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Perceived instrumental support and children's health across the early life course

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ABSTRACT

A large, venerable literature demonstrates the importance of social relationships and social support for health, though much less research examines whether the benefits of social support to mothers extend to children. This paper examines the relationship between mothers' perceptions of instrumental support and children's health using longitudinal data from the U.S. Fragile Families and Child Wellbeing Study ($N = 4342$), a cohort of American children born in urban areas to mostly unmarried parents. Results suggest mothers' perceptions of instrumental support is positively associated with children's overall health, and this finding persists despite controlling for a host of individual-level characteristics of mothers and children (including a lagged indicator of children's health) and in fixed-effect models. Mothers' economic security and mothers' wellbeing attenuate some, but not all, of the association between perceived instrumental support and children's overall health. In addition, the link between perceived instrumental support and three specific indicators of health – asthma, overweight/obese, and number of emergency room visits – falls to statistical insignificance after accounting for individual-level characteristics, suggesting these associations result from social selection processes. Taken together, these findings suggest the beneficial health consequences of social support may extend to children across the early life course and demonstrate the need to better understand mothers' reports of children's overall health.

Introduction

A large, venerable body of literature demonstrates the importance of social relationships and social support for health (Berkman, 1995; House, Umberson, & Landis, 1988; Kawachi & Berkman, 2001; Thoits, 2011; Uchino, 2004; Umberson, Crosnoe, & Reczak, 2010). Individuals who create and maintain close relationships with kin members, friends, and neighbors experience positive and lasting benefits of these relationships. Instrumental support – generally considered support that comes in the form of money, time, or in-kind assistance – is the most commonly exchanged form of social support (House, 1981; also see Swartz, 2009). Researchers have documented that instrumental support is linked to health and wellbeing among adults (Harknett, 2006; Henly, Danziger, & Offer, 2005; Lin, Ye, & Ensel, 1999; Uchino, 2004).

But the health benefits of parents' instrumental support may extend to children. First, the association between parents' perceived instrumental support and children's health may be direct. A mother with friends or family members to provide a small loan, for example, may be able to afford a co-payment, prescription or over-the-counter medication, or transportation to a doctor's appointment, all of which may promote health and wellbeing among children. Second, the relationship between parents' perceived instrumental support and children's health may be indirect, operating through economic security. For parents, especially those with limited economic resources, having a friend or family member available to provide financial or in-kind assistance may be necessary for economic survival (Edin & Lein, 1997). Economic security may allow mothers to purchase high-quality material health inputs (including healthy food, medical care, and housing) and to use these inputs to improve children's physical health (Currie, 2009). Finally, the relationship between parents' perceived instrumental support and children's health may operate through parents' health and wellbeing. Having the potential to activate such assistance may relieve emotional stress among parents (Thoits, 1995), which may enable parents to notice children's health problems as they arise or adhere to treatment regimes for sick children.

Despite reasons to believe instrumental support may affect children's health, little empirical research, especially in developed countries, examines this association (though see Jackson, Brooks-Gunn, Huang, & Glassman, 2000; Leininger, Ryan, & Kalil, 2009; Ryan, Kalil, & Leininger, 2009; Sherraden & Barrera, 1997). Thus, this paper addresses the association between perceptions of instrumental support among mothers and health among children, nearly

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all of whom live with their mothers. The focus on perceived support is advantageous because it captures the support mothers have available to draw upon when needed. This is in contrast to received support, which conflates the availability of and need for support, making it impossible to distinguish between mothers who have unmet support needs and mothers who simply do not need support (Meadows, 2009; Thoits, 2011).

This paper uses data from the Fragile Families and Child Wellbeing Study, a recent cohort of American children born in urban areas to mostly unmarried parents, to understand the relationship between mothers' perceived instrumental support and children's health. The outcomes of children born to unmarried parents may be especially important, as these children are an increasing demographic group (Hamilton, Martin, & Ventura, 2010) and may be especially vulnerable (Bzostek & Beck, 2011). These data provide an exceptional empirical lens to understand this relationship, and this paper contributes to the literature in the following ways: by using a large, recent, and longitudinal data source; by adjusting for a rich set of covariates (including a lagged dependent variable) and employing a fixed-effects modeling strategy; by detailing the mechanisms linking perceived instrumental support to children's health; and by considering multiple indicators of children's health including overall health, asthma, overweight/obese, and number of emergency room visits.

Background

Importance of understanding children's health

Children's health and wellbeing plays an important role in the intra-generational process of stratification (Palloni, 2006). Poor health in childhood is associated with low educational attainment (Case & Paxson, 2010), low socioeconomic status (Case & Paxson, 2010; Palloni, 2006), and health problems (Case & Paxson, 2010; Haas, 2007; Smith, 2009) in adulthood. which suggests understanding the social determinants of children's health is important. Indeed, children's health and wellbeing is not randomly distributed across the population and considerable disparities begin as early as infancy (Bloom, Cohen, & Freeman, 2009; Reichman, Hamilton, Hummer, & Padilla, 2008).

Why would we expect mothers' perceived support to influence children's health?

The association between perceived instrumental support and children's health may be direct. As noted above, having friends or family members to provide a small loan, for example, may enable a mother to afford a co-payment, prescription or over-the-counter medication, or transportation to a doctor's appointment, all of which may promote health and wellbeing among children. Similarly, the provision of emergency child care may allow a mother to take a sick child to a doctor or emergency room without his or her siblings (thus preventing siblings from exposure to illness). Having someone to provide a place to live in an emergency may mean children are protected against unexpected stints of homelessness and have a respite from exposure to environmental allergens.

It is also possible perceived instrumental support indirectly benefits children's health through its broader benefits to mothers. Mothers' increased economic security may be one mechanism underlying the relationship between mothers' perceived instrumental support and children's health. Available social support may help supplement earnings, assist in procuring employment, or reduce material hardship. Large amounts of financial assistance may buffer against economic hardship in the face of an unexpected shock such as job loss, divorce, or eviction. Indeed, among low-income families, perceived instrumental support is associated with greater employment, less perceived material hardship, and a reduced likelihood of living in poverty (Harknett, 2006; Henly et al., 2005). Increased economic security, in turn, may allow mothers to purchase healthy food for children, engage in health-promoting activities or preventive care, and purchase necessary medication. Indeed, employed mothers have healthier children than their counterparts (Osborne & Knab, 2007), and household income is positively associated with children's health (Bloom et al., 2009).

An additional mechanism linking perceived instrumental support and children's health may be mothers' improved health and wellbeing. Perceiving available support may lead to both physical and mental health advantages by mitigating against stress and strengthening a mother's coping capacity (Lin et al., 1999; Uchino, 2004). Empirical literature suggests parental physical and mental health problems are associated with poorer health in children (Angel & Worobey, 1988; Hogan, Shandra, & Msall, 2007; Minkovitz, O'Campo, Chen, & Grason, 2002). Maternal depression, for example, is associated with lower overall health in children, health conditions such as asthma, and less preventive care (Turney, 2011).

Empirical evidence linking mothers' instrumental support and children's health

Despite conceptual frameworks suggesting mothers' perceived instrumental support may improve children's health, as well as frameworks highlighting the importance of examining social relationships and health across the life course (Umberson et al., 2010), relatively little empirical research considers the association between social support and children's health. These existing empirical findings suggest a positive association between support and children's health in developed countries (Drukker, Buka, Kaplan, McKenzie, & Van Os, 2005; Leininger et al., 2009; Ryan et al., 2009; Sherraden & Barrera, 1997), though support is rarely operationalized across studies and few studies consider measures of perceived instrumental support. One study of U.S. mothers enrolled in welfare-to-work programs found that children of mothers lacking social support — especially socially isolated mothers — were more likely than their counterparts to experience an accident or injury (Leininger et al., 2009). Perceived instrumental support is also associated with fewer behavior problems in children of low-income mothers (Ryan et al., 2009).

Additional research examines the consequences of social support for children in less developed countries (Adams, Madhavan, & Simon, 2002; Carter & Maluccio, 2003; De Carvalhaes, Benicio, & Barros, 2005; Harpham, De Silva, & Tuan, 2006; Surkan, Ryan, Vieira, Berkman, & Peterson, 2007). For example, higher levels of financial and emotional support are associated with a reduced likelihood of mother-reported fair or poor child health in Mexico (Kana'iaupuni, Donato, Thompson-Colon, & Stainback, 2005). Similarly, social support is positively associated with children's nutritional status in South Africa (Carter & Maluccio, 2003) and adequate growth in Brazil (Surkan et al., 2007). Support is negatively associated with child mortality in Mali (Adams et al., 2002) and with children's health problems in Vietnam (Harpham et al., 2006).

It is possible that observed associations between instrumental support and children's health are not causal and instead result from social selection processes. There may be unobserved differences between mothers with high and low perceived instrumental support that render this association spurious. Much previous research does not rule out a spurious relationship, as most studies include relatively few control variables, utilize cross-sectional data, and/or rely on traditional regression models that do not account for unobserved heterogeneity. Two noteworthy exceptions include

research done by Leininger and colleagues (Leininger et al., 2009; Ryan et al., 2009). Both of these rigorous studies are attentive to social selection processes by including a wide array of relevant covariates and by employing residualized change models. They find the consequences of perceived support for children's socioemotional wellbeing (Ryan et al., 2009) and accidents and injuries (Leininger et al., 2009) are robust to these modeling strategies, providing some evidence that the relationship is not spurious.

Contributions of this research

Though research linking mothers' social support to children's health has grown in recent years, there are several opportunities to advance this literature. First, relatively little research examines the consequences of mothers' perceived instrumental support for children's health in developed countries. Second, much research is based on cross-sectional surveys that cannot estimate the direction of this relationship. Directionality is especially important, as mothers with unhealthy children may need more support from network members and, therefore, may perceive more available support. Alternatively, mothers with chronically ill children may exhaust their network's resources. Third, with exceptions as discussed above, the majority of existing research does little to address selection bias. Finally, though understanding the mechanisms linking perceived support to children's health may be especially important (Ryan et al., 2009), no research empirically considers these mechanisms. Each of these limitations is addressed in this manuscript.

Method

Data

This paper uses data from the Fragile Families and Child Wellbeing Study, a longitudinal survey of nearly 5000 new and mostly unmarried parents in 20 U.S. cities (Reichman, Teitler, Garfinkel, & McLanahan, 2001). Because unmarried mothers were oversampled, the sample over-represents minority children, economically disadvantaged children, and children with non-residential fathers. Between February 1998 and September 2000, mothers completed a 30- to 40-min in-person interview at the hospital after the birth of their child. Mothers were interviewed by telephone when their children were approximately 1, 3, 5, and 9 years old. Response rates were relatively high (Bendheim-Thoman Center for Research on Child Wellbeing, 2008, 2011). Additionally, some outcome variables come from the In-Home Longitudinal Study of Pre-School Aged Children, a subsample of families who participated in the Fragile Families survey. This study was exempted from ethics review by the University of California, Irvine, because it uses secondary, de-identified data.

The multivariate analyses used data pooled across all survey waves. For each individual in the sample, a separate record represents each wave of observation. Pooling the data allowed for the analysis of multiple survey waves to generate estimates of the association between perceived instrumental support and children's health across a wide age range of children. Second, given relatively few children had fair or poor health at any given survey wave, this approach increased the number of children with fair or poor health and increased statistical power.

The analytic sample included observations in which the mother completed at least two consecutive surveys (and, thus, observations with complete information about children's health at one survey wave and perceived instrumental support during the previous wave) ($N = 4342$). Although there were no differences between the full and analytic samples in perceived instrumental support or children's health, two other differences existed. Mothers in the analytic sample were less likely to be born outside the United States, as measured at baseline, and reported lower relationship quality with their children's fathers at the 3-, 5-, and 9-year surveys ($p < 0.05$).

Measures

Children's health

The primary dependent variable was a measure of children's overall health. At the 1-, 3-, 5-, and 9-year surveys, mothers were asked to rate children's general health. Because relatively few children were in fair or poor health, these response categories are collapsed (1 = *fair or poor*, 2 = *good*, 3 = *very good*, 4 = *excellent*). The analyses also considered three additional, more objective indicators of children's health: asthma diagnosis (measured at the 3-year In-Home and 5- and 9-year telephone surveys), overweight/obese (measured at the 3-, 5-, and 9-year In-Home surveys), and number of emergency room visits in the past year (measured at the 5- and 9-year In-Home surveys). Asthma and emergency room visits were reported by children's mothers and thus suffer from shared methods variance similar to the measure of overall health. Overweight/obese was calculated using children's height and weight as measured by interviewers. Children with Body Mass Indexes (BMIs) at or above the 95th percentile for their age and sex were considered overweight/obese, which is in accordance with the National Center for Health Statistics (NCHS) guidelines.

Perceived instrumental support

Mother's perceived instrumental support was the primary explanatory variable. At the 1-, 3-, 5-year surveys, mothers were asked if they could count on someone during the next year for the following: $200 loan, $1000 loan, emergency babysitting or child care, place to live, cosigner for a $1000 bank loan, and cosigner for a $5000 bank loan. Each of these questions comprised a dichotomous variable, and responses were summed (0–6; α ranged between 0.79 and 0.81). The final measure included the following mutually exclusive dummy variables, consistent with prior research (Ryan et al., 2009): low support (scores of 0 or 1), medium support (scores of 2, 3, or 4), and high support (scores of 5 or 6). Supplemental analyses considered mother's emotional support. A continuous variable measured the number of close friends reported by the mother and a dummy variable indicated the mother reported the presence of a close confidante ("someone you share confidences and feelings with, someone you can depend on"). Both of these measures were first asked at the 5-year survey.

Mechanisms

Three indicators of mothers' economic security were considered mechanisms. Mother's household income was a continuous variable (logged), with missing data imputed by the Fragile Families data team (see Bendheim-Thoman Center for Research on Child Wellbeing, 2008). Material hardship was the average of responses to questions about if, at some point in the past year, the mother experienced events because there was not enough money (e.g., received free food or meals, did not pay the full amount of rent or mortgage payment). Children's health insurance coverage included the following dummy variables: public insurance, private insurance, and no insurance.

Four indicators of mothers' wellbeing were also considered mechanisms. Maternal depression was measured by mothers' responses to the Composite International Diagnostic Interview Short Form (CIDI-SF) (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). A dummy variable indicated the mother reported her own health was fair or poor. Parenting stress was an average of responses to the following (1 = *strongly disagree* to

4 = *strongly agree*): being a parent is harder than I thought it would be; I feel trapped by my responsibilities as a parent; taking care of my children is much more work than pleasure; and I often feel tired, worn out, or exhausted from raising a family (α ranged between 0.61 and 0.66). Relationship quality was based on mother's reports about the quality of her relationship with the child's father (1 = *poor* to 5 = *excellent*).

Control variables

The multivariate analyses controlled for a host of time-invariant characteristics that may render the relationship between perceived instrumental support and children's health spurious (measured at baseline except when noted). Mother's race was recorded as a series of mutually exclusive dummy variables (non-Hispanic white, non-Hispanic Black, Hispanic, and non-Hispanic other race). Additional dummy variables indicated the mother was born outside of the United States, the child was the mother's first birth, and the mother met the criteria for Generalized Anxiety Disorder (GAD) (measured at the 3-year survey). Mother's cognitive ability was measured at the 3-year survey with a version of the Wechsler Adult Intelligence Scale-Revised (WAIS-R). Analyses also controlled for time-invariant characteristics of the prenatal environment (dummy variables indicating the mother smoked while pregnant and considered an abortion) and the child (dummy variables indicating the child's gender and if the child was born low birth weight [less than 2500 g]).

Additionally, the multivariate analyses adjusted for several time-varying controls. Mother's and father's age were continuous variables. Mutually exclusive dummy variables indicated mother's and father's educational attainment (less than high school diploma, high school diploma or GED, and post-secondary education) and mother's relationship with the child's father (married, cohabiting, nonresidential romantic relationship, and not in a relationship). The analyses also adjusted for mother's employment in the past week, mother's welfare receipt in the past year, number of children in the household, grandmother in the household, and whether the father was ever incarcerated.

Analytic approach

The analyses proceeded in four stages. The first analytic stage presented descriptive information on children's health by perceived instrumental support (Table 1). To address concerns about endogeneity, perceived instrumental support was measured in the wave prior to the measure of children's health. Chi-square tests determined the statistical significance of these differences.

The second analytic stage used pooled ordered logistic regression (Models 1 through 3) and fixed-effect regression (Model 4) models that estimated children's health as a function of perceived instrumental support (Table 2). Model 1 included (lagged) perceived instrumental support, as well as dummy variables indicating the wave at which the dependent variable was measured. Model 2 adjusted for a host of time-invariant and time-varying maternal and child characteristics, and Model 3 included a lagged dependent variable. Including the lagged dependent variable provided a conservative test of the relationship between perceived instrumental support and children's health (Allison, 1994). After the lagged measures were included, any remaining association between perceived instrumental support and children's health was *net* of children's prior health. Covariate adjustment, used in Models 2 and 3, is one method of accounting for spuriousness. But fixed-effects models, which consider within-person changes in the independent and dependent variables and take into account stable unobserved characteristics, are another method of accounting for spuriousness and this model is presented in Model 4. Because there is no agreed-upon method for estimating fixed-effect ordered logistic regression models (Hole, Dickerson, & Munford, 2011), these models used ordinary least squares (OLS) regression.

Table 1
Descriptive statistics of children's health, by mothers' perceived instrumental support.

	Mothers' perceived instrumental support				
	Low	Medium	High	Chi-square	*p*
Children's health (3-year)					
Children's overall health					
Excellent	55.0%	62.0%	69.8%	97.529	0.000
Very good	27.7%	26.6%	23.5%		
Good	13.7%	9.5%	5.8%		
Fair or poor	3.6%	1.9%	0.8%		
Asthma	21.2%	19.0%	15.2%	12.696	0.002
Overweight/obese	19.0%	17.4%	18.4%	0.928	0.629
N	1646	1376	1292		
Children's health (5-year)					
Children's overall health					
Excellent	55.9%	62.2%	70.1%	76.402	0.000
Very good	28.0%	27.4%	23.3%		
Good	13.0%	8.6%	5.7%		
Fair or poor	3.1%	1.9%	0.9%		
Asthma	22.1%	21.7%	17.0%	13.076	0.001
Overweight/obese	17.5%	18.4%	15.5%	1.385	0.500
Number of emergency room visits	0.430	0.352	0.294	48.223	0.026
N	1725	1343	1284		
Children's health (9-year)					
Children's overall health					
Excellent	51.3%	55.0%	63.8%	49.632	0.000
Very good	29.0%	29.1%	25.8%		
Good	15.4%	12.6%	9.5%		
Fair or poor	4.2%	3.3%	1.0%		
Asthma	25.4%	24.5%	20.8%	6.478	0.039
Overweight/obese	26.6%	27.7%	19.9%	16.285	0.000
Number of emergency room visits	0.448	0.384	0.324	40.491	0.035
N	1568	1617	1086		

Note: Mothers' perceived instrumental support is measured at the survey wave prior to children's health. Number of emergency room visits was not asked at the 3-year survey. Sample sizes for asthma (at the 3-year survey), overweight/obese (at the 3-, 5-, and 9-year surveys), and number of emergency room visits (at the 5- and 9-year surveys) are smaller than those listed because these measures were not ascertained for all children.

The third analytic stage, presented in Table 3, considered the extent to which the association between perceived instrumental support was direct or indirect (operating instead through mothers' economic security and mothers' wellbeing). Model 1 presented the baseline model (Model 3 of Table 2). To understand how much of this relationship is explained by mothers' economic security and mothers' wellbeing, Models 2 and 3, respectively, adjusted for three indicators of economic security and four indicators of wellbeing. Mediation was examined using the Sobel–Goodman mediation tests. Model 4 included all potential mechanisms. Results from the pooled models (that include a lagged dependent variable) were presented since traditional fixed-effect models do not account for the direction of the relationship.

The final analytic stage considered alternative indicators of children's health and mothers' support (Table 4). The first analysis examined how perceived instrumental support was associated with three health outcomes: asthma, overweight/obese, and number of emergency room visits. Logistic regression models estimated the likelihood of asthma and overweight/obese, and OLS regression models estimated emergency room visits (though these findings are robust to using a Poisson distribution). The second analysis examined how two indicators of emotional support – number of close friends and presence of a confidante – were associated with children's health. Because measures of emotional support were not asked until the 5-year survey, I discuss but do not present these models.

Table 2
Pooled ordered logistic and fixed-effect regression models estimating children's overall health as a function of mothers' perceived instrumental support.

	Model 1	Model 2	Model 3	Model 4
	Unadjusted model	+ controls	+ lagged child health	fixed-effects
Mothers' perceived instrumental support				
Low	−0.637***	−0.426***	−0.315***	−0.064**
	(0.055)	(0.060)	(0.055)	(0.024)
Medium	−0.364***	−0.232***	−0.163**	−0.028
	(0.054)	(0.057)	(0.054)	(0.021)
High (reference)				
Intercepts				
1	−3.912***	−4.286***	−1.073***	
2	−2.094***	−2.445***	0.914***	
3	−0.586***	−0.909***	2.642***	
R-squared	0.022	0.051	0.174	
N	4342	4342	4342	4342
Person-year observations	11,591	11,591	11,591	11,591

Note: Models 1 through 3 are pooled ordered logistic regression models and Model 4 is an OLS fixed-effect regression model. All models account for clustering at the individual level and include robust standard errors. Mothers' perceived instrumental support is measured at the survey wave prior to children's health. All models include dummy variables that indicate survey wave. Model 2 includes the following controls: mother's race, mother's immigrant status, child was mother's first birth, mother smoked while pregnant, mother reports Generalized Anxiety Disorder (GAD), mother's cognitive ability (WAIS score), child born low birth weight, child is male, mother's age, father's age, mother's education, father's education, mother's relationship status with child's father, mother's employment, mother receives welfare, number of children in household, grandmother in household, and father ever incarcerated. Model 3 includes all controls from Model 2 and a lagged measure of children's health. Model 4 includes all time-varying variables from Model 3. $^{**}p < 0.01$, $^{***}p < 0.001$.

Relatively few observations had missing data, and these observations were preserved with multiple imputation (Royston, 2007). The imputation model included variables related to the research questions or to the likelihood of being missing (Allison, 2002), producing 20 datasets. Both dependent and independent variables were used to impute missing independent variables, but missing dependent variables were not imputed (Von Hippel, 2007). All models accounted for clustering at the individual level and included robust standard errors.

Table 3
Pooled ordered logistic regression models estimating children's overall health as a function of mothers' perceived instrumental support, with mechanisms.

	Model 1	Model 2	Model 3	Model 4
	Baseline model	+ maternal economic security	+ maternal wellbeing	+ all mechanisms
Mothers' perceived instrumental support				
Low	−0.315***	−0.237***	−0.244***	−0.199***
	(0.055)	(0.056)	(0.056)	(0.057)
Medium	−0.163**	−0.121*	−0.146**	−0.120*
	(0.054)	(0.055)	(0.055)	(0.055)
High (reference)	–	–	–	–
Intercepts				
1	−1.073***	−0.873***	−1.624***	−1.402***
2	0.914***	1.118***	0.390*	0.613*
3	2.642***	2.851***	2.140***	2.365***
R-squared	0.174	0.177	0.190	0.191
N	4342	4342	4342	4342
Person-year observations	11,591	11,591	11,591	11,591

Note: All models account for clustering at the individual level and include robust standard errors. Mothers' perceived instrumental support is measured at the survey wave prior to children's health. Model 1 includes all variables from Model 3 of Table 2. Model 2 includes all variables from Model 1 and the following mechanisms: mother's income (log), mother's material hardship, and children's health insurance status. Model 3 includes all variables from Model 1 and the following mechanisms: mother's depression, mother's fair or poor health, mother's parenting stress, and mother's relationship quality with child's father. Model 4 includes all variables from Model 1 and all mechanisms. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Results

Sample description

Descriptive statistics for all variables are presented in Appendix A. At all survey waves, mothers reported relatively healthy children. At age 1, 66% of children were in excellent health, 21% were in very good health, 10% were in good health, and 3% were in fair or poor health. Consistent with expectations, children's health declined slightly over time (though the majority of children were still in excellent health). About 62% of children were in excellent health at age 3, 62% at age 5, and 56% at age 9. The percentage of children diagnosed with asthma increased as children aged, with 19% of 3-year-olds, 21% of 5-year-olds, and 24% of 9-year-olds having an asthma diagnosis. One-quarter of children were overweight/obese by age 9. Perceived instrumental support, on average, remained relatively consistent across survey waves. When children were 1 year old, 38% of mothers reported low instrumental support, 32% reported medium instrumental support, and 31% reported high instrumental support.

With respect to demographic characteristics, the majority of mothers were racial minorities. Nearly half (48%) of the sample was Black, and more than one-quarter (26%) was Hispanic. About 15% of mothers were foreign-born. For nearly two-fifths of mothers (39%), the focal child was her first birth. About 19% of mothers reported prenatal smoking, and 10% of children were born low birth weight. More than half (52%) of mothers were in co-residential relationships with the child's father and more than half (54%) did not have education beyond high school at the 3-year survey.

Description of children's health, by mothers' perceived instrumental support

Table 1 presents descriptive statistics of children's overall health (excellent, very good, good, fair or poor), asthma, overweight/obese, and number of emergency room visits at ages 3, 5, and 9 by mothers' perceived instrumental support. These descriptive statistics show low perceived instrumental support and poor child health go hand in hand. For example, when mothers reported low support at the 1-year survey, 55% of 3-year-old children were in excellent health and 4% were in fair or poor health. This is in stark contrast to when mothers reported medium support (62% of 3-year-olds were in excellent health) or when mothers reported high support (70% of 3-year-olds were in excellent health) ($\chi^2 = 97.529$, $p < 0.001$). The patterns with respect to 5- and 9-year-old children's health were consistent. Mothers with less instrumental support reported children were in worse health ($\chi^2 = 76.402$, $p < 0.001$ for 5-year-old children's health; $\chi^2 = 49.632$, $p < 0.001$ for 9-year-old children's health). Less instrumental support among mothers was also associated with a greater likelihood of asthma (among 3-, 5-, and 9-year-old children), a greater likelihood of overweight/obese (among 9-year-old children), and more emergency room visits (among 5- and 9-year-old children).

Children's overall health as a function of mothers' perceived instrumental support

Though these descriptive differences are striking, children of mothers lacking perceived instrumental support are likely

Table 4
Logit or OLS regression models estimating additional children's health outcomes as a function of mothers' perceived instrumental support.

	Asthma (logit)			Overweight/obesity (logit)			Number of emergency room visits (OLS)		
	Model 1 Unadjusted model	Model 2 + controls	Model 3 + lagged child health	Model 1 Unadjusted model	Model 2 + controls	Model 3 + lagged child health	Model 1 Unadjusted model	Model 2 + controls	Model 3 + lagged child health
Mothers' perceived instrumental support									
Low	0.324***	−0.021	−0.134	0.204*	0.065	0.077	0.131***	0.039	0.016
	(0.079)	(0.089)	(0.091)	(0.085)	(0.096)	(0.099)	(0.031)	(0.036)	(0.037)
Medium	0.255**	−0.020	−0.064	0.219**	0.097	0.094	0.061*	−0.009	−0.030
	(0.076)	(0.081)	(0.083)	(0.084)	(0.090)	(0.091)	(0.030)	(0.032)	(0.032)
High (reference)	–	–	–	–	–	–	–	–	–
Constant	−1.377	−1.219	0.964	−1.239	−1.334	−1.481	0.320	0.312	0.792
R-squared	0.003	0.039	0.076	0.001	0.028	0.029	0.003	0.014	0.024
N	4260	4260	4260	3762	3762	3762	3871	3871	3871
Person-year observations	10,766	10,766	10,766	7871	7871	7871	6483	6483	6483

Note: All models account for clustering at the individual level and include robust standard errors. Mothers' perceived instrumental support is measured at the survey wave prior to children's health. Model 2 includes all variables from Model 2 of Table 2. Model 3 includes all variables from Model 2 and a lagged dependent variable. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

disadvantaged in additional ways that may render this association spurious. Table 2 presents results from pooled ordered logistic regression models estimating children's overall health as a function of perceived instrumental support. Consistent with expectations, Model 1 showed children of mothers with low instrumental support were in worse health than their counterparts. Low perceived instrumental support, compared to high support, was associated with 0.53 ($\exp^{-.637}$) times the odds of rating children's health above a given category ($p < 0.001$). Medium support, compared to high support, was associated with 0.70 ($\exp^{-0.364}$) times the odds of rating children's health above a given category ($p < 0.001$).

The association between mother's perceived instrumental support and children's overall health persisted in the remaining models. In Model 2, which adjusted for a host of demographic covariates, the coefficients for low and medium support were attenuated but remained statistically significant ($p < 0.001$). Similarly, adjusting for a lagged indicator of children's health reduced the coefficients. Compared to children of mothers with high instrumental support, children of mothers with low (OR = 0.73, $p < 0.001$) or medium (OR = 0.85, $p < 0.005$) support had worse health. Finally, the fixed-effect model shows children of mothers with low support – but not those with medium support – had worse health than their counterparts. The difference in coefficients between low and medium instrumental support were also statistically significant ($p < 0.05$). Note the coefficients in Models 3 and 4 are not directly comparable, as the fixed-effect model uses OLS regression instead of ordered logistic regression. Estimating Model 3 with OLS regression produces results that are robust to the ordered logistic models (low instrumental support: $b = -0.100$, $p < 0.001$; medium instrumental support: $b = -0.046$, $p < 0.01$). The coefficients were reduced by nearly two-fifths in the fixed-effect model. Taken together, though, these models provide further support for the link between support disadvantages – especially extreme support disadvantages – and health disadvantages. Fig. 1, which displayed predicted probabilities for each of the four categories of children's health by mothers' perceived instrumental support, was based on estimates from Model 3 of Table 2.

Despite theoretical reasons to suggest the association between perceived instrumental support and children's health may vary by mothers' or children's characteristics, supplemental analyses provided no evidence the association varied by maternal education,

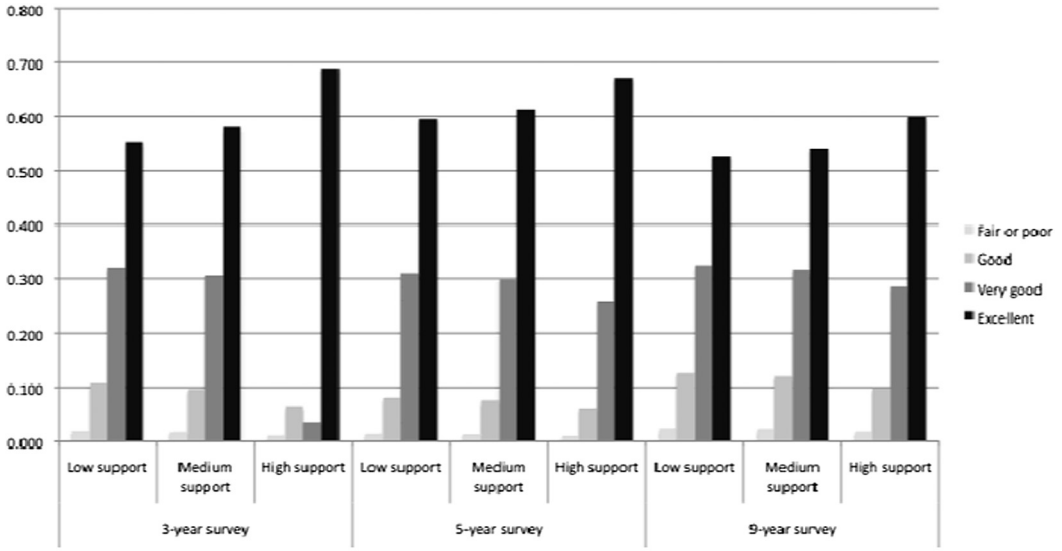

Fig. 1. Predicted probabilities of children's overall health, by mother's perceived instrumental support and survey year.

children's gender, or household living arrangements. There was also no evidence the association varied across children's age.

Mechanisms underlying relationship between children's overall health and mothers' perceived instrumental support

Table 2 established an association between perceived instrumental support and children's overall health. But these analyses provided little evidence about the mechanisms underlying this association, which is the goal of Table 3. Before considering how the proposed mechanisms alter the association between perceived instrumental support and children's health, it is worth noting that instrumental support was independently and robustly associated with all mechanisms except for children's health insurance status (in which the association falls from statistical significance after adjusting for a lagged dependent variable). In Table 3, the baseline model (Model 1) included all control variables from Model 3 of Table 2. When the three indicators of economic security were included in Model 2 ($F = 45.47$, $p < 0.001$), the coefficients for low and medium instrumental support remained statistically significant but were reduced by 25% and 26% from Model 1, respectively. Of the three indicators of economic security, material hardship mattered most (explaining 16% of the low support coefficient and 17% of the medium support coefficient). The coefficients were also reduced – by 23% and 10%, respectively – with the inclusion of four indicators of mothers' wellbeing in Model 3 ($F = 167.13$, $p < 0.001$). Of the four measures, parenting stress most substantially altered this association. The final model shows that taking into account both economic security and wellbeing reduced, but did not entirely mediate, the association between perceived instrumental support and children's health. Though both coefficients remained statistically significant, the coefficient for low support was reduced by nearly two-fifths (OR = 0.82, $p < 0.001$) and the coefficient for medium support was reduced by more than one-fourth (OR = 0.89, $p < 0.05$).

Additional indicators of children's health and mothers' social support

Table 4 presents estimates for three additional health outcomes: asthma, overweight/obese, and number of emergency room visits. The relationship between perceived instrumental support and each of these health outcomes followed a similar pattern. In the unadjusted model (Model 1), children of mothers with low support, compared to their counterparts of mothers with high support, had greater odds of asthma (OR = 1.38, $p < 0.001$), greater odds of overweight/obese (OR = 1.23, $p < 0.05$), and more emergency room visits ($b = 0.131$, $p < 0.001$). Similar, but smaller in magnitude, associations existed when mothers had medium support. These associations disappeared when including control variables (Model 2), suggesting the associations resulted from social selection processes.

The measure of perceived instrumental support, though widely used, is limited because it does not consider emotional support. In supplemental analyses (not presented but available upon request), two indicators of emotional support – number of close friends and presence of a confidante – were examined in relation to children's health. Because measures of emotional support were first asked at the 5-year survey, analyses estimate children's health at the 9-year survey as a function of emotional support at the 5-year survey ($n = 3949$). After including controls and a lagged indicator of children's health (the equivalent of Model 3 of Table 2), number of close friends was associated with greater overall health, though the magnitude of the association was small ($b = 0.016$, $p < 0.05$). Number of close friends was not associated with asthma or overweight/obese, but was associated with fewer emergency room visits ($b = -0.007$, $p < 0.01$). Similarly, in the final model (the equivalent of Model 3 of Table 2), having a confidante was associated with better overall health in children (OR = 1.35, $p < 0.01$). Having a confidante was not associated with children's asthma or number of emergency room visits, but there is some evidence this was associated with a lower odds of overweight/obese (OR = 0.79, $p < 0.10$).

Discussion

Analyses of data from the Fragile Families and Child Wellbeing Study showed that mothers' perceived instrumental support was associated with reports of her child's health. This association was robust across a host of modeling specifications including one that adjusted for children's prior health and utilized a fixed-effects modeling strategy. These findings are consistent with the large body of literature linking perceived support to adult health (Lin et al., 1999; Uchino, 2004). They are also consistent with the much smaller body of literature linking perceived (Leininger et al., 2009; Ryan et al., 2009) and received support (Kana'iaupuni et al., 2005; Sherraden & Barrera, 1997) to children's wellbeing, but extend this literature by looking specifically at children's health, a distinct outcome increasingly associated with social stratification across the life course (Case & Paxson, 2010; Palloni, 2006).

An additional contribution of this research is that it investigated the mechanisms through which mothers' perceived instrumental support is associated with children's health. Results showed that both mothers' economic security and mothers' wellbeing partially mediated the association between perceived instrumental support and children's health. But economic security and wellbeing did not entirely explain this relationship, indicating that either a direct effect of perceived instrumental support on children's health or additional unmeasured mechanisms exist. Future research should continue to investigate these processes by considering additional mechanisms such as child care difficulties or parenting. Those with social support, for example, may receive parenting advice (Moncher, 1995), be emotionally responsive to children (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983), and be less punitive to children (Colletta, 1979), all of which may be positively related to children's health. Future research should also pay attention to the potentially bi-directional relationship between the observed mechanisms and perceived instrumental support.

Contrary to expectations, results suggest the association between perceived instrumental support and three specific indicators of health – asthma, overweight/obese, and number of emergency room visits – results from social selection processes. Therefore, although children's overall health is improved when mothers report high instrumental support, the benefits do not extend to the specific indicators of health considered. There are several explanations for these divergent findings. For one, because these specific indicators were not asked of all mothers at all waves, the analytic sample is smaller than the analytic sample estimating children's overall health. Also, if asthma and overweight/obese are common health conditions among individuals mothers have contact with, which is likely given the relatively economically disadvantaged nature of the Fragile Families sample and the higher prevalence of asthma and overweight/obese among the economically disadvantaged (Bloom et al., 2009; Kimbro, McLanahan, & Brooks-Gunn, 2007), it is possible they do not perceive these conditions as contributing to their children's overall health. Indeed, the correlation between mothers' reports of children's overall health is only moderately correlated with asthma ($r = -0.257$, -0.241, and -0.265 at the 3-, 5-, and 9-year surveys, respectively) and poorly correlated with overweight/obese ($r = 0.005$, -0.047, and -0.158 at the 3-, 5-, and 9-year surveys, respectively). Similarly, the measure of emergency room visits

confounds two types of mothers: those who take children to the emergency room for acute, last-minute care and those who have the ability the take children to the emergency room as a form of health care utilization. Thus, these divergent findings do not make the findings about perceived instrumental support and children's overall health any less important. Though the validity of parent-reported child health is not understood in the same way as adult self-reported health (Idler & Benyamini, 1997), increasing evidence suggests that parent-reported child health is indeed a reliable indicator of child wellbeing. Parent-reported health, for example, is correlated with doctor reports of child health (Case, Lubotsky, & Paxson, 2002). Others find parental reports of child health are associated with health care utilization (Monette, Seguin, Gauvin, & Nikiema, 2007), children's functional limitations (Arcia, 1998), and other acute and chronic medical conditions (Arcia, 1998; McCormick, Brooks-Gunn, Workman-Daniels, & Peckham, 1993). These findings, though, demonstrate the need to better understand mothers' reports of children's overall health.

Several limitations exist. First, though the measure of perceived instrumental support captures available assistance that may be important and practical for mothers, this measure is not exhaustive of all types of support mothers may need or receive. Supplemental analyses considering mothers' emotional support, for example, suggest small benefits to children. Measures of emotional support are not available at all survey waves, however, and future research should consider the possibility that emotional support is an additional, potentially complimentary, determinant of children's health. These data are also limited because they do not contain information about available support providers, the frequency with which support is available, and whether mothers are satisfied with their support. Finally, these findings should not be considered causal estimates of the effect of perceived instrumental support on children's health, as additional unobserved characteristics may render this relationship spurious. The fixed-effects model somewhat addresses this, by taking into account unobserved time-invariant characteristics, but is limited by its inability to account for unobserved time-varying characteristics.

Taken together, though, these findings demonstrate a robust association between mothers' perceived instrumental support and children's overall health. Mothers who report available financial, child care, and housing support not only experience increased wellbeing themselves, as prior research demonstrates, but also experience some benefits for their children. This paper contributes to the literature by using a longitudinal data source, adjusting for a rich set of covariates (including a lagged dependent variable), and beginning to identify the mechanisms linking perceived instrumental support to children's health. Given the importance of children's health in predicting outcomes across the life course, low social support among mothers may play a role in the intergenerational transmission of disadvantage.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2012.08.017.

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