Family Structure and Child Well-being

Examining how the father-child relationship mediates the linkages between family structure and child well-being

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Introduction

Over the past 30 years the composition of the "American family" has transformed dramatically. Changes in the living arrangements of U.S. children broadened the definition of family in the scope of both policy and research; therefore, is important to understand the ways in which these recent family changes influence children.

In 2012, the majority of children (64%) lived with two parents. Of those two-parent families, 92% of children lived with biological or adoptive parent and 8% lived with a biological stepparent. About 70% of children in stepparent families lived with their biological mother and step-father (U.S. Census Bureau, 2011). In 2012, 6% of children lived with their cohabiting biological parents in which a parent and his/her non-marital partner (biological or non-biological) were primary caretakers (U.S. Census of Bureau, 2011). Also in 2001, the U.S. was moderate compared to other developing countries regarding prevalence of non-marital births; 40% of children in 2001 were born out of marriage (Karin & Katz, 2003). To date, more than half of non-marital births are born to cohabiting couples (Karin & Katz, 2003). In 2012, 11% of children lived with a cohabiting step-father (U.S. Census Bureau, 2011). Given the dynamic nature of family structure, the composition of American families holds critical implications for parental and economic resources, and for child health. As a predictor of long term economic, social and cultural prosperity (i.e., population stability, economic productivity, low-disease burden, low-health-related cost, etc.), children's health and well-being is a crucial component in determining social welfare.

In addition to changes in the structure of American families, the roles within those families, especially those of the father, have changed as well. Fathers' influences on child rearing are no longer limited to economic contributions. Although family research has thoroughly

investigated the effect of family structure on child health,family literature has not considered the mediational role father-child interactions may play in influencingin the linkage between family structure and child health. While some studies show that fathers play a key role in child health outcomes, the mediators of this relationship have yet to be thoroughly explored. In spite of the necessary condition that economic factors impose in predicting child health, family income is not a sufficient condition in fully explaining the observed differences in child health outcomes among non-traditional family structures (Brown, 2004; Thomson et al., 1992). High levels of behavioral problems among children are at least partially related to lower levels of parental support and involvement (Brown, 2004; Thomson et al., 1992). Quality of parental relationships and the quantity of parental interactions appear to be key mediators of the linkages between family structure and child well-being (Dunifon & Kowaleski-Jones, 2002; Morrison, 2000).

This study investigates the mechanisms by which child's health is influenced by father-child relationshipsand attempts to contextualize the importance of a father's role within the evolving sphere of family policy. In order to do this, this paper conducts a mediator analysis to answer the following research question: *Does father's time spent with the child, and quality of father-child interactions,mediate the linkage between family structure and child health?*

Literature Review

Family Structure and Child Health

Children's living arrangements have been associated with several dimensions of well-being such as education and health outcomes. Research on this topic has evolved over recent decades to consider a broader emphasis on the kinds of transitions experienced by children not living with both biological married parents as well as the linkages between various family

structures and child health (Cavanagh et al., 2008; Hofferth & Goldscheider, 2010; Ryan et al., 2009; Sassler et al., 2009).

Health outcomes among children living in married households

A large body of research identifies family structure as a primary determinant of child health (Brown, 2004; Harris et al., 2000; Hoffman and Johnson, 1998; McLanahan & Sandefur, 1994). Much research in this areahas examined a relatively simple set ofliving arrangements: two-biological-parent married families, stepfamilies or single-mother families (Brown, 2004; Thomson et al., 1992). Compared to families in which the father or mother is non-biological or absent (i.e., step- or single-parent families), children who live with both married biological parents have better health outcomes and overall, experience better health outcomes (Brown, 2004; Harris et al., 2000; Hoffman and Johnson, 1998; McLanahan & Sandefur, 1994). However, few studies havelooked closely at the role fathers play in predicting child well-being within varying family structures (Ono et al., 2013; Brown, 2004).

One exception is Dunifon &Ziol-Guest (2013), who investigated whether child health differs with the biological relationship between parent and child, the gender of the parent and the structure of the child's primary residing household. Using data collected by the National Survey of American Families survey, the study confirmed that children not living with both biological married parents experience poorer health outcomes (Dunifon & Ziol-Guest, 2013). Moreover, the differences in child health outcomes observed between single-mother, single-father,and step-father families demonstrated the key role biological fathers play in predicting child well-being. Specifically, better health outcomes were observed among children living with their biological fathers relative to children living with their step-fathers. A study investigating the mechanisms by which child's health is supported in paternal biological relationshipsis needed to place the importance of a father's role in context within changing family structure.

Health outcomes among children living in cohabiting households

Much of the literature on children residing in cohabiting families has been focused on mother-male partner cohabiting unions (Brown, 2004; Clark and Nelson, 2000; Dunifon & Kowaleski-Jones, 2001; Nelson et al., 2001). In one exception, children living in cohabiting households with biological fathers report fewer limiting conditions and overall, report better measures of child health outcomes than those children who live in cohabiting step-father households (Dunifon & Ziol-Guest, 2013). This suggests a health outcome advantage for children who live with biological fathers compared with step-fathers, regardless of marital status.

However, this biological relationship is trumped by marital status when comparing the mental health outcomes of children. Among children residing with their married biological fathers, better measures of poor mental health are reported relative to their counterparts who live with their cohabiting biological fathers (Dunifon & Ziol-Guest, 2013). Recent research by Clark and Nelson (2000), Dunifon and Kowaleski-Jones (2001) and Nelson et al. (2001) also indicates that child well-being, measured by cognitive performance and the absence of behavioral problems, is greater in married biological families than in cohabiting families. In contrast, Morrison (1998) found few effects of post-marital cohabitation (versus remarriage) on children's behavioral patterns. Although these studies provide a foundational basis for family researchers to explore the association between family structure and child health outcomes, the factors accounting for these family structure differences in child well-being and health outcomes have yet to be investigated.

Summary of the literature

Overall, family research has focused on differences in child outcomes in single parent families (specifically, single-mother families) and married two biological parents. Supplemental analysis considers child outcomes in step families; however, the majority of studies have stayed

within this narrow range of family structures. Such research suggests that child outcomes are generally more positive in two-parent biological families, when compared to single parent families or step families. Yet, mediators of the effect of family structure on child health outcomes have yet to be fully examined. Furthermore, the literature regarding family structure has been primarily maternally focused and is only recently turning to focus upon the roles of fathers. Thus, a black box regarding the mechanisms through which family structure influences child health remains prevalent in family research.

In order to shed light upon the mediating roles father-child interaction play in the linkage between family structure and child health,this study will conduct a mediator analysis on the pathways in which family structure influence child health outcomes. Mediators of father-child relationship characteristics (i.e., time spent with child and quality of father-child interactions) will be analyzed in order to determine to what extent the quantity and quality of a father's interactions in the household act as mediators explaining child health outcomes among children living within the following four family structures:(1) married biological father families;(2) married step-father families;(3) cohabiting biological father families;and (4) cohabiting step-father families. While previous studies have examined child well-being among single-parent and two-parent families, this investigation will extendfamily research to consider what factors in father-child interactions account for the linkage between family structure and child health.

Theoretical Framework

Family structure provides insight regarding a child's living arrangements; however, as a key determinant of child well-being, family structure may also be a predictor of children's health and developmental outcomes (Brown, 2004). Furthermore, the linkage between family structure and child health outcomes may be explained by a number of mediators within the child's home

environment, including father-child interactions (Brown, 2004). Family researchers have pinpointed theoretical explanations that are critical in accounting for the effects of family structure on child well-being including co-parental support and involvementbetween parents (Dunifon &Kowaleski-Jones, 2002), quantity of time spentbetween father and child (Morrison, 2000), quality of parenting (Morrison, 2000), incomplete institutionalization (Brown, 2004; McLanahan & Sandefur, 1994), and household impermanence (Brown, 2000; Brown, 2002; (Brown, 2004; McLanahan & Sandefur, 1994). For the purpose of this study, as highlighted in the Conceptual Model (Figure 1), "quantity of time spent together" and "quality of father child interactions" will be conceptualized as:(a) quantity of father-child time spent together; and (b) quality of father-child relationships.

It is important to note that social selection bias among various living arrangements and types of fathers cannot be ignored. This idea suggests that children and families in different living arrangements may differ in a variety of ways, including selection factors that are also linked to child well-being. Moreover, these selection factors may manifest as observable characteristics such as income, or unobservable factors. Although researchers attempt to control for the characteristics associated with both living in different family types and child health, some studies demonstrate that the variations in outcomes of child health and well-being among various living arrangements are insignificant once a wider range of factors (i.e., parental education, family income, etc.) is controlled for, suggesting a key role for selection in this relationship (Carlson & Corcoran 2001; Ginther & Pollak 2004; Dunifon & Kowaleski-Jones 2002; Foster & Kalil 2007; Gennetian 2005).

Furthermore, although the current study focuses upon the influence of co-resident fathers, the economic and monetary support non-residential fathers (i.e., divorced biological fathers

outside of the home) contribute to support child wellbeing cannot be neglected as influencing child health (McLanahan & Sandefur, 1994; Leininger & Ziol-Guest, 2008). Supplemental analysis of this out-of-household paternal support will need to be conducted to test the role of non-resident fathers in predicting child health outcomes.

Quantity of father-child time spent together and child health outcomes. Regarding child health outcomes and positive child development, a father's detachment from the household (measured in time spent away from home)negatively affects children's well-being (Carlson, 2006). It is hypothesized that step-fathers introduce more stress into the household than biological fathers and may be naturally pre-disposed to spend less time with step children than with biological children (Case, Lin, & Mclanahan, 2000; Case & Paxson, 2001). Time spent between step-fathers and co-resident children may be lower compared to the amount of time spent between biological fathers and biological children. This may be due to step-fathers' out-of-home obligations to other children and/or partners from previous relationships (Coleman, Ganong, & Fine, 2000). It is hypothesized that step-fathers ultimately spend devote less time and energy their step-children compared to biological fathers, negatively affecting child health outcomes.The well-being of children who live in stepfamilies has been found to be worse than their counterparts in biological married or cohabiting families (Case & Paxson, 2001). These differences are observed in married and cohabiting stepfamilies alike, but particularly among cohabiting step parents as research demonstrates such relationships are more likely to terminate (Brown 2003; McLanahan, 2004; Ono, 2013).

Quality of father-child relationships and child health outcomes.The nature of father-child interactions that occur between parents and children is highly associated with child outcomes (Amato, 1998). Although parental time has been identified by most research as the primary

means to explain why living with two parents is more advantageous than living with one, McLanahan and Sandefur (1994) also claim that twenty-five percent of the variation in child health outcomes may be attributed to the differences in parenting interactions, and in particular to different interaction patterns that emerge throughfamily structures. Lamb (2004) demonstrates that the quality of paternal-child interactions is important in establishing children's well-being. Therefore, it is not the natural kinshipof a biological father that is important to children's well-being but the essence and quality of the paternal-child relationship (Amato & Gilbreth, 1999).

A larger body of research examines measures of the father-child relationshipthat may be associated to the quality of father-child interactions.Some research suggests that warmth and support are lower among step-and cohabiting families than biological families (Brown, 2004; McLanahan & Sandefur, 1994). Studiesthat have investigated father-child relationships measured in terms of shared activities and father-child closeness provide greater evidence that higher quality father-child interactions support healthier child outcomes (Lamb, 2004; Marsiglio et al., 2000). Recent research demonstrates that fathers have a critical influence on child rearing.High-quality biological father relationships are beneficial to children and positively impact socio-behavioral outcomes (Amato & Rivera, 1999; Harris, Fustenberg, & Marmer, 1998; Lamb, 2004; Marsiglio et al., 2000). In addition, it is hypothesized that because of the increased investment of fathers observed inmarried families, children benefit from higher quality father-child interactions relative to their counterparts in cohabiting families. Married parents, therefore, are more inclined to make health promoting decisions regarding their child's health care because of their higher quality parent-child relationships (Amato, 1998).

Father's engagement in the household varies between married vs. cohabiting families. Due to the ambiguity of roles within cohabiting families, father involvement in cohabiting unions

are lower than that observed in step-families and married unions (Brown, 2004). As unmarried mothers within cohabiting households try to fulfill both maternal and paternal parent roles due to this decrease, the father-child relationship may decrease in quality and negatively contribute to child development. Although cohabitation, and similarly step-families, introduce a second adult into the household, unless the new father is also a biological parent, the new father's presence may not bring as much warmth and support relative to those received by children in married two-biological parent families (Brown, 2004). Likewise, unless the new father is a biological parent in cohabiting families, child health may worsen compared to children who live in married two-biological parent families (Brown, 2004).

When comparing biological father and step father households, fathers' investment in father-child relationships may vary. Family disruptions and re-marrying/re-partnering experienced by children in step- and cohabiting families cause greater stress and distractions that may reduce child health outcomes (Coleman, Ganong, & Fine, 2000). Analogous to the "quantity" theory above, step-fathers, regardless of marital status, introduce ambiguity into the household, negatively affecting the quality of father-child interactions. Furthermore, the step-father parent-child relationship is "shared" among multiple external factors (i.e., children living outside of the household from father's previous marriage). The devotion and quality of stimulation step-fathers commit to their parent-child relationship relative to biological fathers is therefore compromised and may lead to a negative influence on child well-being (Coleman, Ganong, & Fine, 2000).

Fathers' presence in the household may be linked to differences in fathers' health investments in children (Dunifon & Ziol-Guest, 2013). In cohabiting two parent families, living arrangements are often short-term. Parents in unmarried co-parenting relationships may invest

more time in protecting their own fragile relationship than their child's health (Brown, 2004). In addition, in re-married step-families and in volatile cohabiting partnerships, more stress is experienced in the household, suggesting a reduction in child health as father's household involvement is compromised and not focused upon child well-being (McLanahan, 2004; Dunifon & Ziol-Guest, 2013).

Conceptual Model

There are numerous ways in which family structure can influence child health outcomes and well-being. Figure 1 provides the conceptual framework that guides this analysis. The figure shows that two mediators, father time spent with child and the quality of father-child relationship, may mediate the relationship between family structure and child health outcomes and well-being. The figure also shows that family structure may influence child health outcomes througha potential mediator not included in the present analysis, specifically, non-resident father-child interactions.

Father Time Spent with Child as a Mediator

Specific family structures have been shown to increase child health outcomes and well-being (Cavanagh et al., 2008; Hofferth & Goldscheider, 2010; Ryan et al., 2009; Sassler et al., 2009). Increases in the time a father spends with his child may allow children to experience healthier development, and reap better health outcomes (Case, Lin, & Mclanahan, 2000; Case & Paxson, 2001). As the quantity of father-child interactions increases, children experience more support, more stimulation and emotional validation supporting healthier child outcomes (Case & Paxson, 2001). As such, if family structure increases the quantity of father-child time spent together, child health outcomes may improve.

Quality of Father-Child Relationships as a Mediator

In order to ensure healthy child development, the quality, not just quantity, of father-child relationships must be high (Lamb, 2004). Improved quality, stability, and reliability of father-child relationships may increase healthier returns to childhood development. In addition, father-child closeness supports healthier child outcomes and decreases behavioral problems (Lamb, 2004; Marsiglio et al., 2000). Therefore, to the extent that higher father-child relationship quality proves critical to healthy child development and behavior, children may benefit from higher levels of health.

For children, stronger paternal ties within a household can reduce family instability and household stress and increase parental resources (Brown, 2004; Sassler et al., 2009). In addition, children in two-parent married families tend experience greater gains in social capital than children in single-parent families, leading to healthier decisions within the household and better child health outcomes (Amato, 1998; Coleman, Ganong, & Fine, 2000). If family structure secures household stability, father involvement and engagement in the household is increased therefore, leading to higher quality father-child relationships and better child health outcomes.

Research Questions and Hypotheses

The ways in which child health outcomes and well-being might be influenced by family structure differ depending on which of the proposed father-child interactions are operating: father time spent with child or quality of father-child relationships.

The current study aims to answer the following research questions:

1. How do child health outcomes and well-being differ among children residing in four family structures: children who live with their married biological fathers, married step-fathers, cohabiting biological fathers andcohabiting step-fathers?

Hypothesis 1:Children who live with their married biological fathers will demonstrate the most positive child health outcomes. However, as demonstrated in Figure 1, the magnitude of the relationship will depend on which mediating variables are at work.

2. Do the quantity offather-child time spent together and the quality of father-child relationships serve as mediators through which family structure affect child health outcomes?

Hypothesis 2:Among children who live with their married biological fathers, both mediators (father-child time spent together and higher quality father-child relationships)will fully account for the linkage between family structure and child health outcomes and well-being.

Data and Methods

FFCWS 9-year Dataset

Data for this study are drawn from the Fragile Families and Child Wellbeing Study (FFCWS), a longitudinal study which follows a cohort of 4,898 American children born in the U.S. between 1998 and 2000 (Brooks-Gunn et al., 2011). The FFCWS collected data through stratified random sampling of 75 hospitals in 20 US cities with 200,000 or more people and conducted interviews with both mothers and fathers at the time of their child's birth and then again when children reached the ages of one, three, five and nine. Biological mothers were interviewed at each wave of data collection while fathers (biological or step) and mother's current partner were interviewed only once. The response rate for each follow-up survey was near 75%.[1] Cities were selected based on welfare generosity, strength of the child support

[1]Biological fathers were an exception; 59% of biological fathers completed the 9-yr follow up interview.

system, and strength of the local market conditions in order to achieve a nationally representative sample of non-marital births in the US (Reichman, Teitler, Garfinkel & McLanahan, 2001).

The FFCWS's fifth wave of data collection was conducted around the focal children's ninth birthdays (August 2007-April 2010). It integrated interviews with (1) core biological parents, (2) primary caregivers (including non-parental caregivers in certain circumstances), (3) "focal" children, and (4) teachers. The parent, primary caregiver and child interviews collected information on attitudes, relationships, parenting behavior, demographic characteristics and child health (including mental and physical measures).Compensation for participation was provided to families in the Nine-Year wave of data collection.

Creating the current study's subsample

The current study subsample uses merged data from the following surveys included in the fifth wave of data collection conducted in year 9: primary caregiver follow-up survey, and the focal child interview. In addition, supplemental data regarding parents' and children's demographic characteristics were merged from baseline, year-one, three and five. Children were selected for the analytic sample based upon eligibility criteria established by the child's living arrangement: Only children whose mothers reported they were the primary caregiver and therefore living with the focal child were considered for the current study. Furthermore, children whose mothers reported they were co-residing with spouses or partners and married or in romantic cohabitation, were included in the current study's subsample. These selection criteria created the four family structure groups that are studied: children living with their biological married father; children living with their biological cohabiting father; children living with their step (non-biological) married father; and children living with their step cohabiting father.

Independent Variable

Measures of family structure. The main independent variable of interest in this analysis is the child's family structure. Binary variables identifying four family structures were created from mothers' report of their marital status and parental relationship to the focal child. Children are grouped into one of four family structures. First, the entire sample of children, regardless of family structure, was restricted to those whose biological mother reports being their primary caregiver prior to the survey. To identify the mother's marital status, the PCG was asked whether she was married or cohabiting with her current partner. Then, the PCG's responses to the household matrix question, "What is this person's relationship to you?" from the mother PCG's survey identified father's kin relationship to the child. The four independent variable family structures are: children living with their married biological fathers; children living with theirmarried step[2] fathers; children living with their cohabiting biological father; and finally, children living with their cohabiting step-fathers.

Measuring children's family structure and living arrangements in this way relies on certain assumptions. The first is that measures of non-resident father time spent with child and non-resident father-child relationship quality are insignificant in the effect family structure has on child health outcomes. Secondly, by only examining children whose primary caregivers are their biological mothers, the analysis does not apply to children whose biological fathers or non-parental guardian is their primary caregiver.

[2] The term "step" is used interchangeably and in many instances instead of "non-biological." For example, a child living with their step-father could be living with a co-resident father who is non-biological and the child's mother identified spouse.

Dependent Variable

Child Health Outcomes. In this analysis, six child health measures collected from the child interview, primary caregiver interview and self-administered questionnaire and the in-home visit activities will be used to conceptualize child health outcomes: (1) anthropometric BMI, (2) PCG's global assessment of her child's health, (3) illness and accident frequency, (4) emergency room frequency, (5) child behavior, and (6) child risky health behavior.

(1) Anthropometric BMI: During in-home visits, FFCWS interviewers measured child's height and weight and constructed a measure of child's BMI (kg/m^2) from the Nine-Year wave child measurements. As an anthropometric health measure, BMI, calculated using the height and weight of children who participated in the In-home survey, regardless of age and gender,was considered an objective measure of child health and well-being contrary to the other (more subjective) PCG-reported child health measures.

(2) PCG's assessment of her child's health: To assess a PCG's report regarding her child's general health status, the FFCWS PCG interview asks the mother to rate her child's general health and development on a scale of 1 to 5: excellent, very good, good, fair, or poor. Mothers had the option to refuse to answer or also respond with "I don't know." Following Dunifon & Ziol-Guest, 2013, a binary indicator indicating child's mother's report of "fair" or "poor" general child health was constructed and used in analysis.

(3) Illness and accident frequency: The FFCWS includes PCG's report of child health measured by number of child's doctor visits within the last 12 months due to an illness or injury. In the United States, children at the age of nine are *required* to go to the doctor once a year for their well-child check-up. A child's frequency of doctor

visits for an illness or injury is used as a proxy ofa child's frequency of illness or occurrence of disease and/or injury. A binary variable constructed from the top 25 percentile of mother's responses (response cutoff: 3 or more doctor visits due to illness/disease within the last 12 months) was used in analysis to represent a child's illness/disease frequency in the last 12 months.

(4) Emergency room frequency: Similar to the measure of illness and accident, the frequency with which a child is taken to the ER is considered a proxy of child health and well-being. The FFCWS asks PCG's to report the number of times within the last 12 months the child has been taken to the emergency room. Any frequency above zero potentially represents a child's compromised health. A binary variable representing if a child was taken to the ER in the last year (YES/NO) was constructed and used in logistical analysis.

(5) Child Behavior: A variety of scales and measures are used within the FFCWS to assess child behavior. The Child Behavior Checklist (CBCL) is the most widely used measure for assessing problematic behavior in children (Bronte-Tinkew, Horowitz, & Scott, 2009; Hale, Berger, LeBourgeois, Berger, Brooks-Gunn, 2011) and is available in the year five follow up PCG self-administered questionnaire (PCG SAQ). Data about child's behavior were collected using questions taken from the behavioral scales of the CBCL/6-18. The PCG SAQ contains 111 items and scales of the CBCL/6-18 on which a PCG is asked to rate their child's behavior from 0 (*Not true*) to 2 (*Very true or often true*). From the eight subscales CBCL included in the PCG SAQ, two broader scales can be constructed: total internalizing (all anxious/depressed and withdrawn items) and total externalizing (all aggressive and destructive items)

behavior. In this analysis, the internalizing and externalizing subscales are used as family structure has been shown to impact both types of child behaviors (Brown, 2004). Each of the eight constructs was first recoded to set the minimum response to 0 (*not true*) and then summed across responses to construct the two broader scales: total internalizing behavior and total externalizing behavior.

It should be noted that the CBCL is completed by the child's PCG and is therefore, subject to mother's biased reports. Although mother-reported behavior may be accurate, mothers' observation of child behavior within the home may not align with the child's behavior outside of the home, such as in school or in secondary home. Further studies should verify the alignment of child behaviors in and outside the home to test the bias of mothers' reports.

(6) Child Risky Health Behavior: The FFCWS uses the Things That You Have Done scale developed by Maumary-Germaud (2000), to record child self-reported delinquency. Similar items were included in the National Longitudinal Survey of Youth (1997) and are upheld as proxies of children's delinquent behaviors. The FFCWS uses a modified format of the scale asking "YES/NO" questions as opposed to employing a Likert scale for frequency of behaviors (Fragile Families, 2008). For this study, a total child's delinquent behavior scale was constructed by summing across child's responses to exemplify risky health behaviors and used as a proxy to measure child health outcomes and well-being.

Mediator Variables: Father-child interactions

The FFCWS five year child survey includes measures of parental supervision and relationships. Responses to these questions are the child's self-reported answers and therefore represent direct

measures of the mediating variables analyzed in this study. Although a child's response may be biased in reporting paternal supervision and relationship (i.e., father time spent with child) for various reasons, this study measures how father-child interactions in the four family structures mediate family structure's effect on child health. The quantity of time fathers spend with the child andthe quality of father-child relationships can be conceptualized by the following FFCWS child survey measures regarding father-child interactions.

Father-child time spent together.The five year child survey asks children to rate their perception of whether their resident father spends enough time with them. Children's answers may range from 0 (*Never*), 1 (*Sometimes/Very Often*), 2 (*Often*), or 3 (*Always*).

Father-child relationship quality. The FFCWS year-nine follow up collects father-child relationship quality from both the biological mother and the focal child. To remain consistent across father-child interaction measures, the year-nine child survey will be used to conceptualize father-child relationship quality through five measures: whether the resident father (biological or step) (1) talks over important decisions with the child; (2) listens to child's side of an argument, (3) how close child feels to his/her father, (4) how well do child and child's father share ideas or communicate regarding important issues, and (5) if father misses events or activities important to the child. Mediators (1), (2) and (5) follow the rating scale on which a child is asked to rate his assessment 0 (*Never*) to 3 (*Always*).Measures (3) and (4) are measured on a scale 1 (*Extremely*) to 4 (*Not very*). These measures were re-coded to an ascending scale to coincide with the logic of the proposed hypotheses. Five variablescorresponding to the five scales listed above are used proxy the father-child relationship quality mediators in mediational analysis.

Although child's self-report bias must be taken into account, a child's assessment of the quality of his/her father-child relationship is the mediating measure this study looks to investigate. A child's report, biased or unbiased, creates a framework for the proposedmediational analysis of father-child relationship quality (dependent variable, DV) on family structure (independent variable, IV) and ultimately, child health outcomes (DV) on family structure (IV).

Control Variables

Father's Sociodemographics.Father's age, race, education and number of other biological children were controlled for in all regressions (Equations 1-3). Father's age was constructed from the mother's response to the household grid question, how old is this person (referring to the list ofhousehold members).Father's race and education were constructed from biological fathers' and mothers' responses to demographic race and educations questions collected throughout the Fragile Families and Child Well-being study. Biological fathers were asked race and education identifying questions at baseline; mothers were asked their "current partners" (i.e., step fathers') race and education. From baseline to year nine, demographic data regarding fathers' race and education were collected during each wave. Therefore, to construct the residential step fathers' race and education variables, data from across waves 2, 3, and 4 were used. A generic fathers' race and education variable was thus constructed from baseline biological fathers' responses to race/ethnicity and education questions and mothers' responses to step fathers' race and education responses. Despite pulling data across waves to construct the generic fathers' education variable, family structures' sample sizes remained relatively low due to missing data on residential partners/fathers at year 9. Fathers' reported the number of other biological children he had at

baseline—the time of the child's birth; therefore, a variable constructed from the baby's fathers response was created to control for fathers' other biological children.

Mother's Sociodemographics. Mother's age, race, education and other sociodemographic control variables were all constructed from the baseline interview. At the time of the baby's birth, biological mothers (who met this study's selection criteria[3]), reported demographic information, her prenatal healthcare, and the number of other biological children present in the household. These data were used to construct the mother's control variables listed in Table 1. The mother's report of prenatal care is a binary variable; Table 1 list the mean of mothers who reported affirmative answers to seeing a doctor during her pregnancy.

Child's Sociodemographics. Control variables regarding the study's focal child were collected from mother's report at the baseline and year nine PCG interviews. Child's gender is a binary variable constructed from the mother's response at baseline—the time of the baby's birth. Whether the biological parents were married at baseline is binary variable constructed from the mother's response at baseline; and a child's pre-existing condition and insurance coverage are binary variables constructed from mothers' responses to child's health in year nine PCG's interviews. Whether the child has seen a doctor in the last 12 months is a categorical variable constructed from the mother's responses to child's history in the year nine PCG interview.

Empirical Approach

The most ideal parameters of the ways family structure influences child well-being would be derived from randomized control trials in which children were randomly assigned to different family structures. However, without such experimental data, this analysis controls for covariates

[3] Biological mothers must have identified as the child's primary caregiver to be included in this current study sample.

that may be linked with both child health and family structure.As father-child interactions are predominant factors in the relationship between family structure and child health outcomes, those father-child interactions that mediate the influence of family structure on child health and well-being were explored, using the four step mediational procedure proposed by Baron and Kenney (1986) and Kenny, Kashy and Bolger (1998):

> *First, the dependent variable (DV) must be regressed onto the independent variable (IV) to demonstrate that an effect to be mediated indeed exists.*

Equation 1 below compares the health outcomes of children who live with married biological fathers to that of children living with (a) married step-fathers, (b) cohabiting step-fathers and (c) cohabiting biological fathers. Ordinary Least Squares (OLS) regression estimates the following baseline model:

$$Y_i = X_i\beta + \alpha_1 F_1 + \alpha_2 F_2 + \alpha_3 F_3 + \varepsilon_i \quad (1)$$

where Y_i is an individual child's, *i*, measure of child health outcomes; F_1, F_2, and F_3step-father families, cohabiting step-father families cohabiting, married father families, respectively; X_i is a vector of factors that determine child well-being; and ε_i is random error.

> *Second, the mediator must be regressed on the IV and be significantly predicted by the IV.*

Equation 2 is compares father-child interactions in an OLS regression and is used to estimate the linkages between family structure and father-child interactions:

$$Z = X_i\beta + F_1 + F_2 + F_3 + \varepsilon_i \quad (2)$$

where Z represents the father-child interactions (father's time spent with the child, the quality of the father-child relationship and the father's household investment); F_1, F_2, and F_3 are married-step-father families, cohabiting-biological father families and cohabiting-step-father families, respectively; X_i is a vector of factors that determine child well-being; and ε_i is random error. Equation 2 is regressed six times, once for each of the mediator variables as a mediational model to test whether father's time, the quality of father-child's relationship and father's household investment mediate the linkage between family structure and child health outcomes.

> *Third, both the mediators and the IVs are used to predict the DVs. For full mediation to exist, the IVs should no longer significantly predict the DVs. However, partial mediation may be achieved when these associations are reduced in absolute size but not reduced to non-significant levels*

Equation 3 is an OLS regression that represents the mediational relationship hypothesized to exist between family structure and child health outcomes. Equation 3 tests the role of father-child interaction factors in mediating the linkages between family structure and child health outcomes.

$$Y_i = X_i\beta + \alpha_i F_i + \gamma Z + \varepsilon_i \quad (3)$$

To establish mediation, the following conditions must be true. First, family structure must be shown to affect child health outcomes and well-being (the dependent variable) in equation (1). Second, family structure (the independent variable) must affect the mediator in equation (2). Third, the mediator must affect the dependent variable in equation (3). If these conditions hold true in the predicted direction, then the effect of family structure on child health outcomes must be less in the equation (3) than in equation (1). Perfect mediation exists if family structure has no significant effect when the mediator is controlled for. Thus, if parent-child interactions (i.e.,

father's time, quality of father-child relationship and father's household investment) serve as mediators for the relationship between family structure and child health outcomes, α in equation (2) will be higher than the parameter for family structure in equation (3).

Results

Of the 1,978 children included in the analysis, 1,679 children's health outcomes were recorded. Based on the mean sample child health outcomes, 85.30% children were reported to be in good health with a mean BMI of 19.36. Among these children, the mean score of internalizing behavior was 2.21, the mean score of externalizing behavior[4]was 1.12, and the mean score of children's self-report of his/her delinquent behavior[5]was 1.10. For sample means and percentages of child health outcomes by family structure, see Table 3.

Descriptive Statistics

Table 1 compares sample means and percentages by family structure group for resident fathers, mothers and focal child. Fathers in the omitted variable group (married biological families) are relatively older compared to other family structures and are also more likely to have higher education. Fathers in married step familiesare more likely to be non-Hispanic white and have a median age of 35.62 years. A total of 27.24% of mothers in married step families are non-Hispanic white while 29.10% identified as Hispanic and 42.41% identified as non-Hispanic black. Mothers in married step work more hours per week and are more likely to have obtained some college or technical school education than mothers residing in other family structures. However, a greater percentage of mothers in married biological families have completed 4 years or more of college education.Finally, a higher percentage of married biological parents report

[4] Total internalizing and externalizing behavior were scored on a scale of 0 *Not true* to 2 *Very true or often true*.
[5] Total delinquent behavior was based upon the child's self-report: 0 NO / 1 YES. See Data section for a description of the treatment of data and the summation of scales.

being married at the child's birth than in any other family structure. Children living with married biological parents are more likely to have private health insurance and less likely to have seen a doctor more than 4 times in the last year.

Table 2 compares household sociodemographic status by family structure. Compared to the omitted group, households in which the child lives with a cohabiting biological father, on average report a lower mean income and a larger family size.

Table 3describes child health outcomes among the sample and by family structure. Overall, children living with married biological fathers had higher health outcomes at the baseline; however, no significant differences existed between family structures.

Table 4 compares child's self-report of father-child interactions (i.e., measures of the mediator variables). Compared to the omitted group, children in other groups reported spending less time with their father and on average a lower father-child relationship quality[6] (i.e., feeling less close with their father, sharing fewer ideas with their father and feeling as if their father listened to their side of an argument a fewer number of times). Similarly, the number of times a father misses an event that is important to his child was highest among children living with their cohabiting step-fathers. However, children living with a cohabiting biological father reported that their father talked over important decisions with them more than children in other family structures.

[6]These measures were scaled accordingly: time spent together and father listens—0 (*Never*) to 3 (*Always*); child feels close to father and child shares ideas—1 (*Extremely*) to 4 (*Not very*). See Data section for more details on the re-coding of these measurements.

Mediational analysis: the role of father-child interactions

In the mediational model, the independent variable is the family structure in which a child resides: (1) with a married biological father, (2) with a marriedstep-father, (3) with a cohabiting biological father, or (3) with a cohabiting step-father. The dependent variable was a child's health outcome: BMI, poor general health, illness frequency, emergency room visit frequency, total internalizing behavior, total externalizing behavior, and total delinquent behavior. Mediator variables are children's self-report of their father-child interactions: (1) father-child time spent together, (2) whether a father talks over important decisions with child, (3) whether a father listens to a child's side of an argument, (4) how close the child feels to his/her father, (5) how well do child and father share ideas, and (6) how often does a father miss events or activities that are important to his child.

For each multiple regression in the mediational model, Table 5-8 displays the β coefficients, SE, significance levels, and R^2 values. For the three logistic regressions in Tables 5 and 8, the coefficients of each outcome are listed as well as the SE and significance level. In the first regression, Equation 1, three of the seven child health outcomes were significantly predicted by family structure when compared to the omitted group (i.e. children who reside with their married biological fathers). Children living with a married biological father consistently had better general health than those living with a cohabiting biological father and those living with a cohabiting step father. Additionally, children in married parent families had fewer externalizing behavior problems compared to those living with a married step father and those living with a cohabiting stepfather, and fewer internalizing problems compared to those living with a married stepfather. Thus step one of the mediational procedure is met, demonstrating that there is an association between family structure and three child health outcomes.

To comply with the second step of mediation it was demonstrated that 6 mediator variables were significantly predictive of family structure independently. As shown in Table 6, children in married step-father families reported being less close to their fathers, those living with a cohabiting biological father reported being less close and sharing less with their fathers, and those living with cohabiting step-fathers had lower-quality interactions on all six dimensions.

For the finalstep of mediation (see Table 7), the mediational effects of father-child interactions while controlling for family structure in predicting the three child health outcomes shown to be linked with family structure are examined in Table 5 (i.e., child's poor general health, child's total internalizing behavior and child's total externalizing behavior). Results show that family structure no longer significantly predicted any of these outcomes after the inclusion of the mediators. Results suggest that the measure of sharing ideas mediates the linkages between living in a cohabiting household and child poor health; the measure of closeness mediates the linkbetween living with a married step father and children's internalizing behavior, and both listening and closeness mediate the link between living with a cohabiting or married step father and children's externalizing behavior.

Discussion

In this study six father-child interactions were investigated as potential mediators of the relationship between family structure and child health outcomes. Specifically, the study examined whether the linkage between three family structures (married step-father families, and cohabiting biological or step-father families) and child health outcomes are mediated by the (1) quantity of time fathers and children spend together and (2) the quality of father-child relationships.

Results suggest that, perhaps not surprisingly,children in other living arrangements often fare worse than those living with their married biological fathers; children living with their cohabiting step-fathers fared the worst in all child health outcome measures predicted by family structure: (1) child's poor general health, (2) child's total internalizing behavior, and (3) child's total externalizing behavior. These findings are in accordance with previous research (Cavanagh et al., 2008; Hofferth & Goldscheider, 2010; Ryan et al., 2009; Sassler et al., 2009; Brown, 2004; Harris et al., 2000; Hoffman and Johnson, 1998; McLanahan & Sandefur, 1994) and confirm hypothesis 1 by demonstrating the positive health benefits children living with married biological fathers experience compared to the negative effects other children may face when living with a cohabiting or stepfather. Furthermore, the idea that child's behavioral or mental health aspects of health are more sensitive to living with a step-father are supported by previous child health and family research findings (Brown, 2004; Dunifon & Ziol-Guest, 2013).

Moreover, it is interesting to note the difference between fathers' biological relationships versus marital status in predicting father-child interactions. In married father families, only how close a child perceives his/her relationship to a married biological or step father is affected by family structure; while all six father-child interactions are affected by cohabiting father family structures. These trends are similar to those found in prior research (Case, Lin, & Mclanahan, 2000; Case & Paxson, 2001; Lamb 2004; Brown, 2004).

Finally, the full mediational effect[7] father-child interactions had in accounting for the effect of family structure on child health outcomesprovide strong evidence of the importance of higher-quality co-resident father-child relationships over family structure (or whether a child

[7]After controlling for all father-child interaction mediators, the significant effects of family structure were reduced to non-significance.

lives with his/her married biological parents) in predicting child health outcomes. Children who lived with their married biological father consistently reported significantly higher quality and quantity of father-child interactions across all six mediator variables and alsoexperienced better child health outcomes. Children who lived with their cohabiting step fathers consistently reported lower quality and quantity of father-child interactions and also experienced lower child health outcomes, specifically poorer general health and more externalizing behavior. These findings coincide with previous theories surrounding the stability and stress cohabiting and step-father family structures impose on father-child relationships and interactions (Brown, 2004; Brown 2003; McLanahan, 2004; Ono, 2013; Coleman, Ganong, & Fine, 2000).

However, for children living with a married step father or a cohabiting biological father, health outcomes varied. Children living with a married step-father reported lower father-child closeness and experienced more internalizing and externalizing behaviors. Children living with a cohabiting biological father reported lower father child closeness as well as lower father-child sharing of important ideas; and experienced no significant effect in child behavior outcomes but poorer general health. Therefore, the meditational effect of father-child interactions can be summarized in three resulting patterns:

(1) Children living with a step-father reported lower father-child closeness (i.e., lower quality of father-child relationships) and experienced a significant increase in a child's total externalizing behaviors (i.e., more child aggression and rule-breaking).
(2) Children living with a cohabiting father reported less sharing of important ideas/decisions with their father and experience poorer general health.

(3) However, children's internalizing behavior outcomes were only significantly mediated by a lower report of father-child closeness among children living with their married step fathers.

Thisvariation in mediated child health outcomes suggests strong evidence of the importance of higher quality father-child relationships among children living with a step- or cohabiting father, despite family structure or a child's living arrangements. Living with a step-father, whether married or cohabiting, was associated with children's poorer general health and more externalizing child behaviors. In addition, an association between children living with cohabiting father and lower father-child sharing interactions led to poorer general health among children. These resulting patterns, therefore, provide a foundational base for future research to investigate the mediational role father-child interactions play in predicting different aspects of child health. Future studies are needed to discern which father-child interactions are most predictive of a child's general health, physical health and/or behavioral health among step versus biological families and married versus cohabiting families.These findings confirm hypothesis 2 and are consistent with other theoretical frameworks surrounding the mediational relationship of family structures' impact on child health (Hofferth & Anderson, 2003; Brown, 2004). Hofferth and Anderson (2003) found a father'sbiological relationship to his child explained less of father involvement thananticipated after controlling for differences between fathers; however, marriage continued to differentiate paternal involvement levels. Therefore, whether a father marriesmay still influence father-child relationship quality which in turn predicts child health outcomes among step-father or biological families. However, the full meditational results of the current study emphasize the importance of father-child interactions in the pathway linking family structure to child health outcomes. The current study's results demonstratethe importance of

fathers' roles (regardless of biological or marital status) in the home and the importance of higher quality father-child interactions.

The finding of full mediational effects of the quality of father-child relationship while controlling for family structure provides evidence of the importance of enhancing the resident father's commitment and engagement within in the home. Although more studies are needed to investigate the consistently lower quality father-child interactions—measured in all dimensions—among children residing with cohabiting step-fathers, the implications of this study demonstrate that co-resident fathers', regardless of family structure, interactions inside the home are fundamental to a child's healthy development.

Furthermore, in the current study, child's CMI illness frequency, ER visits and total delinquency behavior were unaffected by family structure while a child's poor general health, total internalizing behavior and total externalizing behavior were significantly predicted by family structure. More research should be conducted to test the effects of other family dimensions and demographic characteristics on child health outcomes. The current study demonstrates that if father-child interactions are strengthened, not only would a child's physical aspect of general health be predicted to improve, his/her developmental behavior would be expected to result in better outcomes and may lessen a child's aggression and/or anxiety. Although many policies seek to monetarily involve the father in household and child support, there has been a shift in the cultural structures of families which are today lending more weight to the quantity and quality of father-child interactions in predicting child well-being. Family policies in America should therefore conform to the institution of the family, regardless of its structure, to support higher-quality and meaningful father-child bonding and relationship building.

Methodological considerations

Several limitations of this research need to be acknowledged. This study utilized self-report and surveys. Previous survey studies have been compromised due to recall bias, respondent burden or responder bias. In merging data from five waves of data collection, survey patterns and respondent answers were systemically collected and coded to reduce underestimate or overestimate biases. Future studies should cross check teachers' health reports with those of the PCG to ensure external validity of mothers' responses. In addition, because the population subsample was limited to children living with their biological mother who identified as the PCG and who lived with a resident "father," small sample sizes were used in this analysis. Thus further studies should be conducted to test the accuracy of these findings across a more representative sample.

This study examined the effects of father-child interaction in mediating the relationship between family structure and child health outcomes. Although these father-child interactions did prove to be full mediators of this relationship, future studies should investigate which father-child interactions most predict family structure. These top father-child interactions should then be used in an analysis similar to this study's to test the significance in mediating family structures' effects on child health. Similarly, other "household" factors such as the quality of mother-father relationships and the quality of mother-child relationships should be examined to determine whether other factors as predicted by family structure affect the linkages between family structure and child health outcomes.

Furthermore, one missing factor not considered in this study is the influence of non-resident fathers. Although this study ignores the impact non-resident paternal support has in predicting child health outcomes, these fathers' influence in predicting child well-being should

be analyzed to establish efficient and holistic family policies. Non-resident fathers may play a greater role in predicting later adolescent health outcomes and should be further investigated to identifythe relationship out of household kin have on a child's future health.

Using OLS regression to estimate the influences of family structure on child health outcomes may produce a biased estimate in the parameters of interest.. These parameters may be over or underestimated if there are unobserved factors that predict family structure and child health outcomes. This may be the case if children in married biological father families are systematically different from other children living in other family in non-measureable ways. For example, children who live in married biological father families may be exposed to healthier family behaviors because fathers who tend to marry and stay married may be less inclined to engage in risky health behaviors. These characteristics may also be directly linked to child health, leading to an overestimate of the linkages between for child well-being and child health outcomes. More experimental analysis should be conducted to determine the influences and mechanisms by which father involvement and family structure predict child health outcomes.

Policy Implications

The quality of father-child interactions has been demonstrated to mediate the relationship between family structure and three child health outcomes: poor general health, total internalizing behavior and total externalizing behavior. Although the quantity of father-child time spent together was not foundto have a significant effect on the linkage between family structure and this study's three mediated child health outcomes, the quality of father-child relationships was observed to significantly, fully mediate the pathway in which family structure affects these three child health outcomes. Therefore, these findings suggest a shift in paradigm for social and family

policymakers. This study's results suggest that higher quality father-child interactions are key factors to determining child health outcomes.

Policies which seek to foster high quality father-child interactions should be prioritized in order to protect and enhance the health of children living with their step or a cohabiting father. In the past, family policies have sought to foster fathers' support through monetary means and financial payments. However, the quality of father-child interactions may play a more significant role in fostering child development and improving child health outcomes. Family policies which promote higher quality father-child interactions in any given family structure may create a healthy and protected space for fathers and children to establish meaningful and long-lasting interactions. In order to promote better child health outcomes, a balance between policies which support fathers' involvement in the lives of their children and household stability should be established. For example, current policies surrounding a father's child support payments require fathers (step and biological) to make annual and/or monthly payments to thechild's biological mother until the age of 18 years. However, as suggested by the current study, a father's financial contribution to his child may not be the only predicting factor of healthier child outcomes; the time and relationship he builds with his child may also contribute to his child's well-being. This gap between family structure, father support and child health outcomes can be bridged by social policies which support a fathers' involvement, engagement and commitment to his child, promoting better child health and higher-quality and meaningful paternal support throughout childhood.

Parental training programs which aim to improve and education paternal parenting skills can be implemented by US family welfare policies to ensure healthier child outcomes among America's youth. Research has established that parents, who take part in these programs, whether

voluntarily or due to a court-issued mandate, exhibit more nurturing parenting attitudes upon program completion (Byrne et al., 2013; Serketich et al., 1996). More importantly, studies have shown that parent training programs are also commonly associated with both the prevention and improvement of early childhood behavioral problems (Barth, 2009; Fennell et al., 1998; Kaminski et al., 2008). Additionally parents have observed fewer and less frequent disruptive behaviors in their children after completing their respective programs (Letarte et al., 2010). This is likely due to the fact that parents who participate grow to have more positive perceptions of their children and become less potentially abusive towards them (Byrne et al., 2013; Kaminski et al., 2008). Such effects on the externalizing behaviors of children are also consistent with an increase in cost-effectiveness, as these programs can help reduce the social costs of child abuse and neglect (Barth, 2009; Mihalopoulos et al., 2007). Thus, the effectiveness of parent training programs is a critical step in ensuring the well-being of children. Parents who are involved in some type of parenting skill training program are more equipped to respond to their children's' needs and therefore, increase the viability of child health outcomes (Byrne et al., 2013; Letarte et al., 2010; Serketich et al., 1996).

Nevertheless, it must be acknowledged that the quality of father-child relationship conceptualized and measured in this study is limited and may only provide a partial explanation for the mediational relationship between family structure and child health. Future studies must be conducted to test whether non-residential fathers' support—through both financial means and father-child interactions—play a role in predicting child health outcomes. The interplay between identified mediating father-child interactions and parenting styles, father-mother interactions and mother-child relationships must also be explored to establish holistic policies which protect and promote child health outcomes regardless of family structure.

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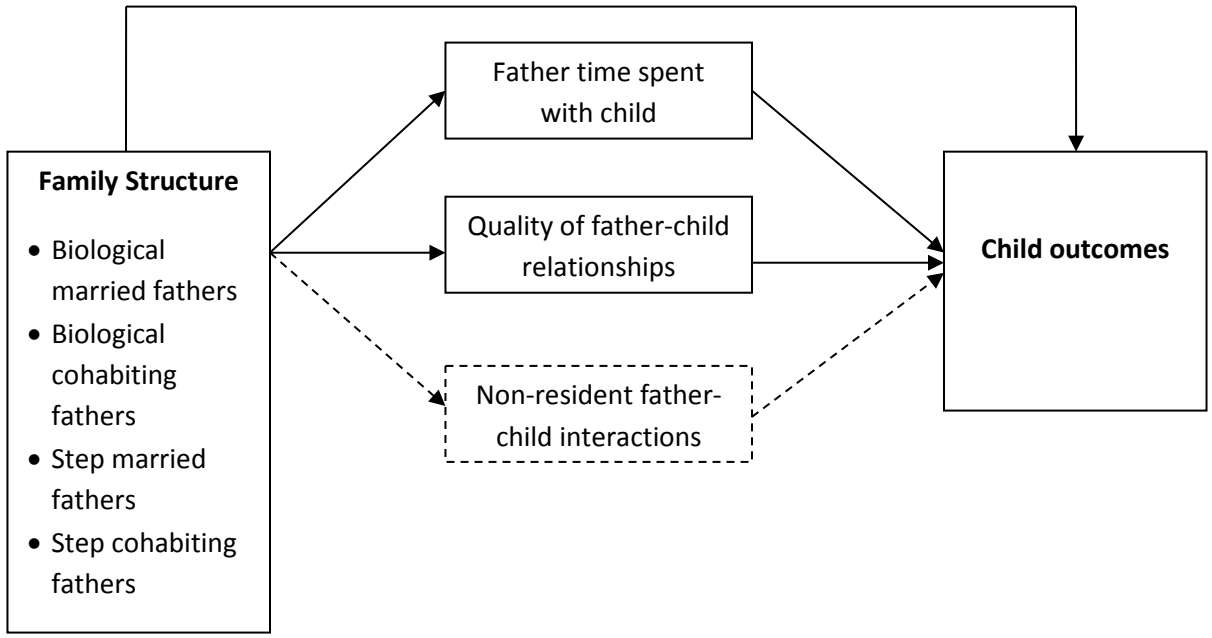
APPENDIX

Figure 1. Conceptual map of father-child interactions mediating roles in the linkage between family structure and child health outcomes.[8]



[8] Note: Only the relationships indicated by solid arrows will be explicitly accounted for in this mediator analysis. Dotted lines indicate potential mechanism that may be at work, but will not be measured or included in the current study.Pathway a: family structure to child health outcomes; pathway b: the mediational pathway from family structure to parent-child interactions to child health outcomes

Table 1. Sample Means and Percentages by Family Structure for Fathers,Mothers and Focal Child

		Married Biological Families	Married Step Families	Cohabiting Biological Families	Cohabiting Step Families
	N	988	323	269	400
Father's Sociodemographic Characterisitcs					
Age	*N*	985	320	268	398
Mean		39.68	35.62	36.24	34.08
Min		25	23	24	21
Max		70	83	75	62
Race	*N*	987	320	269	396
White		20.63	31.94	11.52	16.92
Black or African American		26.69	45.31	47.21	53.28
Hispanic		28.67	30.63	37.92	25.25
Other		5.37	3.44	3.35	4.55
Education	*N*	922	179	245	217
Less than High School		13.23	24.02	31.43	23.50
High School/equivalent		19.09	29.61	29.80	37.33
Some college/technical school		34.38	37.99	32.72	21.89
4 yrs college or more		33.30	8.38	5.71	6.45
Number of other biological children	*N*	910	245	233	300
Mean		1.06	0.96	1.06	1.06
Min		0	0	0	0
Max		10	7	7	8
Mother's Sociodemographic Characterisitcs					
Age	*N*	988	323	268	399
Mean		37.32	32.53	34.03	31.79
Min		23	24	24	23
Max		54	51	54	50
Race	*N*	985	323	269	400
White		37.46	27.24	14.50	19.25
Black		26.80	42.41	44.61	50.75
Hispanic		29.85	29.10	39.03	26.00
Other		5.89	1.24	1.86	4.00

Table 1. Sample Means and Percentages by Family Structure for Fathers, Mothers and Focal Child (cont.)

Education	*N*	988	323	269	400
Less than High School		15.08	21.98	32.34	23.50
High School/equivalent		18.12	18.58	24.54	25.75
Some college or technical school		33.20	47.37	36.43	43.00
4 yrs college or more		33.60	12.07	6.69	7.75
Hrs worked per week	*N*	985	322	268	395
Mean		32.88	36.43	34.36	34.23
Min		0	0.00	0.00	0
Max		100	95	70	80
Number of other biological children	*N*	988	322	269	394
Mean		1.07	0.99	1.19	0.99
Min		0	0	0	0
Max		10	7.00	8	11
Prenatal care: saw doctor while pregnant	*N*	984	319	268.00	394
Mean (%)		98.68	97.18	96.64	97.72
Focal Child's Sociodemographic Characterstics*					
Child is Male	*N*	988	323	269	400
Mean		52.63	56.66	55.39	50.75
Biological parents are married at birth	*N*	986	320	269	399
Mean		61.36	15.94	2.23	10.28
Seen doctor in last 12 months	*N*	976	320	266	392
Never		10.67	10.00	6.39	7.14
1-3 times		83.54	83.13	86.09	83.16
4 or more times		5.79	6.88	7.52	9.69
Pre-existing condition	*N*	988	323	269	400
Mean		35.53	34.98	37.55	36.75
Private insurance coverage	*N*	986	319	266	391
Mean		64.60	45.45	27.07	22.51
Medicaid coverage	*N*	986	319	266	391
Mean		36.92	58.31	71.43	77.49

Notes: *Means listed as percenatges

Table 2. Household Sociodemographics by Family Structure

		Married Biological Families	Married Step Families	Cohabiting Biological Families	Cohabiting Step Families
	N	988	323	294	413
Income	*N*	987	322	269	398
Mean		$ 79,268.18	$ 50,205.91	$ 35,707.69	$ 36,209.05
SD		*$ 71,283.24*	*$ 44,497.16*	*$ 23,249.59*	*$ 31,232.86*
Median		$ 60,000.00	$ 40,000.00	$ 32,000.00	$ 28,699.00
# of children in household	*N*	984	321	269	400
Mean		2.717480	2.738318	2.821561	2.722500
SD		*1.153287*	*1.211944*	*1.439624*	*1.503711*
Median		3	3	3	3
# of adults in household	*N*	984	321	269	400
Mean		2.277439	2.246106	2.408922	2.297500
SD		*0.654633*	*0.616334*	*0.830812*	*0.670909*
Median		2	2	2	2

Table 3. Sample Means and Percentages of Child health outcome variables

		Married Biological Families	Married Step Families	Cohabiting Biological Families	Cohabiting Step Families
	N	988	323	269	400
BMI	*N*	905	293	258	373
Mean		19.09	19.37	20.22	19.59
Min		9.84	12.13	12.29	13.02
Max		40.01	38.36	41.21	43.15
Child's general health and development	*N*	987	320	266	392
Poor health		12.16	13.44	19.55	19.64
Illness and accident frequency	*N*	987	319	265	390
≥ 3 doctor visits (%)		16.72	15.36	15.09	16.15
Mean		1.33	1.17	1.20	1.33
Min		0	0	0	0
Max		20	20	20	20
Emergency room visit within last 12 mo	*N*	987	320	266	392
Mean (%)		1.82	2.19	3.01	3.06
Child's behavior					
Total internalizing behavior	*N*	878	282	250	363
Mean		2.05	2.40	2.45	2.32
Min		0	1	1	0
Max		14	19	19	19
Total externalizing behavior	*N*	880	285	250	367
Mean		0.92	1.32	1.22	1.43
Min		0	0	0	0
Max		8	12	9	11
Child's delinquent behavior (self-report)	*N*	882	292	248	363
Mean		0.88	1.23	1.20	1.40
Min		0	0	0	0
Max		17	7	10	11

Table 4. Sample Means and Percentages of Mediator variables (Child's self-report)

		Married Biological Families	Married Step Families	Cohabiting Biological Families	Cohabiting Step Families
	N	988	323	269	400
Father-child time spent together					
Does father spend enough time with child?	*N*	898	246	253	263
Mean		2.23	2.15	2.20	2.01
Min (Never)		0	0	0	0
Max (Always)		3	3	3	3
Father-child relationship quality					
Does father talk over important decisions with child?	*N*	894	247	251	262
Mean		1.88	1.94	1.97	1.50
Min (Never)		0	0	0	0
Max (Always)		3	3	3	3
Does father listen to child's side of an argument?	*N*	887	245	251	261
Mean		1.76	1.65	1.74	1.46
Min (Never)		0	0	0	0
Max (Always)		3	3	3	3
How close does child feel to father?	*N*	898	247	251	260
Mean		3.60	3.23	3.45	2.97
Min (Not very)		1	1	1	1
Max(Extremely)		4	4	4	4
How well do child and father share ideas or talk about things that really matter?	*N*	894	247	250	265
Mean		3.06	2.89	2.92	2.54
Min (Not very)		1	1	1	1
Max(Extremely)		4	4	4	4
Does father miss events or activities that are important to child?	*N*	889	247	250	257
Mean		1.01	1.04	1.08	1.32
Min (Never)		0	0	0	0
Max (Always)		3	3	3	3

Table 5. The effect of family structure on child health outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Models 1-4: Multiple Regressions (β coefficients listed below) Models 5-7: Logistical Regression (β coefficients listed below)						
VARIABLES	child's bmi	child's total internalizing behavior	child's total externalizing behavior	child's total delinquent behavior	child is in poor health	child has visited doctor more than 3 times in last 12 months due to an illness or disease	child has visited ER in last 12 months
Constant (omitted group: married biological fathers)	19.913***	2.193***	1.809***	0.793	-7.469***	-4.211***	-7.742***
	(1.749)	(0.707)	(0.612)	(0.651)	(1.281)	(1.066)	(2.615)
married step father	0.096	**0.292***	**0.336****	0.094	0.0115	0.144	-0.271
	(0.413)	**(0.166)**	**(0.145)**	(0.151)	(0.308)	(0.261)	(0.691)
cohabiting biological father	0.212	0.054	0.100	0.105	**0.414***	0.137	0.513
	(0.380)	(0.153)	(0.134)	(0.140)	**(0.246)**	(0.251)	(0.533)
cohabiting step father	0.020	0.108	**0.268***	0.020	**0.497***	0.0840	0.194
	(0.408)	(0.166)	**(0.144)**	(0.150)	**(0.267)**	(0.259)	(0.587)
father's age	0.013	0.008	-0.008	-0.001	0.0165	0.0120	-0.0363
	(0.024)	(0.010)	(0.009)	(0.009)	(0.0159)	(0.0155)	(0.0411)
father's race: NH Black	0.052	0.009	0.234	0.151	0.426	-0.870**	-0.692
	(0.617)	(0.251)	(0.218)	(0.225)	(0.461)	(0.408)	(0.911)
father's race: Hispanic	1.114**	0.156	0.025	-0.094	1.036**	0.0691	-1.739*
	(0.532)	(0.217)	(0.190)	(0.197)	(0.403)	(0.321)	(0.921)
father's race: Other	-0.407	0.075	0.228	-0.087	-0.0438	-0.415	-0.0739
	(0.752)	(0.305)	(0.265)	(0.278)	(0.621)	(0.472)	(1.020)
father's education: high school graduate or equivalent	0.097	-0.088	0.241*	0.075	-0.0749	-0.0577	-0.182
	(0.396)	(0.160)	(0.140)	(0.145)	(0.254)	(0.257)	(0.574)
father's education: some college or technical school	-0.734*	-0.146	0.061	-0.151	0.0116	-0.00501	0.0576
	(0.383)	(0.155)	(0.135)	(0.140)	(0.247)	(0.246)	(0.545)
father's education: college graduate or higher	-0.869*	-0.144	-0.074	-0.078	-0.309	-0.0845	-1.194
	(0.493)	(0.199)	(0.174)	(0.182)	(0.362)	(0.311)	(0.906)
fathers who have other biological children	-0.342	-0.160	-0.068	-0.148	0.283	-0.0256	0.781
	(0.396)	(0.161)	(0.140)	(0.146)	(0.267)	(0.255)	(0.567)
no. of father's biological children	-0.046	-0.106*	-0.026	-0.031	0.00600	-0.0374	0.0705
	(0.149)	(0.060)	(0.052)	(0.055)	(0.0940)	(0.0975)	(0.181)
mother's age	0.006	0.010	0.002	-0.018	0.0351	-0.0269	-0.0315
	(0.033)	(0.013)	(0.012)	(0.012)	(0.0216)	(0.0208)	(0.0529)
mother's race: NH Black	1.389**	-0.028	-0.468**	0.216	0.271	0.208	0.354
	(0.599)	(0.244)	(0.211)	(0.219)	(0.432)	(0.397)	(0.932)
mother's race: Hispanic	0.449	0.045	-0.400**	-0.364*	-0.243	-0.346	0.956
	(0.512)	(0.208)	(0.183)	(0.190)	(0.383)	(0.320)	(0.845)
mother's race: Other	0.765	0.084	0.080	-0.139	0.486	-0.259	0.775
	(0.764)	(0.312)	(0.271)	(0.280)	(0.541)	(0.467)	(1.009)

Table 5. The effect of family structure on child health outcomes (cont.)

mother's education: high school graduate or equivalent	0.443	-0.126	-0.213	-0.303**	0.0218	0.797***	-0.0516
	(0.410)	(0.166)	(0.144)	(0.150)	(0.247)	(0.277)	(0.563)
mother's education: some college or technical school	-0.201	-0.278*	-0.292**	-0.246*	-0.736***	0.582**	-0.654
	(0.384)	(0.156)	(0.136)	(0.141)	(0.252)	(0.267)	(0.554)
mother's education: college graduate or higher	-0.327	-0.215	-0.116	-0.323*	-0.906**	0.303	-0.121
	(0.489)	(0.199)	(0.173)	(0.180)	(0.361)	(0.325)	(0.696)
no. of hours mother works	0.009	-0.000	0.003	0.001	-0.00570	0.000849	0.0211
	(0.009)	(0.004)	(0.003)	(0.003)	(0.00650)	(0.00569)	(0.0155)
mothers who have other biological children	-0.116	-0.136	-0.160	0.107	0.262	0.120	-0.0240
	(0.398)	(0.162)	(0.141)	(0.146)	(0.269)	(0.253)	(0.570)
no. of mother's biological children	-0.007	-0.087	-0.031	0.032	0.164*	0.0719	0.376**
	(0.154)	(0.062)	(0.054)	(0.057)	(0.0927)	(0.0974)	(0.173)
mothers who visited doctor during pregnancy	-0.883	-0.008	-0.172	0.724**	0.416	-0.494	0.0974
	(0.931)	(0.381)	(0.323)	(0.364)	(0.689)	(0.519)	(1.129)
child is male	-0.477**	0.069	0.264***	0.625** *	0.389**	0.0469	0.113
	(0.241)	(0.098)	(0.085)	(0.089)	(0.173)	(0.150)	(0.377)
child's parents were married at birth	-0.779**	-0.224*	-0.176	0.001	-0.192	0.426**	0.367
	(0.332)	(0.135)	(0.118)	(0.122)	(0.238)	(0.209)	(0.533)
child has visited doctor in last 12 months	0.169	0.062	0.042	0.108	0.708***	1.030***	1.020**
	(0.300)	(0.121)	(0.105)	(0.111)	(0.208)	(0.190)	(0.447)
child has a medical pre-condition	0.039	0.255**	0.126	0.139	0.932***	0.891***	1.205***
	(0.250)	(0.101)	(0.088)	(0.092)	(0.172)	(0.151)	(0.393)
child is covered under private insurance	-0.317	-0.168	-0.048	-0.050	0.0634	0.159	1.140**
	(0.390)	(0.158)	(0.136)	(0.145)	(0.272)	(0.242)	(0.518)
child is covered under Medicaid	-0.376	0.098	0.122	0.102	-0.0660	0.0824	1.086**
	(0.383)	(0.154)	(0.133)	(0.141)	(0.268)	(0.235)	(0.537)
household income	0.000	-0.000*	-0.000**	-0.000	-6.42E-04	1.00E-03	3.47E-05
	(0.000)	(0.000)	(0.000)	(0.000)	-2.46E-03	-1.43E-03	-5.21E-03
no. of adults who live within child's household	-0.001	0.059	0.015	-0.043	0.169	0.187	0.199
	(0.188)	(0.077)	(0.068)	(0.070)	(0.116)	(0.118)	(0.271)
Observations	1,299	1,263	1,267	1,263	1,381	1,378	1,381
R-squared	0.084	0.056	0.070	0.109			

Notes: Models 1-4 are determined by multiple regressions. Models 5-7 are determined by logistic regressions. Standard errors are listed in parenthesis. Household income coefficients have been multiplied by 1000.
***$p<0.01$, **$p<0.05$, *$p<0.1$

Table 6. The effect of family structure on father-child interactions

VARIABLES	(1) Father-child time spent together *Does father spend enough time with child?*	(2) Father-child time spent together *Does father talk over important decisions with child?*	(3) Father-child relationship quality *Does father listen to child's side of an argument?*	(4) Father-child relationship quality *How close does child feel to father?*	(5) Father-child relationship quality *How well do child and father share ideas or talk about things that really matter?*	(6) Father-child relationship quality *Does father miss events or activities that are important to child?*
Constant (omitted group: married biological fathers)	2.218***	1.585***	1.238***	3.632***	2.257***	2.008***
	(0.409)	(0.447)	(0.469)	(0.339)	(0.402)	(0.411)
married step father	-0.138	-0.020	0.012	**-0.414*** **	-0.116	-0.043
	(0.103)	(0.112)	(0.118)	**(0.084)**	(0.100)	(0.102)
cohabiting biological father	-0.059	0.109	0.008	**-0.129***	**-0.241*** **	-0.002
	(0.087)	(0.095)	(0.100)	**(0.072)**	**(0.086)**	(0.087)
cohabiting step father	**-0.286*** **	**-0.461*** **	**-0.326*** **	**-0.637*** **	**-0.581*** **	**0.236** **
	(0.107)	**(0.117)**	**(0.124)**	**(0.090)**	**(0.105)**	**(0.108)**
father's age	-0.004	-0.005	-0.008	0.008*	-0.001	0.003
	(0.006)	(0.006)	(0.007)	(0.005)	(0.006)	(0.006)
father's race: NH Black	0.249*	0.096	0.045	0.038	0.171	-0.192
	(0.145)	(0.159)	(0.166)	(0.120)	(0.142)	(0.145)
father's race: Hispanic	0.061	0.234*	0.059	0.119	0.206	-0.186
	(0.128)	(0.140)	(0.146)	(0.106)	(0.127)	(0.128)
father's race: Other	0.149	0.004	0.162	0.107	0.295*	-0.330*
	(0.180)	(0.196)	(0.208)	(0.148)	(0.177)	(0.179)
father's education: high school graduate or equivalent	0.029	0.062	-0.221**	-0.022	0.032	-0.109
	(0.095)	(0.104)	(0.109)	(0.079)	(0.093)	(0.095)
father's education: some college or technical school	0.032	0.097	-0.074	-0.002	0.052	-0.071
	(0.091)	(0.100)	(0.105)	(0.075)	(0.090)	(0.091)
father's education: college graduate or higher	0.170	0.247*	0.015	0.025	0.203*	0.053
	(0.117)	(0.128)	(0.134)	(0.097)	(0.115)	(0.118)
fathers who have other biological children	-0.120	0.005	-0.129	-0.049	-0.120	-0.055
	(0.094)	(0.103)	(0.108)	(0.077)	(0.092)	(0.093)
no. of father's biological children	-0.032	-0.004	-0.001	-0.026	-0.064*	-0.009
	(0.035)	(0.039)	(0.041)	(0.029)	(0.035)	(0.035)
mother's age	-0.001	0.007	0.011	-0.004	0.004	-0.010
	(0.008)	(0.008)	(0.009)	(0.006)	(0.008)	(0.008)
mother's race: NH Black	-0.278**	0.005	-0.001	0.093	-0.001	0.213
	(0.141)	(0.154)	(0.161)	(0.117)	(0.138)	(0.142)
mother's race: Hispanic	-0.044	-0.046	0.089	0.043	-0.056	0.094
	(0.122)	(0.134)	(0.140)	(0.102)	(0.121)	(0.122)

Table 6. The effect of family structure on father-child interactions (cont.)

mother's race: Other	-0.353**	-0.105	-0.176	-0.233	-0.330*	0.238
	(0.180)	(0.197)	(0.207)	(0.149)	(0.177)	(0.179)
mother's education: high school graduate or equivalent	0.090	0.039	0.059	0.109	0.114	-0.142
	(0.097)	(0.106)	(0.112)	(0.080)	(0.095)	(0.097)
mother's education: some college or technical school	0.116	0.050	0.025	0.115	-0.015	-0.160*
	(0.092)	(0.100)	(0.105)	(0.076)	(0.090)	(0.091)
mother's education: college graduate or higher	0.065	-0.007	-0.013	0.011	-0.063	-0.222*
	(0.116)	(0.127)	(0.134)	(0.096)	(0.114)	(0.116)
no. of hours mother works	0.002	0.001	0.004	0.002	0.006***	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
mothers who have other biological children	0.085	-0.103	-0.017	0.038	0.060	-0.043
	(0.094)	(0.103)	(0.109)	(0.078)	(0.092)	(0.094)
no. of mother's biological children	0.007	-0.019	-0.039	0.009	0.058	-0.027
	(0.037)	(0.040)	(0.042)	(0.030)	(0.036)	(0.037)
mothers who visited doctor during pregnancy	0.112	0.289	0.340	-0.135	0.237	-0.356
	(0.220)	(0.241)	(0.252)	(0.187)	(0.222)	(0.231)
child is male	-0.044	0.007	-0.039	-0.090*	-0.008	-0.036
	(0.057)	(0.062)	(0.065)	(0.047)	(0.055)	(0.056)
child's parents were married at birth	0.087	0.040	0.136	0.041	0.029	0.006
	(0.078)	(0.085)	(0.089)	(0.064)	(0.076)	(0.078)
child has visited doctor in last 12 months	0.067	-0.002	0.127	0.004	0.111	-0.049
	(0.071)	(0.077)	(0.082)	(0.059)	(0.069)	(0.070)
child has a medical pre-condition	-0.037	-0.062	-0.068	-0.056	-0.105*	-0.014
	(0.059)	(0.064)	(0.068)	(0.049)	(0.058)	(0.059)
child is covered under private insurance	-0.087	-0.051	0.015	-0.116	0.022	0.031
	(0.092)	(0.100)	(0.106)	(0.076)	(0.090)	(0.092)
child is covered under Medicaid	-0.092	-0.015	-0.059	-0.122*	0.005	0.120
	(0.089)	(0.097)	(0.103)	(0.074)	(0.088)	(0.090)
household income	-0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
no. of adults who live within child's household	-0.028	-0.024	0.000	-0.044	0.005	0.021
	(0.044)	(0.048)	(0.051)	(0.037)	(0.044)	(0.044)
Observations	1,204	1,201	1,192	1,201	1,201	1,190
R-squared	0.030	0.034	0.036	0.090	0.064	0.030

Notes: Standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7. The effect of family structure on child health outcome controlling for mediator variables

VARIABLES	(1) child is in poor health	(2) child's total internalizing behavior	(3) child's total externalizing behavior
Does the father spend enough time with child?	0.0366	-0.0159	-0.00516
	(0.110)	(0.0590)	(0.0504)
Does father talk over important decisions with child?	-0.0109	0.0589	0.0357
	(0.0949)	(0.0503)	(0.0430)
Does father listen to child's side of an argument?	0.0283	-0.0659	**-0.104*** **
	(0.0864)	(0.0457)	**(0.0391)**
How close does child feel to father?	-0.139	**-0.139***	**-0.146** **
	(0.128)	**(0.0727)**	**(0.0620)**
How well do child and father share ideas?	**-0.195***	0.000109	0.0339
	(0.114)	(0.0606)	(0.0520)
Does father miss events or activities that are important to child?	0.0556	-0.0274	0.00376
	(0.0988)	(0.0521)	(0.0447)
Constant (omitted group: married biological fathers)	-7.211***	3.251***	2.411***
	(1.510)	(0.746)	(0.636)
married step father	-0.312	-0.00550	0.0185
	(0.380)	(0.177)	(0.151)
cohabiting biological father	0.318	-0.00958	0.0226
	(0.260)	(0.148)	(0.127)
cohabiting step father	0.400	-0.117	-0.0272
	(0.331)	(0.191)	(0.163)
father's age	0.0166	0.0127	-0.0132
	(0.0179)	(0.0102)	(0.00876)
father's race: NH Black	0.435	-0.0940	0.163
	(0.539)	(0.249)	(0.212)
father's race: Hispanic	1.198**	0.122	0.0130
	(0.484)	(0.222)	(0.191)
father's race: Other	-0.124	0.163	0.233
	(0.782)	(0.306)	(0.262)
father's education: high school graduate or equivalent	0.0233	-0.0999	0.219
	(0.279)	(0.160)	(0.138)
father's education: some college or technical school	0.0359	-0.179	0.0712
	(0.275)	(0.155)	(0.133)
father's education: college graduate or higher	-0.126	-0.187	-0.133
	(0.401)	(0.198)	(0.172)
fathers who have other biological children	0.197	-0.238	-0.209
	(0.295)	(0.160)	(0.137)
no. of father's biological children	0.0158	-0.120**	-0.00981
	(0.103)	(0.0595)	(0.0507)
mother's age	0.0357	-0.00102	-0.000860
	(0.0242)	(0.0135)	(0.0116)

Table 7. The effect of family structure on child health outcome controlling for mediator variables (cont.)			
mother's race: NH Black	0.433	0.0747	-0.354*
	(0.502)	(0.243)	(0.206)
mother's race: Hispanic	-0.154	0.0169	-0.413**
	(0.450)	(0.212)	(0.182)
mother's race: Other	0.00562	-0.117	0.0485
	(0.693)	(0.307)	(0.262)
mother's education: high school graduate or equivalent	0.105	0.00290	-0.156
	(0.270)	(0.164)	(0.141)
mother's education: some college or technical school	-0.746***	-0.117	-0.230*
	(0.282)	(0.156)	(0.134)
mother's education: college graduate or higher	-0.937**	-0.0949	-0.0305
	(0.404)	(0.198)	(0.170)
no. of hours mother works	-0.00512	-0.000794	0.00305
	(0.00726)	(0.00376)	(0.00321)
mothers who have other biological children	0.532*	-0.0897	0.0483
	(0.298)	(0.161)	(0.138)
no. of mother's biological children	0.248**	-0.0635	-0.00434
	(0.101)	(0.0616)	(0.0533)
mothers who visited doctor during pregnancy	0.607	-0.0538	-0.0757
	(0.828)	(0.394)	(0.328)
child's gender	0.455**	0.0508	0.241***
	(0.191)	(0.0964)	(0.0824)
child's parents were married at birth	-0.270	-0.248*	-0.198*
	(0.257)	(0.132)	(0.114)
child has visited doctor in last 12 months	0.808***	-0.0427	0.0150
	(0.234)	(0.121)	(0.103)
child has a medical pre-condition	0.958***	0.191*	0.0588
	(0.189)	(0.1000)	(0.0859)
child is covered under private insurance	0.0296	-0.171	-0.0617
	(0.301)	(0.159)	(0.135)
child is covered under Medicaid	-0.182	0.0648	0.0260
	(0.294)	(0.153)	(0.131)
household income	-1.30e-06	-1.67e-06*	-1.28e-06
	(2.91e-06)	(9.46e-07)	(8.11e-07)
no. of adults who live within child's household	0.0735	0.0804	0.0621
	(0.130)	(0.0763)	(0.0656)
Observations	1,163	1,123	1,127
R-squared		0.060	0.080

Notes: Model 1 is determined by logistic regression. Models 2-3 are determined by multiple regression. β coefficient listed above. Standard errors are listed in parenthesis. Income coefficients have been multiplied by 1000. ***$p<0.01$, **$p<0.05$, *$p<0.1$