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Do Nonresidential Fathers' Financial Support and Contact Improve Children's Health?

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Abstract

Nonresidential father investment of time and money has been shown to ameliorate the negative consequences of family dissolution on children's behavior and achievement; however, no research has shown whether this investment also has positive effects on child health. Using data from the Early Childhood Longitudinal Survey, Kindergarten cohort, this research uses a two-wave cross-lagged model to examine how child support and contact are associated with maternal reports of children's physical health over time following parental separation. Child support in kindergarten is not associated with child health in third grade. Instead, children who are healthier in kindergarten receive greater financial support from their father. Although contact and child support are positively related, greater contact is not associated with better child health.

Keywords

child support; children; fathers; health; visitation

Introduction

Increasingly, family economic ties cross household lines and these ties may benefit children (Cao 2006). Family dissolution has been found to be associated with the onset of and vulnerability to academic, behavior, and health problems for children (Amato 2001; Amato and Keith 1991; Dawson 1991; Mauldon 1990). Research has also shown that children whose nonresidential fathers support them financially achieve more academically and have fewer behavior problems than those without supportive fathers (Amato and Gilbreth 1999). Having a father who remains close to and involved with his child has been shown to ameliorate some of the negative impact of family breakup on child achievement and behavior (Amato and Gilbreth 1999; Baydar and Brooks-Gunn 1994; King 1994a; King 1994b). However, no research has examined whether father support and contact, his investment and involvement post-separation, are also associated with improved child physical health. Do nonresident fathers' financial support and contact improve their children's health?

In what has been called a "father effects" model, poor child outcomes result from the tendency of fathers to reduce their financial and emotional involvement with their biological children after dissolution of the relationship with the other parent (Hofferth and Anderson 2003). Recent research suggests that the model of father behavior influencing their children's well-being provides an incomplete picture of father and child relationships post-

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separation (Hawkins et al. 2007); it has ignored the effect of the child on the father (“child effects”). In fact, poor child health may have caused stresses that led to family dissolution in the first place (Joesch and Smith 1997; McLanahan et al. 1994) and may also lead to reduced father involvement following dissolution. Finally, other factors, such as low family income, lack of health insurance coverage, or maternal depression, may cause both poor child health and a low level of nonresidential father involvement. It is important to consider all possible associations between nonresidential father involvement and child health.

Recent research that has linked child academic and behavioral outcomes with father involvement found evidence for child effects as well as the anticipated father effects on child behavior and achievement, but the former were the stronger ones for nonresidential fathers and children (Hawkins et al. 2007). Although the study by Hawkins and colleagues examined potential associations over time, it was limited in two ways: first, it focused only upon child behavior and achievement. In fact, researchers who have examined the benefits or costs of continued nonresidential father involvement for children after dissolution have only focused upon children’s behavior and achievement (Amato and Gilbreth 1999). None has focused upon physical health. Childhood health has been shown to influence cognitive and noncognitive skills and, through these, to completed schooling and later socioeconomic attainment and social class (Haas 2006; Palloni 2006). Therefore, it is an important area for exploration. Second, the previous research focused upon adolescents; father effects may be stronger among younger children, who are more dependent on parents, than adolescents. It is important to test for father and child effects among elementary school-age children.

In sum, no previous research has linked nonresidential father support and involvement to the health of elementary school-age children over time and only one study has addressed the direction of effects. Support for father effects would be strengthened if we could show improved health over time among children whose fathers remained involved and provided financial assistance after divorce or separation. Support for child effects would be shown if fathers whose children have more initial health problems show lower involvement at a later time point. The present study examines, among a nationally representative sample of children whose families separated prior to the child’s kindergarten year, whether child support and contact with the father in kindergarten are associated with child health in third grade and whether child health in kindergarten is associated with contact and child support in third grade.

Background and Theoretical Approach

We first describe how the physical health of children is measured. We then describe why nonresidential father involvement following disruption may influence the health of their children and why child health may influence father involvement.

Child Health

Child health is a positive state, meaning a lack of illness or negative health conditions. The most common measure of child health in use today is the simple overall evaluative item asked of a parent: Would you say (child’s) health is excellent, very good, good, fair, or poor? This overall question, used in studies from the National Center for Health Statistics, the U.S. Census Bureau, and the Bureau of Labor Statistics, has been shown to be a good indicator of child health (Bloom et al. 2006). Mother-reported child health has also been shown to be an excellent predictor of health and socioeconomic attainment in adulthood (Haas 2006; Johnson and Wolinsky 1993; Miilunpalo et al. 1997). Several studies have examined the predictive power among adults of this self-rated health item and found a strong association with mortality across some 40 studies from the mid-1960s to about 2003 (DeSalvo et al. 2005; Idler and Benyamini 1997).

Overall, children tend to be healthy, with 82% reported by their parents to be in excellent or very good health in 2005 (Bloom et al. 2006), using the overall summary evaluation of their child's health. A child's health is a function of permanent and chronic health conditions and temporary health problems at the time of the interview. There are two other approaches to assessing specific aspects of health. The first is the measurement of the presence of specific health conditions, such as asthma or allergies, and the second documents permanent functional limitations, such as a deformed limb. The problem with using a specific health condition is wide variability in its severity and the difficulty of documenting whether and when it has been professionally diagnosed. The problem with using a functional limitation is that it may not have long-term consequences for overall child health and adjustment. The measure of perceived child health is argued to be a more inclusive and accurate measure of health status and health risk. It captures the full array of conditions and illnesses the child has and possibly even those not yet diagnosed (Idler and Benyamini 1997). Consequently, the overall measure of mother-rated child health is the one used in this study. Following Currie (2009) we treat it as an ordered variable rather than a dichotomy.

There is one major limitation to mother-rated health; maternal evaluation of her child's health may reflect the mental and physical resources of the reporter (Idler and Benyamini 1997; Waters et al. 2000). This could be a serious problem if we were comparing the maternal-reported health of children whose mothers and fathers live separately with those whose mothers and fathers live together. This potential bias is reduced by limiting the sample only to children whose biological parents were but are not currently living together; all have experienced family dissolution. Of course, a depressed mother may still evaluate the health of her child as worse than a child of a mother who is not depressed, but that can be taken into account in the analysis.

Although no prior research has examined the relationship between nonresidential father involvement and his child's physical health, we may learn from examining studies that have compared the physical health of children in intact and nonintact families. Five studies have found a higher risk of physical health problems following divorce in single mother, remarried parent, or cohabiting mother families compared with two married parent families. Two found that children from divorced families had a significantly higher risk of accidental injuries, illnesses, and hospitalizations than children from intact families (Dawson 1991; O'Connor et al. 2000). Two found a higher rate of asthma or receiving emergency treatment for asthma at age 1 for those not in a stable married parent family compared with those who were (Dawson 1991; Harknett 2009). One found that children whose families experienced divorce/separation had a greater risk of developing hypersensitivity disorders like atopic eczema (Bockelbrink et al. 2006). Even following remarriage, children from stepparent families were more likely to suffer accidents, illnesses, and hospitalizations than child living with two biological parents (O'Connor et al. 2000). A study that utilized data from the 1966 through 1978 waves of the Child Health supplement to the National Health Interview Survey showed that children from divorced families were more likely to experience the onset of a health problem, even when the mother remarried (Mauldon 1990). The association held not only for recent separations but also for separations that had occurred some time ago.

These studies are limited by their use of cross-sectional data. A recent study (Bzostek and Beck 2008) predicting changes in child health outcomes from changes in family structure for children followed from ages 3 to 5 years of age, found that the effect of family structure on mother-reported child health measured over time was not statistically significant, whereas it had been significant in the cross-sectional analysis at age 5. In fact, poorer health at age 3 was associated with a significantly lower likelihood of biological parent coresidence at 5 years of age. This shows how important it is to examine change over time, considering

potential reverse causation. But none of the previous research has studied *nonresidential father involvement* and child health.

Effect of Father Involvement on Child Health

We consider two potential theoretical explanations for an effect of father involvement on child health. The first theory utilizes the investment perspective of health economics (Currie 2009; Grossman 2000), which examines the costs and benefits of investment in health over the life cycle, modified to consider the household (or, more broadly speaking, family) production function. In the household production model, the family allocates time and goods to produce “commodities,” such as the health of family members, in order to maximize a joint utility function. The “stock” of health at a point in time is a function of initial health and investment over time. Investment in health is subject to resource, time, and knowledge constraints because it requires financial resources to feed children properly and pay preventive and medical bills, and time to take children to the doctor, to comfort and nurse them, to find the appropriate medical attention, to monitor them, and to pay attention to their needs (Haveman and Wolfe 1994). Additionally, not all parents may have the knowledge or experience to make the best use of resources available for optimal investment; thus, parental education enters the model in health decision-making (Cutler and Lleras-Muney 2006). The model is dynamic in that child health at $t+1$ depends on child health at t , investment in health between t and $t+1$, and depreciation over the period (Currie 2009; Grossman 2000); depreciation is likely to be trivial for young children.

This model has been extended to include the nonresidential parent’s investment in the health of his child after divorce (Bolin et al. 2002). Child support provision and contact with his child are our indicators of the investments of the nonresidential father. According to theory, divorce weakens the father’s incentive to invest in his child’s health and low parental investment levels following family dissolution, particularly financial support, lead to poor child health. Paternal investment declines because the father has less control over how his money is spent (Weiss and Willis 1985), the father takes on new family obligations (Hofferth & Anderson 2003), or the mother remarries (Tach et al. 2010). In all cases the father has less to gain by investing in his former family (Dew 2009). Policies requiring nonresidential parents to support their children financially (e.g., child support enforcement) increase the incentive for fathers both to invest and to monitor expenditure of these funds (Allen et al. 2010). From the child’s perspective, child support payments increase the residential parent’s resources to pay for preventive and ameliorative health care. Another consequence of divorce is the decline in time spent by family members devoted to the child. Besides the loss of the father’s daily time in household production and child care after family dissolution, the mother may return to the work force. If the father does not include the child in his health insurance, she will need to obtain insurance through her employer (Murasko 2008). Although her wages increase family financial resources, her employment hours reduce the hours available to devote to the health of her children.

Receiving child support after family dissolution is associated with reduced child behavior problems and higher achievement (Amato and Gilbreth 1999; Baydar and Brooks-Gunn 1994; King, 1994a; King, 1994b; King and Heard 1999; McLanahan et al. 1994). The effect of child support is documented even controlling for overall income; receipt of any support appears to be more important than the amount received (Argys et al. 1998).

The second theory is that of social stress. Disruption in routines and conflict between parents associated with family dissolution may increase stress, reduce the child’s immunity, and increase the susceptibility of children to illness and emotional distress through physiological pathways (Bockelbrink et al. 2006; Troxel and Matthews 2004). Besides emotional disruption, parents change housing, children change schools, and parents remarry, further

altering their environments (McLanahan and Sandefur 1994). Theory suggests that greater involvement after divorce benefits child health. Fathers who remain in frequent contact with their children may be better able to maintain routines, monitor their health, and ensure they are getting appropriate health care. In addition, positive emotional support from the father through frequent contact may contribute to the improved health of the child. However, frequent contact may also lead to greater conflict with the mother over the child, which could lead to greater health problems, whether because the parents are inconsistent in their parenting behavior, unable to adequately deal with any problems their child exhibits, or in conflict, causing the child emotional distress. In addition, recent research suggests that contact declines when the mother takes a new partner (Tach et al. 2010), but maternal remarriage may improve the stability of the child's family, reducing stress. Thus increased frequent contact with the nonresidential father could have positive or negative consequences for child health.

Research has not found a consistent effect of paternal contact. Several studies found a positive association between visitation and reduced behavior problems (Flouri 2006; Simons et al. 1994), but other studies have not (King 1994a; King and Heard 1999; McLanahan et al., 1994). Although greater contact is associated with a better relationship between the former partners (Hofferth et al. 2010), research has found that the effect of visitation on child well-being depends upon maternal attitudes and satisfaction with the visit; contact that is not mother-supported increases behavior problems (King and Heard 1999). Researchers have concluded that the quality of the emotional relationship between father and child is more important for children's health than frequency of visits. Frequency of visitation does not indicate the content or quality of the visit (Buchanan et al. 1996). The present research uses a measure which includes not only the frequency of visits, but also the frequency of telephone conversations between child and father. This is a better measure of the quality of the relationship than the number of visits.

The impact of receipt of child support on health may result from reduced conflict as well as greater financial stability. Even though parents may argue about the amount of child support provided, the evidence is that payment reduces conflict. One study showed that increased child support payments over time was associated with an improved relationship and reduced conflict between former partners (Hofferth et al. 2010). Reduced conflict, in turn is associated with an improved relationship between the father and child, reduced behavior problems, and increased school achievement (Hofferth et al. 2010; King and Heard 1999; McLanahan et al. 1994). Payment of child support may also increase the desire of the father to see his child, thus increasing contact.

Effect of Child Health on Father Involvement

It is possible that the direction of the relationship between father involvement such as contact or child support and health is the reverse; poor child health leads to less father involvement. The argument is that the utility from investment in a union and, specifically, in children, is reduced when the health of one's child is worse than anticipated (Reichman et al. 2004). If, as evolutionary theory argues, one of the motivations for having children is to carry on the family name, then children in better health will be seen as better vehicles for paternal investment; their futures will be more beneficial to fathers (Emlen 1995; Hofferth and Anderson 2003). Improved health may contribute to increased contact over time as it is more rewarding being with a healthy child. Better child health may also reduce parental conflict, leading to greater contact (Troxel and Matthews 2004).

A line of research supports a "child effects" model. Research has shown that child health problems are linked to marital dissolution and, consequently, to lower father involvement (Joesch and Smith 1997; Corman and Kaestner 1992; Reichman et al. 2004). Fathers may

respond to child health problems by staying away. In this case we would expect to find a positive association between child health at an early time point and father involvement later on. Because of the possibility that causality is bidirectional, it is important to clearly establish the timing of reports of child health and reports of father contact and child support.

Selection into Nonresidential Father Involvement

The present study addresses the selectivity of nonresidential father involvement in two ways. First, it controls for a variety of observed conditions that previous research has shown linked to child health, to child support, or to contact (McLanahan et al. 1994; Peters et al. 2003). These include child gender, family income, race/ethnicity, child birth weight, maternal employment, maternal education, marital status, maternal depression, and health insurance. Second, this study is dynamic, examining how father involvement (support or contact) in kindergarten is linked to child health in third grade and how child health in kindergarten is linked to father involvement in third grade. By controlling for initial levels of the dependent variable in kindergarten year the model effectively examines, for example, how investment during the kindergarten year contributes to a change in child health between the kindergarten and third grade.

Model and Hypotheses

The conceptual model is shown in Figure 1. On the left side of the model, health, contact, and child support in kindergarten are influenced by a set of background and control variables, including race/ethnicity, maternal education, family income, child gender and birth weight, maternal employment, maternal marital status, health insurance, and maternal depression. Proceeding to the right, health, contact, and child support in third grade are directly influenced by health, contact, and child support in kindergarten, controlling only for factors that change between kindergarten and third grade (maternal employment, maternal marital status, and health insurance; right side of the model). It is called a cross-lagged model because each dependent variable at the third grade wave is a function of itself (lagged from the kindergarten wave), as well as lagged versions of the other two dependent variables.

Hypothesis 1—Based upon health investment theory, children whose mothers received child support in the kindergarten year following the dissolution of their parents' relationship are expected to be in better health in third grade than those whose mothers did not receive such support. This will hold controlling for kindergarten health and contact and maternal employment, marital status and health insurance in grade 3.

Hypothesis 2—Based upon stress theory, children whose nonresident fathers were in contact with them in their kindergarten year are likely to be in better health in third grade than those whose fathers were not in contact in the kindergarten year, net of kindergarten health, child support and maternal employment, marital status and health insurance in grade 3.

Hypothesis 3—Based upon potential benefits or utility to the father of investment in his child, better child health in kindergarten is likely to result in increased paternal child support in third grade, net of kindergarten child support and contact and maternal employment, marital status and health insurance in grade 3.

Hypothesis 4—Based upon potential benefits or utility to the father of investment in his child, better child health in kindergarten is likely to result in increased paternal-child contact in third grade, net of kindergarten contact and child support and maternal employment, marital status and health insurance in grade 3.

Hypothesis 5—Consistent with investment theory, higher maternal income and education will be linked to a higher level of paternal support and contact and better child health in kindergarten.

Hypothesis 6—Consistent with investment theory, better child health at birth will be linked to better child health in kindergarten.

Hypothesis 7—Consistent with family stress theory, mothers who remarry will have better child health in kindergarten and in third grade than those who do not.

Data and Methods

Data

The data come from the nationally representative Early Childhood Longitudinal Survey (ECLS-K) conducted by the U.S. Department of Education. Data from the Longitudinal Kindergarten-Third Grade Public Use data file were used for analysis. This data set contains information on 19,684 children collected in the fall and/or Spring of Kindergarten in the 1998-99 school years (Wave 1, 1998; Wave 2, 1999). The family information used in this study was obtained through a parental interview. A 30% subsample of children's families was reinterviewed in the fall of first grade (Wave 3, 1999). All were followed up in the spring of first grade (Wave 4, 2000), and in the spring of third grade (Wave 5, 2002). Of the initial sample, the families of 13,306 children were followed up in third grade.¹ In order to focus on children of nonresidential fathers, we selected a subset of 1,765 children who were living with their biological mother and not their biological father in kindergarten, whose biological father was still alive when the child was in grade 3, whose health was reported by the mother in kindergarten and grade 3, and who reported degree of contact with and receipt of child support from their absent father in kindergarten and grade 3. No information was collected from the nonresidential father. Our statistical software (Mplus) does not permit missing data on exogenous variables in ordinal regression so the expectation maximization (EM) algorithm was used to impute 30 cases missing on maternal depression and 38 cases missing on child birth weight.

Dependent Variables

Health of Child—The health status of the target child was asked of mothers, as follows: “Would you say child’s health is excellent, very good, good, fair, or poor? Of the five options, fair and poor were combined because there were too few cases to separately analyze in the ordinal models; therefore, we have 4 categories, with highest value, 4, being excellent health and the lowest value, 1, being fair or poor health. This is treated as an ordinal variable. We used health status measured in kindergarten and again in third grade.

Father-Child Contact—The mother reported on the length of time since the child had contact with his/her father. “How long has it been since child last had a visit, a phone call, or received a card or letter from his biological father?” The response categories are 0 = not since birth or adoption, 1 = not in last year, 2 = in last year but not last month, 3 = in last month. Categories 0 and 1 were combined because the coefficients were similar and category sizes were small. This left us with three categories, treated as an ordinal variable. Contact was measured in kindergarten and in third grade.

¹Although data are now available through 5th grade, attrition greatly reduces the sample size available for analysis, thus limiting any benefit another two years might provide.

Child Support—Child support is coded 0 if the mother was not “supposed to receive any child support payments for (child) in the past year,” 1 if the mother was “supposed to receive child support payments for (child) in the past year” but did not receive them regularly, and 2 if the mother was supposed to receive child support payments and received the money regularly so that “they could almost always count on the money.” This is treated as an ordinal variable. Support was measured in kindergarten and in third grade.

Controls in the Kindergarten Wave for all Outcomes

Family income—The annual income of the family was obtained at the first interview, when the child was in kindergarten. Missing data were imputed by the ECLS-K staff. The variable was logged (natural log) to make the distribution normal. Based upon health investment theory, greater maternal family income at the kindergarten wave was expected to be positively related to child health, to nonresidential father contact, and to child support. Mothers with more resources invest more in child health. Additionally, although we do not know fathers’ income in the ECLS-K, mothers’ and fathers’ incomes are likely related; higher income fathers are more likely to pay child support than lower income fathers (Garfinkel, McLanahan & Robins, 1994).

Mother’s education—We created an indicator for whether the mother had completed at least some college (1), compared with having completed no college education (0). Again, there are no missing data; missing data were imputed by ECLS-K staff. Greater maternal education is also anticipated to be linked to child health because of greater knowledge about how to improve child health. Greater education facilitates monitoring and accessing paternal contact and support.

Race—This variable was divided into four dichotomous variables: White (0=no, 1=yes); Black (0=no, 1=yes); Hispanic (0=no and 1=yes); and other race (0=no, 1=yes), with White the omitted category. No data were missing. Race is likely related to child health and to father involvement because it is linked to income, to education, and to family structure.

Gender of child—The child’s gender was coded 1 for female, 0 for male. It is argued that fathers are more involved with sons than daughters (Mammen, 2005; Raley & Bianchi, 2006).

Time Varying Variables

Marital status of the mother—Two variables indicate whether the mother had remarried (1=yes, 0=no) when the child was in kindergarten and when the child was in grade 3. Research has shown that nonresidential father involvement declines whether the mother takes a new partner (Tach et al., 2010). We include a measure of maternal marital status in both K and grade 3 to take into account changes in her marital status between these time points.

Mother’s employment—Two dichotomous variables indicate whether the mother was employed outside the home (1=yes, 0=no) when the child was in kindergarten and when the child was in grade 3. Maternal employment is expected to be linked to child support from the father when the child is in kindergarten and in third grade. However, it is not expected to be linked directly to child contact with the father or with child health.

Health Insurance—The mother was asked whether the child was covered by a health insurance plan that would pay any part of a hospital, doctor’s or surgeon’s bill (1=yes, 0=no). Again, variables were included for receipt of health insurance when the child was in kindergarten and when he/she was in third grade. It was expected that children who were

covered by health insurance would have better health outcomes. This may be part of the father's contribution, though we do not know whether this is provided through his policy. Because of this possibility, we expect that being covered by health insurance will be linked with contact and child support. Variables linked only to Child health in Kindergarten

Maternal depression—Mothers who are in poor health have been shown to rate their child's health as poorer than mothers who are healthier (Waters et al. 2000). This is particularly important for mental health; maternal depression is an important control variable as well as an indicator of stress. Unfortunately, the ECLS-K has only one question asked of the mother: "How often during the past week have you felt depressed? Would you say never, some of the time, a moderate amount of the time, or most of the time?" Mothers who answered a moderate amount or most of the time were coded 1; the others were coded 0. It is expected that this variable would be linked to maternal reporting of her child's health, but not to child support or father-child contact.

Birth weight—Birth weight is an excellent measure of initial exogenous child health conditions; as such it is a predictor of later child health. It was included as a predictor of health in kindergarten. The child's birth weight in ounces was converted to pounds and fractions of a pound to be on a scale comparable to the other variables.

Variables Considered but Not Included

Because of model complexity, we had to limit the number of control variables. Variables initially considered included family size, number of years that the child lived with his/her father, whether the child changed schools between kindergarten and 3rd grade, and marital status of mother and father at the child's birth. None of these variables was associated with health outcomes, so they were not included in the final models. A high proportion changed schools from kindergarten to grade 3; variation was not associated with family structure. In addition, children are relatively young; the proportion of years with the father did not vary greatly as they had to have separated before the child's kindergarten year. Almost half the sample was unmarried at the child's birth, but this was unrelated to reported child health. Finally, the distance lived from the child was considered but not included because data were only available for fathers who had been in contact with the child in the last year.

Data Analysis

Our sample is comprised of children whose parents' marriages had already broken up by the kindergarten wave; child support and contact are undefined prior to separation. In our model, mother-reported child health, child support, and child contact in kindergarten and in third grade are the dependent variables in a set of ordered logistic regressions. For the first three of the six equations in the model, child support, frequency of contact, and child health in kindergarten are regressed on our background control variables, time-varying variables, maternal depression and child birth weight, all measured in the kindergarten wave. In the second three equations, child health, child support, and frequency of contact between father and child in third grade are regressed on their corresponding measures in kindergarten and time varying variables from the third grade wave. Background variables influence third grade outcomes only through the kindergarten wave measures of child health, contact and child support whereas the time varying variables are allowed to have direct effects at both time points. We considered a model in which we permitted health, contact and child support to be correlated within the same wave (kindergarten or grade 3) but the model was not identified. The correlations of dependent variables within each wave are determined by the background variables, which are included in the model.

$$\begin{aligned}
 H_K &= \sum_j b_j X_K \\
 C_K &= \sum_j b_j X_K \\
 CS_K &= \sum_j b_j X_K \\
 H_3 &= b_1 H_K + b_2 CS_K + b_3 C_K + \sum_l b_l X_3 \\
 C_3 &= b_1 H_K + b_2 CS_K + b_3 C_K + \sum_l b_l X_3 \\
 CS_3 &= b_1 H_K + b_2 CS_K + b_3 C_K + \sum_l b_l X_3
 \end{aligned}$$

Where

H = health, C = contact, CS = child support, K = kindergarten wave, 3 = grade 3, and X indicates a set of control variables which number j in kindergarten and l in third grade.

Coefficients and standard errors were estimated in Mplus by maximum likelihood using the weights, stratum, and primary sampling unit (PSU) information provided by the ECLS-K for this complex sample. Coefficients are interpreted as the odds of being in a higher (e.g., better health, higher involvement) versus a lower (e.g., worse health, lower involvement) category. The coefficient in an ordinal regression represents an average effect across categories (Allison 2001). The fit of the model was evaluated using the log likelihood, Akaike (AIC) and Bayesian (BIC) information criteria, comparing the full model to a model that included no control variables (only the cross-lagged association between the health, contact, and child support variables at kindergarten and third grade).

Results

Descriptive Statistics

Table 1 presents the means and standard deviations for all variables in the model. The overall health of children was good. Seventy-eight percent of children were in excellent or very good health in kindergarten and 80% were in excellent or very good health in third grade. About half the sample changed health status; 23% of mothers reported that their child's health declined and 27% reported that it improved (not shown). Fifty-six percent of mothers reported receiving child support occasionally or regularly when the child was in kindergarten, 61% when the child was in third grade. Of these, about half reported regular payments and half did not, with increases in regular payments from kindergarten to third grade. In kindergarten, 31% had not communicated with their father in the past year, 16% had communicated with him in the past year but not in the past month, and 53% had communicated with him in the past month. Contact declined from kindergarten to third grade; the proportion not being in touch with their father in the past year rose.

The sample is relatively disadvantaged, with minorities overrepresented: 47% of the sample was white, 29% was black, 17% was Hispanic, and 7% were of other races and ethnicities. Only about 36% of mothers had completed at least some college; about three-quarters were employed at either wave. Most mothers were single; only about 19% had remarried by the time the child was in kindergarten, though 29% had remarried by the time the child was in the third grade. Thirty-eight percent reported depressive symptoms. As a result, family income in the kindergarten wave was relatively low; averaging about \$17,500 in 1997 dollars. Finally, about 90% of children had health insurance in kindergarten, 83% in third grade, and the average birth weight was 7.25 pounds.

Correlations between health, contact, and child support

Table 2 shows the correlations among the health, contact, and support variables. Contact in kindergarten and health in third grade ($r = .064$, $p < .05$) and support in kindergarten and

health in third grade ($r = .082, p < .001$) were significantly correlated. Health in kindergarten and contact ($r = .05, p < .05$) and support ($r = .10, p < .001$) in third grade were also correlated. Finally, there were significant correlations between contact in kindergarten and health in grade 3 ($r = .07, p < .01$) and support in kindergarten and health in grade 3 ($r = .07, p < .01$). These support the bidirectional association hypothesis, but other factors have not yet been controlled.

Ordered Logistic Analyses of Child Health

The multivariate results without (Model 1) and with (Model 2) time varying variables predicting kindergarten and third grade outcomes are shown in Table 3. The full model (Model 2) with only significant coefficients ($p < .05$) is shown in Figure 2. An examination of the fit statistics indicates that adding the control variables (Model 2) significantly improved the fit of the model. The change in the -2 log likelihood was 474; this is highly significant at $p < .001$. The decline in the BIC adjusted for sample size is 340 with an increase of 36 in the number of free parameters, also highly significant. Here we discuss only the right side of the model. The left side will be discussed in the following section.

Overall child health in third grade—The first 4 columns of Table 3 (Model 1) show the coefficients for the association between mother-reported child health and overall child health in third grade without any controls. Having received child support in kindergarten was not significantly associated with the child being reported as being in better health in third grade. Receiving more regular child support was associated with a 10% increase in the odds of being in a higher compared with a lower health category, but this was not statistically significant at the .05 level. The frequency of contact with the father in kindergarten was also not associated with mother-reported child health in third grade. The child's health in kindergarten was strongly associated with health in third grade, as expected.

In Model 2 we added controls for maternal employment, maternal marital status, and receipt of health insurance when the child was in third grade estimated jointly with the same variables in kindergarten, family resources, exogenous health, and controls (the left side of Figure 1). Initial health was still strongly associated with the child's health status in third grade, as expected, and the child support and contact coefficients remained insignificant. Maternal employment when the child was in grade 3 was not associated with better child health but the mother having remarried was associated with better child health in grade three. Having health insurance in grade 3 was not directly linked to child health.

Contact in third grade—Child support and contact with the father were associated. Children whose fathers paid child support regularly had more frequent contact with their fathers (Table 3, middle columns, Model 1). This association increased in strength with controls for background variables (Model 2). Children whose fathers paid child support regularly when they were in kindergarten had a 55% greater odds of more frequent contact in third grade compared with children whose fathers did not pay child support regularly. Mother-reported child health in kindergarten was not linked with father-child contact in grade 3. As expected, greater contact in kindergarten was associated with greater contact in third grade. Children whose mothers remarried had less contact with their fathers in third grade compared with children whose mothers did not remarry.

Child support in third grade—The last columns of Table 3 show that better health and greater paternal contact in kindergarten were both associated with children being more likely to receive regular child support in third grade. The association between health in kindergarten and support in grade three increased slightly when controls were included. Being in a better health category in kindergarten was associated with a 19% increase in the

odds of receiving child support more regularly compared with being in poorer health in kindergarten. The association between contact and support declined slightly but remained highly significant after controlling for the third grade variables. Children whose fathers had more contact with them in the last year when they were in kindergarten had a 63% greater odds of receiving child support regularly in grade 3. Receiving support in kindergarten was associated with receiving it in grade 3, as expected. Compared with children of nonemployed mothers, children whose mothers were employed at grade three received more regular child support. Compared with children whose mothers did not remarry, those whose mother remarried were less likely to receive regular child support. Finally, having health insurance was not significantly associated with more regular receipt of child support in third grade.

Association between Health, Contact, and Support in Kindergarten and Family Background

Table 4 shows the association between background factors and mother-reported child health, contact, and child support in kindergarten. This is shown on the left side of Figure 2.

Health in kindergarten—Children with a mother who had completed some college were reported to be in better health in kindergarten than were those with a mother who had not completed college (Table 4). Family income was not associated with level of health reported in the kindergarten year nor was receipt of health insurance or maternal marital status linked to child health in kindergarten. Children whose birth weights were higher were reported to be in better health in kindergarten. Of the control variables, females were reported to have better health in kindergarten than males. The association between maternal depression and child health was in the anticipated direction (negative) but was not statistically significant at $p < .05$.

Contact with the father in kindergarten—Children whose families had higher incomes, and those whose mother were better educated had more contact with their fathers than those in lower income families and those with less educated mothers. Children whose mother remarried by the kindergarten year had less frequent contact with their fathers in kindergarten than those whose mother did not remarry (Table 4). Of the control variables, children who were Hispanic or of other races had less contact with their fathers than those who were White.

Child support in kindergarten—Children whose mothers had completed some college, whose family incomes were higher, and who had health insurance were more likely to receive child support than children whose mothers had not completed any college, whose family incomes were lower, and who did not have health insurance. Black children, Hispanic children, and children of other races were less likely than White children to receive child support regularly when they were in kindergarten.

Discussion and Conclusions

This paper is the first to examine the influence of nonresidential father involvement after family dissolution on the mother-reported physical health of elementary school-age children. We addressed two questions: 1) did the analysis support a father effects or child effects model? and 2) did the results provide support for the health investment model, the stress model, neither model, or both?

Father Effects

The results did not support Hypothesis 1. A two-wave cross-lagged model showed that regular receipt of child support from the nonresidential father during the kindergarten year was not associated with a higher level of child health reported by the mother in third grade, controlling for initial level. This is inconsistent with the expectation that child support is an investment in child health and should, therefore, be linked to later child health.

Child Effects

Surprisingly, the stronger effect represented the reverse causal path, the effect of positive child health in kindergarten on child support in third grade. Supporting Hypothesis 3, children in better health in kindergarten received child support more regularly when they were in third grade, compared with children in worse health in kindergarten. This result is consistent with research finding that poor child health is linked to greater marital dissolution and, therefore, less father involvement (Reichman et al., 2004). It is also consistent with new research that shows stronger effects of child behavior on father involvement than father involvement on child behavior (Hawkins et al., 2007).

In sum, these results do not support theory arguing that nonresidential fathers' financial resources and decisions are important in maintaining children's health. Instead, they support the argument that child health impacts the father's financial decisions. Fathers choose in which children to invest. Paternal resources are selective, going to those who are healthy and whom fathers may believe are more likely to benefit from their investment of financial resources. However, this does not mean that income and financial security are not important to child health. Maternal education was strongly linked to initial child health in kindergarten (Hypothesis 5). Also consistent with the investment model, child health at birth was linked to child health in kindergarten, which, in turn, was associated with child health in grade 3 (Hypothesis 6). Thus two of the three hypotheses related to the investment model were supported. There was also some evidence for the family stress model. The health of children whose mothers remarried was higher in third grade compared with those whose mothers had not (Hypothesis 7). Maternal employment was not linked to child health in third grade. Maternal employment has both positive effects from increased income and negative impacts from reduced available time; there was no net impact. Receiving health insurance was also not linked to child health in either kindergarten or in third grade. Variation was limited; more than 80% of our sample of third grade children was insured and 90% had been insured in kindergarten.

Contact and Health not Related

As other studies of child achievement have found, greater frequency of contact in kindergarten was not associated with improvement in child health by grade 3, and thus Hypothesis 2 was not supported. The lack of an association between contact and health is inconsistent with the stress explanation for why contact should affect child health. It is possible that contact has offsetting or heterogeneous effects, improving some relationships and causing increased strain in others. In this study, contact was associated with race/ethnicity, education, family income, and the mother's marital status. Hispanic nonresidential fathers and those of other races were less likely than White nonresidential fathers to remain in contact. Fathers became less involved when mothers remarried, perhaps increasing their social distance. For more educated and higher income families, nonresidential father contact was higher. The contact variable was fairly broad, including not only visits but also phone calls, cards, and letters; however, other research suggests that this study did not include the most important aspect of contact — the emotional content of the relationship between father and child. Although we were not able to directly test the mediating effects of stress, some

support is indicated by our finding that children whose mothers remarried were reported to be in better health than those whose mothers did not remarry.

Hypothesis 4 was not supported. Better health in kindergarten was not associated with greater father contact in grade 3. This suggests that although nonresidential fathers are selective in their financial investments, they may be less selective in contact with children, spending time talking with them and spending time with them regardless of their health. In this study health influenced financial support but not contact.

Contact and Child Support are Related

As expected, paternal-child contact and child support payments were associated across the two waves of data. More contact in kindergarten was associated with more child support in third grade, and more support in kindergarten was associated with more contact in third grade. This supports other research that has shown that payment of child support improves the relationship between the two biological parents, which is subsequently associated with a better relationship between father and child (Hofferth et al., 2010).

Limitations of the Study

Although this study has improved upon previous research by examining changes in child health over time and utilizing data on the timing of parental divorce, there are several weaknesses. Most significantly, the measure of health was the mother's report of her child's health in a standard set of categories from excellent to poor. We controlled for maternal depression to adjust for health reporter bias. Although the ECLS-K asked parents about conditions such as asthma and allergies, the timing of diagnosis could not be determined; thus, they could be not linked to the timing of family dissolution and to other wave-specific measures such as child support and contact. There is clear need for better measurement of diagnosed conditions, including the timing of diagnosis. Additionally, the contact variable measured only communication and contact with the child, not the content or emotional character of the relationship. The emotional involvement of father and child has been shown in the literature to be more strongly linked to the child's well-being than frequency of contact (Buchanan et al., 1996; King, 2006; King & Sobolewski, 2006; Sobolewski & King, 2005; Manning & Lamb, 2003). A third study limitation is that there was no information on the nonresidential father, such as his current income, employment, marital status, whether he had children living with him, and his relationship with the focal child's mother. Research with better measures of the post-dissolution relationship between the two parents and his financial and family situation may help explain the nonresidential father's contribution to his child's health. Finally, we were able to include only the receipt of child support as the father's investment in his child; it is likely that informal financial supports such as purchasing clothing, paying tuition, and paying medical bills contribute to the child's health.

Conclusions

The results of this analysis indicate that nonresidential father involvement following relationship dissolution is associated with the physical health of his child, but the relationship is not as anticipated. We did not find a significant association between receipt of child support in kindergarten and better child health in third grade. Instead, we found that fathers provided financial support more regularly in grade three to children who were in better health in kindergarten. Nonresidential father investment is related to the reasons parents are no longer coresiding. The health of the child and the father's expected utility and return from investment are likely to influence his level of resource investment. Fathers are not motivated to and do not invest as much financially in children for whom the payoff may not be as great. Children in poor health, therefore, are doubly disadvantaged. Besides having

poor health, which could lead to divorce, once their parents' relationship has dissolved, they do not receive fathers' financial support as regularly as those in better health.

One implication of this research is the need for caution in interpreting the potential effects of a policy. Even through a substantial proportion of fathers do not pay on time or pay fully their obligations to their children, one cannot assume that a public policy more closely monitoring financial support from higher income fathers to nonresidential children would directly improve the health of children. However, to the extent that child support enforcement with strong penalties makes it costly to ignore financial obligations to children, the tendency of fathers to support healthier children should be reduced, eliminating the double disadvantage that less healthy children have regarding paternal investment. Additionally, it is important to know whether health insurance is a contribution of the father; in the present study health insurance may or may not have been provided by the father. If newly passed health insurance legislation reduces the proportion of children who are uncovered by health insurance by making it possible for more parents to purchase it, child health will benefit. Health insurance may comprise an important economic contribution from the father to his child.

In sum, this study found no support for direct effects of nonresidential fathers' regular payment of child support or child contact on child health, but found evidence for effects of child health on father involvement. Contact with the father did not appear to directly influence or to be influenced by child health, but contact and support were highly associated. The fact that fathers appear to invest less in children with poor health is of concern. The prevalence of childhood chronic conditions has been increasing (Perrin, Bloom & Gortmaker, 2007); lack of father investment could present more serious problems in the future. Research on the family processes involved, which this paper was unable to explore, could further illuminate the positive and negative aspects of nonresidential father involvement, contribute to our understanding of factors leading fathers to engage with or disengage from their children, and contribute to knowledge leading to improvements in child health.

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Figure 1.
Conceptual Model of Nonresidential Father Involvement and Child Health In Grade 3

Figure 2.
Final model: Nonresidential Father Involvement and Child Health In Grade 3

Table 1

Descriptive Statistics

Variable description	When child was in Kindergarten		Third Grade	
	Mean	SD	Mean	SD
<i>Dependent Variables</i>				
Health				
Excellent	0.45	0.50	0.47	0.50
Very Good	0.33	0.47	0.33	0.47
Good	0.18	0.39	0.16	0.37
Fair/poor	0.04	0.21	0.05	0.21
Contact:				
No contact in last year	0.31	0.46	0.36	0.48
Contact 1 to 12 months ago	0.16	0.36	0.14	0.35
Contact Last month	0.53	0.50	0.51	0.50
Child Support:				
Did not receive child support	0.44	0.50	0.39	0.49
Received support occasionally	0.29	0.45	0.27	0.44
Received support Regularly	0.27	0.45	0.34	0.47
<i>Family Resources</i>				
Ln Family Income	9.75	1.52		
Family Income in \$	17,154	4.50		
Maternal education > HS	0.36	0.48		
<i>Exogenous child health</i>				
Birth weight (pounds)	7.25	1.36		
<i>Time varying variables</i>				
Mother Married	0.19	0.39	0.29	0.47
Mother employed	0.77	0.42	0.77	0.43
Health insurance	0.90	0.30	0.83	0.39
<i>Controls</i>				
Female	0.48	0.50		
White	0.47	0.50		
Black	0.29	0.45		
Hispanic	0.17	0.38		
Other Race/ethnicity	0.07	0.26		
Mother Depressed (K)	0.38	0.49		
Number of Cases	1765		1765	

Table 2

Correlations among Health, Contact and Support in Kindergarten and Grade 3

Variable	Health (K)	Health (Gr 3)	Contact (K)	Contact (Gr 3)	Support (K)	Support (Gr 3)
Health (K)	1					
Health (Gr 3)	0.369	1.000				
Contact (K)	0.070	0.074	1.000			
Contact (Gr 3)	0.054	0.047	0.707	1.000		
Support (K)	0.064	0.073	0.350	0.331	1.000	
Support (Gr 3)	0.102	0.126	0.378	0.411	0.571	1.000

* p<0.05,

** p<0.01,

*** p<0.001

Ordered Logistic Regression of Health, Contact, and Support in Third Grade on Health, Contact, and Support in Kindergarten

Table 3

Variable description	Health in Grade 3						Contact in Grade 3						Support in Grade 3							
	Model 1			Model 2			Model 1			Model 2			Model 1			Model 2				
	B	SE	p	OR ^a	B	SE	p	OR ^a	B	SE	p	OR ^a	B	SE	p	OR ^a	B	SE	p	OR ^a
Health K	0.820	0.077	***	2.270	0.821	0.074	***	2.272	0.008	0.078		1.008	0.018	0.081	*	1.191	0.176	0.068	**	1.192
Contact K	0.095	0.075		1.099	0.091	0.075		1.096	1.837	0.105	***	6.276	1.835	0.105	***	1.677	0.488	0.077	***	1.630
Support K	0.096	0.067		1.100	0.062	0.068		1.064	0.380	0.079	***	1.462	0.436	0.078	***	4.337	1.495	0.098	***	4.459
Mother married (Gr 3)					0.325	0.123	**	1.384					-0.571	0.172	**		-0.274	0.127	*	0.760
Mother employed (Gr 3)					0.266	0.140		1.305					0.058	0.178			0.442	0.151	**	1.556
Health insurance (Gr 3)					0.193	0.177		1.213					0.206	0.159			0.246	0.147		1.279
Fit Statistics																				
-2 Log likelihood		20,774				20,300														
AIC		20,821				20,418														
BIC		20,947				20,741														
BIC (sample size adjusted)		20,873				20,543														
N (free)		23				59														
N (total)		1,765				1,765				1,765				1,765				1,765		

* p<0.05,

** p<0.01,

*** p<0.001

^aOdds ratio

Table 4
Ordered Logistic Regression of Health, Contact, and Support in Kindergarten Year on Background Variables

Variable description	Health in Kindergarten				Contact in Kindergarten				Support in Kindergarten			
	B	SE	p	OR ^a	B	SE	p	OR ^a	B	SE	p	OR ^a
<i>Family resources</i>												
Ln Income (K)	0.045	0.040		1.046	0.181	0.052	**	1.198	0.109	0.046	*	1.115
Maternal Ed > HS	0.279	0.120	*	1.322	0.288	0.141	*	1.334	0.244	0.103	*	1.276
<i>Time varying</i>												
Mother married (K)	0.277	0.181		1.319	-0.826	0.135	***	0.438	0.065	0.162		1.068
Mother employed (K)	omitted				omitted				0.449	0.143	**	1.57
Health insurance (K)	0.021	0.192		1.021	0.079	0.162		1.082	0.546	0.181	**	1.726
<i>Exogenous health</i>												
Birth weight	0.161	0.046	***	1.175	omitted				omitted			
<i>Controls</i>												
Female	0.254	0.117	*	1.289	0.187	0.104		1.205	-0.015	0.115		0.986
<i>White (reference)</i>												
Black	-0.075	0.155		0.928	-0.118	0.131		0.889	-0.935	0.147	***	0.393
Hispanic	-0.287	0.155		0.751	-0.726	0.187	***	0.484	-1.188	0.173	***	0.305
Other race	0.044	0.193		1.045	-0.507	0.186	**	0.602	-0.904	0.235	***	0.405
Mother Depressed (K)	-0.165	0.100		0.848	omitted				omitted			
N	1765				1765				1765			

* p<0.05,

** p<0.01,

*** p<0.001

^a Odds ratio