). Behavioral adjustments include providing social support to his partner, attending prenatal doctor visits and viewing ultrasounds, being present at the birth, and establishing paternity when unmarried. Attitudinal adjustments include wanting the pregnancy (which may also occur before the pregnancy) and desiring to become a father.

The life course perspective coupled with identity theory is a sound framework to understand early predictors of fathers' engagement with children. Erikson (1968) defined identity as a subjective sense of one's self that provides a sense of continuity and consistency across time and place. Identity theory posits that fathers have an internalized standard of performance (e.g., expectations) associated with being a father (Adamsons & Pasley, 2016). Fathers who develop a high standard of performance and have higher expectations for their role as parent are more committed to fathering and tend to find fatherhood more meaningful than fathers who have lower expectations (Bruce & Fox, 1999). Developing a fathering identity begins early during the pregnancy and is important for constructing positive expectations associated with being a father which then may set the father on a trajectory of involved parenting (Habib & Lancaster, 2006).

The life course perspective defines trajectories as paths of change in developmental processes (van Geert, 1994). These paths of change mark the long view of the life course (Black et al., 2009). A man who makes positive behavioral, attitudinal, and identity adjustments before the birth of his child is likely to follow a trajectory of involved parenting throughout the course of his child's development. On the other hand, a father who does not

make these adjustments when expecting a new baby may follow a trajectory of uninvolved parenting which can persist throughout a child's development.

Father Involvement

To date, the literature on unmarried fathers' prenatal and birth-related behavioral, attitudinal, and identity adjustments and trajectories of involved fathering have focused on outcomes including father contact with children, engagement in child-related activities, and parenting responsibility (Adamsons & Pasley, 2016; Bellamy et al., 2015; Cabrera et al., 2008; Mincy et al., 2005). Although nonresidential (and unmarried) fathers' contact with children and parenting responsibility have been shown to correlate with child outcomes (Elam et al., 2016; Mincy et al., 2005), reviews of research have concluded that the frequency of contact with children and parenting responsibility are weak predictors of child outcomes (Adamsons, 2018). Engagement in child-related activities tends to be a stronger predictor of child outcomes (Adamsons, 2018; Adamsons & Johnson, 2013). It is thus important to examine prenatal and birth-related variables in relation to a trajectory of engagement in child-related activities.

Researchers have also argued that father-child relationship quality should be incorporated into models of parenting (Palkovitz, 2019). Affective aspects of the father-child relationship are central to positive child development and cannot be deduced from the amount of father-child interaction (Cabrera et al., 2014; Pianta, 1997). Driscoll and Pianta (2011) have indicated that parental representations of quality are best described as closeness and conflict. Closeness is defined as warmth, affection, and open communication. Children's perceptions of closeness to parents is critical during all stages of development. During middle childhood, children who do not think of their parents as a source of support and comfort are likely to develop negative thinking when distressed, including feelings of low self-worth, negative attributional thoughts, and low emotion regulation (Hughes et al., 2021), all of which can contribute to higher social-emotional problems such as depression (Brumariu & Kerns, 2010; Fagan, 2022). Research using FFCW data has shown that father-youth closeness was directly related to adolescents' self-rated health (O'Gara et al., 2019). These studies indicate the importance of assessing quality of father-child relationship during middle childhood and adolescence. The life course perspective and identity theory suggest that men who engage in prenatal and birth-related behaviors, develop positive attitudes about the pregnancy, and develop a positive fatherhood identity are more likely to engage in child-related activities and form deep bonds and connections with their child during early childhood that builds over time to have a close father-child relationships during middle childhood and adolescence (Shannon et al., 2009).

Prenatal and Birth-Related Behavioral Adjustments

An important tenet of the life course perspective is the notion of linked lives, that is, lives are lived interdependently (Elder, 1998). Expectant fathers' prenatal and birth-related adjustments are not made in isolation, but occur in relation to the mother of the child. Studies of middle-income fathers have shown that many men make lifestyle changes during the pregnancy that include providing care and support to mothers (Widarsson et al., 2012). Mothers place a high value on the support provided by

fathers, including psychological support for the woman during pregnancy as well as practical help in the form of going to prenatal doctor visits and buying things for the baby (Plantin et al., 2011). Supporting his partner during the pregnancy may signal that the father feels a strong connection to the mother as a prospective coparent, and as a partner. Fathers' prenatal support is also important to men themselves. Fathers who attend prenatal visits report greater parenting confidence, comfort, and intentions to learn about the pregnancy and engage in healthy habits, such as avoiding smoking and alcohol during their partner's pregnancy (Albuja et al., 2019). Although studies have found unmarried fathers' tangible support of pregnant mothers correlates with fathers' engagement with children during early childhood (Cabrera et al., 2008), research has not examined the associations between prenatal tangible support of mothers and father-child relationships during later stages of child development (e.g., adolescence).

Fathers' presence at the birth is another adjustment that signals the man's commitment to the mother and baby and his expectations as a father. There is an increasing worldwide trend for fathers to be present during the birth of the child (Plantin et al., 2011). Studies using nationally representative data sets have found that 93% of resident fathers across ethnic groups were present at the time of birth in the United States (Bronte-Tinkew et al., 2007). Unmarried fathers are less likely to be present at the birth, with one study of 800 mothers conducted in Texas showing that 75% of fathers were at the birth (Child and Family Research Partnership, 2014). Research conducted with a community sample of low-income African American mothers found that fathers' presence at the birth of their child was significantly and positively associated with seven indicators of father involvement with toddlers (Bellamy et al., 2015). Again, researchers have not examined presence at the birth and father-child closeness during later stages of child development.

Paternity establishment is another behavioral adjustment that may predict fathers' involvement with children. Paternity establishment is a prerequisite to adding an unmarried father's name to the child's birth certificate. Data from the FFCW study showed that about 69% of unmarried fathers established paternity, and most of these were established in the hospital at birth (Mincy et al., 2005). Qualitative researchers have found that fathers view paternity establishment as integral to their understanding of what it means to be a responsible father (Rebman et al., 2018). Men have reported that a long-term benefit of establishing paternity is children knowing who their father is (Rebman et al., 2018). After controlling for a wide range of variables, paternity establishment was significantly and positively associated with father-child visitations and payment of child support (Mincy et al., 2005).

An expectant father's transition to parenting also includes developing a positive coparenting relationship with his partner (Marsiglio, 1997). It is fairly well established that positive father-mother coparenting interactions are important to both parents and child outcomes (e.g., Cabrera et al., 2009). Positive coparenting is characterized by joint investment in children, valuing the importance of the other parent for facilitating positive child development, respecting the other parents' judgments, and engaging in ongoing communication in reference to children's needs (Cohen & Weissman, 1984). When mothers and fathers have a positive coparenting relationship, mothers are more likely to encourage

and support fathers' involvement in childcare and activities (Varga et al., 2017), and fathers are more likely to be committed to the parenting role (Baker et al., 2018). Studies have shown that mothers and fathers begin to form mental representations of their coparenting relationship before the birth of the child (Fagan, 2008). Parents establish early patterns of communication, set boundaries around parenting roles, and make joint decisions about how the child will be cared for and reared prior to the birth (Palkovitz & Palm, 2009). Parents who establish cooperative coparenting patterns before the birth of the child are likely to continue to do so in later years, which then has positive effects on parenting and child outcomes (Palkovitz & Palm, 2009).

Prenatal Attitudinal Adjustments

Father's pregnancy wantedness is an important attitudinal adjustment when expecting a child (Adamsons, 2013; Sayler et al., 2021) and is closely tied to the quality of the father's relationship with the mother (Hohmann-Marriott, 2009). Data from a sample of over 2,000 low-income couples in the Building Strong Families study showed that about half of fathers reported they did not want the pregnancy before the mother had given birth (Combs et al., 2021). In the same study, low-income fathers who did not want to have a baby with the mother engaged in significantly lower levels of social and cognitive play with their infants, compared with fathers reporting an intended pregnancy. Fathers can be high or low on pregnancy intentionality and high or low on prenatal father engagement (Sayler et al., 2021), suggesting the importance of assessing fathers' wantedness or desire to have a child.

Prenatal Identity Adjustments

Expecting a child involves reorganization of inner thinking (Goldberg, 2014; Palkovitz & Palm, 2009). As predicted by identity theory, men who adopt an identity that includes a high standard of performance as a parent are more committed to fathering and tend to find fatherhood more meaningful (Stryker, 1991). Researchers have further conceptualized identity as salience and centrality. Salience suggests the probability that one will enact behaviors associated with the father identity; centrality reflects the importance an individual attaches to an identity (Henley & Pasley, 2005). Assessments of fathers' identity centrality at birth were found to be better predictors of father involvement at ages 1 and 3 years than were identity salience in a sample of low-income, mostly unmarried fathers (Adamsons & Pasley, 2016) and to predict fathers' relationships with children at age 9 (Adamsons, 2013).

Mediators

The association between a man's prenatal and birth-related behavior, attitude, and identity adjustments and later father-child relationships may be explained by the quality of his coparenting relationship with the mother (Palkovitz & Palm, 2009). FFCW data show that the majority of unmarried fathers who were supportive of the pregnancy planned to marry and coparent with the mother and have high hopes of raising their child together (Waller, 2002). Studies of low-income residential and nonresidential mother-father dyads have shown concurrent and longitudinal associations between coparenting relationship quality and father engagement with children during early childhood (Fagan & Palkovitz, 2019; Lee et al.,

2020). Although we did not find any studies that tested whether coparenting mediated the association between prenatal behaviors and later engagement, researchers have found that coparenting mediates the association between mother-father partner relationship and children's behavior outcomes (Karberg & Cabrera, 2017). These findings suggest that coparenting relationship quality during early childhood will mediate the association between fathers' prenatal and birth-related variables and youth reports of father-child closeness in middle childhood and adolescence.

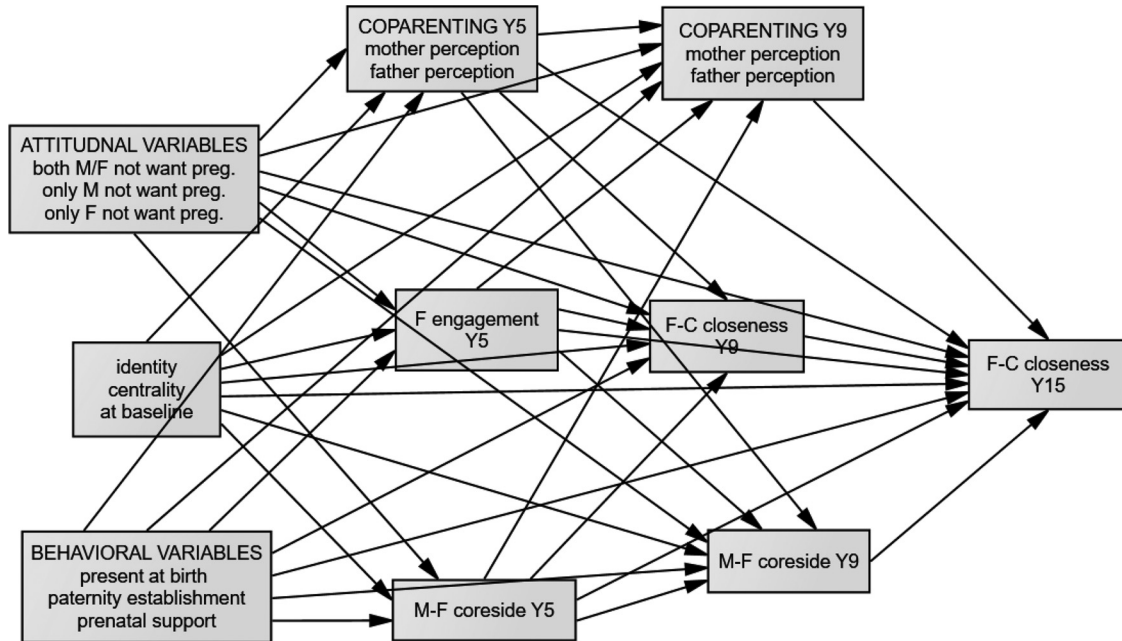
Fathers who are committed to the fathering role and are supportive of the pregnancy are also more likely to coreside with their child's mother over time, which in turn, is strongly associated with higher levels of subsequent paternal engagement with children (Cabrera et al., 2008). Coresidence may mean that parents who are unmarried at the child's birth either cohabit or marry in subsequent years. A father's positive trajectory from being involved during the pregnancy to continued involvement across time can be partially mediated by the tendency for unmarried biological parents to coreside through marriage or cohabitation in later years.

Identity theory also posits that men who internalize a positive fatherhood identity behave in ways that fulfill expectations for being involved parents (Rane & McBride, 2000). Men who support their partner's pregnancy and undergo behavioral, attitudinal, and identity adjustments may commit to their child through increased engagement during early childhood (Brown & Eisenberg, 1995), which in turn, may be associated with closer relationships with children in middle childhood and adolescence. Combining premises from identity theory and the life course perspective, one can expect that the association between fathers' prenatal and birth-related behavioral, attitudinal, and identity adjustment and father-child relationships during middle childhood and adolescence will be mediated by men's engagement with children during early childhood.

The Current Study

Guided by the life course perspective and identity theory, and as shown in Figure 1, the current study models the associations among unmarried fathers' prenatal and birth-related behaviors, attitudes, and fatherhood identity and father engagement at age 5 and father-child closeness at ages 9 and 15. We expect that fathers' prenatal and birth-related behaviors, attitudes, and fatherhood identity will have both direct and indirect effects on individuals' trajectories of involved fathering and higher quality relationships with children (Elder, 1998). We hypothesize that fathers who are unmarried when their children are born and who provide higher levels of prenatal tangible support of the mother, are present at the birth, establish paternity, have positive attitudes about the pregnancy (pregnancy wantedness), and develop a positive fatherhood identity will be more engaged in child-related activities during early childhood (age 5, Hypothesis 1), and will have closer relationships with their children during middle childhood (age 9) and adolescence (age 15, Hypothesis 2). We also hypothesize that fathers' engagement in child-related activities, coresidence, and coparenting cooperation during early childhood (age 5) will mediate the relationship between unmarried fathers' prenatal and birth-related variables and father-child relationship closeness in middle childhood and adolescence (Hypothesis 3). Finally, we hypothesize that coresidence, coparenting, and father-child closeness in

Figure 1
Path Model With Prenatal and Birth-Related Variables Predicting Coparenting, Father Engagement, and Father–Child Closeness During Early Childhood, Middle Childhood, and Adolescence



Note. Control variables include father's age, education, race/ethnicity, poverty status, incarceration, child sex assigned at birth, difficult child temperament at age 1, and M/F coresidence at baseline. Attitudinal variables are shown in one box, even though they are separate variables. The same is true for behavior variables and coparenting.

middle childhood (age 9) will mediate the relationship between fathers' prenatal and birth-related variables and father–child relationship closeness during adolescence (Hypothesis 4). Fathers' and mothers' prenatal coparenting representations were not measured in FFCW and, therefore, are not included in our hypotheses.

We control for a variety of parent-level and child-level characteristics in order to isolate these associations of interest and test our hypotheses. At the parent level, we control for fathers' race/ethnicity, education, and income/poverty status, as all of these demographic characteristics are well-known predictors of parenting behaviors and engagement (Cabrera et al., 2011, 2014). For example, parental education level consistently predicts father involvement with children across ages and ethnicities (Cabrera et al., 2011). We also control for fathers' incarceration status, as this plays a significant role in fathers' ability to maintain involvement and close relationships with their children (McLeod & Tirmazi, 2017). At the child-level, we control for child sex at birth, as some studies report greater father investment with sons than with daughters (Raley & Bianchi, 2006). We also control for child difficult temperament, as this has been found to reduce marital relationship satisfaction, as well discourage parental involvement (Mehall et al., 2009).

Method

This study used the FFCW dataset that followed a cohort of nearly 5,000 children born in the United States between 1998 and 2000. When weighted, the data are representative of nonmarital births in large U.S. cities at the turn of the century (McLanahan & Garfinkel, 2000). The sampling approach resulted in a large

number of Black, Hispanic, and low-income families and oversampled births to unmarried couples (McLanahan & Garfinkel, 2000). Fathers and mothers were interviewed shortly after the birth of their focal child (baseline) and again when children were 1 (Y1), 3 (Y3), 5 (Y5), 9 (Y9), and 15 (Y15) years of age. Children were interviewed at Y9 and Y15. The FFCW study included 3,710 unwed couples and 1,187 married couples at baseline. The analytic sample in the present study was limited to biological fathers and mothers who were not married when the child was born and cases in which the parents were asked coparenting questions at Y5 and Y9 (1,063 respondents were not asked coparenting questions because the father had no contact with the child). The analytic sample size was 2,647 cases. The first author of this article received institutional committee approval for this study. Data for this study are available from the FFCW project at Princeton University.

Analytic Sample Characteristics

Table 1 shows the majority of fathers in the sample were Black (56.3%), followed by Hispanic (27.9%), White (11.6%), and Other (3.7%). Nearly three fourths of fathers completed a high school education or less. Most fathers (70.3%) were employed at baseline. All fathers were unmarried when their children were born. Mother–father cohabitation (defined as romantically involved unmarried cohabitators) included 51.6% of couples at baseline, 19.6% of couples at Y5, and 10% of couples at Y9. Mother–father marriage included 14.5% at Y5 and 12.8% at Y9. On average, fathers and mothers were approximately 27 and 24 years old,

Table 1
Sample Characteristics

Variable	<i>N</i>	%	<i>M</i>	<i>SD</i>	Range
Father's age B			26.58	6.92	16–53
Mother's age B			24.01	5.64	15–43
Father's household income ^a			30,944	27,679	0–214,456
Father's race/ethnicity					
Non-Hispanic White	306	11.6			
Hispanic	739	27.9			
Black	1,489	56.3			
Other	98	3.7			
Missing	15	.6			
Father employed, baseline	1,861	70.3			
Father education at baseline					
<High school	991	37.4			
High school graduate	950	35.9			
Some college	515	19.5			
College graduate	76	2.9			
Missing	115	4.3			
M-F cohabit baseline	1,367	51.6			
M-F cohabit Y5 ^b	469	17.7			
M-F cohabit Y9 ^c	266	10.0			
M-F married at Y5 ^b	384	14.5			
M-F married at Y9 ^c	340	12.8			
Child is a boy	1,350	51.0			

Note. B = baseline.

^a 638 cases are missing; income is measured in dollars. ^b 521 cases are missing. ^c 783 cases are missing.

respectively, at baseline. The mean score of 3.23 on father's poverty status is equivalent to 100%–199% of the poverty line.

Measures

Father-Child Closeness

Father-child closeness at Y9 and Y15 were measured with the focal child's response to three identical items asked about their relationship with their biological father at both waves. One item addressed the child's perception of how often in the past month (1 = *never* to 3 = *often*) the father engaged in activities with the child. Two items addressed the youth's perception of how close they feel with their father (1 = *not very close* to 4 = *extremely close*) and how well they share ideas and talk (1 = *not very well* to 4 = *extremely well*). The latter two items were obtained from the National Survey of Children's Health and have been shown to be strong markers of the quality of parent-child relationships (Bandy & Moore, 2008). Correlations above .50 among the standardized items suggested that they could be summed to construct a three-item measure at Y9 and a three-item measure at Y15. Confirmatory factor analysis revealed adequate fit of the three item variables, $\chi^2(df = 9) = 127.08, p < .001$; comparative fit index (CFI) = .96; Tucker Lewis index (TLI) = .91; root mean square of approximation (RMSEA) = .06, 90% CI [.05, .08]. The three items were summed to construct observed measures of father-child closeness at Y9 and the same measure at Y15 (α for Y9 = .61, range = -5.58 to 2.86 ; α for Y15 = .90, range = -3.67 to 3.92).

Father Engagement

FFCW includes eight *father engagement* items at Y5 that assess fathers' developmentally appropriate child care and

participation in play. These items have been widely used as a measure of father engagement in FFCW studies (e.g., Fagan & Palkovitz, 2019). All items are based on a scale with responses ranging from 0 = *no days* to 7 = *seven days per week*. The self-report items include how often the father sings songs, reads stories, tells stories, plays inside with toys, plays outside, takes child on outings/activities, tells child he or she is appreciated, and watches TV together. The items were summed to construct a measure of engagement ($\alpha = .90$, range = 0 to 56). Father engagement at Y5 was included as both an outcome and mediator variable in the current study.

Prenatal and Birth-Related Variables

Behavioral Variables. *Prenatal support* was assessed with two items at baseline that asked fathers and mothers whether or not the father gave money to buy things for the baby and helped with other things such as transportation (1 = *yes*, 0 = *no*). These items have been used in previous studies of the FFCW dataset and found to be predictive of father engagement in infancy (Cabrera et al., 2008). Responses to these two items were added together to construct a measure of paternal perception and maternal perception of prenatal tangible support ($\alpha = .55$, range = 0 to 2; $\alpha = .77$, range = 0 to 2, respectively). Due to the low reliability of the paternal perception measure, we only use mothers' report of prenatal social support in subsequent analyses.

One item was available in the mothers' survey that asked mothers whether the father was *present at the birth* of the focal child (1 = *yes*, 0 = *no*). *Paternity establishment* was measured with one item that asked mothers at Y1 whether or not father's legal paternity had been established (1 = *yes*, 0 = *no*).

Attitudinal and Identity Variables. Data from the baseline mother and father surveys were used to assess *pregnancy*

wantedness. Mothers and fathers were asked: "When you found out [baby's mother] was pregnant, did you think about having an abortion?" FFCW researchers who have used this measure suggest that responses to this question provide insight into parent's level of pregnancy wantedness as wanted pregnancies would not be likely to be considered for an abortion (Guterman, 2015). Mothers' and fathers' yes/no responses to these items were recoded into four dummy variables: mother and father wanted the pregnancy (reference group), only the mother wanted the pregnancy, only the father wanted the pregnancy, and neither parent wanted the pregnancy.

Father's identity centrality was measured with three items that asked fathers at baseline about the importance to them of being a father (1 = *strongly disagree* to 4 = *strongly agree*). Sample items include: "Being a father is one of the most fulfilling experiences for a man," and "I want people to know I have a child." The three items were summed to construct a measure of identity centrality ($\alpha = .99$, range = 3 to 12), with higher scores indicating that the fathering identity is more important to the respondent.

Mediator Variables

We used five items from the Y5 and Y9 mother questionnaires and five items from the Y5 and Y9 father questionnaires to assess perceptions of *coparenting cooperation*. Items were based on a scale with responses ranging from 1 = *always* to 3 = *never*. Sample items included how often does the father (mother) respect the schedules and rules you make for the child, how often can you and the father (mother) talk about problems that come up rearing your child, and how often can you trust the father (mother) to take good care of the child. These coparenting items were used in a prior study based on FFCW data and were found to have strong psychometric properties (Bronte-Tinkew et al., 2010). The items were reverse recoded and then summed to construct measures of perceived mother and perceived father coparenting cooperation (range = 5 to 15). The internal reliability for these summed measures was .91 for mothers at Y5, .85 for fathers at Y5, .97 for mothers at Y9, and .85 for fathers at Y9.

We used a constructed variable from Y5 and Y9 surveys to assess mother–father *coresidence*, which included parents who married or cohabited at some point after the birth of the child. Coresidence was also included as a control variable at baseline. Mothers were asked at these waves whether or not they live together all or most of the time or 7 days per week. The constructed variables produced categorical measures of coresidence (1 = *coreside*, 0 = *not coreside*). Sensitivity analyses were performed to determine whether fathers' engagement at Y5 or closeness with children at Y9 differed by marriage and cohabitation. There was no significant difference for fathers' engagement at Y5 or father–child closeness at Y9 among cohabiting versus married fathers, $t(741) = -.06, ns$; $t(559) = 1.61, ns$; respectively.

Control Variables

To isolate the associations between our prenatal and birth-related variables and the outcomes, we controlled for *father race/ethnicity*, which was measured at baseline with a constructed measure based on the combined father and mother report indicating whether the father was Non-Hispanic White, Black, Hispanic, or Other (includes Asian American and American Indian). *Father education* was

measured at baseline with a FFCW constructed measure (1 = *less than a high school diploma*, 2 = *high school diploma*, 3 = *some college or technical school*, 4 = *graduated college or attended graduate school*). Data regarding fathers' *incarceration status* were available at Y1. FFCW provided a constructed variable that indicated whether the father was interviewed in jail.

FFCW used baseline information on fathers' total household income and size to assess *poverty*. Poverty status was measured by dividing total household income in the prior 12 months by the official poverty threshold for the year in which the interview was conducted. The FFCW constructed variable included five poverty categories: 1 = 0%–49% of the poverty line, 2 = 50%–99%, 3 = 100%–199%, 4 = 200%–299%, 5 = 300%+). These data were reverse coded so that high numbers indicated a higher poverty level (range = 1 to 5).

Child sex assigned at birth was controlled (1 = *girl*, 0 = *boy*). We also included a measure of the child's temperament based on three items addressing the child's reactivity from the Y1 mother questionnaire (1 = *least like* to 5 = *most like*): child often fusses and cries, child gets upset easily, and child reacts strongly when upset. We summed these items to construct a measure of *difficult child temperament* (range = 3 to 15); measures with higher scores suggest more negative reactivity ($\alpha = .60$).

Data Analysis

Data for this study are available from Princeton University at <https://fragilefamilies.princeton.edu>. This study has not been pre-registered. We first calculated descriptive statistics for all study variables using SPSS software. Next, we conducted bias analyses to determine if cases that were missing data on the study variables differed from cases that were not missing data on demographic characteristics. Next, we calculated Pearson correlation coefficients for all study variables; the SPSS multiple imputation function with 20 iterations was used to handle any missing data before conducting these bivariate analyses.

Finally, we used path analysis with AMOS software to test our model (see Figure 1). AMOS is structural equation modeling software used to test a set of regression equations simultaneously. AMOS uses full information maximum likelihood (FIML) estimation to handle missing data. FIML produces unbiased parameter estimates and standard errors. Four fit statistics were used in the path analysis: chi-square, CFI, RMSEA, and TLI. These fit statistics were selected because they are the least affected indices by estimation technique and sample size under conditions of multivariate normality, especially with large sample sizes (Cangur & Ercan, 2015). Little (2013) provides the following guidelines for the CFI, RMSEA, and TLI (CFI: $< .85$ = poor fit, $.85$ – $.90$ = mediocre, $> .90$ = acceptable; RMSEA: $> .10$ = poor, $.10$ – $.08$ = mediocre, $< .08$ = acceptable; TLI $> .95$ indicates goodness of fit). Researchers have also indicated that negative model chi-square results can be discounted when other model fit measures such as CFI and RMSEA support the model and when the sample size is reasonable (Little, 2013). We used Betas to indicate effect sizes in the path analysis. Acock (2014) suggests that $\beta < .2$ is considered weak, $.2 < \beta < .5$ is moderate, and $\beta > .5$ is strong. Using AMOS, we calculated both direct and indirect effects. However, the software does not calculate significance levels for indirect (mediation) effects when there are missing data. To obtain p levels of total and specific

indirect effects we conducted multiple imputation and bootstrapping. We used the estimands command to estimate specific indirect effects.

Results

Descriptive Analyses

Notably, according to maternal reports, more than half, 57.5% of fathers were present at their child's birth, and 63% of fathers established paternity by Y1 (see Table 2). The mean score of 1.85 on the composited measure of father perception of prenatal support and 1.68 on the mother assessment of prenatal support measure (range = 0 to 2) indicates fathers provided a high level of tangible support to mothers during the pregnancy. About 14.7% of mothers (but not fathers) did not want the pregnancy, 8.1% of mothers and fathers both did not want the pregnancy, and 7.9% of fathers (but not mothers) did not want the pregnancy. Fathers' mean identity centrality score was equivalent to an item score of 3.72 (range = 1 to 4 per item), indicating that fathers strongly agreed the fatherhood role was important to them. The average total score of 25.92 for father engagement at Y5, when divided by eight items (item scores ranged from 0–7), gives a mean item score of 3.24,

indicating that fathers engaged in child-related activities about 3 days per week.

Missing Data Analyses

Little's test for missing data revealed that the data are not missing completely at random, $\chi^2(939) = 1,875, p < .001$. Father's race/ethnicity, which was missing for 15 cases, was significantly associated with missingness for father engagement at Y5, $\chi^2(3) = 18.05, p < .001$; father-child closeness at Y9, $\chi^2(3) = 14.98, p < .001$; and father-child closeness at Y15, $\chi^2(3) = 33.75, p < .001$. Hispanic fathers were more likely to be missing these data than fathers in the other race/ethnicity groups. Fathers' education (missing 115 cases) was not significantly associated with missingness for father engagement at Y5, $t(2), 530 = .22, ns$, but education was associated with missingness for father-child closeness at Y9, $t(2), 530 = -2.84, p = .002$, and missingness for father-child closeness at Y15, $t(2), 530 = -2.90, p = .002$.

One method to handle data that are not missing at random is to include auxiliary variables in the path analysis. Auxiliary variables are expected to be significantly related to missingness on the key variables in the model but would not have been otherwise included in the model (Collins et al., 2001). Collins et al. (2001) indicate

Table 2
Descriptive Statistics of Study Variables

Variable	<i>n</i>	%	<i>M</i>	<i>SD</i>	Range
F present at birth	1,526	57.5			
Missing	646	24.4			
F prenatal support			1.85	.43	0–2
Missing	671	25.3			
M prenatal support			1.68	.66	0–2
Missing	32	1.2			
Paternity established Y1	1,668	63.0			
Missing	350	13.2			
M/F did not want pregnancy	214	8.1			
Only M did not want preg.	390	14.7			
Only F did not want preg.	209	7.9			
F identity centrality			11.17	1.26	4–12
Missing	660	24.9			
F coparenting Y5			18.12	2.91	5–20
Missing	1,009	38.1			
M coparenting Y5			17.61	2.80	5–20
Missing	581	21.9			
F coparenting Y9			14.02	2.73	4–16
Missing	1,302	48.2			
M coparenting Y9			13.34	3.25	4–20
Missing	1,124	42.5			
Father engagement Y5			25.92	14.61	0–56
Missing	965	36.5			
Father-child closeness Y9			.00	2.20	–5.58–2.86
Missing	1,185	44.8			
Father-child closeness Y15			.38	2.52	–3.67–3.92
Missing	1,193	45.2			
F incarcerated Y1	166				
Missing	366	13.8			
Difficult temp. Y1			10.85	3.79	4–20
Missing	352	13.3			
F poverty status B			3.23	1.38	1–4
Missing	638	24.1			

Note. F = father; M = mother; B = baseline; F prenatal support = father perception of support provided to mother; M prenatal support = mother perception of father's support provided to her; Temp. = temperament. Table 1 contains descriptive statistics for child sex, race/ethnicity, father's education, and coresidence.

that auxiliary variables have the most impact when the amount of missing values is greater than 25%, which is the case in the current study. We have already included a number of control variables, including race/ethnicity and education, which are correlated with missingness and can serve as auxiliary variables.

Bivariate Analyses

Table 3 shows the bivariate correlations among the continuous variables used in the path model. Mother perception of prenatal support was positively and significantly associated with both father and mother perceptions of coparenting cooperation at Y5 and Y9, as well as with father engagement at Y5, and father-child closeness at Y9 and Y15. Father's identity centrality was significantly, positively associated with father engagement at Y5, as well as with father-child closeness at Y9. Furthermore, father perceptions of coparenting cooperation at Y5 and Y9 had strong, positive associations with father engagement at Y5, and with father-child closeness at Y9 and Y15; the same was true for mother perceptions of coparenting support. Additionally, father engagement at Y5 was strongly associated with father-child closeness at Y9 and Y15. Finally, father-child closeness at Y9 was strongly, positively associated with father-child closeness at Y15.

Multivariate Analyses

We tested a path analysis model that included prenatal and birth-related variables linked to Y5, Y9, and Y15 variables (see Figure 1). The Y5 and Y9 variables were identical (mother perception of coparenting, father perception of coparenting, and coresidence). Father engagement was assessed at Y5 and youth perception of father-child closeness was assessed at Y9 and Y15. The path model showed acceptable fit to the data, $\chi^2(df = 16) = 30.50, p < .05$; CFI = 1.00; TLI = .95; RMSEA = .02, 90% CI [.01, .03].

Direct Effects

Table 4 shows the direct linkages in the path model. The results partially supported the first study hypothesis. Father engagement at Y5 was significantly and positively associated with father

presence at birth ($\beta = .10, p < .001$), identity centrality ($\beta = .06, p < .05$), coresidence at baseline ($\beta = .06, p < .05$), and mother perception of prenatal support ($\beta = .16, p < .001$). Father engagement at Y5 was significantly and negatively associated with pregnancy wantedness, that is, engagement was lower when both mother and father did not want pregnancy ($\beta = -.05, p < .05$). All effect sizes were small. Father engagement at Y5 was not significantly related to paternity establishment.

The second hypothesis was also partially supported. Youth perception of father-child closeness at Y9 was significantly and positively predicted by paternity establishment ($\beta = .06, p < .05$) and mothers' perception of prenatal support ($\beta = .08, p < .01$). Youth perception of father-child closeness at Y9 was also significantly and positively associated with mother perception of coparenting at Y5 ($\beta = .17, p < .001$) and father engagement at Y5 ($\beta = .14, p < .001$). All effect sizes were small. One prenatal/birth-related variable was significantly related to father-child closeness at Y15: Father-child closeness was lower when only mothers did not want the pregnancy ($\beta = -.06, p < .05$). Youth also reported closer relationships to their fathers at Y15 when parents coresided at baseline ($\beta = .08, p < .01$), when there was greater closeness at Y9 ($\beta = .17, p < .001$), when fathers were more engaged with children at Y5 ($\beta = .10, p < .01$), and when mothers perceived more coparenting cooperation at Y9 ($\beta = .20, p < .001$).

The following results were not included in our study hypotheses. Fathers perceived more coparenting cooperation from mothers at Y5 when they were present at the birth ($\beta = .06, p < .05$), when paternity was established ($\beta = .05, p < .05$), when mothers reported greater prenatal support ($\beta = .06, p < .05$), and when couples coresided at birth ($\beta = .08, p < .01$). Fathers perceived less coparenting cooperation from mothers at Y5 when only fathers did not want the pregnancy ($\beta = -.06, p < .05$). Mothers perceived more coparenting cooperation from fathers at Y5 when fathers were present at the birth ($\beta = .07, p < .01$), when couples coresided at birth ($\beta = .08, p < .001$), and when mothers reported higher prenatal support ($\beta = .21, p < .001$).

Mother perception of coparenting at Y5 significantly and positively predicted father perception of coparenting at Y9 ($\beta = .11, p < .001$). Coresidence at Y5, mother's perception of coparenting at Y5, and mother perception of prenatal support positively predicted

Table 3
Correlation Matrix of Continuous Variables

Variable	1	2	3	4	5	6	7	8	9
1. M prenatal	—								
2. F identity centrality	.05	—							
3. F poverty	-.06*	.07*	—						
4. F coparenting Y5	.12***	.02	-.03	—					
5. M coparenting Y5	.28***	.03	-.03	.44***	—				
6. F coparenting Y9	.10*	.02	.003	.48***	.31***	—			
7. M coparenting Y9	.25***	-.02	.02	.29***	.59***	.46***	—		
8. F engagement Y5	.24***	.09**	-.01	.27***	.41***	.17***	.27***	—	
9. F-C closeness Y9	.20***	.08*	.01	.12***	.27***	.15***	.38***	.26***	—
10. F-C closeness Y15	.16***	.01	.01	.12**	.28***	.12***	.34***	.25**	.31***

Note. $N = 2,647$. 1 = mother perception of prenatal support; 2 = father's identity centrality; 3 = fathers' poverty status at baseline; 4 = father perception of coparenting cooperation at age 5; 5 = mother perception of coparenting cooperation at age 5; 6 = father perception of coparenting cooperation at age 9; 7 = mother perception of coparenting cooperation at age 9; 8 = father engagement at age 5; 9 = father-child closeness at age 9; 10 = father-child closeness at age 15. Data were subjected to multiple imputation before conducting the correlations.

* $p < .05$ (2-tailed). ** $p < .01$. *** $p < .001$.

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Table 4
Parameter Estimates in the Path Analysis

Linkages in the model	Direct effects				Indirect effects				
	<i>B</i>	<i>SE</i>	β	<i>p</i>	<i>B</i>	β	<i>SE</i>	<i>p</i>	
F engagement Y5	←	M did not want preg.	-.32	.98	-.01		.747		
F engagement Y5	←	F did not want preg.	.41	1.28	.01		.748		
F engagement Y5	←	M/F did not want preg.	-2.90	1.26	-.05		.022		
F engagement Y5	←	Present birth	3.35	.93	.10		***		
F engagement Y5	←	Paternity	1.02	.87	.03		.241		
F engagement Y5	←	Identity centrality	.66	.29	.06		.024		
F engagement Y5	←	M/F coreside baseline	1.85	.80	.06		.021		
F engagement Y5	←	M prenatal support	3.58	.60	.16		***		
F coparenting Y5	←	M did not want preg.	-.30	.20	-.04		.139		
F coparenting Y5	←	F did not want preg.	-.65	.26	-.06		.014		
F coparenting Y5	←	M/F did not want preg.	-.35	.26	-.03		.176		
F coparenting Y5	←	Present birth	.33	.19	.06		.050		
F coparenting Y5	←	Paternity	.36	.18	.05		.048		
F coparenting Y5	←	Identity centrality	-.01	.06	-.00		.887		
F coparenting Y5	←	M/F coreside baseline	.49	.17	.08		.003		
F coparenting Y5	←	M prenatal support	.26	.12	.06		.038		
M coparenting Y5	←	M did not want preg.	-.60	.33	-.04		.074		
M coparenting Y5	←	F did not want preg.	-.36	.44	-.02		.405		
M coparenting Y5	←	M/F did not want preg.	-.23	.43	-.01		.598		
M coparenting Y5	←	M/F coreside baseline	.90	.27	.08		.001		
M coparenting Y5	←	Identity centrality	.02	.10	.00		.887		
M coparenting Y5	←	Paternity	.41	.30	.03		.171		
M coparenting Y5	←	Present birth	.95	.33	.07		.004		
M coparenting_Y5	←	M prenatal support	1.74	.21	.21		***		
F-C closeness Y9	←	M did not want preg.	-.09	.16	-.01		.587		
F-C closeness Y9	←	F did not want preg.	-.30	.21	-.04		.159		
F-C closeness Y9	←	M/F did not want preg.	-.21	.21	-.03		.317		
F-C closeness Y9	←	Present birth	.10	.16	.02	.17	.04	.01	.002
F-C closeness Y9	←	Paternity	.30	.15	.06		.042		
F-C closeness Y9	←	Identity centrality	.09	.05	.05		.089		
F-C closeness Y9	←	M/F coreside Y5	.16	.10	.04		.056		
F-C closeness Y9	←	M/F coreside baseline	.21	.13	.05	.10	.03	.01	.002
F-C closeness Y9	←	F engagement Y5	.02	.01	.14		***		
F-C closeness Y9	←	F coparenting Y5	-.02	.02	-.02		.482		
F-C closeness Y9	←	M coparenting Y5	.07	.01	.17		***		
F-C closeness Y9	←	M prenatal support	.29	.10	.08	.20	.08	.01	.002
F coparenting T9	←	M did not want preg.	.03	.19	.00		.864		
F coparenting T9	←	F did not want preg.	-.02	.24	-.00		.932		
F coparenting T9	←	M/F did not want preg.	.07	.24	.01		.779		
F coparenting T9	←	F engagement Y5	-.01	.01	-.02		.504		
F coparenting T9	←	F coparenting Y5	.39	.03	.41		***		
F coparenting T9	←	M/F coreside Y5	.50	.17	.08		.002		
F coparenting T9	←	Present birth	.32	.18	.05		.075		
F coparenting T9	←	Paternity	.18	.17	.03		.265		
F coparenting T9	←	Identity centrality	.01	.06	.01		.806		
F coparenting T9	←	M/F coreside baseline	.06	.15	.01		.709		
F coparenting T9	←	M coparenting Y5	.06	.02	.11		***		
F coparenting T9	←	M prenatal support	-.02	.12	-.00		.878		
M coparent Y9	←	F coparenting Y5	.03	.03	.02		.380		
M coparent Y9	←	F engagement Y5	-.01	.01	-.02		.439		
M coparent Y9	←	M/F coreside Y5	.75	.18	.09		***		
M coparent Y9	←	M/F coreside baseline	.17	.16	.02		.311		
M coparent Y9	←	Identity centrality	-.12	.06	-.04		.057		
M coparent Y9	←	Paternity	-.03	.18	-.01		.854		
M coparent Y9	←	Present birth	.39	.20	.05		.049		
M coparent Y9	←	M did not want preg.	.06	.20	.01		.777		
M coparent Y9	←	F did not want preg.	.08	.25	.01		.752		
M coparent Y9	←	M/F did not want preg.	.25	.25	.02		.311		
M coparent Y9	←	M coparenting Y5	.32	.02	.53		***		
M coparent Y9	←	M prenatal support	.43	.13	.08		***		
F-C closeness Y15	←	F-C closeness Y9	.19	.03	.17		***		
F-C closeness Y15	←	Present birth	.10	.17	.02	.29	.06	.01	.002
F-C closeness Y15	←	Paternity	.11	.15	.02	.12	.03	.01	.004
F-C closeness Y15	←	Identity centrality	-.05	.05	-.02		.390		

(table continues)

Table 4 (continued)

Linkages in the model	Direct effects				Indirect effects			
	<i>B</i>	<i>SE</i>	β	<i>p</i>	<i>B</i>	β	<i>SE</i>	<i>p</i>
F-C closeness Y15 ← M/F coreside baseline	.42	.14	.08	.004	.22	.06	.01	.002
F-C closeness Y15 ← F engagement Y5	.02	.01	.10	.002				
F-C closeness Y15 ← M/F coreside Y9	.23	.16	.04	.158				
F-C closeness Y15 ← M did not want preg.	-.37	.17	-.05	.034				
F-C closeness Y15 ← M/F did not want preg.	-.12	.22	-.01	.607				
F-C closeness Y15 ← F did not want preg.	.31	.23	.03	.175				
F-C closeness Y15 ← F coparenting Y9	-.01	.03	-.01	.824				
F-C closeness Y15 ← F coparenting Y5	-.02	.03	-.02	.513				
F-C closeness Y15 ← M coparent Y9	.15	.03	.20	***				
F-C closeness Y15 ← M coparenting Y5	.02	.02	.05	.167				
F-C closeness Y15 ← M prenatal support	-.03	.11	-.01	.792	.36	.12	.01	.002

Note. Statistical controls include race/ethnicity, father's education, child sex assigned at birth, poverty status, incarceration, difficult child temperament. Parameters from control variables to Y5, Y9, and Y15 variables are not shown in this table. Parameters from prenatal variables to M/F coreside at Y5 and Y9 are not shown.

*** $p < .001$.

mother's perception of coparenting at Y9 ($\beta = .09, p < .001$; $\beta = .53, p < .001$; $\beta = .08, p < .001$, respectively).

Indirect Effects

Table 4 shows that three out of six prenatal and birth-related variables (prenatal support, presence at birth, and coresidence at birth) were *indirectly* related to father-adolescent closeness at Y9, and all of these predictor variables plus paternity establishment were indirectly related to father-adolescent closeness at Y15 (see Hypotheses 3 and 4). All indirect effects were small. The specific indirect effects were examined via estimating estimands to determine which Y5 and Y9 mediator variables accounted for the significant indirect associations. The specific indirect effects are not shown in a table. These tests showed that the positive association between prenatal support and father-adolescent closeness at Y9 was significantly mediated by mothers' perception of coparenting cooperation at Y5 ($B = .75, p = .002$) and father engagement at Y5 ($B = .09, p = .002$). The positive association between prenatal support and father-adolescent closeness at Y15 was significantly mediated by mothers' perception of coparenting cooperation at Y9 ($B = .07, p = .002$), father engagement at Y5 ($B = .07, p = .002$), and father-child closeness at Y9 ($B = .06, p = .002$).

The positive association between presence at birth and father-adolescent closeness at Y9 was significantly mediated by mothers' perception of coparenting cooperation ($B = .08, p = .002$) and father engagement at Y5 ($B = .09, p = .002$). The positive association between presence at birth and father-adolescent closeness at Y15 was significantly mediated by mothers' perception of coparenting cooperation at Y9 ($B = .07, p = .002$) and father engagement at Y5 ($B = .07, p = .002$). Paternity establishment was indirectly related to father-adolescent closeness at Y15 only. The association between paternity establishment and father-adolescent closeness at Y15 was significantly mediated by father-child closeness at Y9 ($B = .07, p = .002$).

Discussion

More than any other group of men, unmarried fathers are at high risk for becoming disconnected from their children over time, especially fathers who are not prenatally involved (Carlson &

McLanahan, 2004; Shannon et al., 2009). The results of the current study are consistent with the life course perspective and identity theory in showing that fathers' prenatal and birth-related behaviors, attitudes, and identity are associated not only with higher levels of father-reported engagement with children at age 5 (Hypothesis 1), but also with child reports of closer relationships with their fathers at ages 9 and 15 (Hypothesis 2). However, not all prenatal and birth-related variables are related to outcomes during each stage of childhood development. For example, fathers' identity centrality is only significantly related to father engagement at Y5, whereas prenatal support and presence at the birth are directly or indirectly related to father engagement at Y5, father-child closeness at Y9, and father-child closeness at Y15. Paternity establishment is only directly related to father-child closeness at Y9.

Previous researchers have incorporated only prenatal and birth-related behavioral variables (e.g., presence at birth), or attitudinal variables (e.g., pregnancy wantedness), or identity centrality in studies predicting later father involvement (e.g., Cabrera et al., 2008; Mincy et al., 2005). Incorporating multiple variables in the analysis, we find that behavioral variables are more likely to predict unmarried father involvement over the course of childhood than attitudinal or identity variables. All three of the behavioral measures (prenatal support, presence at birth, and paternity establishment) directly and/or indirectly predicted fathering outcomes during each stage of development. The attitudinal variables (pregnancy wantedness) and identity centrality did not consistently predict the outcomes. These findings appear to suggest that unmarried fathers' actions taken when expecting a new baby are what matters most in relation to a positive parenting trajectory.

Attitudinal variables played some role in predicting youth reports of father-child closeness. Consistent with earlier studies (Bronte-Tinkew et al., 2007; Cabrera et al., 2009; Combs et al., 2021), we found that when only mothers did not want the pregnancy, adolescents reported less closeness to the father compared with teens with both parents wanting the pregnancy. Our approach in this study is unique in that we included mothers' and fathers' pregnancy wantedness and constructed variables indicating whether both or only one parent wanted the pregnancy. The particular dyadic characteristic (i.e., mothers did not want the pregnancy, but

fathers did) may be suggestive of later maternal gatekeeping in which mothers restrict fathers from being involved with the child. In our study, none of our mediating variables explained why the children of mothers who did not want the pregnancy reported being less close to their fathers. This hypothesis should be tested in future studies.

Our mediation hypotheses (Hypothesis 3 and 4) suggested that father engagement at Y5 would explain the association between prenatal and birth-related behaviors, attitudes, and identity and father-child closeness at Y9 and Y15. The findings confirmed this hypothesis for prenatal support and presence at the birth. Specifically, prenatal support and presence at the birth significantly predicted closeness at Y9 and Y15 in part because fathers were more engaged with children at Y5. Consistent with the life course perspective, these findings support the notion that prenatal and birth-related behaviors are associated with a trajectory of involved fathering.

We also predicted that the associations between prenatal and birth-related variables and later father engagement and father-child closeness would be mediated by coparenting cooperation (Hypotheses 3 and 4). We found support for these hypotheses, that is, mothers' perception of coparenting cooperation measured during a previous wave of data collection mediated the associations between prenatal support and presence at the birth and outcomes at Y9 and Y15. Unexpectedly, only mothers' perception of coparenting cooperation, not fathers' perception, was a significant mediator. Fathers' perception of coparenting cooperation was also not directly associated with the outcomes. Children of unmarried parents are far more likely to coreside with the mother and, therefore, may be influenced to a greater extent by mothers' perceptions of coparenting cooperation than fathers' perceptions of coparenting. Mothers may communicate positive feelings about the father when they perceive coparenting support from the man.

We found no support for coresidence as a mediator of the associations among prenatal and birth-related variables and any outcomes. These findings are not consistent with those of researchers who found that the association between prenatal support and father engagement during early childhood was mediated by fathers transitioning from nonresident to coresidential relationships with the mother (Cabrera et al., 2008). One possible explanation for the discrepancy between our findings and those of Cabrera et al. (2008) is that the latter study did not assess coparenting cooperation. Coparenting cooperation may be a better mediator because many unmarried mothers and fathers no longer coreside as children grow older, but parents can still maintain positive coparenting relationships despite not living together. Future research should also consider coresidence as a moderator, as prenatal behaviors and attitudes may have a greater impact on father-child relationships depending on the parents' residential status.

Several variables (e.g., fathers' perception of coparenting cooperation) were missing a large amount of data which may cause bias in the findings. Missing data were more likely to occur among Hispanic fathers and fathers with lower levels of education. The findings of the current study may therefore be more applicable to non-Hispanic fathers with higher education. There were also limitations with the prenatal support measure. The fathers' perception of prenatal support measure had low reliability and was dropped from the analysis. The multivariate analyses only included mothers' perception of support. This variable only addressed fathers'

provision of tangible support. Emotional support is an important variable (Plantin et al., 2011), although it was not included in the dataset. Also, the prenatal support measure was not validated, although it has been used in several previous studies (Cabrera et al., 2008). The measure used to assess pregnancy wantedness was also lacking because it was based on a question about whether parents ever considered abortion, which may not be the same construct as wanting the pregnancy. In addition, several important indicators of fathers' prenatal involvement were not available in the dataset, including fathers' participation in prenatal visits, viewing the ultrasound of the fetus, and attending prenatal classes.

Conclusions

This study makes several important contributions. First, our results seem to suggest that some fathers, despite their unmarried marital status, did not become disconnected from their children if they were involved prenatally and at birth. These associations between fathers' prenatal and birth-related variables and children's perceptions of closeness to their fathers imply that men's relationships with their partners and with their unborn children are critical for the development of a man's long-term commitment to fatherhood and to his child, especially among men who are at high risk for becoming disconnected from their children. Although we did not include measures of child outcomes in the current study, one can assume, based on the large literature showing significant relationships between parent-child close relationships and child well-being (see Frosch et al., 2021), that fathers' positive prenatal and birth-related behaviors, attitudes, and identity will not only predict father-child closeness, but will also be associated with positive child outcomes.

Second, we have shown that the early parenting period characterized by fathers' tangible support during the pregnancy, presence at the birth, paternity establishment, and to a lesser extent having positive attitudes about the pregnancy and developing a commitment to fatherhood, put men on a trajectory of positive coparenting with their partners and children during early childhood, which explain why children feel close to their fathers 9 and 15 years later. The importance of the mother-father coparenting relationship cannot be emphasized enough. Our findings, coupled with other findings in the literature, present a clear opportunity for investing in fathers, especially among unmarried fathers, in a way that might pay high dividends during middle childhood and adolescence. Research shows that adolescents who feel close to their fathers and feel that their fathers care about them exhibit fewer behavior problems at school and have better relationships with friends than adolescents who do not have a close relationship with their fathers (Cabrera et al., 2012). Researchers, practitioners, and policymakers should take advantage of this period and direct some of their resources to facilitate and strengthen prospective fathers' early relationships with their partners and children. This type of effort can significantly promote children's social adaptation, which is beneficial for developing the social skills needed to become good citizens, responsible adults, and productive members of society.

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