Grandparenting in Three-Generation Families and the Health of Their Grandchildren

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Abstract

The prevalence of grandparents in homes with young children has grown considerably over the past three decades, yet we do not know what this means for child health. Using data from three waves of the Fragile Families and Child Wellbeing Study (N=4,956 person waves), I investigate the relationship between grandparent co-residency and grandchild health. I find households with co-residing grandparents to be positively associated with grandchild health. This study also finds evidence of a marginally stronger association related to grandfather co-residency, although this may be due to selection. This paper next investigates the role of instrumental support in the relationship between grandparent co-residency and grandchild health. It finds no evidence of mediation by common grandparental supports, like caregiving, provision of housing and income.

Introduction

A consistent finding in health research has been that individuals are healthier when more embedded in positive social relationships. People recover more quickly from illness (Cohen and Janicki-Deverts 2009), live longer (Glanz, Rimer, and Viswanath 2008) and cope better with chronic disease (Cukor et al. 2007). Two of the more common mechanisms for explaining these relationships are social support and social control. Social support refers to the "positive, potentially health promoting or stress-buffering aspects of relationships," typically flowing through instrumental, emotional or informational channels (House, Landis, and Umberson 1988). Social control refers to attempts to limit the engagement of another in activities that may be harmful or risky to health (Umberson, Crosnoe, and Reczek 2010). The positive influence of both social support and social control on health has strong empirical support (Glanz et al. 2008).

An important consideration of social support and social control is proximity. Communicating, providing resources and enacting influence may be more cumbersome when individuals are distant. Efforts may also be less effective, as face-to-face contact is important for many kinds of social support and control (Wasserman and Galaskiewicz 1994). Consistent findings have led to the assumption that closer is better (Cherlin and Furstenberg 1986)(Denham and Smith 1989), however, it is unclear whether this principle applies to the most proximal of relationships—co-residential relationships. The proximity of co-residence, it seems, would facilitate—maybe even maximize—social support and social control. Yet sharing a common living space may also introduce unique dynamics that are corrosive to these resources and detrimental to health.

This study examines the impact of co-residence on health, focusing on an important subgroup of co-residential relationships. Three-generation households—the co-residence of one or more grandparents with adult children and grandchildren—have grown rapidly in the United States over the last thirty years (Kreider and Ellis 2011). In the last decade alone, their number has increased by over thirty percent. Today, nearly one in ten children reside in a three-generation household (Dunifon 2013)—but there may be as many as one in four when considering *young* children (Pilkauskas and Martinson 2014). Despite this growth, our understanding remains limited with regard to how this will affect health, particularly for the children raised in these circumstances. Traditionally, the connection between grandparent involvement and grandchild health has been weak or inconsistent (Sear and Mace 2008)(Coall and Hertwig 2010); but grandparental co-residency may change this. Sharing residence, grandparents may be an additional set of eyes in the home for monitoring grandchildren or a convenient, in-house reference for caregiving advice. Alternatively, highly dependent or fragile grandparents may divert parental resources away from children, resulting in worse health outcomes. In this paper, I examine the relationship between grandparent co-residence and grandchild health. My measure of grandchild health is an overall assessment of child health reported by mothers.

I argue that there are important correlations between grandparent co-residence and grandchild health that merit closer attention. Co-residence potentially facilitates a grandparent's provision of resources important for child health and well-being. However, whatever resources they provide, they are not closely linked to instrumental forms of support like childcare, housing or income. This finding encourages researchers

to pursue alternative pathways of grandparental influence and to be mindful of the risk of selection bias in this line of research.

Literature review

Families are social networks and there is agreement that networks matter for health. Researchers offer many explanations for this relationship. Berkman and Glass focus on social support, social influence, social engagement, and person-to-person contact on health outcomes (Berkman et al. 2000). Umberson and colleagues review the role of social support, social and personal control and the symbolic meanings behind relationships and health (Usmberson, Crosnoe, and Reczek 2010).

Grandparents, it has been shown, are frequent providers of many of these forms of support, involvement and influence. They teach their grandchildren life skills and offer them advice. They discipline their grandchildren in times of misbehavior or irresponsibility (Denham and Smith 1989)(Cherlin and Furstenberg 1986). For their own adult children, they offer help with childcare and financial support (Wandersman, Wandersman, and Kahn 1980)(Pilkauskas 2012). Grandparents are also important outlets of emotional support—a critical role given the formidable challenges of early parenthood (Silverstein and Ruiz 2006).

Despite these substantive contributions, there is little empirical support of any linkage between grandparents and grandchild health. Part of this may be due to the fact that so few have pursued this particular line of inquiry (Tinsley and Park 1984). Parents, not grandparents, are assigned primary child health responsibilities, so they have received the bulk of attention. However, the fact that few have published on this topic may be due to the possibility that no relationship exists. Other family members may simply "step-up" in the absence of a grandparent. Parents may take on even more responsibilities or hire outside help when grandparental care is not an option. If grandparents are substitutable in this way, then no statistical correlation between grandparents and grandchild health would be found. Whatever the reason, a review of the literature reveals little evidence of consistent associations.

The co-residence of a grandparent, however, has the potential of changing this, perhaps for the better or perhaps for the worst. One reason why co-residency may enhance the linkage between grandparents and grandchild health is proximity: being close by may facilitate the provision of resources, influence and support—some of the traditional pathways linking networks and health. In particular, grandparent co-residence may have especially strong consequences for social control and social support.

When health scholars discuss social control, they refer to the regulatory nature of social relationships. Having a grandparent in the household potentially enhances social control over grandchild health practices and behaviors. Co-residential grandparents may be additional role models in the household for inculcating positive health practices like washing hands with soap and hot water and covering one's mouth when sneezing. They may also help reinforce important health behaviors, like adequate bed rest and compliance with medication. Their presence in the household may also compel parents to follow through with discipline in an effort to correct unhealthy child behavior.

Co-residence may also facilitate higher levels of social support by grandparents, particularly instrumental forms like childcare and financial help. Living under the same roof may make it easier for parents to solicit help, oblige on grandparents and coordinate grandchild care. This may lead to fewer hours in day care centers, where children encounter cold and flu pathogens with greater facility. Extra care may provide families with the flexibility necessary for preventative care, like well-baby check-ups and vaccinations. Co-residence may also be important for financial transfers. Seeing each other everyday probably creates more opportunities to ask for assistance. Co-residential grandparents may also feel a stronger obligation to provide finances, especially when they see these resources going towards important health goods and services, like insurance premiums, physician fees and medicines.

Co-residence may also help with communication-related forms of social support, like emotional and informational support. Emotionally, grandparents are already important outlets for their adult children. Co-residence may help keep communication channels open and effective, easing the stress that has been linked to low birth weight complications (Barker 1994, Dombrowski et al 1992), illness (VanItallie 2002) and ineffective parenting (Botcheva and Feldman 2004). Improved communication may also help with informational support, as grandparents are able to impart their child rearing knowledge to their children and provide constructive feedback. This would be particularly important during times of crisis when proactive responses are key for preventing the escalation of health emergencies.

Of course, the co-residence of a grandparent could also be negligible or even harmful to child health. One possibility is "sandwiching", whereby primary caregivers are forced to divide their time and resources between children and aging, dependent grandparents (Bryson and Casper 1999). In these circumstances, children may not receive the level of care necessary for good health. Grandparent health care knowledge may also be outdated by the time they reach grandparenthood. There is also the possibility that co-resident parents and grandparents disagree strongly on parenting strategies or household routine. This could lead to a stressful home environment that is detrimental to health.

While it is true that co-residence, in some cases, may lead to inferior child health outcomes, these circumstances are somewhat rare. Grandparents today are younger, healthier and much more capable of contributing to the demanding work of caregiving (Bryson and Casper 1999)[1]. It is also unlikely that grandparent health knowledge becomes obsolete during their lifetime. Some health recommendations change, but core home practices and basic remedies have remained stable for decades. Finally, tensions with in-laws are only proverbial. Research shows that adults in three-generation households report generally positive relationships and parents are quite grateful for the support of older generations (Deleire and Kalil 2002)(Denham and Smith 1989).

Analyses of grandparent effects on grandchildren are rare, however, a few studies have tested relationships related to health. While none of these studies assesses general health outcomes, they do provide some guidance for establishing expectations. Tinsley and Park studied the interaction patterns of 51 co-residential grandparents playing with their seven-month-old grandchildren. Their analysis linked both grandmothers and

[1] As a precaution, diagnostics were conducted to assess the risk of sandwiching. Robustness checks supported the unlikelihood of this process.

grandfathers to the improved physical development of their grandchild[2]. Measurements were taken using the Bayley Scales of Infant Development (Tinsley and Park 1987).

Pope and colleagues examined the health trajectories of babies born with low birth weights (LBW). This is an important subset of children because LBW is a significant risk factor for a range of early childhood health problems. Co-residential grandparents may be especially important for these vulnerable children and, indeed, their study found this to be the case: a grandmother's co-residence was associated with better child health and development. The results were strongest for children whose mothers tested low on measures of verbal ability (Pope et al 1993).

DeLeire and Kalil (2002) studied the health behaviors of adolescents raised in different family structures. They found that teenagers raised in multigenerational households were associated with some of the lowest rates of cigarette and alcohol use. In fact, for children in these households with "never-married" mothers, their health behaviors were better than their peers living in married, two-parent families (Deleire and Kalil 2002).

In summary, my review of the literature revealed three empirical studies examining relationships between co-residential grandparents and grandchild health. Each of these studies offers mild support for a positive relationship; however, they each possess important limitations. The outcomes pursued in DeLeire and Kalil's study are more closely related to psychosocial development, not physical health per se. The other studies focus on particular subgroups (LBW babies and adolescents) and the findings in these studies may not generalize to all children. I conclude from this review that our knowledge of the relationship between grandparent co-residence and grandchild health is incomplete and that this shortcoming should be remedied.

Hypotheses

Based on a review of the research, I propose a set of hypotheses regarding the consequences of co-residency for family relationships and child health. First, co-residence potentially enhances or facilitates processes important for health outcomes, like social control and social support. With higher levels of involvement, supervision and communication, I reason that there will be health benefits for children raised in households with a co-resident grandparent.

Hypothesis 1: The presence of a grandparent in the household is positively associated with grandchild health.

Among many things, grandparents are women and men, and the gendered practices of the family are an important criteria to be factored in (Lye 1996). Women are more prevalent in "kin-keeping" (Furstenberg and Cherlin 1991) (Hagestad 1986) and typically have more experience and involvement in caregiving (Sayer, Gauthier, and Furstenberg 2004). This leads me to expect stronger relationships between the co-residence of a grandmother and the health of the grandchild. Following the logic above, I still anticipate

[2] By physical development, I assume the authors are referring to the development of motor skills, although this was not specified in their research.

an association between grandfather co-residence, but expect the relationship to be relatively weaker.

Hypothesis 2: The presence of a grandmother in the household is more positively associated with grandchild health than the presence of a grandfather.

The phrase "it takes a village to raise a child" is an elegant way to state that more childcare ties are better than fewer ties. To date, however, no research has offered strong empirical support for the concept that more is better. The one exception is research on the nuclear family, which consistently shows that children with two married parents fare better than children with one non-married parent (Astone and McLanahan 1991)(McLanahan and Sandefur 1997)(Dawson 1991). Co-resident grandparents, however, offer an interesting case. Grandparents, of course, are kin and this may generate ties of commitment and dedication similar to that of many nuclear families. Additional co-resident grandparents, then, may be tantamount to additional surrogate parents and we may expect grandchild health to respond positively to additional social supports. On the other hand, additional ties may introduce health risks or simply be redundant (Lamb 1979). I expect, however, that having two grandparents will be beneficial for child health. Prejudicial grandparental ties are not common and grandparent pairs are typically of opposite gender, potentially reducing role redundancy. This leads me to predict the following:

Hypothesis 3: Households containing both a co-resident grandmother and a co-resident grandfather are likely to have the strongest relationships with grandchild health.

In addition to testing basic associations between grandparental co-residence and grandchild health, this study also aims to clarify mechanisms driving this relationship. Of the many mechanisms theorized to link social networks to health, social support may have the strongest empirical backing. And of the many kinds of social support, instrumental forms are some of the most important (Smith and Christakis 2008)(Umberson et al. 2010). This makes an analysis of instrumental support an appropriate first step in this line of research. It is one of the more likely explanatory pathways. House originally conceptualized instrumental support as the tangible forms of help or resources for accomplishing tasks (House 1981). If instrumental support is important for the connection between grandparent co-residence and child health, then it will mediate that relationship, at least in part, when included in the model. Earlier work leads me to expect partial mediation.

Hypothesis 4: Instrumental support of co-resident grandparents mediates part of the relationship between co-residence and grandchild health.

Going one step forward, co-residential grandparents offer their families many kinds of tangible aid and it would be interesting to clarify which kinds of instrumental help are most important. Three instrumental supports that may be especially helpful for parents with young children are income, the provision of housing and childcare services. Grandparent income may help with medical costs (Thomson and McLanahan

2012)(Currie and Lin 2007) and the provision of housing usually results in safer environments (Taylor, Parker, Kim, and Wang 2010). If co-residence facilitates these resources, then they may account for some of the association between grandparent co-residence and grandchild health. Earlier work has shown instrumental supports to be important processes linking network ties and health outcomes. This leads me to expect partial mediation by each of these instrumental components.

Hypothesis 5: Income, provision of housing and childcare each mediate part of the relationship between grandparent co-residence and grandchild health.

Method

Data

This study utilizes the longitudinal data collected by the Fragile Families and Child Wellbeing Study. Between 1998 and 2000, researchers interviewed mothers and fathers of a birth cohort of babies born in 75 hospitals in 20 U.S. cities. Mothers and fathers were recruited for baseline interviews shortly after the birth and then pursued for follow-up interviews when the child was one, three, five and nine. Data collection on these children, now fifteen years old, and their families continues today. This study makes use of data supplied by the child's mother, as this information was the most complete and comprehensive. The moniker "Fragile Families" is owed to the study's oversampling on non-marital births, linked to many vulnerabilities.

There are many advantages to using Fragile Families for this research study. On account of the correlation between non-marital births and multigenerational families, Fragile Families consists of a relatively high number of three-generation families. This helps to statistically discern potential relationships in these households if they exist[3]. The fact that Fragile Families begins with a birth cohort is also important. The first years of life are some of the most precarious in terms of health and demanding in terms of childcare. If a relationship exists between grandparent co-residency and grandchild health, it may be most likely during this interval. Finally, family relationships happen over time and the longitudinal nature Fragile Families helps to factor in this time dimension.

Fragile Families recruited a sample of 4898 focal children and their families. Survey data for the first five waves of the study are currently available. For the purpose of my study, two of these waves, waves one and five, were not analyzed. This was due to the fact that there is no direct[4] measure of child health in wave one and, for wave five, mothers are not the ones who report child health status[5]. The analytic sample also excluded a small percentage of mothers (2.7%) who did not reside with their children.

Fragile Families response rates for waves two, three and four were 87%, 85% and 83%, respectively. Data missingness was also common on many of the covariates utilized in this study. I employed listwise deletion to remove all person-waves missing information. This eliminated 65% of the person-waves. Waves two, three and four

[3] Studies using datasets without oversampling have reported inferential limitations on account of the sparseness of this family type (Deleire and Kalil 2002).
[4] Fragile Families does have measures on the mother's health behaviors during pregnancy.
[5] The child, him or herself, reports health status.

consisted of 2116, 1978 and 862 complete cases in the analytic sample (corresponding to rates of 44.1%, 41.4% and 18.3%[6]). Future work should consider more robust methods like maximum likelihood or multiple imputation (Allison 2001). Before excluding person-waves with missing information, 94% of respondents contributed some information to the dataset. This partial information would lower the risk of attrition-related bias.

Measures

Dependent Variable. The child's mother reported child health status at each survey wave. In each wave of the analytic sample, she was asked: *"Now, I'd like to ask you some questions about (CHILD'S) health and development and how (he/she) is doing. In general, would you say (CHILD'S) health is . . . excellent, very good, good, fair or poor?"* A response of "excellent" was coded as "5" and "poor health" was issued a "1." Higher values, then, indicated that the child was in better health. This variable was scaled as continuous, despite its categorical nature. This allowed for a more simple linear regression in the analysis. Child health was consistently reported in the full Fragile Families sample (86.3%).

Research by Miller gives us confidence in a mother's ability to accurately report her child's health (Miller 2000). Comparing official medical records and mother reports, Miller found mothers to be "moderately" capable of accurately reporting child asthma[7]. Ambiguity still exists, however, in how Fragile Families mothers interpreted the health question in the previous paragraph. I have adopted the perspective that this measure likely captures chronic childhood conditions and high frequencies of colds, flus or ear infections. Accidents threatening child health, like broken limbs, cuts or scrapes, are less clearly linked to general health and probably do not factor into this measure.

Independent Variables. Grandparent co-residency was also determined from mother-reported data. At each survey wave, mothers were asked who resides in their household and what the relationship of each individual was to the family (e.g. father, niece, grandmother, etc.). This provided a clear measurement of whether a grandparent resided in the same household as the mother and grandchild. It was also informative of grandparent gender and the number of grandparents in the home. These dimensions were coded into factors and statistically tested in the analysis.

For the mediation component, this study examined whether grandparent-provided instrumental support—like income, provision of housing and grandparent childcare—explain any of the association between grandparent co-residence and grandchild health. Again, mothers provided information related to each of these dimensions at each time point. The measure of income is the overall household income and not grandparent income per se. However, the correlation between these two items allows for some measurement of this dimension. Measurements on housing and childcare were more direct. For housing, mothers reported whether they lived in the home provided by a

[6] Wave four has a drop in the number of complete cases. This drop was caused by the fact that wave four has considerably more missing information on one variable—provision of housing. Patterns of missingness on other covariates were similar across waves.

[7] The concordance between the mother's report and medical records had a kappa value of 0.48.

family member. For mothers in this situation who also reported the co-residence of a grandparent, it was reasoned that this housing was grandparent-provided. Given the unlikelihood that both mother and grandparents co-reside in a home provided by a third family member, this seems like a reasonable assumption. For grandparent childcare, mothers reported whether grandparents[8] were one of the family's "care arrangements." "Care arrangement" seems to suggest regularity in the provision of childcare, not just in times of emergency.

Covariates. One way this study deals with selection is through statistical conditioning. A review of the literature identified the covariates likely to confound the relationship between grandparent co-residence and child health. Some of these confounders are household characteristics. The number of children in a home is one example. Research has shown there to be a correlation between sibship size and the rate of child respiratory illness (Bernsen, de Jongste, and van der Wouden 2003). Potentially, grandparents may be more likely to co-reside when there are more children to take care of, so this is a potential bias that needs to be parsed out of estimates. A father's presence in the household and whether parents are married is another potential household confounder controlled for in the model (Dawson 1991). There are also important demographic and background characteristics that threaten to bias inferences. Mother's race (Kana'iaupuni et al. 2005), mother's education (Kimbro et al. 2008), mother's age at birth (McLanahan and Sandefur 1997), and whether the child is male or female were all included in the models. I also controlled for whether the child was covered by a private health insurance policy, given its relationship to health behavior and practices. Time-invariant covariates were taken from baseline surveys.

Analytic Approach

The goal of this analysis was to test hypotheses and produce estimates of the correlation between grandparent co-residence and grandchild health, net of confounding. My strategy included the use of two different regression frameworks: random effects and fixed effects. These frameworks differ in how they measure variation in the data, resulting in different, yet complementary, findings. The random effects models estimate the relationship between grandparent co-residence and child health utilizing both between-individual and within-subject variation. The fixed effects models focus only on the variation of children who experienced both circumstances during the study, residing with a co-resident grandparent at one time and without one at another. Fixed effects analysis controls for time-invariant characteristics of subjects by focusing only on within subject variation (Allison 2009).

The first analysis I conducted was to produce a table of descriptive statistics of variables of interest in the Fragile Families dataset. Next, I employed a series of statistical models to establish baseline correlations and test each of the five research hypotheses. At each step in this series, both a random effects model and as a fixed

[8] Specifically, mothers report whether the "child's maternal grandparent" or "child's paternal grandparent" are a care arrangement. The responses to these two questions were coded into a single indicator "grandparent care" in the analysis.

effects model were run[9]. The first set of models established baseline correlations. Next, observed background and demographic characteristics were included in Model 1 to control for confounding. Model 1 tests hypothesis one, whether having *any* co-resident grandparent (grandmother or grandfather) is associated with child health. Model 2 disaggregates "any grandparent" into its gendered dimensions, grandmother and grandfather. This tests hypothesis two, whether grandparent gender is important with respect to grandchild health. Model 3 introduces a factor variable (no grandparents, only a grandfather, only a grandmother and both a grandfather and grandmother), allowing for an examination of hypothesis three, whether different kinds of grandparent households are important.

For the final two models, I conducted mediation analyses to test pathways associated with instrumental support. The strategy here was to add potential mediators to Model 3 and then observe changes in the coefficient associated with grandparent co-residence. A change in statistical significance would suggest that the mediators account for some of the relationship. A coefficient that remains significant would suggest that additional pathways merit further exploration. Model 4 tests whether instrumental support, as a general category, accounts for the relationship between grandparent co-residence and grandchild health (hypothesis four). Model 5 disaggregates this instrumental support into its sub-components of income, provision of housing and childcare, testing each separately. For more information on mediation analysis see Imai, Keele, and Tingley (2010).

In sum, these models are an attempt to isolate the association between grandparent co-residence and grandchild health. The large number of covariates in the Fragile Families dataset helps in this endeavor. It makes it possible to statistically condition on characteristics confounding this association. Nonetheless, like all regression techniques, proper estimates are still subject to omitted variable bias. One particular risk of omitted variable bias relates to characteristics associated with the co-residential selection process. Families choosing to live together (or not live together) may have special characteristics not captured by the Fragile Families instrument.

Results

[Insert Table 1]

Descriptive statistics. Table 1 shows the unweighted distribution of household arrangements in the Fragile Families sample. Across all waves of the analytic sample, grandparents co-resided with their children and grandchildren about 16% of the time. In nationally representative samples, this figure is closer to 10%[10] (Arafeh 2010). Table 1 reports descriptive summaries based on four household structures related to this study: no grandparents in the household, only grandmother, only grandfather and both grandmother and grandfather. All household arrangements contained comparable numbers of children. The data show that teenage pregnancy significantly increased the odds of co-residing with grandparents. The non-residence of the child's father did so as well. Parent-child

[9] The fixed effects model had the same covariates, with the exception of the time-constant characteristics it already controls for.

[10] This is the author's own calculation based on figures presented in (Arafeh 2010).

dyads who did not live with grandparents were disproportionately likely to have health insurance.

One important pattern to recognize in these descriptive statistics is the relative disadvantage of "grandmother-only" households. To clarify, these are households consisting of a grandmother, their adult child and their grandchildren. Of all household types, grandmother-only households have the lowest incomes, a full 20% lower than the median income in this fragile sample. This does not seem intuitive, as co-residential grandmothers could potentially earn a salary or at least bring in social security assistance. This paradox is likely suggestive of important selection processes driving co-residence and is something to be seriously considered. The mothers in these households are also disadvantaged in terms of education and marriage rates. They are also disproportionately African American. The concentration of disadvantage in this subset is important and merits closer attention in future research.

With regard to health, children in the Fragile Families study look similar to national averages. Nearly 88% of mothers reported children in "excellent" or "very good" health. The Center for Disease Control reports similar statistics based on nationally representative data (85%) (CDC 2012). At first glance, then, three-generation households have no disadvantage with regard to child health. This is also true for the disadvantaged "grandmother-only" households discussed in the previous paragraph. The fact that these households are comparable to other households types in terms of health suggests a protective effect of grandmothers in these otherwise vulnerable households.

[Insert Table 2]

Table 2 summarizes the over-time changes in grandparent co-residence. As tabulated, it refers only to households with "any grandparent"—that is, any grandmother or grandfather. Between times one and two, grandparents move out (105 cases) more often than they move in (59 cases), thereby reducing the number of multigenerational households in the study. This pattern is repeated from time two to time three. Forty-six households transitioned to residential status without grandparents. Thirty-five households became three-generation households with young children. Eleven percent of families experienced a change in household structure between times one and two. Sixteen percent experienced a change between times two and three. This follows the pattern documented in (Pilkauskas 2012): three-generation households are most prevalent during the early years of a child's life and gradually decrease over time.

[Insert Table 3]

Multivariate Analyses. The results of the random effects models are reported in Table 3. The baseline model reports the bivariate relationship between the co-residence of any grandparent and grandchild health. This is a naive model that does not control for any confounding factors. There is no statistically significant relationship between the co-residence of a grandparent and grandchild health. Model 1 introduces background and demographic covariates to control for confounders of the bivariate relationship. Net of these controls, the co-residence of a grandparent is positively associated with grandchild

health. Children living with a grandparent are predicted to be .07 points higher on the parent-reported health scale.

Model 2 disaggregates grandparent into its gendered dimensions, grandmother and grandfather. In doing so, however, the positive association present in Model 2 disappears. This is probably due to the inflation of standard errors[11] that occurred when disaggregating the variable. Model 3 tests whether statistical differences exist between different kinds of grandparent households: only-grandmother, only-grandfather, both a grandmother and a grandfather, and the reference category of no grandparents. Two-grandparent households were predicted to be .11 points higher in child health (on the 5-point scale of child health), compared to the reference category of no co-resident grandparents.

Finally, the last random effects models test whether forms of instrumental support mediate the relationship between two-grandparent households and child health. Model 4 tests the general linear hypothesis that all measures of instrumental support equal zero. The coefficient on the instrumental support predictor suggests that instrumental support of grandparents is not related to grandchild health. Additionally, the stability of coefficients associated with grandparent residence when instrumental support is added to the model suggests that instrumental support is not the pathway through which co-residence is linked to health.

Model 5 tests whether any of the disaggregated subcomponents of instrumental support mediate the relationship between grandparent co-residence and child health. Neither grandparent childcare nor provision of housing have main effects on child health and this suggests that these variables are not responsible for the relationship. Household income, on the other hand, does have a main effect (.04). However, mediation requires that several criteria are met. To mediate, a covariate must have a significant correlation with both the outcome variable and the main explanatory variable. Household income does not have a significant correlation with the main explanatory variable, grandparent co-residence, and this suggests that it is not an important mediator of the relationship (Baron and Kenny 1986). Furthermore, the coefficient of .04 is not large.

[Insert Table 4]

The results of the fixed effects models are reported in Table 4. The progression of models is the same as for the random effects models. The baseline model reports the simple bivariate relationship between any grandparent's co-residence and child health. Model 1b introduces the covariates shown to confound the bivariate relationship. With or without controls, there are no perceivable differences in child health between the times when the child lived with a grandparent and the times when he or she did not.

Model 2b disaggregates grandparent co-residence into its gendered dimensions, grandmother and grandfather. In both instances, a child's health is not predicted to be different between the times when he or she co-resided with a grandmother (or grandfather) and when he or she did not. Model 3b introduces a factor for testing different grandparental housing arrangements (no grandparents, only-grandmother, only-

[11] Standard errors increase by 63% for the grandfather disaggregation and 20% for the grandmother disaggregation.

grandfather, and both grandparents) for children who changed status on this variable during the course of the study. This model provides evidence that children have better health (an increase of 0.26 on the 5 point health scale) when living with their grandfather, compared to times when they did not co-reside with their grandfather.

The final two models test whether this association with grandfather co-residence is mediated by the grandfather's instrumental support. Instrumental support was not found to be an important mechanism explaining this relationship (Model 4b). This was also true when disaggregating instrumental support into its sub-components of income, provision of housing and childcare (Model 5b).

Discussion

Research has consistently shown that social ties influence the health status of individuals enmeshed in such networks. Since the 1970s, investigators have marshaled empirical support for mechanisms driving this relationship, including the role of social control and social support. Despite being consistently linked to these kinds of supports, very little research has empirically demonstrated any connection between grandparents and grandchild health. Of those who have, they have focused on outcomes tangentially related to health or restricted their analyses to unique subgroups. In this study, co-residence of a grandparent was theorized to facilitate or enhance the pathways of social control and social support, and therefore generate stronger and more consistent relationships with grandchild health. Using longitudinal data from Fragile Families, this study tested whether indeed this theorized relationship has empirical support. I presented evidence that, in fact, there is a positive association. These associations, however, do not seem to be driven by increased levels of instrumental support like income, housing or childcare.

One of the central findings of this study resulted from basic descriptive statistics of grandparent households. This study found that households with a grandmother but no grandfather were especially likely to have disadvantageous circumstances. These households were the least likely to have parents who were married or a co-resident father. They had the lowest median incomes, education levels and health insurance rates. These households had the highest sibship size and were disproportionately African American and with mothers who were teenagers at the time of their child's birth. On every dimension, children in three-generation, grandmother-headed households were at a disadvantage and one might expect the unfavorable child health outcomes traditionally linked to these characteristics. Strikingly, however, children in these households were just as healthy as children in other household types.

Potentially, the fact that these children were equally healthy is due to the fact that younger, teenage mothers are less capable of accurately reporting the health of their children. Perhaps their lack of life experience or youthful optimism clouds a veritable assessment. However, no empirical work exists supporting the likelihood of this kind of bias. Another perspective may be that child health is largely independent of household conditions and therefore household circumstances do not matter. It is true that children are quite resilient, but nearly ten percent of children have chronic conditions that we know can be attenuated by household factors like caregiving, medical resources and caregiver supervision. For this reason, it is difficult to dismiss the potential impact household circumstances may make. A third possibility is that grandmothers in these

households have something of a protective effect on their grandchildren; one that helps overcome otherwise disadvantageous household circumstances. This line of research merits further investigation.

Earlier research has shown that proximity matters with respect to grandparent involvement (Cherlin and Furstenberg 1986) (Hagestad 1986). However, few have examined whether co-residence leads to increases in grandparent involvement and desirable health outcomes. This study provides evidence that, indeed, the "proximity trend" continues as proximal grandparents crossover into co-residential status. The random effects models also present evidence of an association between two-grandparent families and grandchild health. Earlier work has demonstrated the advantages of children who have both a mother and father at home (Astone and McLanahan 1991)(McLanahan and Sandefur 1997). However, few have considered whether the childcare supports and services of additional household adults may be beneficial for child health. This study supports the position that additional household adults are associated with advantages; however, only grandparents were tested—probably the adults most likely to matter outside of the child's parents. The finding that "more adults matter" may not hold when considering other kinds of adult co-residents like cousins, siblings or friends.

In consideration of these findings, it is important to be mindful of several caveats and limitations. First, these are associations and they do not imply causation between variables of interest. This is particularly important when interpreting results from the fixed effects models (which defied conventional understanding of how gender relates to care work). "Grandfather-only" households may be associated with higher levels of child health, but this could simply be an artifact of the selection process. As an example, a mother may only choose to co-reside in a grandfather-only household when her child is in good health. Given the gendered nature of caregiving, she may expect little caregiving support from her father and may move in with her mother instead. If true, the selection process just outlined would inflate the positive-health characteristics of "only-grandfather" households and deflate associations with grandmother co-residence. Indeed, the coefficient associated with "grandfather-only" households is very large (.26)—more than three times the size of the coefficient associated with the parental marital status variable. It is just not plausible that co-residential grandfathers exert this kind of effect on grandchild health. So selection bias probably plays some kind of role in these relationships. This may have a particular negative bias for children living in "grandmother-only" households—households that "started" with substantial disadvantages early on.

Second, the decision to use listwise deletion was an important one. By eliminating cases that were missing information, the analysis may have been conducted on individuals with unique characteristics. For example, the mothers most likely to report may be from some of the sample's most stable households, where respondents can more easily be found for follow-up interviews and who may have the time to participate in a lengthy interview. Such non-response has the potential of inflating the stability of the analytic sample and may bias inferences meant to apply to the sample overall. Future work should employ methods like multiple imputation or maximum likelihood in order to limit the effects of attrition.

Third, Fragile Families are overrepresented by non-marital births and one should be mindful of the fact that inferences tied to this study may not be generalizable to

broader swathes of the population. Co-residential grandparents in middle-class, two-parent families, for example, may mean different things and they may have different functions or roles in these households. Future work may want to consider using nationally representative data to model these relationships.

In the interest of identifying the mechanisms responsible for these associations, this study tested whether relationships were mediated by instrumental support. Instrumental support has been shown to be one of the more important ways social networks improve health (Smith and Christakis 2008). In the mediation analysis of this study, however, instrumental support failed to account for any of the relationship between grandparent co-residence and grandchild health. This was also true for sub-components of instrumental support like income, provision of housing and childcare. This study is unable to offer any evidence that instrumental support is responsible for any of the association between grandparent co-residence and grandchild health.

This finding is surprising, given that instrumental support has so consistently linked networks to health in the past. An implication is that some other mechanism "explains" this association. Social control, theorized to be important in this paper, was not explicitly tested in this study and may be one candidate for further investigation. The literature also identifies other mechanisms that may be important, like social engagement or person-to-person contact (Berkman et al. 2000). Finally, the fact that instrumental support does not explain this relationship may also suggest biases attributable to the selection process. Scholars in this line of work are encouraged to seek out datasets that may be able to better deal with the potentially important role of selection in this research question. Qualitative research in particular may provide important evidence for answering questions related to selection.

In conclusion, this study estimated the relationship between grandparent co-residence and grandchild health, finding there to be a positive association. This association was not explained by instrumental support, however, so the mechanism linking grandparent co-residence and grandchild health is an important question for future research.

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Appendix

Table 1: Unweighted Descriptive Statistics of Fragile Families

Characteristic	Across All Children	Family Structure Type: No Grandparents in household	Only Grandmother in household	Only Grandfather in household	Both a Grandmother and Grandfather
Percent of Children (across waves)		84.1%	9.7%	1.2%	4.9%
Have a resident father (biological or social)	74.6%	77.8%	50.9%	63.3%	60.4%
Married parents	32.5%	35.9%	12.9%	29.4%	19.9%
Median household income	$24,000	$24,000	$20,000	$25,289	$32,000
Mother's highest education					
some college	35.0%	37.2%	26.4%	33.8%	32.5%
high school degree	30.3%	20.4%	30.4%	33.8%	35.4%
< high school degree	34.7%	32.4%	43.1%	32.5%	32.1%
Mean number of adults	2.1	1.9	2.8	2.9	3.8
Mean number of children	2.4	2.4	2.5	2.3	2.4
Mother's race					
Black	49.7%	50.0%	60.9%	38.4%	33.3%
White	30.8%	32.2%	21.0%	34.6%	34.4%
Other	19.5%	17.8%	18.1%	27.0%	32.3%
Teenage mother at time of child's birth	9.2%	7.7%	17.7%	12.5%	17.4%
Percent of children with health insurance	60.2%	62.5%	47.5%	50.0%	49.6%
Child Health					
Excellent	63.1%	63.3%	61.8%	61.4%	64.8%
Very Good	24.5%	24.3%	25.1%	26.1%	24.8%
Good	10.0%	10.0%	10.3%	9.8%	9.1%
Fair	2.2%	2.3%	2.5%	2.6%	1.3%
Poor	0.002%	0.002%	0.002%	0.000%	0.000%

Table 2: Change in Grandparent Residence Status between Waves

n=1433		Time 2: Grandparent in HH	Time 2: Grandparent not in HH
Time 1	Grandparent Present in Household	95	105
	No Grandparent Present in Household	59	1174

n=516		Time 3: Grandparent in HH	Time 3: Grandparent not in HH
Time 2	Grandparent Present in Household	16	46
	No Grandparent Present in Household	35	419

Table 3: Random Effects Models

	Random Effects					
	Baseline	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	4.54 **	4.52 **	4.52 **	4.52 **	4.18 **	4.18 **
Time 2	-0.03	-0.03 *	-0.04 *	-0.04 *	-0.04 *	-0.04 *
Time 3	-0.06 *	-0.06 *	-0.06 *	-0.06 *	-0.07 **	-0.07 **
Household Structure						
A grandparent (grandmother or grandfather) is coresident	0.03	0.07 *				
Grandfather is coresident			0.06			
Grandmother is coresident			0.04			
Grandparent factor (reference = no coresident grandparent)						
Only grandfather coresident				0.06	0.05	0.05
Only grandmother coresident				0.04	0.04	0.04
Both grandmother and grandfather coresident				0.11 *	0.1 *	0.1 *
Biological father is coresident		-0.04	-0.04	-0.04	-0.5	-0.5
Total number of children		-0.02 *	-0.02 *	-0.02 *	-0.2 *	-0.2 *
Parents are married		0.03	0.03	0.03	0.02	0.02
Demographic/background characteristics						
Mother's Race (reference = White)						
Black		-0.05	-0.05	-0.05	-0.04	-0.04
Other		-0.16 **	-0.17 **	-0.17 **	-0.16 **	-0.16 **
Mother's Education		0.16 **	0.16 **	0.16 **	0.14 **	0.14 **
Mother was a teenager at birth of child		0.11 *	0.11 *	0.11 *	0.12 *	0.12 *
Child is a girl		0.08 **	0.08 **	0.08 **	0.08 **	0.08 **
Child is covered with private health insurance		0.1 **	0.1 **	0.1 **	0.08 **	0.08 **
Instrumental support					0.02	
Household Income						0.04 **
Grandparent provides housing						0
Grandparent provides childcare						-0.02

* p < .05. ** p < .01.

Table 4: Fixed Effects Models

	Fixed Effects					
	Baseline	Model 1b	Model 2b	Model 3b	Model 4b	Model 5b
Time 2	-0.05 **	-0.06 **	-0.06 **	-0.06 **	-0.06 **	-0.06 **
Time 3	-0.07 *	-0.09 **	-0.09 **	-0.09 **	-0.09 **	-0.09 **
Household Structure						
A grandparent (grandmother or grandfather) is coresident	0.07	0.07				
Grandfather is coresident			0.14			
Grandmother is coresident			-0.01			
Grandparent factor (reference = no coresident grandparent)						
Only grandfather coresident				0.26 *	0.27 *	0.27 *
Only grandmother coresident				0.02	0.02	0.02
Both grandmother and grandfather coresident				0.09	0.1	0.1
Biological father is coresident		-0.05	-0.06	-0.06	-0.06	-0.06
Total number of children		0	0	0	0	0
Parents are married		0.08	0.08	0.08	0.08	0.08
Background characteristics						
Child is covered with private health insurance		-0.01	-0.01	-0.01	-0.01	-0.01
Instrumental support					-0.6	
Household Income						0
Grandparent provides housing						-0.04
Grandparent provides childcare						-0.02

Only cases that experience a change in grandparent coresidence between years 1 and 3 contribute to the estimate

* p < .05. ** p < .01.