

## ABSTRACT

Title of Document: INTERGENERATIONAL SUPPORT AND WELL-BEING OF OLDER ADULTS IN CHANGING FAMILY CONTEXTS

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This dissertation consists of three papers that examine the complexities in upward intergenerational support and adult children's influence on older adults' health in changing family contexts of America and China. The prevalence of "gray divorce/repartnering" in later life after age 55 is on the rise in the United States, yet little is known about its effect on intergenerational support. The first paper uses the life course perspective to examine whether gray divorce and repartnering affect support from biological and stepchildren differently than early divorce and repartnering, and how patterns differ by parents' gender. Massive internal migration in China has led to increased geographic distance between adult children and aging parents, which may have consequences for old age support received by parents. This topic has yet to be thoroughly explored in China, as most studies of intergenerational support to older parents have focused on the role of coresident children or have not considered the interdependence of

multiple parent-child dyads in the family. The second paper adopts the within-family differences approach to assess the influence of non-coresident children's relative living proximity to parents compared to that of their siblings on their provision of support to parents in rural and urban Chinese families. The study also examines how patterns of the impact are moderated by parents' living arrangement, non-coresident children's gender, and parents' provision of support to children. Taking a multigenerational network perspective, the third paper questions if and how adult children's socioeconomic status (SES) influences older parents' health in China. It further examines whether health benefits brought by adult children's socioeconomic attainment are larger for older adults with lower SES and whether one of the mechanisms through which adult children's SES affects older parents' health is by changing their health behaviors. These questions are highly relevant in contemporary China, where adult children have experienced substantial gains in SES and play a central role in old age support for parents. In sum, these three papers take the life course, the within-family differences, and the multigenerational network perspective to address the complexities in intergenerational support and older adults' health in diverse family contexts.

INTERGENERATIONAL SUPPORT AND WELL-BEING OF OLDER ADULTS IN  
CHANGING FAMILY CONTEXTS

by

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## Introduction

Intergenerational relationships between parents and adult children have always been central to old age support and have become increasingly important as the world population is aging at an unprecedented speed. At the same time, intergenerational ties have also become more complex in many countries around the world. Among the U.S. older adults, the proportion of those who have experienced divorce and repartnering has substantially increased in recent decades (Brown and Lin 2012; Manning and Brown 2011). The baby boomers generation has a particular higher level of marital instability than their predecessors. As a consequence of multiple marital transitions, older adults' intergenerational relationship with adult children could become complex, often involving both biological and step parent-child ties. These ties are formed or disrupted, strengthened or weakened along with the occurrence and the timing of parental divorce and repartnering. Intergenerational support in these ties, therefore, could be harder to predict. Thus, older adults with diverse marriage history are aging in families with ambiguous boundaries, facing more uncertainty with regard to from whom to expect support and care in old age (Seltzer and Bianchi 2013). Given such changes in the demographic and family contexts for intergenerational support to older adults, it is substantively important to know how old age support from adult children is affected by older parents' marriage history. Further, do certain marital transitions put older mothers and fathers in particularly disadvantaged positions to receive support from biological and stepchildren?

In China, rapid economic development and massive internal migration lead to increased physical distance between parents and adult children. Meanwhile, migration, as well as other means of economic gains, facilitates a great deal of intergenerational social mobility in contemporary China, possibly enabling children to provide better support to their parents than ever before. When parents have multiple children, dyads between the parent and each child are interdependent and comprise a network of intergenerational relationships (Matthews 2002). Provision of support to parents should not be viewed as independent behavior of each child, but rather incorporates cooperation and coordination among sibling children. The strong tradition of familism and sibling solidarity embedded in Chinese families may enhance sibling influence on elderly support, make the Chinese family an ideal setting for studying within-family dynamics of elderly support. Given the massive trend of internal migration in China over the last several decades, the geographic dispersion of non-coresident adult children varies to a larger extent for recent aging cohorts. Children's geographic proximity to parents provides the opportunity structure for assistance in housework, caregiving, and emotional support. Such support in general requires close proximity or frequent travel, thus children living farther from parents are hindered from providing it. However, farther living distance from parents is often associated with a child's migrant status and greater ability to provide economic support. In view of their different availability in various dimensions of support, sibling children living at different distance to older parents may cooperate and coordinate in elderly support. Therefore, the relativity of a child's own and his/her siblings' living proximity is a proper starting point to investigate within-family dynamics in intergenerational support to older parents in Chinese families.

The cultural norm of filial piety persistently plays a central role in motivating adult children to support aging parents in Chinese families. The substantial upward intergenerational social mobility brought by China's rapid economic and social development to its younger generations enable many adult children to mobilize their economic and social resources to better support older parents. Meanwhile, healthcare resources become more stratified than before. The dysfunction of the public health care system and the increasing costs of privatized medical and hospital services make it difficult for many older adults to cover high inpatient and outpatient expenses by pension and health insurance. Therefore, whether adult children can financially support older parents to receive better health care may have an impact on older parents' health. In addition, health-related knowledge and information could be diffused from highly educated adult children to aging parents, facilitating them to follow the instructions of healthcare providers and to change health risk behaviors. These scenarios together suggest that the multigenerational social determinants of health could be an upward impact from adult children to aging parents. Through multiple pathways, adult children's socioeconomic achievement could be transmitted upwardly to health benefits of older parents. Besides, socioeconomic inequalities in health persist among Chinese older adults (Luo, Zhang, and Gu 2015; Zhu and Xie 2007) and socioeconomic disparities in access to healthcare resources is found in the general population (Luo and Tong 2016). This propels the current study to ask whether the upward intergenerational transmission of SES benefits for health could play a role on narrowing the health gap between older adults of different SES.

In short, the changing demographic, social, and family contexts for intergenerational relationship require a deeper understanding of the new complexities in intergenerational support from adult children to older parents. Recognizing that lives of generations are linked and interdependent, and intergenerational dyads within the family are also correlated, research on intergenerational support and its implication for older adults' health needs to be advanced by adding new perspectives to traditional theories and approaches. Based upon the theory of intergenerational and sibling solidarity and the life course theory, this dissertation adopts the network perspective to address within-family differences in support and the multigenerational perspective to assess influences between generations. This dissertation studies the changing nature of intergenerational support and its impact on older adults' health that have not been fully evaluated in contemporary American and Chinese society. Specifically, it asks in the U.S., does gray divorce or repartnering (divorce or repartner after age 55) affect elderly support from biological and stepchildren differently compared to such events happened at an earlier life stage? How do the patterns differ for older mothers and fathers? In China, how does non-coresident children's relative living proximity to older parents in comparison with that of their siblings influence support to parents? Is the impact different between rural and urban parent-noncoresident child dyads? How is the effect being moderated by parents' living arrangement, children's gender, and parents' support to children? Furthermore, to what extent does adult children's socioeconomic status (SES) influence older parents' health in China? Does adult children's SES attainment bring larger health benefits to older adults of lower SES? Whether one of the mechanisms through which children's SES attainment improves parental health is by changing their health behaviors?

The first paper uses data from the Health and Retirement Study (HRS, 1998-2012). HRS is a nationally representative longitudinal survey of older adults aged 50 and over in the United States. This longitudinal data provides information on different dimensions of intergenerational support from each of the biological and stepchild to older adults over time. It also documents a complete marriage history of respondents, including the timing of divorce and repartnering. Data for the second and third paper comes from the China Health and Retirement Longitudinal Study (CHARLS, 2011, 2013). CHARLS is an ongoing biennial longitudinal survey based on a nationally representative sample of Chinese residents at age 45 and over in China. CHARLS has a detailed survey section on older adults' health. It also asks older adults to report characteristics of each of their children (i.e. SES, living distance), as well as information on a full range of intergenerational support and exchange between them and each non-coresident children. The HRS and CHARLS data are widely considered to be among the highest quality longitudinal data for older population in the United States and China. They provide unique opportunities to answer questions raised by this dissertation.

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## **Chapter One**

### **Intergenerational Support in the Context of Diverse Marriage History in Later Life**

#### **Abstract**

In recent decades, the proportion of older adults having experienced divorce and repartnering either in earlier or later life stages has substantially increased in the U. S. This study examines the influence of older parents' marriage history on various types of support they receive from biological and stepchildren. The study conducts random-effects analysis on longitudinal parent-child dyad data from the Health and Retirement Study (1998-2010). The study finds that stepchildren are less likely to provide support than biological children. Gray divorce (divorce after age 55) decreases the likelihood of receiving informal caregiving from biological children to a larger extent than early divorce. Gray repartnering (repartner after age 55) also diminishes the likelihood of receiving informal caregiving from stepchildren to a larger extent than early repartnering, but lessens contact with stepchildren by a smaller extent than early repartnering. Patterns are further moderated by parents' gender. Divorce, especially that happened in earlier life stages, is more likely to put fathers in a disadvantaged position than mothers in receiving support from biological children. However, repartnering, especially an early one, provides fathers a better position than mothers to receive various types of support from stepchildren.

Although divorce rate in the U.S. has been on the decline, the proportion of those having experienced divorce and repartnering has substantially increased among older adults in recent decades (Brown and Lin 2012; Manning and Brown 2011). Census data (U.S. Census Bureau 2008-2012, 2009) shows that among people aged 60 and over, 29 percent of them had ever divorced and 28 percent of them had been married two or more times. Within various marriage transitions among older adults, researchers have found a rising trend of gray divorce (divorce after age 55). The divorce rate among adults aged 50 and older rapidly increased from 4.87 in 1990 to 10.05 in 2010 (Brown and Lin 2012). There are multiple forms of repartnering for divorced or widowed adults in later life, including remarriage, unmarried cohabitation, and living apart together. The cohabiting population among older adults had doubled from 2000 (1.2 million people) to 2010 (2.75 million people) (Brown, Bulanda, and Lee 2012). The baby boomer generation has a particularly higher level of marital instability than their predecessors. As they enter in old age, their relationship with adult children (both biological and stepchildren) becomes more complex as a consequence of marriage transitions. The ambiguity in the boundary of family thus brings more uncertainty with regard to from whom to expect support and care in old age (Seltzer and Bianchi 2013).

Existing studies have documented that older adults who have ever experienced divorce or repartnering receive less intergenerational support from children than those in intact marriages (Cooney and Uhlenberg 1990; De Jong Gierveld and Peeters 2003; Eggebeen 1992; Kalmijn 2007; Lin 2008; Pezzin and Schone 1999). However, little is known about its effect on intergenerational support if divorce or repartnering happens in



old age, which is on the rise in recent years (Brown, Bulanda, and Lee 2005; Cooney 1993; Schoen and Standish 2001). For example, divorce at an earlier life stage may lead to distant relationship between parents and biological children, which could translate into a lower level of support from biological children in old age. In contrast, gray divorce may not have such an influence on intergenerational support from biological children because of a strongly developed relationship in earlier life. In addition, repartnering in an earlier time point in life means that stepparents and stepchildren may have opportunities to foster their relations long before stepparents have any need for support, which increases the possibility of receiving support from stepchildren in old age. However, gray repartnering (repartner after age 55) leaves both stepparents and stepchildren a short period to develop a relationship, while the stepparents' health may begin to deteriorate, thus the level of support provided by stepchildren could be low.

This study examines the implications of increasing complexity of older adults' marriage experiences for receiving intergenerational support. It goes beyond the existing literature in that it not only distinguishes the provision of support from biological children and stepchildren, but also takes into account the timing of divorce and repartnering. It pays particular attention to the effect of divorce and repartnering in later life, a phenomenon deemed as "the gray divorce revolution", due to its rapid increase in prevalence in recent decades (Brown and Lin 2012). The study posits that gray divorce and repartnering of older parents affect support from biological and stepchildren differently than when such events happen in an earlier life stage. The study also models how parents' gender moderates the effect of marriage history on received intergenerational support from biological and stepchildren. This study uses data from the

Health and Retirement Study (1998-2010), a longitudinal survey that includes information on different dimensions of intergenerational support from each of the biological and stepchild to older adults over time. The data also provides a complete marriage history of respondents, including the timing of divorce and repartnering.

## Literature Review

Existing studies have suggested that having the experience of divorce and repartnering significantly reduces the level of contact frequency, financial support and informal caregiving that parents receive from adult children in old age, and this negative effect is particularly salient for older fathers (Cooney and Uhlenberg 1990; De Jong Gierveld and Peeters 2003; Eggebeen 1992; Kalmijn 2007; Lin 2008; Pezzin and Schone 1999). A few studies have differentiated the support provided by biological children and stepchildren for those who get repartnered after divorce. There are mixed findings about who is more likely to provide support to an aging parent. Some researchers found that biological parent-child ties are much stronger and closer than step intergenerational relationships (for a review, see Becker et al. 2013) and the level of intergenerational exchange is also higher between parents and biological children than that between parents and stepchildren (Pezzin and Schone 1999). However, some recent studies suggested that in the last two decades, an increasing number of parents include stepchildren in their personal network (Suanet, Van Der Pas, and Van Tilburg 2013). Specifically, repartnered older fathers have stronger relations with stepchildren from the current union than with biological children from the prior union (Kalmijn 2013; Noël-Miller 2013). Such stronger relations are manifested in greater contact and a higher likelihood of transferring money to adult children.

In order to know how older adults' marriage history influences biological and stepchildren's provision of support, a closer look at the timing of divorce and repartnering is needed. From the theoretical perspective of exchange theory, support provided by adult children to parents in old age is a reciprocal behavior, which could be related to the resources and time that parents invested in children in early life. Although little literature has addressed this issue directly in stepfamily context, with regard to relationship quality, researchers found that the amount of time that parents spend with biological and stepchildren influences the closeness of their relationship. Longer duration of stepparent-stepchild relation increases the relationship closeness thus narrowing the stepgap in within-parent differential in relationship quality with biological and stepchildren (Becker et al. 2013). In regard to intergenerational support in stepfamilies, the amount of intergenerational support for parents could also be associated with the length of time that parents and stepchildren share as family members. Therefore when examine whether biological children or stepchildren provide more support to aging parents, it is important to take into account the timing of parental divorce and repartnering. Existing studies have provided inconsistent findings on how different *timing of parental divorce* differentially affects upward intergenerational support from children to parents. One study indicated that for both aging mothers and fathers the timing of divorce is not related to adult children's support behavior after controlling for the characteristics of parents and children (Lin 2008). However, other researchers argued that the timing of divorce of parents is critical in determining the level of transfers between them and their adult children. Early divorce has a much larger negative effect on the intergenerational support for fathers than for mothers, but late divorce of the parent in the

child's adulthood results in less or no gender differences in received intergenerational support between mothers and fathers (Furstenberg, Hoffman, and Shrestha 1995; Kalmijn 2007). However, little is known about how the *timing of parental repartnering* shapes intergenerational support from adult children. Few studies specifically discussed the effect of repartnering that happened in old age and research on parents who have ever experienced repartnering usually focuses on the overall support received, without distinguishing how the timing of the event differentially influences stepchildren in providing elderly support.

Researchers also found gender differences in the effect of parental divorce and repartnering on upward intergenerational support. Divorce has a negative effect on the quality of intergenerational relationship between parents and biological children, and this negative effect is stronger for fathers than for mothers (Daatland 2007). Compared to men, women generally invest more caretaking time in biological children, they usually have the custody of children after divorce and continually take care of children. As “kinkeepers” women also spend more time with adult children. Therefore, women may expect more support from biological children in old age, and divorce may decrease the support from biological children at a lesser extent for women than for men. At the same time, women are also more likely to experience differentials in support provided by biological children and stepchildren. Researchers suggested that the difference in relationship closeness with biological children and stepchildren is more pronounced for women than for men (Becker et al. 2013). Compared to women, men in general spend less time with children and they tend to invest more equally in biological and stepchildren. After divorce and remarriage, men usually coreside with their stepchildren and thus have

more opportunities to interact with them. However they may have much less interaction with biological children if the mother has repartnered (for a review, see Becker et al. 2013). Therefore, compared to women, men may receive less support from biological children but more support from stepchildren, thus the differentials of support provided by biological children and stepchildren could be smaller for men than for women.

In addition, previous literature provided inconsistent findings on gender differences in the effect of the *timing of divorce* on received intergenerational support among older adults. One study found that the level of support received by divorced fathers is much lower than that received by divorced mothers regardless of the timing of divorce (Lin 2008). But other researchers suggested that early divorce increases fathers' disadvantage in receiving support or intergenerational exchange in general to a larger extent than late divorce (Furstenberg et al. 1995; Kalmijn 2007). However, little is known about gender differences in the *timing of repartnering* and intergenerational support received by older adults.

#### Research Significance of the Current Study

This study contributes to existing literature in several ways. First, existing studies provided inconsistent findings about whether early or gray divorce has different effect on receiving support from children in old age, and whether the pattern differs between older mothers and fathers. This is because these studies only looked into limited aspects of intergenerational support, such as money and time transfers. Yet the major flow of intergenerational monetary transfers in the U.S. is from older parents to adult children, and parents may not be needy for informal caregiving until functional limitations occur at very old age. Indeed, the national representative longitudinal data for this study shows

that only a small proportion of older adults reported receiving financial support or help with ADLs and IADLs from adult children. This study offers a more comprehensive view by examining more aspects of intergenerational support, such as the perceived help in the future from adult children and contact frequency between older parents and adult children.

Second, existing studies have focused on the divorce of older adults, few of them specifically discussed how repartnering, especially that happened in old age, affects chances for older adults to receive support from stepchildren, and whether the effect differs for older mothers and fathers. This study addresses this gap in the literature by examining the effect of parental repartnering and its timing on received support from stepchildren.

Third, exiting studies have limitations in data. Some studies were based on non-U.S. population, and some of them used cross-sectional data. This study uses dyad data from HRS, a nationally representative longitudinal survey in the U.S.. This longitudinal dyad data captures the timing of marriage transitions for older adults as well as the duration of parent-child relationship specifically for each biological and step parent-child dyad.

Finally, intergenerational support in real live situations could be complex. The extent to which that older parents' marriage history puts them in a disadvantaged position in receiving support in old age from adult children could depend on the nature of dyads as biological or step, the timing that divorce or repartnering happened, and gender of older adults. By taking into account of all these aspects, this study tries to provide a more nuanced story about intergenerational support for older adults with diverse marriage

history and reveal those most vulnerable older adults having weak connections with children and are lack of support in times of need.

### Research Hypotheses

This study asks whether older adults' divorce or repartnering happened in earlier life stages or in old age strongly, but differently, influences biological and stepchildren's provision of support in times of need. Further, how effects of divorce and repartnering timing on different dimensions of received intergenerational support from biological and stepchildren are different for older mothers and fathers. This study draws on the theory of intergenerational solidarity and the life course theory to develop hypotheses. The theory of intergenerational solidarity states that both greater opportunities for intergenerational interaction and higher levels of affection are associated with higher levels of intergenerational association (Bengtson and Roberts 1991). In regard to the current study, both the duration of the parent-child relationship and the relationship quality largely affect the level of intergenerational solidarity that could be developed throughout the life course. A higher level of intergenerational solidarity may translate into a higher possibility of receiving support from adult children in old age. Two principles of the life course theory also provide the theoretical foundation for the current study. The timing of lives principle states that "the developmental impact of a succession of life transitions or events is contingent on when they occur in a person's life" (Elder 1998, p3), and the linked lives principle suggests that "lives are lived interdependently, and social and historical influences are expressed through this network of shared relationships" (Elder 1998, p4).

These theoretical arguments could be applied to this study. The extent of intergenerational support from adult children to older parents can vary considerably across child-parent dyads. Both the nature of dyads as biological or step parent-child and the length of time that dyads endure for parents and children to spend life together as family members are associated with the extent of upward intergenerational support in parents' old age. In general, the level of intergenerational solidarity is higher in biological parent-child dyads than in step dyads, thus the study first hypothesizes that older adults are more likely to receive support from biological children than stepchildren, regardless of their marriage history.

The timing of parental divorce and repartnering in parents' lives implies different length of life span that parents and children share as family members and therefore according to the intergenerational solidarity theory, different levels of solidarity could be generated, hence affect the likelihood of receiving support from adult children in later life. For example, divorce at an earlier life stage may lead to a distant relationship between parents and biological children, which could translate into a lower level of support from biological children in old age. In contrast, gray divorce may have a smaller negative influence on biological children's provision of support because a strong intergenerational relationship may have been developed through out the life span before parental divorce occurs in old age. Therefore the second hypothesis of the study is that among biological parent-child dyads, early divorce of parents reduces children's support to a larger extent than gray divorce.

As for repartnering, early repartnering means that stepparents and stepchildren may have opportunities to foster their intergenerational solidarity long before the



emergence of parental need for support, which increases the possibility of receiving support from stepchildren in old age. However, gray repartnering leaves both stepparents and stepchildren a short period to develop intergenerational solidarity, while the stepparents' health may begin to deteriorate, thus the level of support provided by stepchildren could be low. In sum, gray repartnering may have a larger negative effect than early repartnering on support from stepchildren to parents. Taking an alternative perspective, how parents' divorce or repartnering influence intergenerational support could also be contingent on its timing in children's lives. For example, parental repartnering in parents' old age and children's adulthood may be less influential on stepparent-child relationships. Adult children have formed their own families and are not likely to coreside with the new stepparents, thus their lives are less likely to be disrupted by parental marriage changes and chances are smaller for intergenerational conflict with stepparents. The relationship between adult children and stepparents from a gray repartnering could be peripheral, distant but polite. Although adult children are not likely to provide large financial support or intensive caregiving to gray repartnered stepparents, they may keep basic contact with these stepparents to check out how life is going with their biological parents. So the study has an alternative prediction that gray repartnering could have a smaller negative effect than early repartnering on some forms of upward support, such as contact, which are not money or time demanding and need less commitment. Therefore the third hypothesis of the study is that among the step parent-child dyads, in terms of most but not all forms of support, older adults receive less support from stepchildren come with a gray repartnering than stepchildren from an early repartnering.

Gender of the parent could moderate the effect of children's status and parents' marriage history on intergenerational support. For people who divorced in either earlier or later life stages, their relationship with biological children is negatively influenced by marriage dissolution and this negative effect could be stronger for fathers. In earlier life stages, mothers usually have custody of biological children and continually take care of them. When children grow up, mothers, as the kin keepers, also have more connections with biological children. While fathers have more distant relationship with biological children from prior marital union. Thus, divorced fathers may receive much less support from biological children in later life than divorced mothers. As for the relationship with stepchildren, if the repartnering happened in an earlier life stage both mothers and fathers may have opportunities to develop intergenerational bonds with stepchildren, but fathers may invest more equally between stepchildren and biological children than mothers. Thus, early repartnered fathers may receive more support from stepchildren in later life than early repartnered mothers. As for people who repartnered in old age, both mothers and fathers may receive less support from stepchildren. Yet gray repartnered fathers may receive more support from stepchildren than gray repartnered mothers because their spouse as biological mothers and kin keepers may have stronger connections with these adult children. Therefore the fourth hypothesis of the study contains two parts:

H4a. Early and gray divorce brings a larger disadvantage to fathers than to mothers in receiving support from biological children.

H4b. Early and gray repartnering provides fathers a better position than mothers to receive help from stepchildren.

## Methods

### Data and Measurement

This study uses 7 waves of the Health and Retirement Study (HRS, 1998, 2000, 2002, 2004, 2006, 2008, and 2010). HRS is a nationally representative longitudinal survey of older adults aged 50 and over in the United States. Since this study investigates intergenerational support from adult children in the context of diverse parental marriage history, respondent-child dyad data is used. The whole sample is restricted to respondents aged 50 and over who have ever married and have at least one living adult child aged 18 and over. All parent-child dyads between eligible respondents and his/her eligible biological and stepchildren are included. The respondent-child dyads are dropped from the sample if for which the first change of parental marriage after the birth of the biological child is marriage ended for unknown reason other than divorce or widowhood. 2.4% and 3.8% of the whole sample is missing on the dependent variable of upward financial support and children's willingness for providing support in the future. Most of the independent variables have less than or around 2% missing, with the exception of the respondent's living proximity to the child (12.7%). Respondent-child dyads that are missing on any variable for the analysis are excluded. This allows the sample to have 46,472 respondent-child dyads in 1998, 38,653 in 2000, 41,391 in 2002, 42,218 in 2004, 35,955 in 2006, 39,577 in 2008 and 43,789 in 2010. The attrition rate of respondent-child dyads due to the death of or the follow-up loss of respondents is about 26.1% and 1.6% respectively across years. Altogether, 77,751 unique respondent-child dyads are finally included in the whole sample and each dyad is observed 3.7 times on average from 1998 to 2010, yielding a dyad-period data set of 288,055 observations. Contact in parent-child

dyads is examined in a non-coresident subsample. Dyads between respondent and coresident child are excluded and dyads that are missing on contact frequencies are also dropped. This allows the non-coresident subsample to have 159,060 dyad-period observations from 1998 to 2010.

The study has four dependent variables measuring different aspects of intergenerational support from each adult child to the aging parent. Whether or not the child provided any financial support, informal caregiving and will help the parent in the future is measured by three dichotomous variables in the whole sample. If the amount of financial transfer from the child to the parent since the previous wave is larger than zero, the child is coded as provided financial support to the parent. The child is coded as provided informal caregiving to the parent if the child or his/her spouse helped with either the parent's ADLs, IADLs, or was listed as a helper in the HRS helper file. The child is coded as will help in the future if the respondent indicated this child would be willing and able to help with basic personal care activities over a long period of time if the respondent needs it. Contact frequency per week between the parent and the child is measured by a continuous variable in the non-coresident subsample. Figure 1 shows that overall, a small percentage of older parents receive financial support or informal caregiving from adult children. But a third of parents state that they will receive help from adult children in the future. On average, older parents and adult children have three contacts per week. There are gender differences in receiving intergenerational support from adult children. More mothers receive financial support and informal caregiving from adult children than fathers. Mothers also have slightly more contact with adult children than fathers. While more fathers believes that they will receive help from adult

children in the future. The gender difference in receiving informal caregiving is most prominent. The percentage of older mothers receiving such support is 4.0, more than twice as large as that of older fathers.

- Figure 1 about here-

For the independent variable, the study is interested in children's status as biological or stepchildren and the timing of parental divorce for parent-biological child dyads and the timing of parental repartnering for stepparent-stepchild dyads as whether the divorce or repartnering happened in an earlier or later life stage. Since old adults may have multiple experiences of divorce and repartnering, the study is cautious about choosing the marriage experience to identify the timing of divorce or repartnering for the parent-child dyad. For parent-biological child dyads, the first change of parents' marriage after the birth of biological children may be the most influential marital change on the intergenerational relationship and the upward intergenerational support in later life. Therefore, the timing of the first parental divorce after the birth of the biological child, as early divorce or gray divorce at age 55 or later, is assigned to parent-biological child dyads. For stepparent-stepchild dyads, respondents are most likely to report stepchildren from the current or the most recent marriage. The beginning of this marriage indicates the establishment of intergenerational relationship between the respondent and the stepchild. Therefore, the timing of the current or the most recent marriage/remarriage, as early marriage or gray repartnering at age 55 or later, is assigned to stepparent-stepchild dyads. The variable of *child status with parental marriage history* is created to capture both the nature of the parent-child dyad as biological or step and the timing of parental divorce or repartnering as early or gray. Biological parent-child dyads for which the first marital

change after the birth of the biological child is widowhood are also included as a category to make the variable inclusive. Cohabiting older adults are not separated from those married and are also coded as repartnered. Altogether, this variable has six categories: (1) biological child with the parent in intact marriage; (2) biological child with the parent experienced early divorce; (3) biological child with the parent experienced gray divorce; (4) stepchild with the stepparent experienced early repartnering; (5) stepchild with the stepparent experienced gray repartnering; and (6) biological child with the parent experienced widowhood. As is shown by Figure 2, the distribution of this independent variable is similar between the whole sample and the non-coresident subsample. In the whole dyad-period sample, half of the parent-child dyads are biological child with the parent in intact marriage (51.4%). Near a quarter of the dyads are biological child with the parent ever experienced early or gray divorce. Specifically 20.5% of parents divorced before age 55 while 1.9% of them had a gray divorce at or after age 55. 12% of the dyads are stepchild with the stepparent from either early or gray repartnering. Among them 9.0% of the dyads are formed in an earlier life stage of stepparents before age 55 and 3.0% of the dyads are established from a gray remarriage that happened at or after age 55. There are 14.2% of the dyads are biological child with the parent whose first marital change after the birth of this child is widowhood.

- Figure 2 about here-

In the multivariate analysis, key characteristics of both parents and children are controlled. For parents, the variables include parents' current marital status, gender, need for support (measured by self-reported health, whether has long-term care insurance, whether currently receiving pension, and whether currently working for pay), living

proximity to the adult child, total number of biological and stepchildren, socioeconomic status (measured by years of education, logged income, and net wealth), age and race/ethnicity. Parents' attrition status is also controlled by whether died or lost to follow-up during the survey. Children's characteristics in control include years of education, age, gender, and current marital status. Descriptive statistics for all control variables are presented in Table 1.

-Table 1 about here-

### Random-Effects Analysis

For the multivariate analysis, the study uses random-effects logistic and linear regression to model different types of intergenerational support provided by biological and stepchildren to parents with different marriage history by pooling 7 waves of the HRS data. Compared to a regular regression model that only examines between-individual differences, a random-effects model with panel data is in a better position to model both between-individual and within-individual differences. It better controls for possible unobserved or unmeasured within-individual error component that would produce heterogeneity bias in coefficient estimation (Petersen 1993). Compared to a fixed-effects model, the advantage of a random-effects model is that time-invariant variables can be included. Key variables of interest for this study are time-invariant variables of child status with parental marriage history and parents' gender, although time-varying effects on intergenerational support, such as parental needs for support are need to be controlled. Therefore, random-effects models are more suitable for this study. In addition, the same parent-child dyads are observed repeatedly in survey waves, but

they may not be observed for the same number of waves. Random-effects analysis allows the data to be unbalanced, which means there is no restriction on the number of observations for each dyad. Dyads that are missing at any given survey wave are not excluded from the analysis.

The multivariate analysis begins with separate random-effects binary logistic regression models predicting upward financial support, informal caregiving and adult children's willingness to help in the future, as well as the random-effects linear regression model predicting contact frequencies between older parents and adult children. The models are illustrated by the follow equation:

$$Y_{ij} = \beta_0 + \beta_1 H_i + \beta_2 F_i + \beta_3 C1_{ij} + \beta_4 C2_i + u_j + e_{ij} \quad (1)$$

In the dyad-period data, parent-child dyads are at level 1 and are nested in waves, which is level 2. This equation is a combination of a two-level modeling, with level 1 models the between-individual variations across all dyads in the dyad-period sample, while level 2 models the within-individual variations. In this case, it is the observations of a certain dyad at different waves.  $Y_{ij}$  is the outcome variable for the dyad  $i$  (level 1) at wave  $j$  (level 2). In random-effects binary logistic regression models, it has a standard logistic distribution. The dependent variable is  $\log [p_{ij}/(1 - p_{ij})]$ . In random-effects linear regression models it is assumed to have normal distribution. Independent and control variables are added to models step by step. For each dependent variable, the analysis begins with a model including the key time-invariant independent variable of child status with parental marriage history ( $H_i$ ). Then the time-invariant variable of parents' gender as whether female or not ( $F_i$ ) is added. Finally, time-varying or time-invariant parents' and children's characteristics are added as control variables ( $C1_{ij}$  and



$C2_i$ ).  $u_j$  is a random effect accounting for the random variation at level 2, and  $e_{ij}$  is the level 1 random effect (model residuals). Because older adults and their spouse both enter the survey as respondents and all biological and step parent-child dyads of a respondent are included in the sample, in the dyad-period data parent-child dyads are clustered in the household. Standard errors are adjusted for household clusters in the data.

The study further examines whether parents' gender moderates effects of the key independent variable on intergenerational support. As illustrated by equation (2), the interaction term of the variable of child status with parental marriage history and parent's gender is added and tested for each dependent variable. The models also adjust standard errors for the clustering in household in the data.

$$Y_{ij} = \beta_0 + \beta_1 H_i + \beta_2 F_i + \beta_3 (H_i * F_i) + \beta_4 C1_{ij} + \beta_5 C2_i + u_j + e_{ij} \quad (2)$$

## Results

Results of random-effects models examining the effect of child status with parental marriage history on different aspects of intergenerational support from adult children to older parents are presented in Tables 2. For each dependent variable, the analysis begins with a model including the key independent variable of child status with parental marriage history. Then different groups of other predictors are added step by step. The decreasing BIC for the nested models for each dependent variable indicates that the model fit becomes better as the predictors are added. Effects of the key independent variable of child status with parental marriage history remain robust across nested models, so the study presents only the full models in Table 2. After the estimation of each

full model, the study also tests whether the coefficient of each category of the key independent variable is significantly different from each other.

-Table 2 about here-

The results clearly suggest that children's status as biological or step children as well as the child-specific timing of parental divorce and repartnering influence different aspects of upward intergenerational support in distinctive ways. In terms of financial support, Model 1 shows that the likelihood of providing monetary transfers is significantly different between biological and stepchildren, with the latter being significantly less likely to provide such support. Compared to biological children of parents in intact marriage, the odds of giving financial transfers are not significantly different for biological children with parents ever divorced. Early or gray parental divorce also does not make a difference on financial support from biological children. Stepchildren are only 0.433 times as likely as biological children with parents in intact marriage to provide financial assistance to stepparents from an early parental repartnering and 0.357 times as likely to provide such support to stepparents from a gray repartnering. However, the differences between the likelihood of stepchildren providing financial support to early repartnered stepparents and gray repartnered stepparents are not statistically significant.

Model 2 presents results for informal caregiving. To compare between biological child-parent dyads and stepchild-stepparent dyads, biological children are significantly more likely to provide informal caregiving than stepchildren. Comparing within biological dyads and step dyads, the timing of older adults' divorce and repartnering significantly influences received informal caregiving from adult children. On the one

hand, compared to biological children with parents in intact marriage, the odds ratio of receiving informal caregiving from biological children significantly decreases to 0.802 if parents divorced before age 55. The gray divorce of parents further decreases biological children's likelihood of providing such support to 0.540, and this odds ratio is significantly smaller than that for dyads of biological child with the parent experienced early divorce. On the other hand, compared to biological children with parents in intact marriage, the odds ratio of providing informal caregiving is much smaller for stepchildren, with them are only 0.200 times as likely to provide the help to stepparents from an early parental repartnering, and are significantly less likely, with an odds ratio of 0.085, to provide the support to stepparents from a parental repartnering in old age. This pattern suggests that the shorter time the step intergenerational dyads endure the lower probability of receiving support from stepchildren. In addition, compared to older parents in intact marriage, widowed parents are less likely to receive informal caregiving from biological children.

When it comes to future help, Model 3 shows that biological children are significantly more likely than stepchildren to be willing and able to help with basic personal care activities over a long period of time if the respondent needed it in the future. Parental divorce decreases the likelihood of biological children's willingness to help in the future at similar extent for early divorce and gray divorce. Biological children are 0.640 and 0.768 times less likely to offer support in the future respectively to parents experienced early divorce and gray divorce than to parents in intact marriage. Stepchildren show a much lower likelihood of willingness to help in the future. Compared to biological children with parents in intact marriage, stepchildren are 0.184

times less likely to offer future help to stepparents from an early parental repartnering and are 0.218 times less likely to help stepparents from a gray parental repartnering in the future. The likelihood for stepchildren to provide future help does not differ by the timing of repartnering of stepparents.

Model 4 presents results for contact frequency between parents and non-coresident children. Contact level is the highest between biological children and parents in intact marriage, and the lowest between stepchildren and stepparents from an early parental repartnering. Not all step parent-child dyads have lower contact frequency than biological dyads. Frequency of contact between stepchildren and stepparents from a gray repartnering is significantly lower than that between biological children and parents in intact marriage as well as biological children and widowed parents, but is not significantly lower than that between biological children and parents who experienced early or gray divorce. Stepchildren and their stepparents from an early repartnering have lower contact frequency than that in all biological parent-child dyads. Compared to biological children with parents in intact marriage, early parental divorce significantly decreases contact between biological children and parents by a score of 0.751, while gray parental divorce decreases contact by a score of 0.528. The difference between the effect of early and gray divorce is not statistically significant. Compared to biological children with parents in intact marriage, stepchildren have 1.5 and 1 fewer contacts per week respectively with stepparents from an early and a gray parental repartnering. The timing of older adults' repartnering makes a difference on their contact with stepchildren, with early repartnering decreases contact to a significantly larger extent than gray repartnering.

In addition, widowed older adults have less contact with biological children than their counterparts who remain in intact marriage.

Control variables behave in expected directions for the four different dimensions of upward intergenerational support. It is worth noting that although parents' marriage history predicts variations in support from adult children, parents' current marital status also influences children's provision of support. Currently divorced and widowed parents are more likely to receive financial support, informal caregiving and help in the future than those married/partnered. Mothers are more likely to receive financial and instrumental support from as well as have more contact with children, but are less likely to have children being willing to help in the future than fathers. Worse health status, indicating a higher need for support, is associated with a higher likelihood of receiving financial and instrumental support from as well as having more contact with adult children. However, as health condition deteriorates the odds of children's willingness to help in the future significantly decrease. Having long-term care insurance, suggesting a lower need for economic support, is associated with a lower likelihood of receiving financial assistance and help in the future. Currently receiving pension decreases the likelihood of receiving informal caregiving but increases the odds of receiving future help. Older adults who are currently working for pay, indicating less demands for instrumental support, is associated with smaller odds of children's provision of informal caregiving but larger odds of receiving support in times of need in the future.

The study further tests whether and how negative effects of older adults' divorce and repartnering on intergenerational support from biological and stepchildren are moderated by parents' gender. Table 3 presents the main effect of child status with

parental marriage history and parents' gender, as well as the interaction effect of the two variables on financial support, informal caregiving, help in the future, and contact frequency from adult children to older parents. The interaction effect is significant for all four aspects of intergenerational support. Figure 3-6 depicts odds ratios of the interaction term between the key independent variable and parents' gender respectively for each dimension of support. Results clearly suggest that effects of children's status and the timing of parental divorce and repartnering on upward intergenerational support are significantly different for older mothers and fathers.

-Table 3 about here-

Figure 3 presents odds ratios for older parents to receive financial support by child status with parental marriage history and parents' gender. Compared with older mothers in intact marriage, mothers who have experienced either early or gray divorce are more likely to receive financial support from biological children. Yet for older fathers, divorce, especially gray divorce, significantly reduces their likelihood of receiving financial support from biological children. While in comparison with stepfathers, stepmothers either experienced early or gray repartnering have a much lower likelihood of receiving financial support from stepchildren.

-Figure 3 about here-

Figure 4 presents odds ratios of receiving informal caregiving for older parents by the key independent variable and parents' gender. Early divorce decreases the likelihood of receiving informal caregiving from biological children for both older mothers and fathers, but the extent is much larger for older fathers. Such a gender difference is not found in the effect of gray divorce. In addition, older mothers and fathers are even less

likely to receive informal caregiving from stepchildren come with an early repartnering, and such a negative effect is larger for stepmother-stepchild dyads. Again, such a gender difference is not found in the effect of gray repartnering. These results also suggest that when taking into account the moderating effect of older adults' gender, the difference between the effect of early and gray divorce, as well as between the effect of early and gray repartnering on informal caregiving becomes more prominent.

-Figure 4 about here-

Odds ratios of the perceived help in the future from adult children by the key independent variable and parents' gender are presented in Figure 5. The moderating effect of parents' gender on the relationship between child status with parental marriage history and help in the future is similar to that in the model predicting informal caregiving. Gender differences vary by the timing of divorce and repartnering. Although early divorce has a negative effect on receiving future help from biological children for both older mothers and fathers, such a negative effect is much larger for fathers. However, there is no gender difference in the negative effect of gray divorce on future help. Moreover, older mothers and fathers have a small likelihood of receiving future help from stepchildren from an early repartnering, and such a limitation in future help is more severe for older mothers. Yet gray repartnering decreases chances of receiving stepchildren's help in the future to similar extents for older mothers and fathers.

-Figure 5 about here-

Finally, Figure 6 presents contact frequency by the nature of parent-child dyads, timing of parental divorce and repartnering, and parents' gender. Compared with older

mothers in intact marriage, mothers who experienced gray divorce have greater contact with biological children, while mothers who divorced early have less contact with biological children. Yet for older fathers, both early and gray divorce significantly reduce their contact with biological children to a much larger extent than that for mothers. In contrast, stepmothers have much lower contact frequency than stepfathers with stepchildren who are either from an early or gray repartnering. Both early and gray repartnering has a smaller negative effect on older fathers' contact with stepchildren.

-Figure 6 about here-

## Discussion

Findings from the analysis suggest that older mothers and fathers with diverse marriage history receive different levels of support from biological and stepchildren. The nature of the intergenerational ties as biological or step influences the level of elderly support. The timing of parental divorce and repartnering also significantly differentiates the likelihood of receiving some types of support in parent-biological child and stepparent-stepchild dyads. Further, older parents' gender moderates the influence of parental marriage history on intergenerational support from biological and stepchildren.

Consistent with the first hypothesis, stepchildren are much less likely to provide financial support, informal caregiving as well as future help to parents than biological children regardless of the timing of parental divorce or repartnering. In addition, contact between stepchildren and early repartnered stepparents is lower than that in all biological parent-child dyads. These findings could be explained by the theory of intergenerational solidarity since on average the solidarity is stronger for biological parent-child ties than step ties. These results are also consistent with existing literature suggesting that



biological child-parent ties have a higher extent of strength and closeness than step intergenerational ties, which may translate into a higher level of intergenerational exchange (Pezzin and Schone 1999).

The study does not find evidence to support the second hypothesis that early divorce of parents reduces biological children's provision of support to a larger extent than gray divorce. It is found that the dissolution of marriage comes along with the negative effect on receiving financial support, future help and having contact with biological children no matter whether the divorce happened in an earlier life stage or in old age. Contrary to the second hypothesis, results indicate that gray divorce decreases the likelihood of receiving informal caregiving from biological children to a larger extent than that of early divorce. Informal caregiving is the kind of assistance requiring a higher intensity of interaction and devotion of time and emotion, thus may be more sensitive to the quality of biological intergenerational ties rather than the length that biological ties endure. Divorce in old age may bring disagreements and conflicts to the ties with biological children. This more recent event than an early divorce may be more harmful on the quality of the intergenerational relationship at the moment, thus gray divorced older parents are less likely to receive informal caregiving from their own children.

The third hypothesis is partially supported. There are significant differences between the effect of early and gray repartnering on receiving informal caregiving from and having contact with stepchildren. Compared to older adults experienced gray repartnering, older adults who repartnered in an earlier life stage are more likely to receive informal caregiving from stepchildren. This finding is in line with the intergenerational solidarity theory and the linked life principle. Early repartnered older

adults spend a longer life span with stepchildren thus may have more opportunities to nurture the step intergenerational relationship, which could promote their chance of receiving instrumental support from stepchildren in times of need. However, compared to older adults who repartnered in old age, older adults experienced early repartnering have less contact with stepchildren. This could be explained by the theoretical principle of the timing of lives. Gray repartnering decreases parents' contact with stepchildren by a smaller extent than early repartnering because such parental repartnering happened in children's adulthood and parents and children live independently, which could decrease the chance of tensions and conflict. The timing of repartnering does not make a difference on receiving financial support and future help from stepchildren.

Interesting results are found for gender differences in the effect of older adults' marriage history on receiving intergenerational support from biological or stepchildren, which support hypothesis four. First, consistent with hypothesis 4a, early and gray divorce has a larger negative effect on fathers than on mothers for receiving support from biological children. In regard to financial support and contact, early and gray divorce brings advantages or less disadvantages to mothers but much larger disadvantages to fathers in receiving such support. Early divorce also exerts a much larger negative effect on older fathers in terms of receiving informal caregiving and future help from biological children. These results are consistent with the argument in existing literature. Women as the kin keepers may maintain a stronger relationship with biological children than men even after divorce, which could bring them a higher possibility of receiving support in old age. Undoubtedly, divorce, especially that happened in earlier life stages, puts fathers in a very disadvantaged position in receiving all forms of support from biological

children. If divorced fathers are not repartnered when they enter old age they will be the highly vulnerable group of people since they are likely to lost touch with their own children while do not have spouse or stepchildren to rely on in times of need. The findings strongly imply for policy interventions for older divorced fathers to secure their old age support from other resources, such as their pension and health insurance, and the neighborhood and community.

Second, gender differences in the effect of repartnering on receiving old age support from stepchildren show an opposite picture. Consistent with hypothesis 4b, early and gray repartnering provides fathers a better position than mothers to receive various support from stepchildren. Specifically, early and gray repartnered mothers are much less likely to receive financial support from and have less contact with stepchildren than repartnered fathers. Early repartnering also brings a much larger negative effect for mothers than for fathers on receiving informal caregiving and future help from stepchildren come with that marriage. Possible explanations could be after early repartnering men are more likely to coreside only with stepchildren if the custody of biological children is awarded to the mother, while mothers are more likely to coreside with both biological and stepchildren and having a closer relationship with biological children than stepchildren, whereas fathers in general tend to invest more equally in biological and stepchildren (Becker et al. 2013). Therefore fathers may have a better position to receive old age support from stepchildren in later life. These results point out that repartnering even in earlier life stages may not bring the source of support from stepchildren to mothers in old age. Older repartnered mothers will be among the most

vulnerable older adults if they do not have their own children or own children are not available for providing support in times of need.

Finally, results suggest that taking parental gender difference into account makes the differential effect of divorce and repartnering timing on old age support more prominent. For informal caregiving and help in the future, only early divorce but not gray divorce brings a larger disadvantage to fathers than to mothers in receiving such supports from biological children. While only early repartnering but not gray repartnering has a larger negative effect on mothers than fathers for receiving such support from stepchildren. Thus, the study concludes that after considering gender of older parents, the patterns become clearer about how the effect on old age support is different between early and gray divorce, as well as between early and gray repartnering. Findings of this study prompt us to envision the picture of intergenerational support for future aging cohorts in a few decades down the road. When joint custody is becoming more common after divorce, divorced fathers may have more connections with biological children from prior marital union than their predecessors. The prevalence of stepfamily is also increasing, leading more societal attention paid to ways of nurturing harmonious intergenerational relationships in these families. Therefore we may observe changes in the effect of older adults' divorce and repartnering on intergenerational support among future aging cohorts, with a possible decrease of the negative effect of early divorce on intergenerational support and a narrowing gap between expecting or receiving support from biological and stepchildren.

The study has several limitations. First, the key independent variable of child status with parental marriage history in the current study is a time-invariant measure.

However, this variable could be time-varying since during the survey period parents in intact marriage may experience gray divorce and divorced or widowed older adults could repartner in old age. In the next step, the study will create the time-varying measure of this independent variable in order to better estimate its effect on intergenerational support. Second, the predictors in the model have missing values to different extent. To simply drop the missing values may bring bias to the estimation. The study will test different imputation methods to deal with the missing values. Third, the dependent variables of financial support and informal caregiving are rather crude. It only measures the probability of receiving support without any information about the actual amount, which could largely vary across parent-child dyads. However, the distribution of the amount of financial transfers and the hours of informal caregiving from the data are very skewed, which even with transformation can hardly meet the multivariate normality assumption (Lin 2008). Finally, HRS does not provide information about the length of time that older adults and their biological or stepchildren have lived in the same household. Therefore this study could only infer the level of intergenerational solidarity between older parents and adult children based on the timing of parental marriage change.

To build on findings of this study, I propose several future research directions. First, older adults' needs for support largely depend on whether they currently have a spouse. I plan to stratify the sample by older adults' current marital status to see whether this moderates the effect of early and gray divorce and repartnering on receiving support from biological and stepchildren. By doing so, the study could highlight whether those who are currently without a spouse are the most vulnerable people because the divorce

experience could be more influential on the support they receive from children. Second, people's socioeconomic status (SES) affects their marriage experience, relationship with children, and need for support. I propose to examine how the effect of early or gray divorce and repartnering on receiving intergenerational support in old age is contingent on people's mid-life and old age SES. This investigation helps to reveal the extent to which inequalities are enlarged in old age due to earlier or later life marital changes and the consequential differentials in old age support from adult children to meet the needs of the elderly. Third, this study takes the perspective of older adults who are on the receiving end of old age support. To take an alternative perspective from the children's side, it is also important to know when both biological and stepparents are in need for support, will children's commitment to one crowd out the support to the other? Finally, parents can have both biological and stepchildren. It is meaningful to examine the within-family differences in old age support to see how support is initiated and coordinated among biological and stepchildren.

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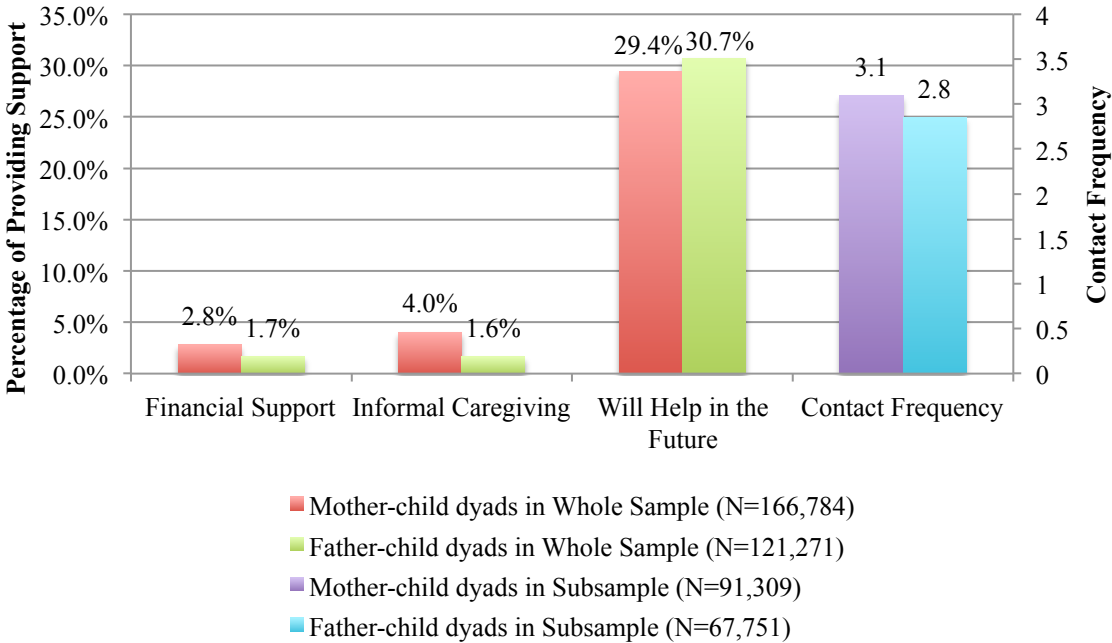
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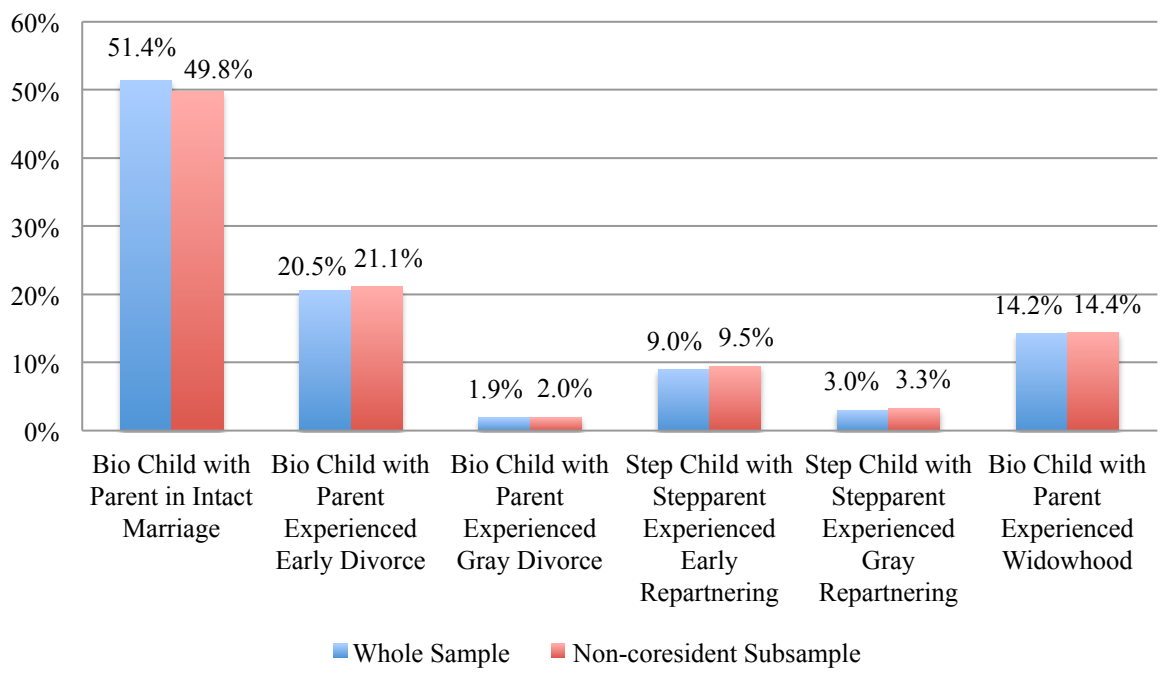


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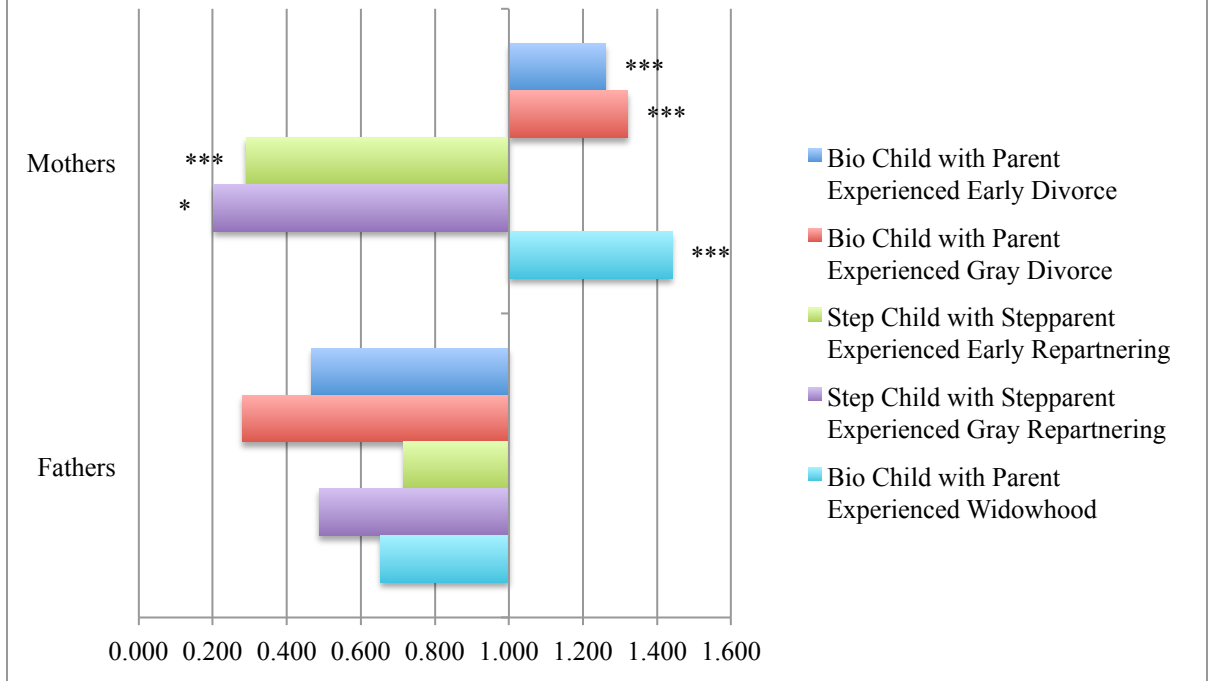
**Figure 1. Received Intergenerational Support by Mothers and Fathers**



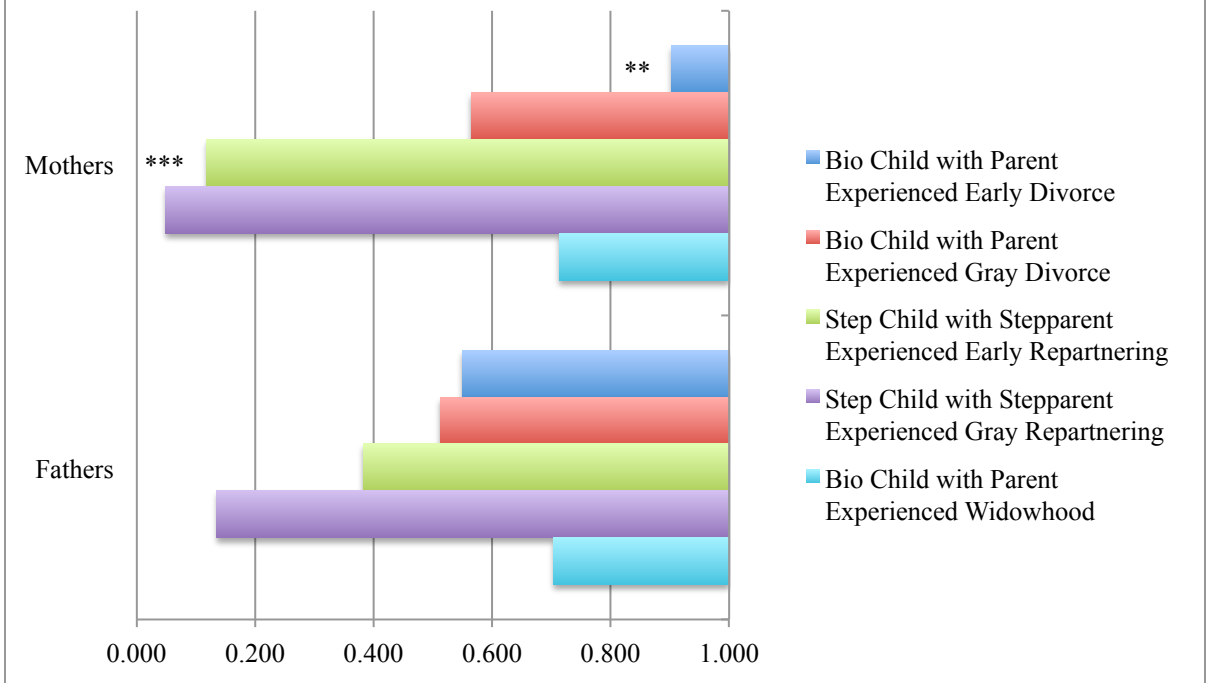
**Figure 2. Child Status with Parental Marriage History in the Whole Sample (N=288,055) and Non-coresident Subsample (N=159,060)**



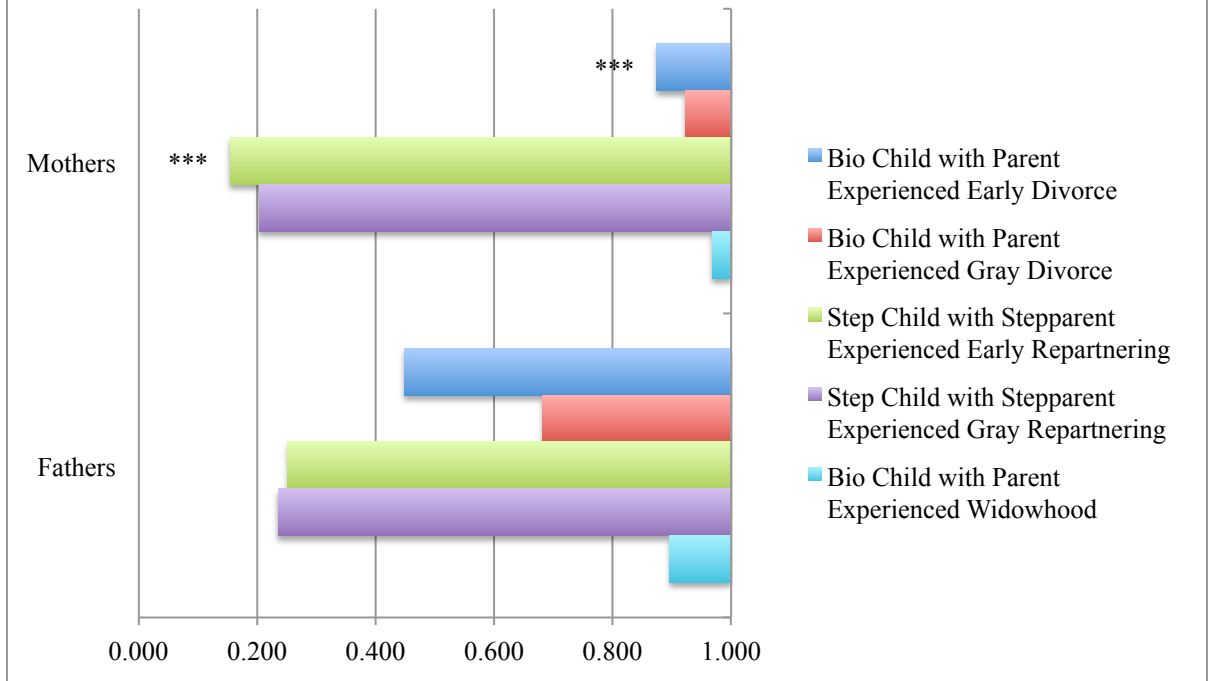
**Figure 3. Odds Ratio of Receiving Financial Support by Child Status with Parental Marriage History and Parent's Gender**



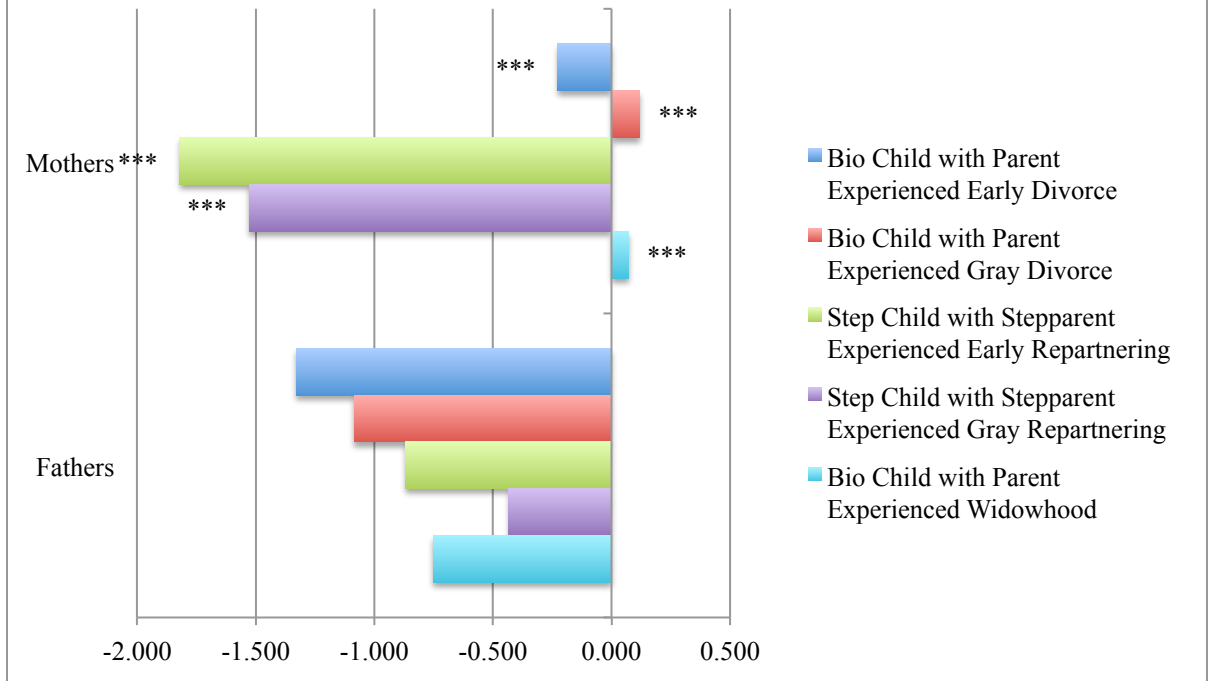
**Figure 4. Odds Ratio of Receiving Informal Caregiving by Child Status with Parental Marriage History and Parent's Gender**



**Figure 5. Odds Ratio of Perceived Help in the Future by Child Status with Parental Marriage History and Parent's Gender**



**Figure 6. Contact Frequency by Child Status with Parental Marriage History and Parent's Gender**



**Table 1. Descriptive Statistics for Dependent Variables and Control Variables, HRS, 1998-2010**

	Whole Sample		Non-coresident Subsample	
	Mean	SD	Mean	SD
<b>Financial Support (Yes=1, No=0)</b>	0.023	(0.151)		
<b>Informal Caregiving (Yes=1, No=0)</b>	0.030	(0.171)		
<b>Will Help in the Future (Yes=1, No=0)</b>	0.300	(0.458)		
<b>Contact Frequency Per Week</b>			2.989	(4.974)
<b>Parent Characteristics</b>				
Current Marital Status				
<i>(Ref. Cat.=Married/Partnered)</i>				
Divorced/Separated	0.097	(0.296)	0.097	(0.296)
Widowed	0.199	(0.400)	0.191	(0.393)
Female (Yes=1, No=0)	0.579	(0.494)	0.574	(0.494)
Self-Reported Health				
<i>(Ref. Cat.=Very Good)</i>				
Good	0.315	(0.464)	0.314	(0.464)
Fair	0.210	(0.407)	0.207	(0.405)
Poor	0.093	(0.291)	0.096	(0.295)
Has Long-Term Care Insurance (Yes=1, No=0)	0.107	(0.309)	0.108	(0.310)
Currently Receiving Pension (Yes=1, No=0)	0.269	(0.443)	0.279	(0.449)
Currently Working for Pay (Yes=1, No=0)	0.356	(0.479)	0.352	(0.477)
Living Proximity to Child				
<i>(Ref. Cat.=Coresidence)</i>				
Within 10 Miles	0.318	(0.466)		
More than 10 Miles	0.586	(0.493)	0.642	(0.479)
Number of Biological Children	3.820	(2.228)	3.837	(2.243)
Number of Step Children	0.699	(1.531)	0.735	(1.566)
Education (Years)	11.942	(3.425)	11.948	(3.385)
Income (Ln)	10.358	(1.322)	10.367	(1.288)
Net Wealth (/100,000)	1.132	(5.070)	1.134	(4.767)
Age	67.860	(9.755)	67.819	(9.625)
Race/Ethnicity				
<i>(Ref. Cat.=White Non-Hispanic)</i>				
Black Non-Hispanic	0.146	(0.353)	0.143	(0.350)
Hispanic	0.104	(0.306)	0.097	(0.296)
Other Non-Hispanic	0.021	(0.144)	0.020	(0.141)
Deceased (Yes=1, No=0)	0.189	(0.392)	0.208	(0.406)
Loss to Follow-up (Yes=1, No=0)	0.006	(0.078)	0.005	(0.071)
<b>Child Characteristics</b>				
Education (Years)	13.583	(2.335)	13.609	(2.331)
Age	40.895	(10.348)	41.232	(9.829)
Female (Yes=1, No=0)	0.500	(0.500)	0.504	(0.500)
Married/Partnered (Yes=1, No=0)	0.652	(0.476)	0.701	(0.458)
N	288,055		159,060	



**Table 2. Random-Effects Regression Models on Upward Intergenerational Support, HRS, 1998-2010**

	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>	
	<b>Financial</b>		<b>Informal</b>		<b>Help in the</b>		<b>Contact</b>	
	<b>Support</b>		<b>Caregiving</b>		<b>Future</b>		<b>Frequency</b>	
Intercept	-7.296 *** (0.431)		-10.512 *** (0.380)		0.887 *** (0.191)		5.646 *** (0.307)	
<b>Child Status with Parental Marriage History</b>								
<i>(Ref. Cat.=Bio Child with Parent in Intact Marriage)</i>								
Bio Child with Parent Experienced Early Divorce	-0.105 (0.097)		-0.221 * (0.092)		-0.446 *** (0.044)		-0.751 *** (0.067)	
Bio Child with Parent Experienced Gray Divorce	-0.257 (0.236)		-0.616 ** (0.197)		-0.264 * (0.111)		-0.528 * (0.240)	
Step Child with Stepparent Experienced Early Repartnering	-0.838 *** (0.133)		-1.611 *** (0.166)		-1.690 *** (0.059)		-1.487 *** (0.070)	
Step Child with Stepparent Experienced Gray Repartnering	-1.029 *** (0.246)		-2.460 *** (0.350)		-1.523 *** (0.102)		-0.940 *** (0.127)	
Bio Child with Parent Experienced Widowhood	0.162 (0.090)		-0.346 *** (0.075)		-0.092 (0.049)		-0.202 ** (0.073)	
<b>Parent Characteristics</b>								
<b>Current Marital Status</b>								
<i>(Ref. Cat.=Married/Partnered)</i>								
Divorced/Separated	0.646 *** (0.108)		1.428 *** (0.109)		0.122 * (0.052)		-0.100 (0.081)	
Widowed	0.467 *** (0.088)		1.327 *** (0.075)		0.101 * (0.041)		0.062 (0.054)	
Female (Yes=1, No=0)	0.334 *** (0.041)		0.724 *** (0.062)		-0.118 *** (0.027)		0.324 *** (0.028)	
<b>Self-Reported Health</b>								
<i>(Ref. Cat.=Very Good)</i>								
Good	0.175 ** (0.059)		0.687 *** (0.069)		-0.130 *** (0.024)		0.047 (0.033)	
Fair	0.455 *** (0.070)		1.679 *** (0.071)		-0.531 *** (0.032)		0.122 ** (0.038)	
Poor	0.608 *** (0.091)		2.621 *** (0.079)		-1.178 *** (0.051)		0.246 *** (0.060)	
Has Long-Term Care Insurance (Yes=1, No=0)	-0.462 *** (0.091)		-0.066 (0.095)		-0.089 * (0.036)		-0.064 (0.050)	
Currently Receiving Pension (Yes=1, No=0)	-0.058 (0.061)		-0.229 *** (0.055)		0.134 *** (0.028)		-0.047 (0.039)	
Currently Working for Pay (Yes=1, No=0)	0.055 (0.061)		-1.687 *** (0.109)		0.189 *** (0.027)		-0.044 (0.041)	
<b>Living Proximity to Child</b>								
<i>(Ref. Cat.=Coresidence for Model 1-3; Ref. Cat.=Within 10 Miles for Model 4)</i>								

Within 10 Miles	-1.048 ***	-1.756 ***	0.122 ***	
	(0.077)	(0.062)	(0.030)	
More than 10 Miles	-1.061 ***	-3.205 ***	-0.771 ***	-1.917 ***
	(0.072)	(0.070)	(0.030)	(0.045)
Number of Biological Children	-0.067 **	-0.157 ***	0.051 ***	-0.194 ***
	(0.021)	(0.014)	(0.010)	(0.011)
Number of Step Children	-0.017	0.054 *	-0.035 *	-0.119 ***
	(0.026)	(0.025)	(0.015)	(0.016)
Education (Years)	-0.003	-0.051 ***	-0.011	-0.036 ***
	(0.011)	(0.009)	(0.006)	(0.007)
Income (Ln)	-0.148 ***	-0.033	0.007	0.027
	(0.017)	(0.018)	(0.011)	(0.015)
Net Wealth (/100,000)	-0.237 ***	-0.024 *	-0.001	-0.002
	(0.059)	(0.011)	(0.002)	(0.003)
Age	0.005	0.080 ***	-0.034 ***	0.009 *
	(0.005)	(0.005)	(0.002)	(0.004)
Race/Ethnicity (Ref. Cat.=White Non-Hispanic)				
Black Non-Hispanic	0.921 ***	0.428 ***	0.063	0.620 ***
	(0.092)	(0.079)	(0.048)	(0.078)
Hispanic	0.979 ***	0.045	-0.264 ***	0.480 ***
	(0.123)	(0.096)	(0.059)	(0.077)
Other Non-Hispanic	1.059 ***	0.246	-0.079	0.294 *
	(0.173)	(0.162)	(0.100)	(0.117)
Deceased (Yes=1, No=0)	0.115	0.681 ***	-0.199 ***	-0.119 **
	(0.076)	(0.058)	(0.040)	(0.045)
Loss to Follow-up (Yes=1, No=0)	-0.832 *	-0.588	0.173	0.335
	(0.380)	(0.397)	(0.144)	(0.416)
<b>Child Characteristics</b>				
Education (Years)	0.205 ***	0.043 ***	0.009	0.001
	(0.015)	(0.011)	(0.006)	(0.010)
Age	0.016 ***	0.001	0.006 **	-0.037 ***
	(0.004)	(0.004)	(0.002)	(0.003)
Female (Yes=1, No=0)	0.007	0.863 ***	0.756 ***	0.998 ***
	(0.047)	(0.045)	(0.020)	(0.036)
Married/Partnered (Yes=1, No=0)	0.130 *	0.168 ***	0.266 ***	-0.040
	(0.050)	(0.046)	(0.018)	(0.037)
BIC	54200.32	49324.40	297828.40	
Wald Chi-Square	1484.75	5401.76	5699.39	4829.86
Rho	0.529	0.530	0.410	0.371
Degrees of Freedom	31	31	31	30
N	288,055	288,055	288,055	159,060

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 16,255 clusters in the data for Model 1-3 and 14,698 clusters in the data for Model 4.

**Table 3. Random-Effects Regression Models on Upward Intergenerational Support with Statistically Significant Gender Interaction Effects, HRS, 1998-2010**

	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>
	<b>Financial</b>		<b>Informal</b>		<b>Help in the</b>		<b>Contact</b>
	<b>Support</b>		<b>Caregiving</b>		<b>Future</b>		<b>Frequency</b>
Intercept	-7.167 *** (0.433)		-10.516 *** (0.382)		0.918 *** (0.192)		5.668 *** (0.305)
<b>MAIN EFFECTS</b>							
Child Status with Parental Marriage History (Ref. Cat.=Bio Child with Parent in Intact Marriage)							
Bio Child with Parent Experienced Early Divorce	-0.761 *** (0.142)		-0.599 *** (0.158)		-0.803 *** (0.058)		-1.328 *** (0.073)
Bio Child with Parent Experienced Gray Divorce	-1.269 *** (0.346)		-0.668 (0.344)		-0.383 * (0.151)		-1.084 *** (0.228)
Step Child with Stepparent Experienced Early Repartnering	-0.333 * (0.167)		-0.959 *** (0.215)		-1.379 *** (0.080)		-0.869 *** (0.101)
Step Child with Stepparent Experienced Gray Repartnering	-0.717 ** (0.274)		-1.997 *** (0.407)		-1.446 *** (0.123)		-0.432 * (0.198)
Bio Child with Parent Experienced Widowhood	-0.426 * (0.173)		-0.351 * (0.141)		-0.109 (0.083)		-0.751 *** (0.096)
Parent's Gender Female (Yes=1, No=0)	0.067 (0.042)		0.694 *** (0.078)		-0.237 *** (0.031)		0.106 *** (0.028)
<b>INTERACTION EFFECTS</b>							
Bio Child with Parent Experienced Early Divorce*Female	0.994 *** (0.134)		0.496 ** (0.166)		0.668 *** (0.065)		1.102 *** (0.085)
Bio Child with Parent Experienced Gray Divorce*Female	1.547 *** (0.412)		0.098 (0.389)		0.303 (0.220)		1.204 *** (0.282)
Step Child with Stepparent Experienced Early Repartnering*Female	-0.901 *** (0.218)		-1.176 *** (0.296)		-0.487 *** (0.098)		-0.951 *** (0.098)
Step Child with Stepparent Experienced Gray Repartnering*Female	-0.879 * (0.410)		-1.020 (0.526)		-0.146 (0.196)		-1.096 *** (0.200)
Bio Child with Parent Experienced Widowhood*Female	0.791 *** (0.181)		0.014 (0.151)		0.077 (0.092)		0.823 *** (0.113)
BIC	54082.96		49339.49		297532.90		
Wald Chi-Square	1547.86		5408.66		5740.56		5951.60
Rho	0.526		0.530		0.408		0.368
Degrees of Freedom	36		36		36		35
N	288,055		288,055		288,055		159,060

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 16,255 clusters in the data for Model 1-3 and 14,698 clusters in the data for Model 4. All models include the same covariates as models in Table 2.

## Chapter Two

### Children's Relative Living Proximity and Intergenerational Support to Older Parents in China

#### Abstract

Research on the impact of living proximity on children's provision of support in Chinese families has been based on cross-family designs. Recent studies of western families have shown significant within-family differences in intergenerational support. Taking the within-family differences approach this paper uses data from the China Health and Retirement Longitudinal Study (CHARLS, 2013) to examine how children's relative living proximity to older parents compared to that of their siblings influences their support to parents. Results suggest that sibling children at different living distance to parents coordinate/cooperate in elderly support. Children who live relatively farther among siblings provide the highest level of economic support but have the least contact with parents. While living closer to parents among siblings is associated with the most frequency contact with parents and the lowest level of economic support. These patterns differ between rural and urban parent-noncoresident child dyads, and are also moderated by parents' living arrangement, the gendered division of support, and the reciprocity between parents and children.

Geographic proximity between adult children and older parents is one of the integral factors that determine intergenerational support. Distance in general inhibits the exchange of support. Farther living distance between adult children and parents is associated with less contact and lower levels of instrumental and social support provided by children (Aldous and Klein 1991; Heylen et al. 2012; Lawton, Silverstein, and Bengtson 1994). Most studies examining the influence of living proximity on children's provision of support have been based on between-family designs, which either focus on a single child in the family or treat child-parent dyads within families as irrelevant. When there are multiple children, dyads between a parent and each child are interdependent and compose a network of intergenerational relationships (Matthews 2002). Provision of support to parents cannot be viewed as an independent behavior of each child, but rather being incorporated in the process of cooperation and coordination among sibling children. In this process, characteristics of an individual child and of the child-parent dyad that help to explain elderly support are relative to characteristics of other children and dyads in the family (Pillemer and Sutor 2014; Spitze et al. 2012). Therefore, when investigating how living proximity of a child to a parent influences his/her provision of support, it is necessary to examine the larger family network by considering characteristics of other sibling children, for example their geographic distance and provision of support to the parent. However, studies of within-family influences among sibling children on intergenerational support in western families have just begun.

How within-family differences in living proximity to parents among sibling children influence intergenerational support to older parents is a question of high significance under the changing family context in contemporary China. Past research has

overwhelmingly focused on the impact of coresident children on elderly support. As the Chinese family remains a strong social unit that tightly bonds its members and the cultural norm of filial piety persistently plays a central role in motivating all adult children to support aging parents, non-coresident children are not negligible sources of support for older parents. For instance, remittances sent back by out-migrant children is an important form of financial support to older adults in rural families. Although some attention has been paid to the support from non-coresident children in rural and urban Chinese families (i.e. Bian, Logan, and Bian 1998; Cong and Silverstein 2008b, 2011a), dyads between a parent and each non-coresident child in the family are treated as not interdependent. Given the massive trend of internal migration in China, the geographic dispersion of non-coresident children varies by families. Although children living far away from parents may be hindered from providing instrumental support to and having in-person contact with parents, they could compensate by assisting parents financially. Oftentimes, depending on their availability in different aspects of support sibling children living at various distance to older parents cooperate and coordinate in elderly support. Therefore, the relativity of a child's own and siblings' living proximity could be an influential factor on within-family differences in intergenerational support to older parents. To my knowledge, this issue has not yet been examined in the Chinese family context.

Taking the perspective of within-family differences in intergenerational support, the study asks two questions. First, how does non-coresident children's relative living proximity to older parents compared to that of their siblings influence their support to parents? Second, how is the association between children's relative living proximity and

provision of support moderated by parents' living arrangement, children's gender, and parents' support to children? Given the substantially different context for rural and urban families, rural-urban differences in the two research questions are also examined. Data for this study comes from the second wave of the China Health and Retirement Longitudinal Study (CHARLS, 2013). This is the first endeavor in the field of Chinese family studies to use the within-family differences approach with data of all sibling children in both rural and urban families, which will provide a significant advance in the study of living proximity and intergenerational support to older parents in China.

## Literature Review

### Within-Family Dynamics of Elderly Support

Intergenerational support to older parents from adult children has been a central topic in social gerontology. When investigating determinants of children's provision of support, most studies in the past were based on a cross-family design, treating each parent-child dyad within or across families independently. It is not until recently that the importance of siblings' influence on intergenerational support has caught researchers' attention. A limited number of studies have taken the within-family dynamics approach to examine how siblings' support to older parents and siblings' characteristics influence a child's provision of elderly support, especially caregiving, in the U.S. and European context (Deane et al. 2016; Leopold, Raab, and Engelhardt 2014; Lin and Wu 2014; Pillemer and Suitor 2006, 2014; Spitze et al. 2012; Tolkacheva, Broese van Groenou, and van Tilburg 2010; Wolf, Freedman, and Soldo 1997). The within-family dynamics approach suggests that multiple parent-child dyads are interdependent in the family. When children make decisions of intergenerational support, they not only consider

parents' need and their own resources, but also take into account the availability of their siblings (Wolf et al. 1997). When multiple sibling children living in different geographic proximity to parents, facing competing demands from other spheres (e.g. work, family), and having different amount and type of resources, they may cooperate or coordinate in providing support in order to meet parents' need (Pillemer and Suito 2006). Therefore, the characteristics of one parent-child dyad and the exchange of support between one child and the parent are correlated to the characteristics and exchange of support between other children and the parent (Pillemer and Suito 2014; Spitze et al. 2012).

Some studies have examined the direct within-family influences, that is, how exchanges of support in one parent-child dyad affect exchanges of support in another parent-child dyad in the family. Contradictory findings were reported. Some scholars found that support from one adult child could be decreased by support from other children to the parent. This includes the situation when support provided by siblings is in the same type of that from the child. For example, children's hours of caregiving (Wolf et al. 1997) although to a limited extent, and children's provision of emotional support (Spitze et al. 2012) are reduced if other siblings provide more of such kind of support to parents. Such a negative within-family influence was also found when siblings provide a different type of support. For instance, a child would provide more caregiving when siblings provide little emotional support to parents (Tolkacheva et al. 2010). However, some scholars obtained opposite findings, suggesting that there is a positive correlation between a child and siblings' provision of support. In caregiving situations involving less needs and simpler tasks, one child's provision of caregiving promotes the same type of caregiving from siblings (Tolkacheva et al. 2010). In addition, high frequency of visiting



with one non-coresident adult child promotes visiting with other sibling children (Deane et al. 2016).

Scholars also went beyond the direct influence of siblings' provision of support on a child's support behavior and investigated how within-family differences in the characteristics of sibling children shape the support. In other words, what characteristics propel a child to be the one providing more support than his/her siblings. The characteristics that have been examined include siblings' gender, age, stepchild status, relationship quality to parents, availability (i.e. competing roles and responsibilities to elderly support, socioeconomic status, and proximity), and past exchange of support with parents (Deane et al. 2016; Leopold et al. 2014; Pillemer and Suitor 2006, 2014; Spitze et al. 2012; Tolkacheva et al. 2010; Wolf et al. 1997). Findings for the effect of these characteristics are not entirely consistent across studies due to differences in the aspect of support examined, the sample parents' need, the social context and the analytical models.

In regard to the effect of within-family differences in living proximity on children's provision of support, researchers found that children's closer living distance to parents, as an indicator of availability, is one of the factors that propel one child among all siblings to be the primary caregiver (Leopold et al. 2014; Pillemer and Suitor 2006, 2014). But there are other more important factors include child's gender (in this case daughters) and affective features of the parent-child relationship, such as being emotionally close and having shared values (Pillemer and Suitor 2006). When it comes to emotional support, one study suggested that siblings' geographic location does not affect emotional support provided by a particular child (Spitze et al. 2012). But another study found that one child's closer distance to parents leads to fewer visits with other children,

whereas living farther to parents is associated with more visits reported by parents with other children (Deane et al. 2016).

### Theoretical Framework

Inconsistent findings in existing literature reveal the complexity of sibling influence on elderly support. To better understand the issue, it is important to distinguish whether support from multiple children in discussion is of the same or different type. As Lin and Wu (2014) pointed out, a positive relationship between a child's and other siblings' support could be the result of "substitution" in caregiving, that is to have another sibling sharing the SAME caregiving activity. In this case, researchers may observe that the likelihood for one child to provide a certain type of support is positively associated with that for other siblings to provide the same kind of support. Alternatively, a negative correlation between a child and other siblings' support behavior could be the consequence of "complement" in caregiving, that is sibling children compensate each other in elderly support by engaging in DIFFERENT support activities. Thus researchers may observe a negative association between a child and other siblings' likelihood of providing the same type of support, but it does not necessarily imply that sibling children provide less support in other dimensions. Lin and Wu's (2014) point of view is in line with the conceptual models of patterns of sibling influence on intergenerational support developed by Spitze and her colleagues (2012). The three models are not necessarily competing with each other and are defined as: (1) Enhancement Model, which describes the scenario of "more promotes more". For example, in-person contact between parents and a sibling child may encourage other sibling children to be more involved in visiting

through joint visits or family gatherings (Deane et al. 2016). (2) Compensation Model, which depicts the situation of “more leads to less elsewhere” or vice versa. For instance, if some children could meet parental need by providing instrumental or emotional support, other sibling children provide less support in these areas (Spitze et al. 2012; Wolf et al. 1997). And (3) Independence Model, which indicates “less coordination” among siblings in providing support. In this case, one child’s characteristics and support behavior are not correlated with that of other sibling children. This study builds its analysis on this theoretical framework and tries to expand it in the Chinese family context.

#### Living Proximity and Other Differentials in Elderly Support in Chinese Families

Studies of living proximity and intergenerational support in China were pervasively based on the cross-family design. In urban families, researchers found that closer living distance is significantly associated with more frequent visiting. Specifically, non-coresident children living in the same neighborhood with parents pay most frequent visits while children living in a different city report the fewest visits (Bian et al. 1998). In addition, having the nearest non-coresident child living in the same neighborhood is associated with receiving more assistance from non-coresident children compared to those whose nearest non-coresident child lives farther (Bian et al. 1998). However, for rural families, farther living proximity between parents and children does not necessarily lead to decreased upward support in all aspects. Out-migrant children, both sons and daughters, provide more financial support to parents than non-migrant children (Cong and Silverstein 2011a; Song, Li, and Feldman 2012). Also out-migration does not necessarily reduce the level of emotional support from children to parents. On the

contrary, some study documented that it is associated with the increased likelihood of providing more emotional support from sons to parents (Song et al. 2012). However, out-migration of children is associated with a lower likelihood of more instrumental support provided by them to parents, while living with parents is associated with providing more instrumental support, and this effect is more pronounced for daughters (Song et al. 2012).

What remains much underexplored is within-family differences in living proximity and intergenerational support in Chinese families. In other words, one child's provision of support to parents is not only influenced by his/her own proximity to parents but also by the living distance between other siblings and parents. A few studies explored the effect of coresident offspring. For urban families, one study found that living with a son significantly reduces the frequency of visiting from non-coresident children, but neither coresiding with son nor daughter affects the assistance provided by non-coresident children (Bian et al. 1998). In rural places, researchers found that living with a daughter-in-law increases the assistance with household chores and personal care from both daughters-in-law and sons but does not change that provided by daughters, while not coresiding with a daughter-in-law is associated with more support from daughters and less help from sons and daughters-in-law (Cong and Silverstein 2008a). Another study found that greater within-family differences in living proximity between parents and children is associated with more within-family variations in relationship quality between old fathers and children but does not influence that for old mothers (Guo, Chi, and Silverstein 2011). Admittedly, whether there is a coresident child among all sibling children heavily moderates the support from non-coresident children. However, given that the rate of intergenerational coresidence is on the decline, it is important to

investigate how non-coresident children coordinate in supporting older parents based on their different living proximity to parents. Moreover, massive internal migration in China increases the physical distance between many parents and adult children in both rural and urban families. It becomes common that among sibling children there are migrant children who live particularly far away from parents (i.e. live in a different county/city or different province). On the one hand, the long living distance may decrease instrumental support to parents, but migration as well as other means of economic gains may facilitate a great deal of intergenerational social mobility of these children, possibly enabling them to provide better financial support to their parents. On the other hand, having migrant children in the family may call for coordination in parental support among sibling children who live closer. However, little is known about the impact of such within-family differences in proximity on intergenerational support from children to parents.

As is reviewed above, living with adult children has impacts on some aspects of support from non-coresident children. Living with an adult child, in most often cases a son, is likely to reduce the amount of financial transfers (Logan and Bian 2003) and the frequency of visiting (Bian et al. 1998), but does not lessen the help from non-coresident children in urban families. Therefore when examining the impact of children's relative living proximity compared to that of their siblings on their provision of elderly support, we need to consider the moderating effect of parents' living arrangement.

Extensive studies have documented the gendered division of elderly support in Chinese families. Different from studies of U.S. families indicating that daughters are more likely to be continuous primary caregivers than sons for parents (Szinovacz and Davey 2013), in rural Chinese families, sons still take the major responsibility for

supporting older parents (Xu 2001). They are found to provide more financial support than daughters (Lei 2013). Thus the out-migration of sons significantly impacts support received by parents while that of daughters does not (Guo, Chi, and Silverstein 2009). However the gendered norm of filial piety is under transformation in rural families. Daughters are considered to be more filial by some rural parents (Shi 2009). Empirically researchers found that daughters do not provide less instrumental and emotional support than sons (Lei 2013). In the situation of the absence of sons for support (i.e. the rural-to-urban out-migration), daughters play an enhanced role in elderly support (Song et al. 2012). In addition, when older parents are under the condition of worse psychological well-being, daughters rather than sons are more reliable in receiving financial, instrumental, and emotional support because only the amount of support from daughters was not significantly reduced by parents' depressive symptoms (Cong and Silverstein 2011b). The gender gap in elderly support is narrower in urban families. Studies consistently reported that daughters, particularly those married and with more resources, play increasingly important and sometimes even more important roles than sons in providing financial (Xie and Zhu 2009), instrumental (Lei 2013; Zhan and Montgomery 2003), and emotional (Lei 2013) support to older parents. Given these gender disparities in elderly support in rural and urban families, non-coresident children's gender may exert a moderating effect on the relationship between children's relative living proximity to parents and their provision of support.

Intergenerational support between children and parents is reciprocal, but the reciprocation is not necessarily matched in the same amount or type of support (Silverstein et al. 2002). For instance, children who received monetary transfers from

parents are more likely than other children to visit and have phone contact with parents and to provide help (Cox and Rank 1992). Some scholars reported that past financial transfers from parents to children is a powerful determinant for the selection of parental caregiver among sibling children (Henretta et al. 1997). But others found that various types of help provided to children in the past do not influence mother's expectation of one child to be the primary caregiver among the siblings (Pillemer and Suitor 2006). Although the norm of filial piety in Chinese families remains strong, scholars suggested that children's provision of support also correlates to the support they receive from older parents. It is found that parents' earlier investment in children or short-term economic support such as housing promotes monetary transfers from children as a repayment or exchange (Lee and Xiao 1998). The other intergenerational exchange in support is described as "time-for-money" (Cong and Silverstein 2008b). There is an increasing prevalence of grandparents caring for grandchildren in both rural and urban Chinese families (Chen, Liu, and Mair 2011; Ko and Hank 2014). It is found that older adults' caregiving for grandchildren is positively associated with the receipt of financial support from adult children (Ko and Hank 2014; Secondi 1997; Yang 1996). Particularly in rural families, out-migrant children send back remittances to their parents who care for the grandchildren in skipped-generation households (Cong and Silverstein 2008b; Secondi 1997). Given the reciprocal nature of intergenerational support in Chinese families, when examining the relation between children's relative proximity to parents and their provision of support, we need to consider whether the association is differ by parental economic support and help in grandchild caregiving.

## Research Significance of the Current Study

The study extends existing literature in several ways. First, most of existing studies of sibling influence on intergenerational support in the U.S. or European family context have focused on a single type of support, and this is often the caregiving for needy parents. My study broadens existing literature by examining sibling influence in two different types of support: financial transfers from adult children to parents and contact between them in Chinese families. Although it is not a direct investigation of how siblings' support in one aspect influences a child's provision of support in the other aspect, observing whether and how sibling influence is different in different types of support offers more information that helps to explain the black box of sibling coordination in elderly support. Taking into account that sibling children may coordinate not only in one but also in different dimensions of support also expands the compensation model for sibling cooperation and coordination in elderly support. As the conceptual model depicts, a child of limited availability may provide less support in a certain aspect, and this could lead to more of this type of support from other available siblings. This study further suggests that "more leads to less elsewhere" could be the situation that a child of a certain resource may provide more support in one aspect but less in the other if they have siblings who are complementary in resources and could compensate them by providing more support in the other aspect. However, if children do not have compensating siblings, they may need to take more responsibilities of elderly support in every aspect.

Second, existing studies of the impact of the relativity of a child and siblings' living proximity on elderly support have been done in the context of western families. Research on the influence of living proximity on elderly support in China has



consistently adopted the cross-family approach. Little is known about sibling influence on a child's provision of support. A few studies have examined whether having a coresident child affects support from other sibling children, but how non-coresident children at different living proximity to parents share elderly support and influence each other in providing support still remain unanswered. To address this gap in existing literature, the study takes the within-family differences approach to examine how the relativity of a child's own and siblings' living proximity to parents influences their economic support to and contact with parents in rural and urban Chinese families. Since the major flow of financial transfers in western families are from parents to children, no study in the general literature has discussed sibling influence on economic support to older parents. In Chinese families, particularly rural families, economic support from adult children to parents is one of the most important aspects of elderly support. The direction of monetary transfers is mainly from adult children to older parents (Secondi 1997). This nature of intergenerational support in Chinese families leads the current study to focus on upward financial support as one of the outcome variables. This study broadens existing literature on within-family differences and influences in elderly support to non-western family contexts that are deemed as embedding strong family solidarity and value of filial piety, which could involve more coordination and influences between sibling children in supporting older parents from various dimensions.

Finally, as is reviewed above differentials in elderly support are founded in Chinese families by parents' living arrangement, children's gender, and received support from parents. The current study tries to provide a more nuanced story for sibling influence on intergenerational support by taking into account whether and how these

characteristics of older parents and adult children moderate the relationship between children's relative living proximity and provision of elderly support.

### Research Hypotheses

Intergenerational support from non-coresident children to parents can vary considerably by how far away or close by they live from/to parents compared to that of their siblings. Among sibling children, living relatively farther from parents means no matter whether the actual living distance between the child and parents is short or long, other siblings live closer to parents. Living relatively closer to parents means regardless of the child's actual living proximity to parents is close or far, other siblings live farther from parents. Living relatively farther from parents than other siblings may decrease a child's provision of instrumental and emotional support, which could be manifested by lower contact frequency with parents. This is because, on the one hand, farther distance makes it more difficult for providing instrumental support and inhibits chances for in-person contact. On the other hand, siblings who live closer may pay more visits to parents and be the ones that parents are more likely to rely on for instrumental support in times of need. Given the sibling coordination in elderly support, children who live comparatively farther may feel less obligated than their closer siblings to keep frequent contact with parents. However, living farther than siblings from parents does not mean that children do not provide any support. On the contrary, relatively farther living proximity may result in more economic support from children to parents. The financial transfers could be viewed as these children's compensation for insufficient support in other aspects. It could be an exchange of parents' caregiving for their children. It could also be the way they share the responsibility of elderly support with siblings. Those live farther away are

oftentimes the better off ones among siblings either because of rural-to-urban migration or urban migration to large cities for job opportunities. Therefore, the economic capacity enables these relatively farther children to contribute in sibling cooperation of elderly support by monetary transfers. Whereas, living closer to parents than other siblings means that children may need to share a larger portion of instrumental support to parents. Given the unavailability of farther siblings, they may also have high contact frequency with parents, both by visits and phone calls. However these children provide less financial support because parents could receive remittances from other children who live farther away. Moreover, if all non-coresident children live at similar proximity to parents, they may share every aspect of intergenerational support more equally than children with greater within-family differences in living proximity. For example, these children may provide more economic support to parents than those who have siblings living farther than them, and they may also have more contact with parents than those who have siblings living closer to parents. Therefore, follows the compensation model the first hypothesis of the study is that within the family, children living in relative different proximity to their parents provide different levels of support. Specifically:

H1a. Among sibling children, those who live the farthest among siblings provide the highest level of economic support, while the ones live the closest among siblings provide the lowest level of economic support.

H1b. Among sibling children, those who live the farthest among siblings have the lowest level of contact with parents; whereas those live the closest among siblings have the highest level of contact.

H1c. Children who do not have sibling living closer or farther than them share the responsibility more equally and provide moderate economic support and contact.

Since the contexts for rural and urban families are quite different, the study also tests the rural-urban differences in the relation between non-coresident children relative living proximity to parents and their provision of support. Given that urban families are generally wealthier than rural families and aging parents in cities are more financially independent, remittances sent back by rural-to-urban migrant children could be more important to rural parents than the financial transfer to urban parents from children who live far away. But the patterns of contact with parents associated with children's relative living proximity are not that different for rural and urban families. Therefore, the second hypothesis of the study is that:

H2a. The differences in children's provision of economic support associated with their relative living proximity are larger for rural families than urban families.

H2b. The rural-urban disparity is less prominent in the association between non-coresident children's relative living proximity and their frequency of contact with older parents.

To what extent that children's relative living proximity influences their provision of support to parents also depends on parents' living arrangement. In regard to economic support, for parents who do not live with children support from non-coresident children is more crucial. There may be a clearer pattern of cooperation in economic support between non-coresident children at different geographic proximity as hypothesized above. If parents are coresident with children, particularly with sons, financial transfers from non-coresident children are less important because the coresident son may take the main

responsibility in supporting older parents' living expense. Therefore, fewer differences may be found in economic support from non-coresident siblings at relatively different distance. I also expect that such a moderating effect of parents' living arrangement is less likely to be observed in rural parent-noncoresident child dyads than their urban counterparts, because for rural families, remittances sent back from the farthest children among siblings could be the most important economic support for parents, thus parents' living arrangement will not change patterns of children's economic support associated with relative proximity. In terms of contact between parents and non-coresident children, the contact from non-coresident children in different living proximity may be less affected by parents' living arrangement. Although literature suggested that coresidence with sons reduces non-coresident children's visiting in urban families (Bian, Logan and Bian 1998), it is also found that migrant children retain strong emotional bonds with parents in rural area (Song, Li and Feldman 2012). Parents' coresidence may let non-coresident children feel less obliged to pay a visit but having phone call and sending message are convenient ways of keeping contact. Thus when measuring contact by including all means, parents' living arrangement may not have an influential impact on the relationship between children's relative living proximity and their contact with parents. Therefore, the third hypothesis of the study is that:

H3a. The influence of children's relative living proximity on their provision of economic support is different by parents' living arrangement for urban parent-noncoresident child dyads. Coresiding with children, particularly sons, makes the difference less prominent between economic support from non-coresident children at different relative living proximity.

H3b. Compared to its moderating effect on economic support, the moderating effect of parents' living arrangement is less prominent on the association between children's relative living proximity and their contact with parents for both rural and urban families.

The gendered division of elderly support declines but persists in Chinese families. Sons are expected to play the preponderant role in supporting older parents particularly in rural families. But existing studies continuously found that daughters' support becomes increasingly important and reliable, especially when there is an absence of sons. Gender disparities in elderly support could be more prominent in rural families. Among non-coresident children in rural families, the out-migrant sons are expected to provide more economic support to older parents than out-migrant daughters; while sons who live closer among siblings are more likely to be the primary caregiver than close-by daughters. Therefore, I expect that rural daughters at different relative living proximity more equally share the responsibility of supporting parents either in terms of financial assistance or contact, while the differentials in support associated with relative living proximity are larger among rural sons. The fourth hypothesis of the study is that:

H4a. The relationship between children's relative living proximity to parents and their provision of economic support is conditional on non-coresident children's gender particularly for rural families. The pattern that relatively farther children provide more economic support is more prominent among rural non-coresident sons than daughters.

H4b. The association between children's relative living proximity to parents and contact with parents is also moderated by children's gender particularly for rural families. The pattern that living relatively closer among siblings promotes intergenerational

contact with parents is also more prominent among rural non-coresident sons than daughters.

Intergenerational support is a reciprocal process. In Chinese families, adult children support older parents financially, instrumentally, and emotionally. While helps that often provided by older parents include financial transfers and caregiving for grandchildren. The receipt of intergenerational support from children could be conditional on whether and how parents help their children. There are situations that parents assist adult children financially, but this is less common in rural families since rural older adults do not fare well as their urban counterparts, thus less able to provide such kind of support. The downward financial support usually implies that children are not in a good financial situation and thus unable to support parents financially or parents are not needy for economic support. Therefore, if children receive financial support from parents, less difference will be observed in their provision of economic support associated with relative different living proximity to parents. However, supported by parents financially adult children could have a strained relationship with parents because their achievement may not meet parental expectation, which could lead to less intergenerational contact. This could diminish the effect of close living distance on more frequent intergenerational contact. In both rural and urban families, older parents help with grandchild caregiving. Older parents helping with childcare could receive more economic support and contact from children being helped. Greater support from these children could be viewed as an exchange for parents' help and a way to express their concern for both parents and the left-behind children. Specifically, remittances sent back by out-migrant children to rural parents probably support the living expense for both

parents and the left-behind children. Therefore, the effect of children's farther living distance on provision of more financial support is enlarged while its effect on having less intergenerational contact diminishes. The study finally hypothesizes that:

H5a. The relationship between children's relative living proximity to parents and their provision of economic support depends on whether parents provide economic support or grandchild caregiving to them. In urban families, receiving parental financial support results in fewer differences in providing such support associated with children's relative living proximity. Yet in both rural and urban families, receiving parents' help on childcare magnifies differences in providing economic support to parents by children's relative living proximity.

H5b. The association between children's relative living proximity and their contact with parents is also conditional on whether parents assist in financial problems or in childcare. In urban families, receiving economic support from parents narrows the gap in intergenerational contact by children's relative living proximity. In addition, in both rural and urban families receiving parental support in childcare also reduces differences in contact frequency with parents by children's relative living proximity.

## Methods

### Data

The study tests these hypotheses by using the second wave from the China Health and Retirement Longitudinal Study (CHARLS, 2013). CHARLS is an ongoing biennial survey based on a nationally representative sample of Chinese residents at age 45 and over in China. CHARLS collected detailed information on a full range of intergenerational support and exchange between older adults and each of their non-



coresident children. It also documented the living distance between parents and each child. Thus, the data provides a unique opportunity to answer the questions raised by this study. This study includes older adults aged 50 and over with at least one living non-coresident adult child aged 18 and over. The unit of analysis is parent-noncoresident child dyad. The total sample of this study contains dyads between these respondents and each of their non-coresident children. The study further divides the dyad sample into the rural and urban subsample based on whether older parents live in rural or urban area. In the total dyad data, the percentage of missing is 6.69%, 4.76%, and 5.57% respectively for children's provision of economic support, children's contact with parents, and parents' provision of economic support to children. Missings for all other variables are under 1 percent. Omitting observations with any missing, the final total sample contains 27,197 parent-noncoresident child dyads nested in 11,044 older parents, in which 18,189 dyads are of rural parents and 9008 dyads are of urban parents.

## Measures

To answer the first research question, the key independent variable is non-coresident children's relative living proximity to parents compared to that of other non-coresident siblings. Whether there are children coresiding with parents is controlled by another independent variable measuring parents' living arrangement. The survey interviewed older adults about the place that each of his/her child normally lives at the time of interview. The answers are based on a 1 to 7 scale representing the living distance between the child and the respondent: (1) this household, but economically dependent; (2) this household, but economically independent; (3) the same or adjacent

dwelling/courtyard with the respondent; (4) another household in the village/neighborhood that the respondent lives; (5) another village/neighborhood in the county/city/district that the respondent lives; (6) another county/city/district or province; (7) abroad. I take two steps to create the indicator of non-coresident children's relative living proximity to parents. Table 1 illustrates the process. First, based on the absolute living proximity of each child and their siblings to parents, I create three dummy variables indicating that among all non-coresident siblings of a non-coresident child, whether the child has siblings living closer than him/her to parents, whether the child has siblings living in the same proximity as him/her to parents, and whether the child has siblings living farther than him/her to parents. The combinations of these three dummy variables provide 8 mutually exclusive categories of non-coresident children's relative living proximity to parents compared to that of their siblings. Second, I simplify the variable into 5 categories by combining category 5-8 because of their shared characteristics. Therefore, the first category is children who are the only non-coresident child of parents. These children do not have other non-coresident siblings to share the responsibility of elderly care or coordinate in elderly support. The second category is children who are the only child living farthest from parents among all non-coresident siblings. There is neither a sibling living farther than them nor as far as them from parents. The third category is children who are one of the children living farthest from parents among non-coresident siblings. This is a similar category to the second one but children in this category have siblings who live as far as them from parents. Different from category 2, since children have siblings living at the same far distance as them than other siblings, they may share the responsibility of support with these far away siblings.

The fourth category is children who live in the same proximity as all other non-coresident siblings to parents. These children do not have siblings living closer or farther than them, rather all the other siblings living at the same distance as themselves to parents. If not considering other determinants of elderly support, these children are most likely to equally share the responsibility with siblings due to the same proximity. The fifth category is children who are the only or one of the children living closest or in middle proximity to parents. As is shown in Table 1, this category combines four subcategories. This is the only group of children who have siblings living farther than them from parents. Since these children live relatively closer to parents than some or all other siblings they may take more responsibilities of instrumental and emotional support manifested by greater contact, and take less responsibilities of economic support.

- Table 1 about here -

The distribution of this variable in the parent-noncoresident dyad data is presented in Table 2. The reference category is dyads of parent and the child who has siblings living farther from parents than him/her. The percentage of this category in the total sample is a little over one-third (32.8%) and is lower in the urban subsample (28.8%). 11.5% of the dyads are older parents with the only non-coresident child and such a percentage is much higher in the urban subsample than the rural subsample. 11.3% of the dyads are parent and the child being the only one living farthest from parents among siblings, and such a percentage is similar between the rural and urban subsample. 15.8% of the dyads are parent and the child who is among the siblings living farthest from parents, and this percentage is lower in the urban subsample. Near one-third (28.7%) of

the dyads are parent and the child who and whose siblings living at the same proximity to parents. This percentage is a little higher in the urban subsample.

- Table 2 about here -

Parents' living arrangement is another important independent variable. Shown by Table 2, not living with adult children is the most prevalent living arrangement for older adults in both rural and urban areas. Among coresident parents, living with son is still the norm. Almost one-third (28.5%) of the parent-child dyads are parent who is coresident with son. This percentage is similar between the rural and urban subsample. Only 4.1% of the dyads are parent coresiding with daughter, and this percentage is higher among urban dyads (5.1%) and lower among rural dyads (3.6%).

The dependent variables of the study are intergenerational support from non-coresident children to older parents including economic support and contact frequency. The survey asked parents to report the exact amount of money support and in-kind support they received from each non-coresident child in the past year. I categorize the sum of money and in-kind support in each parent-noncoresident child dyad into four ordered categories, from 1= zero RMB to 4 =1500+ RMB. The majority of adult children provide economic support to older parents to different extent. Only a quarter (24.4%) of the rural parent-child dyads do not involve any upward economic support, while this percentage is a little higher for the urban subsample (28.8%). Parents reported on a 1-10 scale about how often do they have in-person contact and contact by phone, text message, mail or email with each non-coresident child. I use the highest contact frequency among face-to-face and other means of contact in each dyad and further categorize it into four ordered categories, from 1 = once a month or less to 4=almost every day. The majority of

children have 1-3 contacts with parents per week. In general more intergenerational contact is observed in urban rather than rural parent-child dyads.

Key control variables include characteristics of both older parents and non-coresident children. For older parents the study controls for their age, gender, marital status, socioeconomic status (education, income, *hukou*, and working status), self-reported health and their provision of economic support and grandchild caregiving for each non-coresident child. For non-coresident children, age, gender, marital status, child status as biological or not, and SES (education, *hukou*, and working status) are controlled.

### Analytical Strategy

By using parent-noncoresident child dyad data, I examine how children's relative living proximity to parents compared to that of other non-coresident siblings influences their provision support. Two aspects of intergenerational support are investigated including economic transfers and contact. Since they are measured respectively by ordinal categorical variables, I use ordered logistic regression models for the multivariate analysis. In order to test rural/urban differences in the question, the same ordered logistic regression models are also run in the rural and urban subsamples. The equation is presented below. Considering that non-coresident children are nested in the respondent, and the respondent and his/her spouse (if interviewed) enter the original data as two different observations, standard errors for each regression model were adjusted for clustering by household in the data.

$$\ln\left(\frac{p_{y \leq c}}{p_{y > c}}\right) = \beta_0 + \beta_1 R_i + \beta_2 L_i + \beta_3 P_i + \beta_4 C_i + u_i \quad (1)$$

In equation (1),  $R_i$  is the child's relative living proximity to the parent in the parent-noncoresident child dyad  $i$ ,  $L_i$  is the parent's living arrangement,  $P_i$  and  $C_i$  respectively represents the controlled characteristics of the parent and the child in the dyad. Key independent variables and different groups of control variables are added step by step. Since the effect of key independent variables remains robust across models, I only present full models in the results section.

Then, in order to examine whether the effect of children's relative living proximity on their provision of support to parents is moderated by parents' living arrangement, non-coresident children's gender, and parents' provision of support, as illustrated by equation (2), I add the interaction term between the key independent variable of children's relative living proximity and these variables one at a time to the basic model. Again to test whether there are rural-urban differences, ordered logistic regression models with interaction effects are run for the rural and urban subsamples.

$$\ln\left(\frac{p_{y \leq c}}{p_{y > c}}\right) = \beta_0 + \beta_1 R_i + \beta_2 L_i + \beta_3 R_i * L_i + \beta_4 P_i + \beta_5 C_i + u_i \quad (2)$$

## Results

### Within-Family Differences in Economic Support by Living Proximity

Results in Table 3 clearly suggest that children's relative living proximity to parents influences their provision of financial support, and such effects are different for rural and urban parent-noncoresident child dyads. In the total sample, first it is found that children who live farthest from parents among all sibling children provide significantly more economic support. Results presented in Table 3 and further tests on the difference between coefficients for different categories of the key independent variable indicate that

being the only or one of the children living farthest from parents among all siblings are associated with the highest likelihood of providing more economic support than children in all the other categories of relative living proximity (respectively, the odds of being in a higher level of economic support is 1.363 and 1.329 times than that of children who are the only or one of the children living closest or in middle proximity to parents). Second, being the one who lives closer to parents among siblings is associated with the lowest likelihood of providing more economic support. As the reference group, those who are the only or one of the children living closest or in middle proximity to parents are the ones who live relatively closer to parents and have siblings living farther than them. The odds for them to be in a category of providing greater economic support are significantly lower than that for all the other groups of children except for those who are the only non-coresident child. Third, the likelihood of providing more economic support falls in the middle for children who do not have siblings living closer or farther than them to/from parents. In addition, parents' living arrangement also impacts children's economic support. Compared to non-coresident parents, living with a son significantly reduces the likelihood of receiving more economic support from non-coresident children, but coresiding with daughter does not have such a negative effect.

Results of rural parent-noncoresident child dyads are quite similar to that of the total sample, and the coefficient for each category of children's relative living proximity is larger. Findings further strengthen the argument that being the children who live closer to parents among siblings provide the least economic support, because the odds for them to be in a higher category of economic support is lower than all the other categories including those who are the only non-coresident child. However, results of urban parent-

noncoresident child dyads are different. Regression results and further tests on coefficients of the key independent variable indicate that there are fewer differences in the provision of economic support among sibling children at different relative living proximity in urban dyads. The only significant coefficient supports the argument that living farther from parents among siblings is associated with providing a higher level of economic support. Parents' living arrangement does not significantly influence children's economic support.

All control variables behave in expected directions. In general, married parents with rural *hukou* and who provide economic support or grandchild caregiving to children are more likely to receive greater economic support from non-coresident children. Older non-coresident children and non-coresident sons are less likely to provide greater economic support. Married, biological non-coresident children with higher socioeconomic status are more likely to provide more economic support.

- Table 3 about here -

#### Within-Family Differences in Contact by Living Proximity

Results in Table 4 clearly show that children's relative living proximity affects their contact with parents, and such effects are consistent across the total sample and rural/urban subsamples. For the total sample, first, children who live farthest from parents among siblings have significantly less contact with parents. Regression results and further tests on coefficients of the key independent variable indicate that being one of the children living farthest from parents has the lowest likelihood of being in a higher contact category (i.e. they are only 0.290 times as likely as children who live closer to parents



among siblings to have more contact with parents). Being the only child living farthest from parents is associated with having the second low likelihood of being in a higher contact category. Second, Living closer to parents among all siblings is associated with the highest contact frequency with parents. It is found that those who are the only or one of the children living closest or in middle proximity to parents have the highest likelihood of having higher contact frequency with parents compared to all other categories. Third, contact frequency between parents and children who do not have siblings living farther or closer than them from/to parents falls in the middle. The odds of having a higher level of contact frequency with parents is 0.639 and 0.521 times smaller respectively for those being the only non-coresident child and those having all siblings living at the same distance as themselves. In addition, parents' living arrangement does not influence their contact with non-coresident children in the total sample and rural subsample. But living with son significantly reduces the likelihood of having greater contact with non-coresident children for urban parents.

Patterns of the influence of children's relative living proximity on contact in rural and urban subsamples are similar to that in the total sample, indicating that different from the rural-urban differences found for the impact of children's relative living proximity on economic support, there are few rural-urban differences in the effect of this variable on contact.

All control variables behave in expected directions. In general, older, rural parents, fathers, those currently working, and those having poorer health have less contact with non-coresident adult children. Married parents with higher education and who provide economic support or grandchild caregiving to non-coresident adult children

have greater contact with them. Non-coresident sons, married, biological children with higher education have more contact with parents, while working children have less contact with parents.

- Table 4 about here -

#### The Moderating Effect of Parents' Living Arrangement, Non-coresident Children's Gender, and the Exchange of Support

Then I examine how the relationship between children's relative living proximity and provision of support is moderated by parents' living arrangement, non-coresident children's gender, and parents' provision of economic support and grandchild caregiving for both rural and urban parent-noncoresident child dyads. Interaction effects between children's relative living proximity and these variables are tested respectively for economic support and contact in the total sample and rural/urban subsamples. Figure 1-6 only presents the predicted probabilities of significant interaction effects, holding all other variables in models at their means. If the interaction effect is significant in both the total sample and rural/urban subsamples and patterns are similar across samples, predicted probabilities are presented only for subsamples in figures. Full models of all significant interaction effects in the total sample and rural/urban subsamples are presented in appendix 1-6.

Results suggest that the effect of children's relative living proximity on their support to parents is conditional on parents' living arrangement. For economic support, the significant interaction effect is found for the total sample and the urban subsample. First, predicted probabilities presented in Figure 1 and further tests on coefficients of the

interaction effect indicate that for the urban subsample, overall differences in the predicted probabilities of providing the highest level of economic support associated with children's relative living proximity are much larger for parents living with daughters than for non-coresident parents and parents who are coresident with sons. In other words, the effect of children's relative proximity on provision of economic support is less prominent when parents are coresident with sons than coresident with daughters. Second, the study tests that for each category of relative living proximity whether the predicted probabilities of providing the highest level of economic support are significantly different by parents' living arrangement. Compared to non-coresident parents and parents living with sons, coresiding with daughters significantly decreases the predicted probabilities of providing the highest level of economic support for those who are the only child living farthest from parents and those who live closer than other siblings. Noticing that if parents are coresiding with daughters, being the only child living farthest no longer provide more economic support than other non-coresident children, rather they provide nearly as little as those living closer to parents. In sum, children living relatively farther provide more support among siblings, but if parents are coresident with daughters the likelihood of these children providing the highest level of economic support significantly decreases. Those who live closer to parents among siblings already provide less economic support, and if parents are coresident with daughters, they provide further less. Results suggest that parents' living arrangement does not make a difference in the effect of children's relative living proximity on their provision of economic support to rural parents.

- Figure 1 about here -

For contact between parents and non-coresident children, the significant interaction effect between children's relative living proximity and parents' living arrangement is found for the rural and urban subsamples, but not for the total sample. As is shown in Figure 2, patterns are quite similar for the rural and urban subsamples. First, in general the moderating effect of parents living arrangement on the relationship between children's relative living proximity and their contact with parents is not as large as that for economic support. No matter of parents' living arrangement, children who live farther than other siblings or being one of the children living farthest have significantly less contact with parents, while children who live closer and having siblings living farther have significantly more contact, and this pattern is more prominent in the urban subsample. Second, parents' living arrangement makes a difference in specific situations. For example, in the rural subsample, it is found that for those who living in the same proximity as all other siblings to parents, they have significantly higher predicted probabilities of being in the highest category of contact if parents are coresident with either son or daughter than if parents are not coresident. In the urban subsample, for those who are the only child living the farthest from parents, they have significantly less contact with parents and such a decrease in predicted probabilities of having more contact with parents is significantly larger when parents are living with sons or daughters than when parents are not coresident with children.

- Figure 2 about here -

The effect of children's relative living proximity on their support to parents is also different by non-coresident children's gender. For economic support, the significant interaction effect is found for the total sample and the rural subsample. Figure 3 indicates

that among rural parent-noncoresident child dyads, the effect of children's relative living proximity on their provision of economic support depends on non-coresident children's gender. First, compared to sons, daughters' provision of economic support is less affected by their relative living proximity to parents. Differences in predicted probabilities of providing the highest level of economic support are much smaller between different categories of relative living proximity for daughters than for sons. Second, both daughters and sons who are the only or one of the children living farthest from parents have higher predicted probabilities of providing the highest level of economic support. For these two categories of relative living proximity, no gender difference is found. However, for other three categories, significant gender differences are found. Being in these categories in general is associated with providing less economic support, and this effect is stronger for sons than for daughters.

- Figure 3 about here -

As for contact between parents and non-coresident children, significant interaction effect between children's relative living proximity and their gender is found for the total sample and both the rural and urban subsamples, suggesting that the effect of children's relative living proximity on their contact with parents is conditional on their gender. Patterns of gender differences are similar across the total sample and the rural/urban subsamples. First, Figure 4 shows that similar to gender differences found for economic support, differences in contact brought by children's relative living proximity to parents are larger for sons than for daughters. Second, in general being the only or one of the children living farther than other siblings is associated with less contact with parents, and such a decrease in predicted probabilities of having the highest level of

contact with parents is significantly larger for sons than for daughters. In addition, being children who live closer and having siblings who live farther from parents is generally associated with having higher contact frequency with parents, and such an increase in predicted probabilities of being in the highest contact frequency category is larger for sons than for daughters.

- Figure 4 about here -

Finally, parents' provision of support makes a difference in the influence of children's relative living proximity on their support to parents. The study tests the interaction between children's relative living proximity and parents' provision of economic support and grandchild caregiving to non-coresident children. In regard to the relationship between children's relative living proximity and provision of economic support, parental economic support to children does not have a moderating effect. However, parents' provision of grandchild caregiving matters. The significant interaction effect is found for the total sample and the rural subsample. Figure 5 indicates that for the rural subsample, differences in children's provision of economic support to parents associated with their relative living proximity become more prominent if parents have provided grandchild caregiving for children. Among those who are one of the children living farthest from parents and those living in the same proximity as all other siblings to parents, if parents have provided grandchild caregiving, these children provide significantly more economic support to parents than those who do not have parental help with childcare. In sum, being living farther than other siblings is associated with providing significantly more economic support to parents, and when parents have

provided caregiving for offspring of these non-coresident children, the children provide even greater economic support to parents.

- Figure 5 about here -

As for the association between children's relative living proximity and contact with parents, no moderating effect from parental help with childcare is found. Parents' provision of economic support is found to play a role on the relationship between children's relative living proximity and their contact with parents for the urban subsample. Results presented in Figure 6 suggest that whether or not parents have provided economic support to children significantly influences children's contact with parents for those who live closer among siblings. These children are supposed to have more contact with parents than other siblings, but their contact with parents significantly reduces if parents have provided economic support to them.

- Figure 6 about here -

## Discussion

Due to differentials in availability, adult children cooperate and coordinate in intergenerational support in order to meet older parents' need (Spitze et al. 2012). Findings of this study provide evidence for the argument that the responsibility of elderly support is shared across sibling children at different living proximity to parents. Much of the previous work on the impact of living proximity on children's provision of support in China has been based on a cross-family design, treating parent-child dyad either within or between families independent from each other. Some recent studies in the U.S. and European contexts have shown significant within-family differences in intergenerational support, suggesting that the characteristics of and the support in one parent-child dyad are

interdependent with that in other parent-child dyads in the family (Deane et al. 2016; Leopold et al. 2014; Pillemer and Suitor 2006, 2014; Spitze et al. 2012; Tolkacheva et al. 2010; Wolf et al. 1997). No study of Chinese families has focused on the impact of within-family differences in children's living proximity on elderly support. This study addresses this gap in literature by introducing the concept of children's living proximity in relativity to that of their siblings.

First, the study finds that children's relative living proximity to parents compared to that of their siblings influences their provision of economic support to and contact with older parents. Findings confirm the first hypothesis and also provide evidence for the compensation model (Spitze et al. 2012) which describing the coordination of elderly support among sibling children as receiving support from one child is related to less receipt of this kind of support from other children. Results suggest that children who live relatively farther among siblings provide the highest economic support, lessening the responsibility in this aspect for siblings living closer than them. Relatively longer living distance of a child among siblings may imply his/her migrant status, which could be associated with higher economic capacity than siblings who live closer to parents. The study also finds that consistent with what was reported by the previous study for the U.S. family (Deane et al. 2016), among siblings, close-by children have the most frequency contact with parents while far away children have the lowest. Contact between non-coresident children and parents provides the opportunity structure for assistance in housework, caregiving, and emotional support for parents. Such types of support in general require close proximity or frequent travel. Thus close-by children provide more support in these aspects, offsetting the insufficiency of such support from far away



children. Furthermore, findings of the study broaden the compensation model by incorporating sibling children's coordination across different types of support. A specific child may provide more support in one aspect due to his/her availability and provide less support in the other aspect due to his/her limitation, while other siblings may provide support in a compensatory pattern because their availability and limitation are in an opposite situation. Results show that on the one hand, children who live farther from parents among his/her siblings provide the greatest economic support but have the least contact with parents. This result is consistent across the total sample as well as the rural and urban subsamples. On the other hand, being the one who live closer to parents among siblings is associated with providing the lowest level of economic support, but having the most frequent contact with parents. These findings imply that there is strong adult sibling solidarity (Allan 1977) among sibling children in the Chinese family. Adult siblings at different living distance to parents rely on each other and coordinate/cooperate in elderly support. This study suggests that the coordination of elderly support among non-coresident siblings in Chinese families could be based on their geographic availability as well as the economic capacity implied by their relative geographic location. Findings of the study demonstrate the value of considering support from one child to his or her older parents in a context of interdependent parent-child dyads nested in the larger family network. Applying the within-family differences approach to the study of intergenerational support in Chinese families contributes to explaining the complexity in the process of intergenerational support among multiple adult children within the family.

Results for the rural and urban subsamples support the second hypothesis.

Substantial differences are found between rural and urban parent-noncoresident child

dyads for the influence of children's relative living proximity on upward economic support but not on intergenerational contact. Results show that there are fewer differences in provision of economic support between children at different relative living proximity to parents in the urban subsample than in the rural subsample. In other words, children's provision of economic support in rural parent-noncoresident child dyads more deeply depends on the relativity of their own and siblings' proximity to parents than their urban counterparts. This means that the economic support from non-coresident children to rural parents involves more coordination among siblings at different geographic proximity. It is probably because the availability of financial support varies to a larger extent among rural siblings, with those living farthest to be much more able to support due to their migration status. In addition, monetary transfers from adult children could be more important for rural older parents since they are less economically independent. Thus non-coresident children of rural parents have a clearer division of the responsibility of economic support among siblings in order to ensure the support comes from the most available children.

To understand the elderly support arrangement among sibling children, it is not enough to solely observe the efficient allocation of resources and children's availability by proximity, rather differences in parents' living arrangement, the gendered division of support, and the reciprocity between parents and adult children all play a role in shaping non-coresident children's provision of elderly support. The study finds that the association between children's relative living proximity and provision of support is moderated by parents' living arrangement, non-coresident children's gender, and parents' support to children. Consistent with hypothesis 3a, it is found that the effect of children's

relative proximity on provision of economic support is less prominent if parents are coresident with son, and such a moderating effect of parents' living arrangement is only found for urban parent-noncoresident child dyads. These results provide evidence for the importance of out-migrant children's remittances in rural families reported by existing studies (Cong and Silverstein 2011a; Song et al. 2012). Children who live farthest from rural parents among siblings are most likely to be the rural-to-urban migrants. They provide the greatest economic support among siblings no matter whether their parents live with any child, because these children are often more economically well off than other siblings and their remittances play a crucial role in supporting rural parents. However in urban families, coresident older parents often live with wealthier sons. The wealthier coresident son could pay for the living expense needed by older parents. Therefore, the overall importance of non-coresident children's financial support decreases, thus the gap in economic support between relatively farther and closer non-coresident siblings is narrowed. Moreover, consistent with hypothesis 3b the effect of parents living arrangement on the relationship between children's relative living proximity and their contact with parents is not as large as that for economic support. Contact with non-coresident children to a larger extent is determined by children's relative living proximity among siblings rather by parents' living arrangement. Also being consistent with previous literature (Bian et al. 1998), it is found that for urban parents living with a child may further reduce contact from non-coresident children who live farther away among siblings.

Results also support the fourth hypothesis. First, consistent with hypothesis 4a, in rural families daughters' provision of economic support is less affected by their relative

living proximity to parents than sons'. Non-coresident sons who live closer than other siblings give much less monetary support to parents, while such a large decrease in financial transfers associated with closer proximity is not that conspicuous for daughters. Second, similar to the gender difference found for economic support, differences in contact associated with children's relative living proximity to parents are smaller for daughters than for sons in both rural and urban families, which provides evidence for hypothesis 4b. Sons' contact with parents is affected by their relative living proximity to a larger extent than daughters'. In general, being the only or one of the children who live farther than other siblings is associated with a lower contact level with parents, and such a decrease in predicted probabilities of having the highest contact level with parents is significantly larger for sons than for daughters. If living closer than other siblings to parents, sons have a significantly higher likelihood of having the highest contact level with parents than daughters. These findings strengthen the argument that the gendered division of elderly support in Chinese families remains and it is stronger in rural than in urban families. Sons, particularly rural sons still take the major responsibility of supporting older parents (Lei 2013; Xu 2001). Since sons, especially rural sons, take more responsibilities in elderly support than daughters, there is a clearer pattern of coordination in support associated with relative living proximity among sons than daughters. In rural families, out-migrant sons who live farthest among siblings take the main responsibility of financial support, while sons living closer than other siblings could be the primary caregiver for parents, thus being less obligated in economic support and more engaged in assistance with housework and caregiving manifested by much higher contact levels with parents. Daughters, particularly rural daughters, play a substitute role

if they have male siblings. Out-migrant daughters who live farther away than siblings do not provide as much economic support as that from out-migrant sons. Daughters who live closer than other siblings do not have as much contact as close-by sons with parents. Therefore, daughters' provision of support is less influenced by their relative living proximity to parents among siblings. But it is worth noting that when a daughter is the only non-coresident child of rural parents, she provides significantly more economic support than those who are the only non-coresident son.

The fifth hypothesis is partially supported. Some types of support from parents to non-coresident children moderate parents' receipt of certain types of support from children at different relative living proximity. First, consistent with hypothesis 5a, differences in children's provision of economic support associated with their relative living proximity are larger if rural parents have provided grandchild caregiving for children. Living farther than other siblings is associated with providing significantly more economic support. When these children have been helped by rural parents with childcare, they send even more money to parents. This finding depicts the exchange of support between out-migrant children and older parents who stay in rural areas caring for the left-behind offspring of migrant children and it is consistent with findings from previous literature (Cong and Silverstein 2008b). Migrant children send back more remittances to parents as an exchange for the childcare provided by parents and also as a way to economically support older parents' and younger children's lives. Second, supporting hypothesis 5b, parents' provision of economic support is found to be influential on the relationship between children's relative living proximity and their contact with parents for the urban subsample. Fewer differences are observed in children's contact with

parents associated with their relative living proximity. This is because children who live closer to parents among siblings are supposed to have more contact with parents, but this positive effect of living proximity diminishes if parents have provided economic support to these children. A possible explanation could be that children who are not economically independent in their adulthood do not satisfy parental expectation for them thus leading to a more strained relationship with parents which could involve less intergenerational contact.

The study in several ways contributes to research on the impact of within-family differences in proximity on elderly support. It applies the theoretical approach to the Chinese family context, broadens the compensation model by taking into account different types of support, and models the moderating effect from other characteristics of parent-noncoresident child dyads. But the study is not without limitation. First, the cross-sectional data prevents the study from drawing conclusion about the causal effect of within-family differences in proximity on elderly support. There could be an issue of endogeneity in the effect of proximity on contact. Children who have close relationship with parents may choose to live closer, or children may move closer to parents in order to help with parents' need. In both situations, the relationship between children's relative living proximity and contact with parents is confounded. Second, although the study discusses about the coordination in elderly support among sibling children, it is an inference from findings for different aspects of support associated with within-family differences in children's proximity. To further validate the within-family influences among sibling children in their provision of support, the next step of the study is to test the direct influence of one child's provision of support on the support provided by

another sibling from a different living distance in rural and urban Chinese families. Finally, the current study does not examine instrumental support from non-coresident children because such support heavily depends on parental needs, while the proportion of needy parents is small in the working sample of older adults cut off by age 50. The future plan is to examine within-family influences in instrumental support in an older subsample of aging parents in China.

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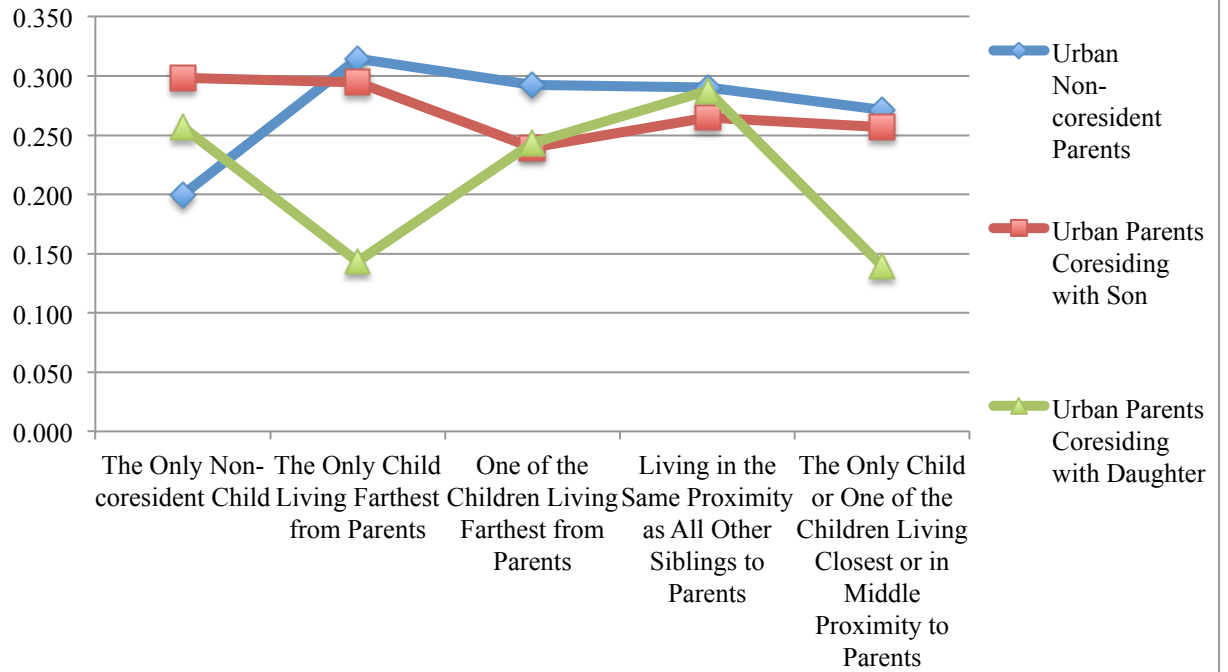
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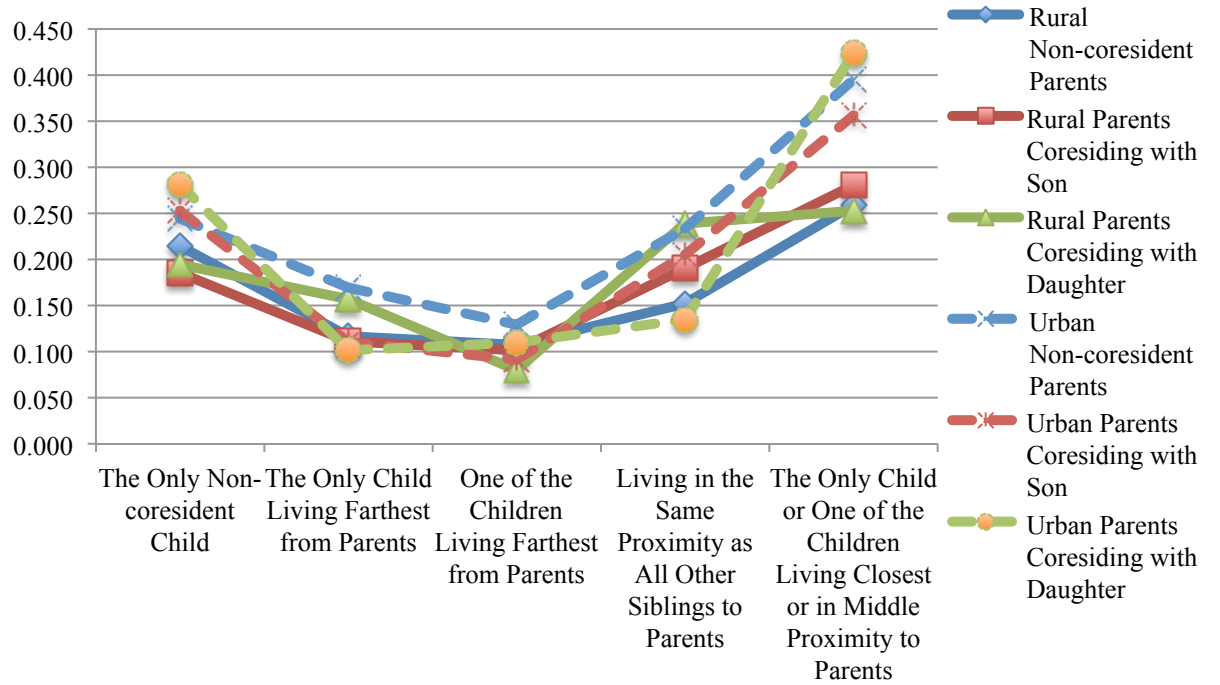
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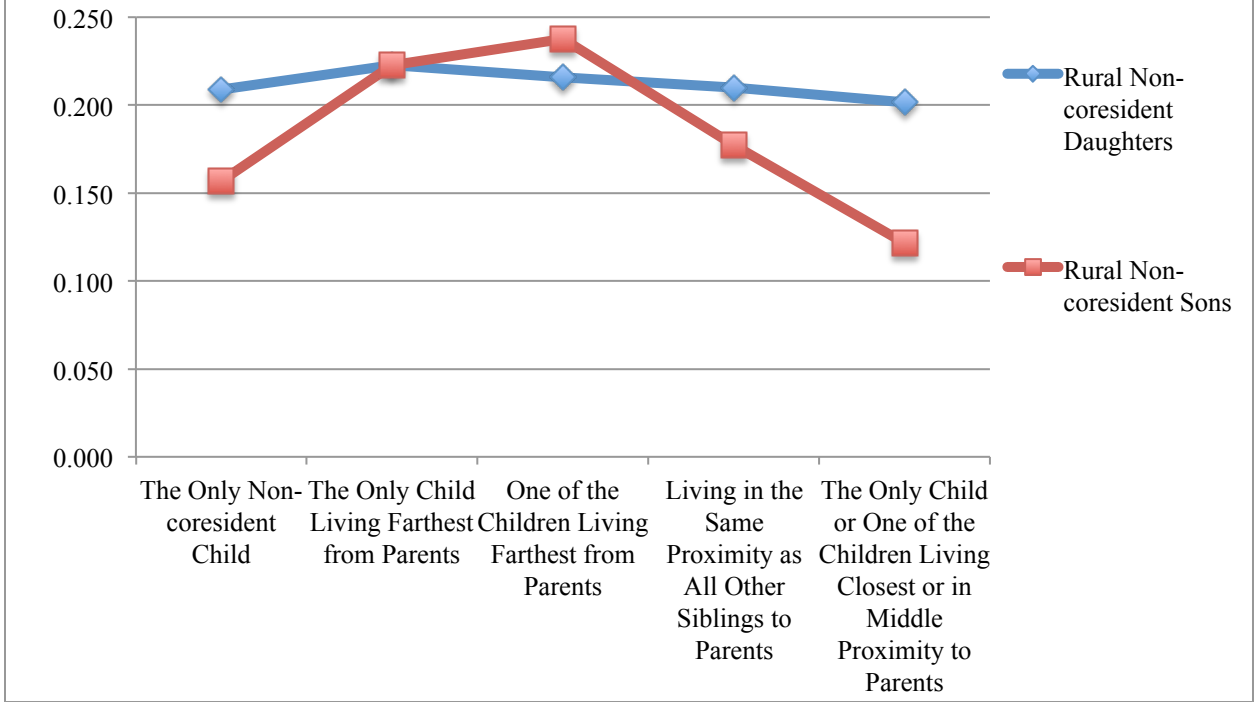
**Figure 1. Predicted Probabilities of Providing Economic Support 1500+ RMB to Parents in the Past Year by Children's Relative Living Proximity to Parents and Parents' Living Arrangement**



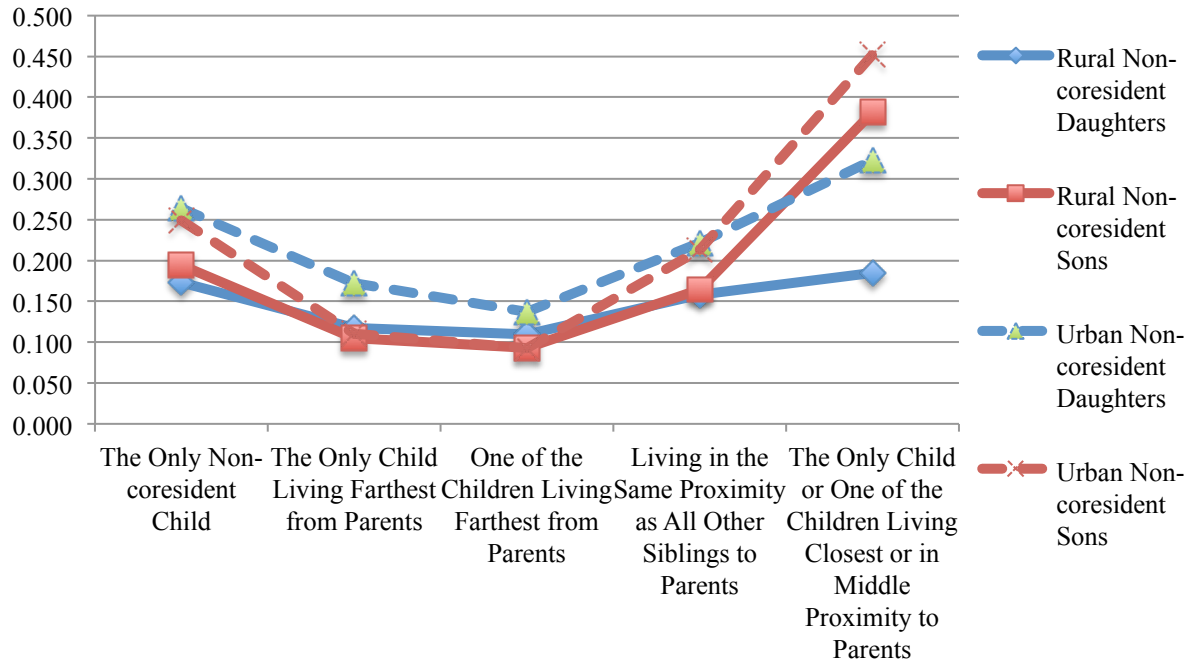
**Figure 2. Predicted Probabilities of Having Contact with Parents Every Day by Children's Relative Living Proximity to Parents and Parents' Living Arrangement**



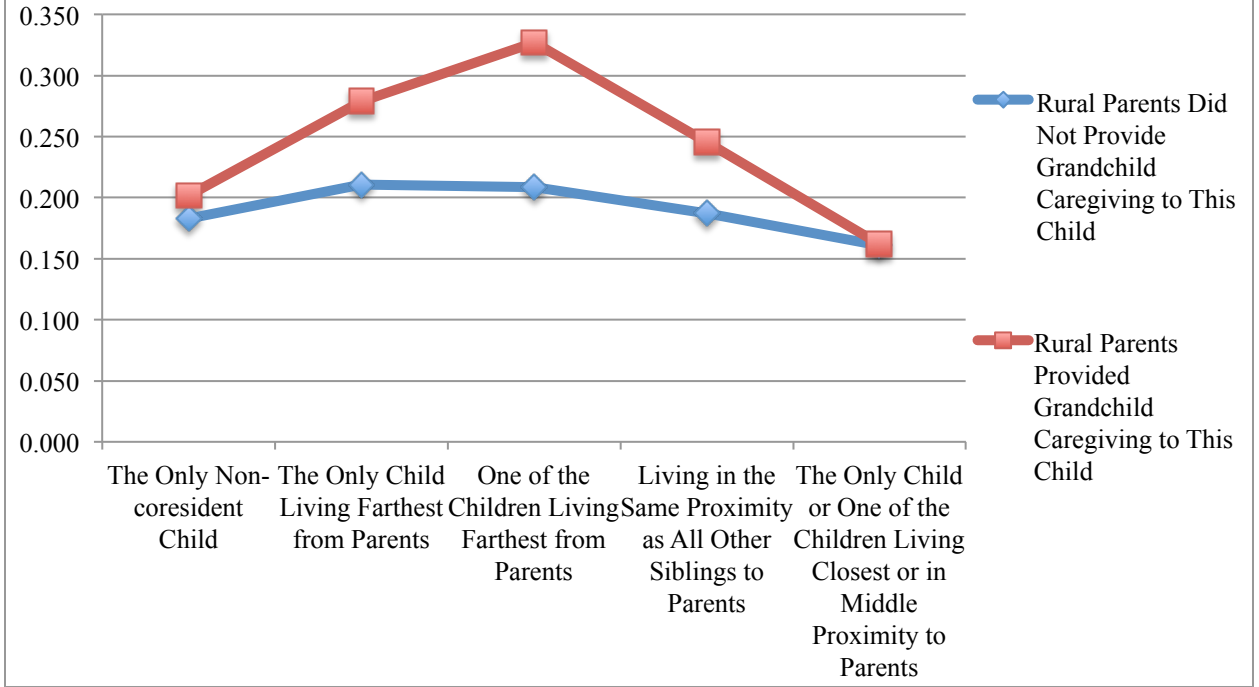
**Figure 3. Predicted Probabilities of Providing Economic Support 1500+ RMB to Parents in the Past Year by Children's Relative Living Proximity to Parents and Children's Gender**



**Figure 4. Predicted Probabilities of Having Contact with Parents Every Day by Children's Relative Living Proximity to Parents and Children's Gender**

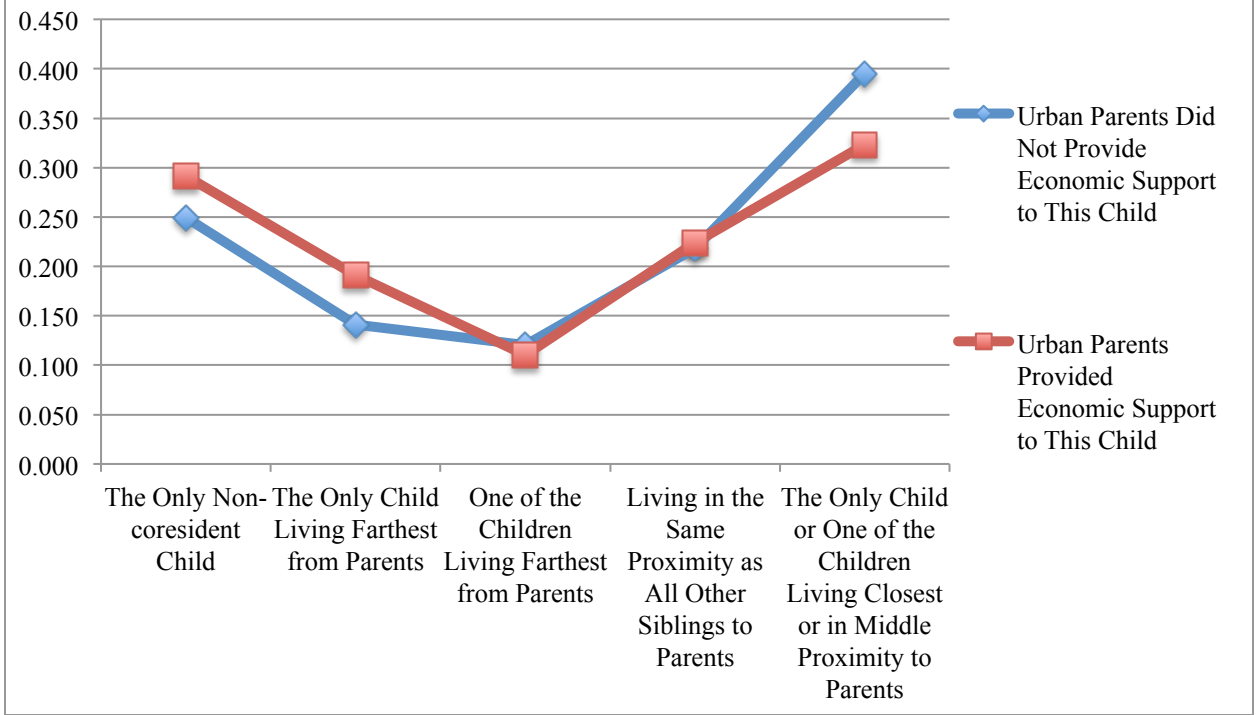


**Figure 5. Predicted Probabilities of Providing Economic Support 1500+ RMB to Parents in the Past Year by Children's Relative Living Proximity to Parents and Parents' Provision of Grandchild Caregiving**





**Figure 6. Predicted Probabilities of Having Contact with Parents Every Day by Children's Relative Living Proximity to Parents and Parents' Provision of Economic Support**



**Table 1. The Variable of Children's Relative Living Proximity to Parents**

Has siblings living closer to parents	Has siblings living in the same proximity to parents	Has siblings living farther from parents	Detailed children's relative living proximity to parents compared to siblings	Children's Relative Living Proximity to Parents
0	0	0	1. The only non-coresident child, does not have siblings living closer to or farther from parents	1. The Only Non-coresident Child
1	0	0	2. The only child living farthest from parents, has siblings living closer to parents	2. The Only Child Living Farthest from Parents
1	1	0	3. One of the children living farthest from parents, has siblings living closer to parents	3. One of the Children Living Farthest from Parents
0	1	0	4. Living in the same proximity as all other siblings to parents	4. Living in the Same Proximity as All Other Siblings to Parents
0	0	1	5. The only child living closest to parents, has siblings living farther from parents	5. The Only Child or One of the Children Living Closest or in Middle Proximity to Parents
0	1	1	6. One of the children living closest to parents, has siblings living farther from parents	
1	0	1	7. The only child living in middle proximity to parents, has siblings living closer to and farther from parents	
1	1	1	8. One of the children living in middle proximity to parents, has siblings living closer to and farther from parents	

**Table 2. Descriptive Statistics for Parent-Noncoresident Child Dyad Data**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008
<b>Dependent Variables</b>			
Economic Support from Children to Parents in the Past Year (RMB) ( <i>Ref. Cat.=0</i> )			
1-500	0.292 (0.455)	0.328 (0.470)	0.219 (0.414)
501-1500	0.226 (0.418)	0.232 (0.422)	0.216 (0.411)
1500+	0.223 (0.416)	0.196 (0.397)	0.277 (0.448)
Annual Contact between Children and Parents ( <i>Ref. Cat.=Once a Month or Less</i> )			
Once Every Two Weeks	0.146 (0.353)	0.162 (0.369)	0.113 (0.317)
1-3 Times a Week	0.368 (0.482)	0.339 (0.474)	0.425 (0.494)
Almost Every Day	0.216 (0.411)	0.192 (0.394)	0.263 (0.440)
<b>Independent Variables</b>			
Children's Relative Living Proximity to Parents ( <i>Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents</i> )			
The Only Non-coresident Child	0.115 (0.319)	0.095 (0.293)	0.155 (0.362)
The Only Child Living Farthest from Parents	0.113 (0.316)	0.113 (0.317)	0.112 (0.315)
One of the Children Living Farthest from Parents	0.158 (0.364)	0.169 (0.374)	0.135 (0.342)
Living in the Same Proximity as All Other Siblings to Parents	0.287 (0.452)	0.276 (0.447)	0.310 (0.462)
Parents' Living Arrangement ( <i>Ref. Cat.=Non-coresident</i> )			
Coresident with Son	0.285 (0.451)	0.287 (0.452)	0.282 (0.450)
Coresident with Daughter	0.041 (0.198)	0.036 (0.186)	0.051 (0.220)
<b>Control</b>			
<b>Parents' Characteristics</b>			
Age	65.690 (8.968)	65.421 (8.857)	66.235 (9.163)
Male (Yes=1, No=0)	0.466 (0.499)	0.468 (0.499)	0.463 (0.499)
Married (Yes=1, No=0)	0.836 (0.371)	0.839 (0.368)	0.829 (0.377)
Education ( <i>Ref. Cat.=Elementary and Under</i> )			
Junior High	0.152 (0.359)	0.130 (0.337)	0.195 (0.396)
Senior High and Above	0.086 (0.281)	0.051 (0.219)	0.158 (0.365)
Annual Household Income Per Capita (Ln)	6.758 (2.608)	6.389 (2.489)	7.503 (2.685)
Rural Hukou (Yes=1, No=0)	0.809 (0.393)	0.948 (0.222)	0.529 (0.499)

Currently Working for Pay (Yes=1, No=0)	0.590 (0.492)	0.678 (0.467)	0.413 (0.492)
Self-reported Health ( <i>Ref. Cat.=Very Good</i> )			
Good	0.132 (0.339)	0.130 (0.336)	0.137 (0.344)
Fair	0.471 (0.499)	0.452 (0.498)	0.511 (0.500)
Poor	0.318 (0.466)	0.345 (0.475)	0.262 (0.440)
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.156 (0.363)	0.144 (0.351)	0.180 (0.384)
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.146 (0.353)	0.137 (0.344)	0.164 (0.370)
<b>Children's Characteristics</b>			
Age	38.546 (8.812)	38.225 (8.714)	39.194 (8.970)
Male (Yes=1, No=0)	0.449 (0.497)	0.453 (0.498)	0.440 (0.496)
Married (Yes=1, No=0)	0.919 (0.272)	0.922 (0.269)	0.915 (0.279)
Biological Children (Yes=1, No=0)	0.969 (0.174)	0.973 (0.163)	0.961 (0.192)
Education ( <i>Ref. Cat.=Elementary and Under</i> )			
Junior High	0.334 (0.472)	0.331 (0.471)	0.342 (0.474)
Senior High and Above	0.258 (0.438)	0.179 (0.384)	0.417 (0.493)
Rural Hukou (Yes=1, No=0)	0.745 (0.436)	0.877 (0.328)	0.477 (0.499)
Currently Working for Pay (Yes=1, No=0)	0.883 (0.321)	0.900 (0.300)	0.850 (0.357)

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**Table 3. Ordered Logistic Regression Models Predicting Economic Support from Non-coresident Children to Parents**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008
<b>Children's Relative Living Proximity to Parents</b> (Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)			
The Only Non-coresident Child	0.100 (0.065)	0.167 * (0.083)	-0.039 (0.105)
The Only Child Living Farthest from Parents	0.310 *** (0.046)	0.372 *** (0.057)	0.192 * (0.080)
One of the Children Living Farthest from Parents	0.285 *** (0.048)	0.381 *** (0.058)	0.086 (0.088)
Living in the Same Proximity as All Other Siblings to Parents	0.187 *** (0.050)	0.227 *** (0.063)	0.102 (0.083)
<b>Parents' Living Arrangement (Ref. Cat.=Non-coresident)</b>			
Coresident with Son	-0.160 *** (0.044)	-0.234 *** (0.055)	-0.029 (0.076)
Coresident with Daughter	-0.200 (0.107)	-0.171 (0.135)	-0.202 (0.166)
<b>Parents' Characteristics</b>			
Age	0.003 (0.003)	0.006 (0.004)	-0.007 (0.006)
Male (Yes=1, No=0)	-0.032 (0.019)	-0.040 (0.022)	-0.064 (0.034)
Married (Yes=1, No=0)	0.097 * (0.046)	0.062 (0.057)	0.152 (0.080)
<b>Education (Ref. Cat.=Elementary and Under)</b>			
Junior High	0.049 (0.050)	0.027 (0.066)	0.059 (0.077)
Senior High and Above	-0.075 (0.080)	-0.101 (0.100)	-0.137 (0.108)
Annual Household Income Per Capita (Ln)	0.004 (0.008)	0.008 (0.011)	-0.015 (0.014)
Rural Hukou (Yes=1, No=0)	0.342 *** (0.063)		
Currently Working for Pay (Yes=1, No=0)	-0.067 (0.040)	0.024 (0.052)	-0.190 ** (0.067)
<b>Self-reported Health (Ref. Cat.=Very Good)</b>			
Good	0.103 (0.074)	0.115 (0.094)	0.096 (0.120)
Fair	0.051 (0.064)	0.096 (0.080)	-0.026 (0.106)
Poor	-0.072 (0.067)	-0.040 (0.082)	-0.116 (0.114)
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.177 ** (0.052)	0.196 ** (0.066)	0.147 (0.086)
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.215 *** (0.060)	0.245 ** (0.077)	0.152 (0.095)
<b>Children's Characteristics</b>			
Age	-0.007 * (0.003)	-0.008 * (0.003)	-0.004 (0.005)

Male (Yes=1, No=0)	-0.287	***	-0.298	***	-0.280	***
	(0.035)		(0.044)		(0.060)	
Married (Yes=1, No=0)	0.371	***	0.372	***	0.344	**
	(0.077)		(0.098)		(0.120)	
Biological Children (Yes=1, No=0)	0.294	**	0.209		0.445	**
	(0.090)		(0.110)		(0.144)	
Education ( <i>Ref. Cat.=Elementary and Under</i> )						
Junior High	0.261	***	0.308	***	0.149	*
	(0.039)		(0.048)		(0.069)	
Senior High and Above	0.662	***	0.727	***	0.531	***
	(0.056)		(0.072)		(0.087)	
Rural Hukou (Yes=1, No=0)	-0.404	***	-0.381	***	-0.205	**
	(0.057)		(0.075)		(0.075)	
Currently Working for Pay (Yes=1, No=0)	0.367	***	0.312	***	0.437	***
	(0.050)		(0.064)		(0.078)	
Constant (Cut1)	0.051		-0.198		-0.473	
	(0.262)		(0.328)		(0.414)	
Constant (Cut2)	1.353		1.281		0.489	
	(0.262)		(0.329)		(0.415)	
Constant (Cut3)	2.457		2.460		1.470	
	(0.264)		(0.330)		(0.416)	
Chi <sup>2</sup>	675.94		473.24		204.96	
df	27		26		26	

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.

**Table 4. Ordered Logistic Regression Models Predicting Contact between Non-coresident Children and Parents**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008
<b>Children's Relative Living Proximity to Parents</b> <i>(Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)</i>			
The Only Non-coresident Child	-0.448 *** (0.060)	-0.440 *** (0.076)	-0.561 *** (0.104)
The Only Child Living Farthest from Parents	-1.077 *** (0.048)	-1.004 *** (0.057)	-1.273 *** (0.088)
One of the Children Living Farthest from Parents	-1.236 *** (0.053)	-1.108 *** (0.062)	-1.530 *** (0.104)
Living in the Same Proximity as All Other Siblings to Parents	-0.652 *** (0.055)	-0.600 *** (0.067)	-0.793 *** (0.096)
<b>Parent's Living Arrangement</b> <i>(Ref. Cat.=Non-coresident)</i>			
Coresident with Son	0.008 (0.046)	0.078 (0.056)	-0.197 * (0.080)
Coresident with Daughter	0.037 (0.082)	0.188 (0.109)	-0.241 (0.128)
<b>Parent's Characteristics</b>			
Age	-0.016 *** (0.004)	-0.016 *** (0.004)	-0.013 (0.006)
Male (Yes=1, No=0)	-0.080 *** (0.019)	-0.071 ** (0.023)	-0.048 (0.035)
Married (Yes=1, No=0)	0.113 * (0.054)	0.126 (0.067)	0.137 (0.091)
<b>Education</b> <i>(Ref. Cat.=Elementary and Under)</i>			
Junior High	0.083 * (0.042)	0.129 * (0.052)	0.003 (0.072)
Senior High and Above	0.182 ** (0.053)	0.284 *** (0.074)	0.124 (0.077)
Annual Household Income Per Capita (Ln)	0.007 (0.008)	0.007 (0.009)	-0.001 (0.014)
Rural Hukou (Yes=1, No=0)	-0.381 *** (0.056)		
Currently Working for Pay (Yes=1, No=0)	-0.223 *** (0.040)	-0.218 *** (-0.050)	-0.122 (0.071)
<b>Self-reported Health</b> <i>(Ref. Cat.=Very Good)</i>			
Good	-0.189 ** (0.063)	-0.189 * (0.081)	-0.180 (0.104)
Fair	-0.260 *** (0.053)	-0.248 *** (0.069)	-0.254 ** (0.084)
Poor	-0.356 *** (0.057)	-0.371 *** (0.073)	-0.222 * (0.095)
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.128 ** (0.044)	0.215 *** (0.054)	0.010 (0.075)
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.605 *** (0.048)	0.450 *** (0.059)	0.851 *** (0.085)
<b>Children's Characteristics</b>			
Age	0.002 (0.003)	0.002 (0.004)	0.001 (0.006)

Male (Yes=1, No=0)	0.198 ***	0.326 ***	-0.003
	(0.036)	(0.045)	(0.061)
Married (Yes=1, No=0)	0.297 ***	0.398 ***	0.163
	(0.058)	(0.073)	(0.095)
Biological Children (Yes=1, No=0)	0.578 ***	0.445 ***	0.822 ***
	(0.093)	(0.120)	(0.149)
Education ( <i>Ref. Cat.=Elementary and Under</i> )			
Junior High	0.194 ***	0.155 **	0.218 *
	(0.043)	(0.049)	(0.090)
Senior High and Above	0.292 ***	0.258 ***	0.295 **
	(0.051)	(0.062)	(0.097)
Rural Hukou (Yes=1, No=0)	0.008	0.240 ***	-0.351 ***
	(0.051)	(0.064)	(0.082)
Currently Working for Pay (Yes=1, No=0)	-0.189 ***	-0.172 **	-0.187 *
	(0.047)	(0.060)	(0.077)
Constant (Cut1)	-2.169	-1.436	-2.297
	(0.262)	(0.313)	(0.436)
Constant (Cut2)	-1.457	-0.698	-1.633
	(0.261)	(0.313)	(0.435)
Constant (Cut3)	0.333	0.987	0.410
	(0.261)	(0.314)	(0.433)
Chi <sup>2</sup>	1802.44	963.59	716.12
df	27	26	26

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.



**Appendix 1. Ordered Logistic Regression Models Predicting Economic Support from Non-coresident Children to Parents with Interaction Effects between Children's Relative Living Proximity to Parents and Parents' Living Arrangement**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008	
<b>Children's Relative Living Proximity to Parents</b> <i>(Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)</i>				
The Only Non-coresident Child	-0.138 (0.108)	0.103 (0.144)	-0.399 (0.156)	*
The Only Child Living Farthest from Parents	0.349 *** (0.058)	0.422 *** (0.072)	0.209 (0.101)	*
One of the Children Living Farthest from Parents	0.314 *** (0.058)	0.410 *** (0.071)	0.104 (0.102)	
Living in the Same Proximity as Other Siblings to Parents	0.201 ** (0.063)	0.260 ** (0.080)	0.095 (0.107)	
<b>Parents' Living Arrangement (Ref. Cat.=Non-coresident)</b>				
Coresident with Son	-0.137 * (0.062)	-0.167 * (0.077)	-0.074 (0.107)	
Coresident with Daughter	-0.382 * (0.181)	-0.142 (0.217)	-0.831 (0.337)	*
<b>Interaction Effects</b>				
The Only Non-coresident Child x Coresident with Son	0.368 ** (0.134)	0.106 (0.177)	0.606 (0.200)	**
The Only Non-coresident Child x Coresident with Daughter	0.354 (0.258)	-0.296 (0.331)	1.155 (0.419)	**
The Only Child Living Furthest to Parents x Coresident with Son	-0.102 (0.094)	-0.142 (0.117)	-0.020 (0.165)	
The Only Child Living Furthest to Parents x Coresident with Daughter	-0.209 (0.263)	-0.270 (0.337)	-0.177 (0.416)	
One of the Children Living Furthest to Parents x Coresident with Son	-0.140 (0.103)	-0.112 (0.125)	-0.196 (0.196)	
One of the Children Living Furthest to Parents x Coresident with Daughter	0.091 (0.282)	-0.099 (0.284)	0.580 (0.606)	
Living in the Same Proximity as Other Siblings to Parents x Coresident with Son	-0.109 (0.103)	-0.167 (0.129)	-0.054 (0.171)	
Living in the Same Proximity as Other Siblings to Parents x Coresident with Daughter	0.486 (0.270)	0.345 (0.345)	0.816 (0.441)	
<b>Parents' Characteristics</b>				
Age	0.003 (0.003)	0.006 (0.004)	-0.007 (0.006)	
Male (Yes=1, No=0)	-0.032 (0.019)	-0.042 (0.022)	-0.062 (0.034)	
Married (Yes=1, No=0)	0.093 * (0.046)	0.065 (0.057)	0.130 (0.080)	
<b>Education (Ref. Cat.=Elementary and Under)</b>				
Junior High	0.052 (0.050)	0.028 (0.066)	0.058 (0.076)	
Senior High and Above	-0.067	-0.098	-0.127	

	(0.080)		(0.100)		(0.108)
Annual Household Income Per Capita (Ln)	0.003		0.007		-0.016
	(0.008)		(0.011)		(0.014)
Rural Hukou (Yes=1, No=0)	0.340	***			
	(0.063)				
Currently Working for Pay (Yes=1, No=0)	-0.071		0.023		-0.198
	(0.040)		(0.052)		(0.067)
Self-reported Health ( <i>Ref. Cat.=Very Good</i> )					
Good	0.104		0.115		0.100
	(0.074)		(0.094)		(0.120)
Fair	0.052		0.093		-0.027
	(0.064)		(0.080)		(0.105)
Poor	-0.069		-0.041		-0.103
	(0.067)		(0.082)		(0.114)
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.183	***	0.199	**	0.161
	(0.052)		(0.066)		(0.086)
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.222	***	0.246	**	0.168
	(0.060)		(0.077)		(0.095)
<b>Children's Characteristics</b>					
Age	-0.007	*	-0.008	*	-0.005
	(0.003)		(0.003)		(0.005)
Male (Yes=1, No=0)	-0.287	***	-0.301	***	-0.275
	(0.035)		(0.044)		(0.060)
Married (Yes=1, No=0)	0.368	***	0.377	***	0.327
	(0.077)		(0.098)		(0.121)
Biological Children (Yes=1, No=0)	0.291	**	0.205		0.456
	(0.090)		(0.110)		(0.146)
Education ( <i>Ref. Cat.=Elementary and Under</i> )					
Junior High	0.256	***	0.305	***	0.138
	(0.039)		(0.048)		(0.069)
Senior High and Above	0.659	***	0.723	***	0.522
	(0.056)		(0.072)		(0.088)
Rural Hukou (Yes=1, No=0)	-0.410	***	-0.384	***	-0.215
	(0.057)		(0.075)		(0.076)
Currently Working for Pay (Yes=1, No=0)	0.368	***	0.315	***	0.428
	(0.050)		(0.064)		(0.079)
Constant (Cut1)	0.041		-0.172		-0.572
	(0.263)		(0.329)		(0.416)
Constant (Cut2)	1.345		1.308		0.395
	(0.263)		(0.329)		(0.417)
Constant (Cut3)	2.451		2.488		1.379
	(0.264)		(0.331)		(0.418)
Chi <sup>2</sup>	696.58		483.96		224.93
df	35		34		34

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.

**Appendix 2. Ordered Logistic Regression Models Predicting Contact between Non-coresident Children and Parents with Interaction Effects between Children's Relative Living Proximity to Parents and Parents' Living Arrangement**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008
<b>Children's Relative Living Proximity to Parents</b> ( <i>Ref. Cat. = The Only Child or One of the Children Living Closest or in Middle Proximity to Parents</i> )			
The Only Non-coresident Child	-0.396 *** (0.084)	-0.245 (0.128)	-0.701 *** (0.124)
The Only Child Living Farthest from Parents	-1.014 *** (0.057)	-0.974 *** (0.069)	-1.163 *** (0.105)
One of the Children Living Farthest from Parents	-1.192 *** (0.060)	-1.067 *** (0.071)	-1.482 *** (0.117)
Living in the Same Proximity as Other Siblings to Parents	-0.683 *** (0.066)	-0.665 *** (0.080)	-0.761 *** (0.115)
<b>Parents' Living Arrangement</b> ( <i>Ref. Cat. = Non-coresident</i> )			
Coresident with Son	0.052 (0.087)	0.108 (0.099)	-0.165 (0.177)
Coresident with Daughter	0.021 (0.173)	-0.032 (0.205)	0.120 (0.324)
<b>Interaction Effects</b>			
The Only Non-coresident Child x Coresident with Son	-0.123 (0.123)	-0.289 (0.166)	0.208 (0.219)
The Only Non-coresident Child x Coresident with Daughter	0.009 (0.215)	-0.092 (0.274)	0.069 (0.375)
The Only Child Living Furthest to Parents x Coresident with Son	-0.238 * (0.112)	-0.160 (0.135)	-0.333 (0.204)
The Only Child Living Furthest to Parents x Coresident with Daughter	0.019 (0.225)	0.377 (0.271)	-0.711 (0.382)
One of the Children Living Furthest to Parents x Coresident with Son	-0.183 (0.132)	-0.173 (0.153)	-0.222 (0.259)
One of the Children Living Furthest to Parents x Coresident with Daughter	-0.286 (0.302)	-0.296 (0.411)	-0.303 (0.442)
Living in the Same Proximity as Other Siblings to Parents x Coresident with Son	0.095 (0.120)	0.159 (0.145)	-0.005 (0.221)
Living in the Same Proximity as Other Siblings to Parents x Coresident with Daughter	0.070 (0.238)	0.590 * (0.295)	-0.793 * (0.400)
<b>Parents' Characteristics</b>			
Age	-0.016 *** (0.004)	-0.017 *** (0.004)	-0.012 (0.007)
Male (Yes=1, No=0)	-0.079 *** (0.019)	-0.072 ** (0.023)	-0.050 (0.035)
Married (Yes=1, No=0)	0.112 * (0.054)	0.129 (0.067)	0.127 (0.091)
<b>Education</b> ( <i>Ref. Cat. = Elementary and Under</i> )			
Junior High	0.086 * (0.042)	0.137 ** (0.052)	0.005 (0.072)

Senior High and Above	0.182	**	0.288	***	0.129	
	(0.054)		(0.074)		(0.077)	
Annual Household Income Per Capita (Ln)	0.007		0.008		0.000	
	(0.008)		(0.009)		(0.014)	
Rural Hukou (Yes=1, No=0)	-0.376	***				
	(0.056)					
Currently Working for Pay (Yes=1, No=0)	-0.223	***	-0.223	***	-0.126	
	(0.040)		(0.050)		(0.071)	
Self-reported Health ( <i>Ref. Cat.=Very Good</i> )						
Good	-0.186	**	-0.185	*	-0.173	
	(0.063)		(0.081)		(0.104)	
Fair	-0.257	***	-0.244	***	-0.255	**
	(0.053)		(0.069)		(0.084)	
Poor	-0.351	***	-0.367	***	-0.221	*
	(0.057)		(0.073)		(0.095)	
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.127	**	0.213	***	0.018	
	(0.044)		(0.054)		(0.074)	
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.606	***	0.453	***	0.856	***
	(0.048)		(0.059)		(0.085)	
<b>Children's Characteristics</b>						
Age	0.002		0.002		0.001	
	(0.003)		(0.004)		(0.006)	
Male (Yes=1, No=0)	0.197	***	0.321	***	-0.001	
	(0.036)		(0.045)		(0.061)	
Married (Yes=1, No=0)	0.300	***	0.401	***	0.160	
	(0.057)		(0.073)		(0.094)	
Biological Children (Yes=1, No=0)	0.578	***	0.461	***	0.824	***
	(0.093)		(0.120)		(0.148)	
Education ( <i>Ref. Cat.=Elementary and Under</i> )						
Junior High	0.196	***	0.157	**	0.221	*
	(0.043)		(0.049)		(0.090)	
Senior High and Above	0.294	***	0.262	***	0.295	**
	(0.051)		(0.062)		(0.097)	
Rural Hukou (Yes=1, No=0)	0.009		0.240	***	-0.351	***
	(0.051)		(0.064)		(0.082)	
Currently Working for Pay (Yes=1, No=0)	-0.188	***	-0.171	**	-0.196	*
	(0.047)		(0.060)		(0.077)	
Constant (Cut1)	-2.150		-1.430		-2.269	
	(0.263)		(0.313)		(0.438)	
Constant (Cut2)	-1.438		-0.692		-1.603	
	(0.262)		(0.313)		(0.437)	
Constant (Cut3)	0.353		0.996		0.444	
	(0.262)		(0.315)		(0.435)	
Chi <sup>2</sup>	1819.54		975.93		754.91	
df	35		34		34	

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.

**Appendix 3. Ordered Logistic Regression Models Predicting Economic Support from Non-coresident Children to Parents with Interaction Effects between Children's Relative Living Proximity to Parents and Children's Gender**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008
<b>Children's Relative Living Proximity to Parents</b> <i>(Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)</i>			
The Only Non-coresident Child	0.044 (0.076)	0.044 (0.095)	0.019 (0.126)
The Only Child Living Farthest from Parents	0.125 * (0.057)	0.126 (0.069)	0.147 (0.104)
One of the Children Living Farthest from Parents	0.083 (0.056)	0.087 (0.067)	0.099 (0.107)
Living in the Same Proximity as Other Siblings to Parents	0.074 (0.058)	0.053 (0.071)	0.109 (0.102)
Son (Yes=1, No=0)	-0.489 *** (0.052)	-0.601 *** (0.062)	-0.267 ** (0.096)
<b>Interaction Effects</b>			
The Only Non-coresident Child x Son	0.100 (0.125)	0.252 (0.165)	-0.144 (0.188)
The Only Child Living Furthest to Parents x Son	0.455 *** (0.113)	0.601 *** (0.138)	0.135 (0.206)
One of the Children Living Furthest to Parents x Son	0.492 *** (0.103)	0.725 *** (0.125)	-0.030 (0.185)
Living in the Same Proximity as Other Siblings to Parents x Son	0.248 ** (0.083)	0.389 *** (0.105)	-0.013 (0.140)
<b>Parents' Living Arrangement (Ref. Cat.=Non-coresident)</b>			
Coresident with Son	-0.155 ** (0.045)	-0.218 *** (0.056)	-0.031 (0.076)
Coresident with Daughter	-0.201 (0.107)	-0.170 (0.136)	-0.204 (0.166)
<b>Parents' Characteristics</b>			
Age	0.003 (0.003)	0.006 (0.004)	-0.007 (0.006)
Male (Yes=1, No=0)	-0.034 (0.019)	-0.044 * (0.022)	-0.064 (0.034)
Married (Yes=1, No=0)	0.095 * (0.046)	0.065 (0.057)	0.153 (0.080)
<b>Education (Ref. Cat.=Elementary and Under)</b>			
Junior High	0.052 (0.050)	0.031 (0.066)	0.060 (0.077)
Senior High and Above	-0.069 (0.080)	-0.086 (0.100)	-0.135 (0.108)
Annual Household Income Per Capita (Ln)	0.004 (0.008)	0.008 (0.011)	-0.015 (0.014)
Rural Hukou (Yes=1, No=0)	0.341 *** (0.064)		
Currently Working for Pay (Yes=1, No=0)	-0.073 (0.040)	0.015 (0.052)	-0.191 ** (0.068)
<b>Self-reported Health (Ref. Cat.=Very Good)</b>			
Good	0.092 (0.074)	0.101 (0.094)	0.091 (0.121)

Fair	0.046 (0.064)		0.090 (0.080)		-0.028 (0.106)	
Poor	-0.080 (0.067)		-0.050 (0.082)		-0.121 (0.114)	
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.176 (0.052)	**	0.196 (0.066)	**	0.148 (0.086)	
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.212 (0.060)	***	0.235 (0.077)	**	0.154 (0.095)	
<b>Children's Characteristics</b>						
Age	-0.006 (0.003)	*	-0.007 (0.003)	*	-0.004 (0.005)	
Married (Yes=1, No=0)	0.385 (0.077)	***	0.401 (0.099)	***	0.346 (0.120)	**
Biological Children (Yes=1, No=0)	0.296 (0.091)	**	0.211 (0.111)		0.443 (0.144)	**
Education ( <i>Ref. Cat.=Elementary and Under</i> )						
Junior High	0.257 (0.039)	***	0.299 (0.048)	***	0.147 (0.069)	*
Senior High and Above	0.656 (0.056)	***	0.719 (0.072)	***	0.527 (0.088)	***
Rural Hukou (Yes=1, No=0)	-0.397 (0.057)	***	-0.368 (0.075)	***	-0.204 (0.075)	**
Currently Working for Pay (Yes=1, No=0)	0.367 (0.050)	***	0.311 (0.063)	***	0.438 (0.078)	***
Constant (Cut1)	-0.011 (0.262)		-0.273 (0.328)		-0.468 (0.413)	
Constant (Cut2)	1.293 (0.262)		1.212 (0.328)		0.494 (0.414)	
Constant (Cut3)	2.400 (0.264)		2.396 (0.330)		1.475 (0.415)	
Chi <sup>2</sup>	695.39		508.11		206.07	
df	31		30		30	

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.

**Appendix 4. Ordered Logistic Regression Models Predicting Contact between Non-coresident Children and Parents with Interaction Effects between Children's Relative Living Proximity to Parents and Children's Gender**

	Total Sample N=27,197		Rural Dyads N=18,189		Urban Dyads N=9,008	
<b>Children's Relative Living Proximity to Parents</b> <i>(Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)</i>						
The Only Non-coresident Child	-0.092 (0.069)		-0.081 (0.085)		-0.288 (0.124)	*
The Only Child Living Farthest from Parents	-0.588 (0.060)	***	-0.530 (0.073)	***	-0.828 (0.110)	***
One of the Children Living Farthest from Parents	-0.745 (0.064)	***	-0.613 (0.074)	***	-1.100 (0.128)	***
Living in the Same Proximity as Other Siblings to Parents	-0.264 (0.062)	***	-0.185 (0.076)	*	-0.519 (0.111)	***
Son (Yes=1, No=0)	0.876 (0.070)	***	1.003 (0.083)	***	0.547 (0.129)	***
<b>Interaction Effects</b>						
The Only Non-coresident Child x Son	-0.844 (0.110)	***	-0.861 (0.147)	***	-0.624 (0.179)	**
The Only Child Living Furthest to Parents x Son	-1.172 (0.105)	***	-1.135 (0.127)	***	-1.069 (0.191)	***
One of the Children Living Furthest to Parents x Son	-1.164 (0.102)	***	-1.185 (0.121)	***	-0.989 (0.187)	***
Living in the Same Proximity as Other Siblings to Parents x Son	-0.887 (0.093)	***	-0.957 (0.113)	***	-0.597 (0.167)	***
<b>Parents' Living Arrangement (Ref. Cat.=Non-coresident)</b>						
Coresident with Son	-0.019 (0.046)		0.039 (0.056)		-0.194 (0.080)	*
Coresident with Daughter	0.022 (0.082)		0.171 (0.109)		-0.247 (0.127)	
<b>Parents' Characteristics</b>						
Age	-0.017 (0.004)	***	-0.017 (0.004)	***	-0.013 (0.006)	
Male (Yes=1, No=0)	-0.075 (0.019)	***	-0.064 (0.023)	**	-0.049 (0.035)	
Married (Yes=1, No=0)	0.124 (0.053)	*	0.129 (0.066)		0.158 (0.090)	
<b>Education (Ref. Cat.=Elementary and Under)</b>						
Junior High	0.077 (0.042)		0.121 (0.052)	*	0.000 (0.072)	
Senior High and Above	0.176 (0.053)	**	0.266 (0.073)	***	0.130 (0.077)	
Annual Household Income Per Capita (Ln)	0.007 (0.008)		0.007 (0.009)		-0.001 (0.014)	
Rural Hukou (Yes=1, No=0)	-0.386 (0.056)	***				
Currently Working for Pay (Yes=1, No=0)	-0.211 (0.040)	***	-0.201 (0.050)	***	-0.122 (0.070)	

Self-reported Health ( <i>Ref. Cat.=Very Good</i> )					
Good	-0.175	**	-0.174	*	-0.169
	(0.063)		(0.081)		(0.103)
Fair	-0.257	***	-0.244	***	-0.251
	(0.053)		(0.069)		(0.083)
Poor	-0.347	***	-0.359	***	-0.217
	(0.057)		(0.072)		(0.094)
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.134	**	0.217	***	0.020
	(0.044)		(0.055)		(0.075)
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.623	***	0.476	***	0.854
	(0.048)		(0.059)		(0.086)
<b>Children's Characteristics</b>					
Age	0.001		0.001		0.000
	(0.003)		(0.004)		(0.006)
Married (Yes=1, No=0)	0.272	***	0.356	***	0.162
	(0.058)		(0.073)		(0.095)
Biological Children (Yes=1, No=0)	0.581	***	0.444	***	0.833
	(0.093)		(0.120)		(0.147)
Education ( <i>Ref. Cat.=Elementary and Under</i> )					
Junior High	0.199	***	0.170	***	0.212
	(0.043)		(0.049)		(0.089)
Senior High and Above	0.304	***	0.278	***	0.297
	(0.051)		(0.062)		(0.096)
Rural Hukou (Yes=1, No=0)	-0.010		0.226	**	-0.374
	(0.051)		(0.065)		(0.081)
Currently Working for Pay (Yes=1, No=0)	-0.183	***	-0.165	**	-0.183
	(0.046)		(0.060)		(0.076)
Constant (Cut1)	-1.964		-1.259		-2.071
	(0.261)		(0.312)		(0.434)
Constant (Cut2)	-1.248		-0.517		-1.404
	(0.260)		(0.312)		(0.432)
Constant (Cut3)	0.569		1.199		0.655
	(0.261)		(0.314)		(0.430)
Chi <sup>2</sup>	1791.67		968.65		727.82
df	31		30		30

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.



**Appendix 5. Ordered Logistic Regression Models Predicting Contact between Non-coresident Children and Parents with Interaction Effects between Children's Relative Living Proximity to Parents and Parents' Provision of Economic Support**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008	
<b>Children's Relative Living Proximity to Parents</b> <i>(Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)</i>				
The Only Non-coresident Child	-0.481 *** (0.067)	-0.440 *** (0.084)	-0.678 *** (0.117)	
The Only Child Living Farthest from Parents	-1.121 *** (0.052)	-1.023 *** (0.063)	-1.382 *** (0.098)	
One of the Children Living Farthest from Parents	-1.259 *** (0.057)	-1.129 *** (0.066)	-1.566 *** (0.113)	
Living in the Same Proximity as Other Siblings to Parents	-0.675 *** (0.060)	-0.622 *** (0.073)	-0.851 *** (0.106)	
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	-0.012 (0.089)	0.119 (0.106)	-0.314 (0.162)	
<b>Interaction Effects</b>				
The Only Non-coresident Child x Parents Provided Economic Support	0.190 (0.123)	0.043 (0.160)	0.530 (0.206)	*
The Only Child Living Furthest to Parents x Parents Provided Economic Support	0.314 * (0.136)	0.146 (0.172)	0.678 (0.233)	**
One of the Children Living Furthest to Parents x Parents Provided Economic Support	0.165 (0.139)	0.178 (0.165)	0.218 (0.253)	
Living in the Same Proximity as Other Siblings to Parents x Parents Provided Economic Support	0.159 (0.118)	0.152 (0.142)	0.347 (0.209)	
<b>Parents' Living Arrangement (Ref. Cat.=Non-coresident)</b>				
Coresident with Son	0.008 (0.046)	0.078 (0.056)	-0.194 (0.080)	*
Coresident with Daughter	0.037 (0.082)	0.188 (0.109)	-0.233 (0.128)	
<b>Parents' Characteristics</b>				
Age	-0.016 *** (0.004)	-0.016 *** (0.004)	-0.013 (0.007)	
Male (Yes=1, No=0)	-0.080 *** (0.019)	-0.071 ** (0.023)	-0.051 (0.035)	
Married (Yes=1, No=0)	0.114 * (0.054)	0.126 (0.067)	0.141 (0.091)	
<b>Education (Ref. Cat.=Elementary and Under)</b>				
Junior High	0.084 * (0.042)	0.130 * (0.052)	0.012 (0.072)	
Senior High and Above	0.183 ** (0.054)	0.286 *** (0.074)	0.130 (0.077)	
Annual Household Income Per Capita (Ln)	0.007 (0.008)	0.007 (0.009)	-0.001 (0.014)	
Rural Hukou (Yes=1, No=0)	-0.381 *** (0.056)			
Currently Working for Pay (Yes=1, No=0)	-0.223 ***	-0.218 ***	-0.120	

	(0.040)		(0.050)		(0.071)	
Self-reported Health ( <i>Ref. Cat.=Very Good</i> )						
Good	-0.189	**	-0.189	*	-0.184	
	(0.064)		(0.081)		(0.104)	
Fair	-0.260	***	-0.247	***	-0.256	**
	(0.053)		(0.069)		(0.084)	
Poor	-0.356	***	-0.371	***	-0.228	*
	(0.057)		(0.073)		(0.095)	
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.605	***	0.451	***	0.853	***
	(0.048)		(0.059)		(0.085)	
<b>Children's Characteristics</b>						
Age	0.002		0.002		0.001	
	(0.003)		(0.004)		(0.006)	
Male (Yes=1, No=0)	0.196	***	0.326	***	-0.009	
	(0.036)		(0.045)		(0.061)	
Married (Yes=1, No=0)	0.300	***	0.401	***	0.166	
	(0.057)		(0.073)		(0.094)	
Biological Children (Yes=1, No=0)	0.579	***	0.445	***	0.819	***
	(0.093)		(0.120)		(0.150)	
Education ( <i>Ref. Cat.=Elementary and Under</i> )						
Junior High	0.195	***	0.155	**	0.219	*
	(0.043)		(0.049)		(0.090)	
Senior High and Above	0.292	***	0.257	***	0.301	**
	(0.051)		(0.062)		(0.097)	
Rural Hukou (Yes=1, No=0)	0.008		0.239	***	-0.350	***
	(0.051)		(0.064)		(0.082)	
Currently Working for Pay (Yes=1, No=0)	-0.187	***	-0.171	**	-0.178	*
	(0.047)		(0.060)		(0.077)	
Constant (Cut1)	-2.183		-1.447		-2.341	
	(0.262)		(0.313)		(0.439)	
Constant (Cut2)	-1.472		-0.710		-1.676	
	(0.262)		(0.313)		(0.437)	
Constant (Cut3)	0.318		0.975		0.370	
	(0.262)		(0.315)		(0.435)	
Chi <sup>2</sup>	1815.48		965.13		729.56	
df	31		30		30	

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.

**Appendix 6. Ordered Logistic Regression Models Predicting Economic Support from Non-coresident Children to Parents with Interaction Effects between Children's Relative Living Proximity to Parents and Parents' Provision of Grandchild Caregiving**

	Total Sample N=27,197	Rural Dyads N=18,189	Urban Dyads N=9,008	
<b>Children's Relative Living Proximity to Parents</b> <i>(Ref. Cat.=The Only Child or One of the Children Living Closest or in Middle Proximity to Parents)</i>				
The Only Non-coresident Child	0.154 *	0.158	0.106	
	(0.069)	(0.087)	(0.113)	
The Only Child Living Farthest from Parents	0.279 ***	0.332 ***	0.190 *	
	(0.048)	(0.059)	(0.085)	
One of the Children Living Farthest from Parents	0.237 ***	0.319 ***	0.073	
	(0.049)	(0.059)	(0.089)	
Living in the Same Proximity as Other Siblings to Parents	0.170 **	0.185 **	0.130	
	(0.052)	(0.065)	(0.087)	
Provided Grandchild Caregiving to this Child in the Past Year (Yes=1, No=0)	0.126	0.010	0.334 *	
	(0.091)	(0.115)	(0.154)	
<b>Interaction Effects</b>				
The Only Non-coresident Child x Parents Provided Grandchild Caregiving	-0.219	0.110	-0.596 *	
	(0.165)	(0.226)	(0.238)	
The Only Child Living Furthest to Parents x Parents Provided Grandchild Caregiving	0.281	0.360	0.102	
	(0.195)	(0.243)	(0.345)	
One of the Children Living Furthest to Parents x Parents Provided Grandchild Caregiving	0.481 **	0.603 **	0.239	
	(0.183)	(0.221)	(0.332)	
Living in the Same Proximity as Other Siblings to Parents x Parents Provided Grandchild Caregiving	0.135	0.335	-0.203	
	(0.139)	(0.179)	(0.222)	
<b>Parents' Living Arrangement (Ref. Cat.=Non-coresident)</b>				
Coresident with Son	-0.161 ***	-0.229 ***	-0.035	
	(0.045)	(0.055)	(0.076)	
Coresident with Daughter	-0.198	-0.168	-0.209	
	(0.107)	(0.135)	(0.166)	
<b>Parents' Characteristics</b>				
Age	0.003	0.006	-0.007	
	(0.003)	(0.004)	(0.006)	
Male (Yes=1, No=0)	-0.032	-0.040	-0.063	
	(0.019)	(0.022)	(0.034)	
Married (Yes=1, No=0)	0.096 *	0.060	0.154	
	(0.046)	(0.057)	(0.080)	
<b>Education (Ref. Cat.=Elementary and Under)</b>				
Junior High	0.051	0.028	0.058	
	(0.050)	(0.066)	(0.077)	
Senior High and Above	-0.072	-0.101	-0.140	
	(0.080)	(0.100)	(0.108)	
Annual Household Income Per Capita (Ln)	0.004	0.008	-0.015	
	(0.008)	(0.011)	(0.014)	
Rural Hukou (Yes=1, No=0)	0.343 ***			
	(0.063)			
Currently Working for Pay (Yes=1, No=0)	-0.071	0.024	-0.198 **	

	(0.040)		(0.052)		(0.067)	
Self-reported Health ( <i>Ref. Cat.=Very Good</i> )						
Good	0.102		0.118		0.090	
	(0.074)		(0.093)		(0.120)	
Fair	0.051		0.098		-0.027	
	(0.064)		(0.080)		(0.106)	
Poor	-0.073		-0.038		-0.116	
	(0.067)		(0.082)		(0.114)	
Provided Economic Support to this Child in the Past Year (Yes=1, No=0)	0.182	***	0.199	**	0.152	
	(0.052)		(0.066)		(0.086)	
<b>Children's Characteristics</b>						
Age	-0.007	*	-0.008	*	-0.004	
	(0.003)		(0.003)		(0.005)	
Male (Yes=1, No=0)	-0.293	***	-0.302	***	-0.291	***
	(0.036)		(0.044)		(0.060)	
Married (Yes=1, No=0)	0.368	***	0.365	***	0.353	**
	(0.077)		(0.098)		(0.121)	
Biological Children (Yes=1, No=0)	0.297	**	0.213		0.440	**
	(0.090)		(0.110)		(0.144)	
Education ( <i>Ref. Cat.=Elementary and Under</i> )						
Junior High	0.262	***	0.307	***	0.153	*
	(0.039)		(0.048)		(0.069)	
Senior High and Above	0.663	***	0.722	***	0.539	***
	(0.056)		(0.072)		(0.087)	
Rural Hukou (Yes=1, No=0)	-0.408	***	-0.385	***	-0.204	**
	(0.057)		(0.075)		(0.076)	
Currently Working for Pay (Yes=1, No=0)	0.366	***	0.312	***	0.436	***
	(0.050)		(0.064)		(0.079)	
Constant (Cut1)	0.045		-0.240		-0.401	
	(0.263)		(0.329)		(0.415)	
Constant (Cut2)	1.347		1.240		0.562	
	(0.263)		(0.329)		(0.416)	
Constant (Cut3)	2.453		2.420		1.545	
	(0.264)		(0.330)		(0.417)	
Chi <sup>2</sup>	684.39		479.02		212.41	
df	31		30		30	

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,952 clusters in the whole sample, 4,437 clusters in the rural subsample, and 2,515 clusters in the urban subsample.

## Chapter Three

### **The Upward Transmission: Socioeconomic Status of Adult Children and Their Older Parents' Health in China**

#### Abstract

The impact of adult children's socioeconomic status (SES) on older parents' health is an important but unanswered question in contemporary China. Adult children play a central role in elderly support in Chinese families. Meanwhile, substantial intergenerational social mobility enables them to take better care of parents. This paper uses data from the China Health and Retirement Longitudinal Study (CHARLS, 2011, 2013) to examine how adult children's SES influences older parents' health in China. The study finds that higher education and income of adult children reduce the level of frailty for older parents, net of the effect of parents' own SES. In addition, adult children's socioeconomic achievement brings a buffering effect to health adversities faced by socioeconomically disadvantaged older parents. However, the largest health benefit yielded by adult children's SES is found for older adults who and whose children are both in the top socioeconomic strata. Finally, one of the mechanisms through which adult children's SES affects older parents' health is by shaping smoking and drinking behaviors.

Studies on the multigenerational social determinants of health have mostly focused on the downward impact, that is, how parents' socioeconomic status (SES)

affects offspring's health (Bradley and Corwyn 2002; Kuh et al. 2002; for a review see Chen, Matthews, and Boyce 2002). However, we know much less about the other direction of the impact, that is, how adult children's SES influences older parents' health. Lives of individuals are nested in family and kinship networks and are interdependent throughout the life span (Elder 1994). Previous studies have shown that socioeconomic resources of both the parents and the partner influence one's health and longevity (for a review see Torssander 2013). As people enter into old age and their children enter adulthood, adult children may also become a crucial source of social support. Therefore adult children's SES could be an important factor affecting older adults' health. Existing studies have found that having adult children attained a higher SES is associated with a lower mortality rate for older parents (Friedman and Mare 2014; Torssander 2013, 2014; Zimmer et al. 2007; Zimmer, Hanson, and Smith 2016). Yet it is still unclear that to what extent that adult children's SES could influence older parents' health problems. Even little is known about whether the benefit of adult children's SES achievement is transmitted to older parents through shaping their health behaviors.

How adult children's SES affects parental health is a research question that is highly relevant in the contemporary Chinese society. On the one hand, the norm of filial piety prescribes that adult children should play a primary role in elderly support in Chinese families. On the other hand, upward intergenerational social mobility in younger generations brought by the rapid economic and social development enables many adult children to mobilize their economic and social resources to take better care of parents. In China, the rural-urban divide in the quality of health care persists (Sylvia et al. 2015). Meanwhile, although the coverage of health insurance substantially increased in the last

decade, access to health insurance, especially to those more generous medical insurance schemes, is still stratified by SES (Luo and Tong 2016). SES disadvantaged people's affordability of better-quality health care is limited because the reimbursement rate of medicines and hospital services in many medical insurance schemes are low and imported medicines and healthcare facilities usually require private out-of-pocket spending. Therefore, whether adult children can financially provide older parents with better health care can have an impact on older parents' health. In addition, health-related knowledge and information of new health technology could be diffused from highly educated adult children to aging parents, facilitating parents to follow instructions of healthcare providers and changing their health risk behaviors. Although the literature on intergenerational support in China has extensively examined the influence of adult children's support on old parents' health and well-being (Chen and Short 2008; Chen and Silverstein 2000; Cong and Silverstein 2008; Li, Song, and Feldman 2009; Liu, Liang, and Gu 1995; Silverstein, Cong, and Li 2006; Song et al. 2008), there is no existing study directly investigates the relationship between adult children's SES and older parents' health. Answering this question provides a more explicit picture about how adult children's socioeconomic achievement could be transmitted upwardly to health benefits of older parents. Further, given substantial intergenerational social mobility in adult children's generation in China, it is important to know whether adult children's attainment in SES could provide a buffering effect on the health deficits faced by socioeconomically disadvantaged older parents.

To address these gaps in the literature, this study investigates how adult children's SES influences older parents' health in China. Particular attention is paid to whether the

health benefits brought by adult children's socioeconomic attainment are larger for older adults with lower SES. The study also examines whether one of the key mechanisms through which adult children's SES affects older parents' health is by changing their health behaviors. The study uses data from the China Health and Retirement Longitudinal Study (CHARLS, 2011, 2013). The detailed survey section on older adults' health allows this study to make important methodological contributions by using a composite measure of older adults' health, the Frailty Index (FI). The national representative panel data also provides the opportunity for using individual fixed-effects models to take a better control of unobserved and unmeasured characteristics of older parents that may bias the relationship between adult children's SES and older parents' health.

## Literature Review

### Adult Children's SES and Older Parents' Mortality

Generations are interdependent. The socioeconomic position and associated resources of one generation could influence the health and well-being of the other generation. The downward impact of parents' SES on children's health and mortality is well documented by existing research (Bradley and Corwyn 2002; Kuh et al. 2002; for a review see Chen et al. 2002). However, we know much less about the other way of the influence, which is whether and how adult children's SES influences older parents' health. In recent years, a limited number of studies have looked into such a potential upward impact by investigating the association between adult children's SES and older parents' mortality in Taiwan (Zimmer et al. 2007), Sweden (Torssander 2013, 2014), and the U.S. (Friedman and Mare 2014; Zimmer et al. 2016). They found that higher SES of adult children is associated with a reduced mortality risk for older parents after



controlling for the effect of parents' own SES (Friedman and Mare 2014; Torssander 2013, 2014; Zimmer et al. 2007, 2016). Specifically, for older Taiwanese the benefit of increased survival chances associated with adult children's education is more robust for older parents who have a serious disease than those who are free of disease (Zimmer et al. 2007). Torssander (2013) used the fixed-effects model to hold constant shared characteristics embedded in the family background among sibling older adults and found the association between their children's education and their mortality risks remained for both older Swedish mothers and fathers.

The study of adult children's influence on older parents' health could be contextualized in the theoretical perspective of multigenerational social determinants of health (Friedman and Mare 2014; Zimmer et al. 2016), which examines the relationship between socioeconomic position and health across generations. The central theme of this theoretical perspective has been focused on the intergenerational transmission of inequality from older generations to offspring. There is a consensus that socioeconomic position of the family influences children's health, and in addition, early childhood health could affect later life health status and socioeconomic attainment (Palloni 2006). However, the few studies, which have been reviewed above, together suggested that adult children's socioeconomic achievement could be transmitted upwardly and translate into older adults' health benefits. To explain this upward intergenerational transmission of health benefits of high SES, Zimmer et al. (2016) drew on a network perspective for the fundamental-cause theory (Link and Phelan 1995; Link et al. 2008), while Torssander (2013) and Friedman and Mare (2014) referred to the conceptual model built by Berkman and her colleagues (2000) of the influence of social networks on health. These theoretical

frameworks complement each other. The fundamental-cause theory suggested that higher SES implies a person's ability to mobilize economic, social and psychological resources of larger amount and better quality, thus might lead to better health (Link and Phelan 1995; Link et al. 2008). The social network approach to health developed that actors and their resources in a person's social networks could affect the person's health and well-being (Berkman et al. 2000). Adult children as the immediate family member are without doubt among the key actors in an older adult's social networks. They could influence older adults' health through intergenerational interaction and support by various mechanisms. By this means, resources associated with adult children's SES become the source that yields health benefits for older adults.

#### Pathways Linking Adult Children's SES to Older Parents' Health

Studies on the relationship between adult children's SES and older parents' mortality have suggested various mechanisms through which adult children's achievement translates into parental survival chances (Friedman and Mare 2014; Torssander 2013, 2014), but few of the mechanisms are tested by empirical data. I summarize the potential mechanisms proposed by these studies into three pathways: resources, behaviors, and psychological impact.

#### *Resources and Social Support*

Higher SES is associated with acquiring more economic and social resources, as well as health-related knowledge and information, which could be beneficial for health. Higher SES adult children could mobilize their resources for older parents through

intergenerational interaction and support, thus influence parental health outcomes. The transmission of adult children's economic resources to better health of older parents could include the provision of direct monetary assistance to get better medical treatment, to utilize the latest health technology, and to purchase better-quality healthcare services for older adults. Besides, children who are not limited in economic resources are also more likely to provide more frequent support to older parents in times of need. This helps parents to better cope with diseases and functional limitations.

In regard to social resources, access to healthcare providers could be influential on health outcomes. There is a clear rural-urban divide in healthcare resources in China. The best medical resources and doctors concentrate in big comprehensive hospitals in urban areas. *Hukou*, as the household registration system in China, identifies a person's rural or urban residency status. People with a rural *hukou* are confined to live in rural areas and are much limited than urban people in access to "permanent employment, medical insurance, housing, pensions, and educational opportunities for children" (p418, Wu and Treiman 2007). Therefore, *hukou* in China is an important indicator of SES. Holding a rural *hukou* is directly associated with disadvantages in medical and healthcare resources. Although the first *hukou* for children is an ascribed status of their mother's *hukou* (Chan and Zhang 1999), there are some but limited channels such as through education or employment for rural children to obtain an urban *hukou* since the market reform and the gradual relaxation of population mobility. Children who have gained an urban *hukou* could provide more convenient access to better healthcare providers for their older rural *hukou* parents. Higher SES children are also more likely to know doctors of

better expertise in their networks than lower SES children, thus bring greater access to healthcare resources for older parents.

In addition, longer years of education are associated with more health-related knowledge and information (Johnston et al. 2015). This is because higher education makes it easier for people to obtain the latest health knowledge and information from media and internet. Acquiring more health-related knowledge enables people to better navigate the health care system, follow the instructions of health providers, make decisions about the use of health products, and stick to healthier lifestyles. Hence, through these ways the benefit of education is transmitted to better health outcomes (Cutler and Lleras-Muney 2010). It is reasonable to infer that children of higher education could diffuse the latest health-related knowledge and information to older parents through intergenerational contact. There is a generational divide in assimilating health information from the internet. More-educated children may provide access to health knowledge that may not otherwise available to older parents even if they are also highly educated. Better-educated adult children could also use their knowledge to assist parents in seeking medical treatment. Besides, with more knowledge, more-educated children may provide better instrumental support to parents in times of need.

### *Behaviors and Social Influence*

Among people of higher SES, a lower prevalence of health risk behaviors, such as smoking, drinking, sedentary lifestyle and overweight is found (Lantz et al. 1998; Ross and Wu 1995). Referred as the pathway of social influence through which social networks influence health, scholars pointed out that people share norms of health

behaviors with similar others or adjacent actors in social networks, thus network members may mutually influence each other in health behaviors (Berkman et al. 2000). Such a health spillover effect is well reported in the family networks, particularly between partners and siblings (for a review see Friedman and Mare 2014). Studies on adult children's influence on older parents' health and mortality brought attention to the health spillover effect between adult children and older parents (Friedman and Mare 2014; Torssander 2013, 2014). Adult children could influence older parents' health by sharing norms on "lifestyle, the use of health care, and adherence to medical treatment" (Torssander 2014).

### *Psychological Impact*

The linked lives principle of the life course theory pointed out that lives of family members are lived interdependently (Elder 1998). Through intergenerational relationship, social influences on children may indirectly affect their parents. One of the pathways linking the well-being and socioeconomic attainment of adult children to older parents' well-being could be the psychological impact. It is found that parents' psychological well-being suffers if even one of the adult children in the family has incurred life problems, while parents psychological well-being is enhanced if multiple children have achieved higher success (Fingerman et al. 2012). Parents worry about their adult children's finances (Hay, Fingerman, and Lefkowitz 2008). If adult children are not faring well, the stress that parents incur could be harmful to health. On the contrary, successful adult children may raise parents' self-esteem (Rosenberg and Pearlin 1978) yielding health benefits in the long run.

## The Chinese Context

Studies about adult children's influence on parental mortality all focused on population in developed areas. Zimmer and his colleagues studied older parents and adult children in Taiwan, where a high degree of family cohesion and intergenerational social mobility in education are found (Zimmer et al. 2007). The current study extends this body of literature by examining the influence of adult children's SES on parental health outcomes and health behaviors in mainland China. This is a developing setting undergoing rapid economic development, where socioeconomic inequalities in health persist among older adults (Luo, Zhang, and Gu 2015; Zhu and Xie 2007) and socioeconomic disparities in access to healthcare resources remain in the general population (Luo and Tong 2016), but substantial intergenerational social mobility is also taking place.

On the one hand, the preponderant role that Chinese adult children play in supporting aging parents makes it reasonable to expect that their SES could be influential on older adults' well-being. The importance of adult children in elderly support is manifested in the high rate of intergenerational coresidence with older parents (Bian, Logan, and Bian 1998; Silverstein et al. 2006; Yasuda et al. 2011) and high levels of financial, instrumental, and emotional support from adult children to aging parents (Bian et al. 1998; Cong and Silverstein 2011; Song, Li, and Feldman 2012; Xie and Zhu 2009; Zhan and Montgomery 2003). The Confucian ethics of filial piety is the basis for such strong intergenerational ties and intensive intergenerational support. Scholars pointed out that "though changing times have greatly altered the interpretation of filial piety, taking

care of aged parents has remained an unquestioned and unquestionable virtue” (p13, Liu and Kendig 2000). Such tight intergenerational connections facilitate the transmission of resources from children to parents. Especially when there is intergenerational social mobility of adult children, the upstream flow of resources from children’s to parents’ generation could be prominent. One of the cases is that the out-migrant children who work in cities send more remittance back to rural parents than non-migrant children (Cong and Silverstein 2011; Song et al. 2012).

Some studies have investigated the impact of intergenerational support from adult children on older parents’ well-being in China. In urban areas, living with children, especially with a daughter, is associated with better psychological well-being for the oldest old (Chen and Short 2008; Chen and Silverstein 2000), and this is because intergenerational coresidence increases parents’ opportunities to receive financial and emotional support from children which could enhance parents morale (Chen and Silverstein 2000). Emotional support from adult children is also found to be beneficial on parental health (Liu et al. 1995). In rural places, financial support (i.e. remittance) from out-migrant adult children also improves parents’ psychological well-being (Cong and Silverstein 2008; Silverstein et al. 2006). Adult children’s financial and emotional support positively affects older parents’ self-reported health (Li et al. 2009; Song et al. 2008).

On the other hand, rapid economic development, sweeping social changes, as well as the reform of health care system make children’s socioeconomic resources of primary importance in influencing parents’ health in China. First, after the market reform in the 1980s, government finance reduced its support to the public health system and increased

the privatized proportion of health care in rural and urban China (Chen, Yang, and Liu 2010). The welfare covered health care became quite limited and access to better healthcare resources heavily depended on individual's own SES. Although the ongoing reform of health care system in recent years is trying to expand the coverage of health insurance in both rural and urban areas by the New Rural Cooperative Medical Scheme (NRCMS), the Urban Employee Basic Medical Insurance (UEBMI), and the Urban Resident Basic Medical Insurance (URBMI), still a considerable proportion of people are left out of the public safety net (Luo and Tong 2016). Besides, these health insurance programs mainly focus on covering expenses on inpatient services, but with limited reimbursement rates ranging from 26% to 46% (Lin, Liu, and Chen 2009; Zhong 2011). Outpatient expenditures and medical expenses are only partially covered, especially for diseases with a large bill (Wu and Li 2014) or imported medicines and healthcare facilities. The private out-of-pocket spending on health care remains high around 34% (Luo and Tong 2016). When income inequality also grew dramatically it became more difficult for people with low SES to afford increasing costs of privatized medical and hospital services. Such social transformations generate double jeopardy for older adults with disadvantaged socioeconomic status. Consequently, support from one's family becomes a crucial factor influencing people's access to and utilization of healthcare resources. In the context in which children play the most important role in elderly care, the socioeconomic resources of adult children can play a decisive role on aging parents' access to healthcare resources.

Second, unprecedented economic development in China leads to a substantial growth in intergenerational social mobility. A large proportion of younger cohorts



received a basic education, and on average, longer years of education (Bauer et al. 1992). Higher education in China used to be elite education. The gross enrollment rate of higher education remained under 7% before 1996 (Yao et al. 2010). During the national expansion of higher education, the gross enrollment rate radically increased from 9.8% in 1998 to 22% in 2006, transforming higher education to be mass education (Wu and Zheng 2008). The annual college enrollment in 2009 is 6.3 million, which is six times than that in 1998 (Yeung 2013). The expansion of higher education provided opportunities for intergenerational social mobility to more families especially those in rural areas. In general, longer years and higher degrees in education could translate into higher income, more socioeconomic resources, and better knowledge about healthy lifestyles. Particularly for rural people, higher education is seen as “a golden ticket for rural youth to gain an urban *hukou* status” (p55, Yeung 2013), and acquiring urban *hukou* is associated with better job opportunities, higher wages, and greater access to better healthcare resources that are not otherwise available.

Moreover, since the market reform in late 1980s, rigid institutional walls such as the rural-urban divide, work unit boundary, and political classification have gradually collapsed (Bian 2002). The social changes and the development of labor market expanded the opportunities for upward social mobility. Researchers found that compared with earlier cohorts, the proportion of people who are in class positions that are more advantaged than their classes of origin substantially increased for each of the younger cohort from 1960s to 1980s (Chen 2013). Children’s occupational attainment is no longer solely determined by fathers’ education and occupation, but rather becomes more of a result of one’s own education (Blau and Ruan 1990). Such social changes enable the

children's generation to have more economic and social resources than their parents' and make them play an increasingly important role in influencing parents' well-being through intergenerational support. Specifically, it should be noticed that when decomposing the large rising tendency of upward social mobility across cohorts, most of the mobility comes from the rural rather than the urban population (Chen 2013). This is due to an increased proportion of people moving from agricultural to non-agricultural work in younger cohorts. Such social changes may have profound influences, especially on rural families. It provides a social ladder for adult children with low SES of origin in rural places to achieve higher SES through their own efforts.

#### Research Significance of the Current Study

The study extends existing literature in several ways. First, socioeconomic inequalities in health and mortality on the individual level have been well documented in literature (Elo 2009; Williams 1990). Taking a life course perspective, health trajectories along the life course could also be stratified by SES. Although the general literature has provided inconsistent empirical findings in regard to whether socioeconomic disparities in health diverge or converge in old age (for a review see Chen et al. 2010), health differentials by SES are found to persist among older adults in China, as higher SES is associated with lower mortality risks for older adults and the oldest old (Luo et al. 2015; Zhu and Xie 2007). The current study links this body of literature that based on the individual perspective to a broader perspective of multigenerational social determinants of health. In regard to the Chinese social context, although socioeconomic disparities in health persist in old age, there is substantive intergenerational social mobility in younger generations. Such unique social context propels the study to ask whether disadvantaged

older adults could benefit from their adult children's socioeconomic attainment, and further whether adult children's SES could transmit to larger health benefits for more disadvantaged older parents. By investigating whether older parents of lower SES benefit more in terms of health from their adult children's socioeconomic attainment, this study offers insights into whether the upward intergenerational transmission of SES benefits for health play a role in influencing socioeconomic inequalities in health among older adults. To my knowledge, these questions have not yet been examined in the Chinese context.

Second, most existing studies of the relationship between adult children's SES and older parents' health have focused on the survival of older parents as the outcome variable. Only two of them have explored the impact of adult children on older adults' functional limitations and health behaviors. Zimmer, Hermalin, and Lin (2002) found that after taking into account the effect of parents' own education, higher education of adult children is associated with a lower probability of having functional limitation of older parents in Taiwan. Furthermore, children's education is a more crucial determinant than parents' own education for the severity of functional limitation. Higher education of adult children is associated with a decreased severity of functional limitation for older parents. Friedman and Mare (2014) found that for the U.S. older adults, after adjusting for the effect of their own education and income, having more-educated adult children is associated with having healthier behaviors indicated by a lower likelihood of smoking and a higher likelihood of engaging in vigorous exercise. Mortality is a health measure that only captures the severest situation of worse health. Most of the related studies only provides a snapshot of how children's SES is linked to the worst health situation of older parents, missing a bigger picture of adult children's impact on older parents whose health

and well-being could vary in a large range in later life. Given that higher SES of adult children is predictive of older adults' longevity, how adult children's SES further influences the quality of life for the prolonged life span of older adults is a more important question awaiting for answers. To answer this question, a closer look at older adults' health problems is needed. The current study employs a composite measure of older adults' health problems, Frailty Index, as the outcome variable. FI measures the proportion of health deficits of a person based on multi-dimensions of health, including chronic diseases, functional limitations, general health conditions, and psychological well-being. Being derived in such a way, FI has the advantage to capture "the biological complexity of the comorbidity process" (p795, Chen et al. 2015). By investigating how adult children's SES is associated with the level of frailty for older parents, this study extends existing literature by providing an insight into adult children's impact beyond affecting parental mortality, but influencing parents' well-being in later life.

Third, although the emerging studies on the impact of adult children's SES on older parents' mortality have all discussed potential mechanisms that explain the association, only one of them has tested whether health behaviors is one of the mechanisms by empirical data on U.S. older adults (Friedman and Mare 2014). As reviewed above, they found that having more-educated adult children is associated with possessing healthier behaviors. They also found the mediating effect of parents' smoking and exercising on the relationship between adult children's education and parental mortality, suggesting that parents' health behaviors are the pathway through which adult children's educational attainment translates into parental survival chances. The current study carries on the investigation of parents' health behaviors as the mechanism but

extends the literature by incorporating the drinking behavior and examining whether parents' smoking and drinking behaviors are also influenced by aspects of adult children's SES other than education.

Finally, the preceding review of pathways through which adult children's SES might influence older parents' health implies that different aspects of SES could exert their impact via multiple and different mechanisms. However, most of the previous studies have only focused on children's education (Friedman and Mare 2014; Torssander 2013; Zimmer et al. 2007). Education level could be a mixture measure of a person's economic resources and knowledge, thus it cannot be differentiated that whether children's educational attainment promotes parental health through the financial assistance or the diffusion of knowledge or both. Besides, education does not linearly predict income, while the latter is a more straightforward measure of a person's economic resources. Only two recent studies have explored other aspects of children's SES, including occupation (Torssander 2014; Zimmer et al. 2016) and income (Torssander 2014). Torssander (2014) found that all the three dimensions of offspring's SES, education, occupational class, and income, have independent association with parental mortality risk in Sweden, but children's education is more important than the other two indicators in predicting parental mortality because it shows the clearest mortality gradient for both older mothers and fathers. Zimmer et al. (2016) measured offspring's SES by the Nam-Power SES scores based occupation. Since it is also an integrated measure of SES capturing the education and income associated with a person's occupation, it does not tell whether the advantage of higher occupation scores is transmitted to parental survival through monetary resources reflected by income or knowledge reflected by education, or

a combination of the two. In line with the work of Torssander (2014), this study extends existing literature by incorporating multiple dimensions of Chinese adult children's SES, including education, income, and *hukou* status. Rural/urban *hukou* status is a unique indicator of SES in the Chinese social context. Rural-urban divide appears in healthcare resources, health insurance schemes, as well as health behaviors. A rural *hukou* status not only indicates a person's limit in economic and social resources, but more importantly, in access to healthcare resources of better quality and larger variety. The prevalence of health risk behaviors could also be higher among rural people since the traditional cultural deemed smoking and drinking as high status activities. Whereas the prevalence of such behaviors could be lower, especially among younger cohorts, in more developed urban areas where the harmfulness of smoking and excessive drinking is widely recognized. Observing how a particular aspect of adult children's SES exerts different effects on parental health outcomes and health behaviors from the others helps to disentangle the underlying mechanisms linking adult children's attainment to better parental health. For instance, differentiating the impact of adult children's education and income could provide an insight into whether adult children's education exerts impact through the diffusion of knowledge and information as well as through the social influence of behavioral norms, while adult children's income is transmitted to parental health benefits via the transfer of economic resources.

### Research Hypotheses

The study asks three questions. First, how older parents' health is influenced by adult children's SES, net of the effect of parents' own SES? Second, does adult children's socioeconomic achievement yield larger health benefits for older parents with lower

SES? Third, does one of the mechanisms through which adult children's SES influences older adults' health is by shaping older adults' health behaviors?

The study begins with a general inquiry about the effect of adult children's SES on older parents' health outcomes controlling for the effect of parents' own SES. Lives of older parents and their adult children are linked in families. Adult children's SES implies the economic and social resources they have as well as the knowledge and information they acquire. Resources, knowledge, and information of adult children could influence older parents' health through intergenerational support and contact. First, highly educated, wealthier adult children with urban *hukou* could improve older parents' living conditions through financial transfers and could provide older parents with greater access to healthcare resources of better quality by mobilizing their own economic and social resources. Second, knowledge of better health behaviors and information of healthier lifestyles could be diffused from better educated children to older parents, which could positively influence the latter's health outcomes. Therefore, the first hypothesis of the study is that:

Hypothesis 1: Having adult children with higher SES is associated with better health outcomes of older parents, controlling for parents' own SES.

Research suggested that older people with lower education, income or occupational status are exposed to higher risks of poor physical and mental health and insufficient insurance protections (Chandola et al. 2007; Corrieri et al. 2010; Grundy and Sloggett 2003; Rueda, Artazcoz, and Navarro 2008), but socioeconomic adversities in health may be compensated by social support from family members (Berkman et al. 2000). Since adult children play a primary role in elderly support in Chinese families, it is

important to know does adult children's achievement in SES offer a buffering effect on health adversities faced by parents with disadvantaged SES. Specifically the study asks if adult children have achieved higher SES than their parents, does it bring larger health benefits to older parents with lower SES than to those with higher SES? Adult children faring better than parents could provide access to healthcare resources and health-related knowledge that are not otherwise available to disadvantaged older parents. The achievement of adult children may be more influential for lower SES parents, because it could help parents to cope with health adversities associated with their own SES.

Therefore the second hypothesis of the study is that:

Hypothesis 2: Upward intergenerational social mobility of adult children brings larger health benefits to parents with lower SES than to parents with higher SES.

Finally, the study takes a closer look at the underlying mechanisms linking adult children's SES to older parents' health. It examines whether one of the mechanisms works through changing older parents' health behaviors such as smoking and drinking. Well-educated children may provide knowledge and advice about healthier lifestyles that helps parents to quit or prevent health risk behaviors. In addition, well-educated children have better health behaviors themselves, as described by the health spillover effect such behavioral norms could be shared to and adopted by older parents thus shaping their health behaviors. For example, children with higher education are less likely to smoke and this health-enhancing behavior could encourage older parents to quit smoking. However, in transitional societies undergoing rapid economic development, smoking and drinking may be viewed as activities that symbolize one's privileged social status (Chen et al. 2010). Thus, people with more economic resources and greater purchasing power



could be more likely to adopt these health risk behaviors (Du et al. 2002; Kim, Symons, and Popkin 2004; Popkin 1998). In addition, the Chinese drinking culture goes back to ancient times. The habit of drinking is widely spread across socioeconomic strata. Thus the drinking behavior could be less related to education level, but more related to one's purchasing power. Parents' purchasing power could be increased by financial support from successful children. By this means children's economic resources may facilitate parents smoking and drinking habits. Therefore I expect that different aspects of adult children's SES may have opposite effects on parents' health behaviors and hypothesize that:

Hypothesis 3: Higher education of adult children is associated with a lower likelihood of smoking and drinking of older parents, but higher income of adult children is associated with a higher likelihood of smoking and drinking of older parents.

In general, rural older adults are more limited in economic resources than their urban counterparts. Besides, the rural-urban divide in healthcare resources also put rural older adults in a disadvantaged position. Therefore, I expect that the benefit of adult children's success could be more important to and influential on rural older adults. The study tested rural/urban differences in the effect of children's SES on older parents' health outcomes and health behaviors. However, since no significant difference is found, results are not presented in this paper.

## Methods

### Data

The study uses two waves of data from the China Health and Retirement Longitudinal Study (CHARLS, 2011, 2013). CHARLS is an ongoing biennial survey

based on a nationally representative sample of Chinese residents at age 45 and over in China. The baseline national survey was conducted in 2011, which included 17,500 individuals from 10,000 households located in 150 counties/districts and 450 villages/resident committees. The second and also the latest wave was collected in 2013. The data consists of demographic and socioeconomic information about the older respondent, his/her partner, parents and all adult children. The older adults are also interviewed about their health status, health behaviors, as well as received health care and insurance. The sample of this study is older adults at age 50 or over with at least one living adult child in 2011 (N=13308). Most of the variables for the study have less than 2% missing, with the exception of older adults' FI (9.3%), whether smoking or not (4.1%), occupation (4.2%), and adult children's income (8.1%). From 2011 to 2013, 383 respondents died and 1152 respondents were lost to follow up. Omitting those who have missing values in the variables leaves a valid sample size of 10680 for the 2011 wave and 7563 for the 2013 wave.

## Measures

Dependent variables for the study include older adults' health outcomes and health behaviors. I use Frailty Index to measure older adults' health outcomes. FI is a composite measure of health which incorporates questions on chronic illnesses, disabilities in activities of daily living, disabilities in instrumental activities of daily living, depressive symptoms, self-reported health, and obesity (BMI $\geq$ 30). FI has been validated by empirical studies as a robust, efficient, and systematic measure of health problems for older population in North America (Chen et al. 2015; Mitnitski et al. 2002;

Yang and Lee 2010) and in China (Gu et al. 2009). Following the method used by existing studies, I calculate this index as the count of frailty symptoms in the individual divided by the total number of 37 questions concerning the abovementioned aspects of frailty in the CHARLS. FI presents a proportion of frailty for an individual with values ranging from 0 to 1. Table 1 shows that the mean score of FI among all older adults in the sample was 0.187 in 2011 and 0.180 in 2013.

- Table 1 about here -

Health behaviors of the older adults are measured by their habit of smoking and drinking. A dummy variable is created to indicate whether the respondent is smoking or not. In the 2011 wave, more than a third of the sample had the habit of smoking. The habit of drinking is also measured by a dummy variable. The respondent is coded as drinking if he/she drank more than once a month in the past year. In the 2011 wave, a quarter of the sample had the habit of drinking.

The key independent variables are children's SES and older adults' SES. Since on average respondents have 2.8 adult children, for children's SES the study uses the highest SES of a respondent's all living adult children. This integrated measure of adult children's SES in Chinese families has been proved to be robust by the previous study (Zimmer et al. 2007). Adult children's SES is measured in three aspects including the highest educational attainment, the highest income, and whether any adult child has urban *hukou* among one's all adult children. In the survey the original question for children's education was asked on a 1-11 scale, representing 11 adjacent educational levels from illiterate to doctoral degree. The study recodes it into four categories with 1 = elementary or under and 4 = college or above. Children's annual income (including children's

spouse's) in the past year was also asked on a 1-11 scale, with each scale representing an income range. In order to make the income of adult children and of older parents comparable, the study first recodes adult children's income into four categories, letting the percentage of each category to be as close as a quarter. Since the contrast between lower income and higher income children is the main concern, by combining the middle two quartiles, I further codes children's income into 3 categories with 1 = the lowest quartile (under 10,000 RMB), 2 = the middle quartiles (from 10,000 to 50,000 RMB), and 3 = the highest quartile (above 50,000 RMB).

Older adults' own SES should be taken into account, because it affects adult children's SES as well as older adults' health outcomes and health behaviors, thus confounding the relationship between the two. Respondents' own SES is measured by their education, annual household income per capita, *hukou* status, whether currently working for pay, and occupation. Respondents' education was asked on the same 1-11 scale as that for children's education. The study recodes it into three categories with 1 = elementary or under, and 3 = senior high or above. The study collapses those with college or above degree to those with senior high degree since the percentage of the former is very small. Respondents' annual household income per capita was asked in exact RMB. To make the measure consistent with adult children's income, the study codes it into four quartiles and then simplifies it into 3 categories with 1 = the lowest quartile (under 1,007 RMB), 2 = the middle quartiles (from 1,007 to 10,667 RMB), and 3 = the highest quartile (above 10,667 RMB).

As specified in research hypotheses, I am interested in testing the influence of adult children's SES, net of the effect of parents' own SES. To make the interpretation

more intuitive, I create another set of variables that aim to get the “distance” or gap between parental SES and children’s SES, with a larger gap indicating a greater extent of upward intergenerational social mobility. This set of variables respectively measures intergenerational social mobility in education, income, and *hukou* between adult children and older respondents. Intergenerational education mobility measures the difference between the highest educational attainment of a respondent’s adult children and the respondent. The variable is first created as the difference between the original 1-11 scale of children’s and respondent’s education. Then it is recoded into 3 categories with

1=children’s education is lower than respondent’s education,

2=children’s education is 1-3 levels higher than respondent’s education, and

3=children’s education is 4 or more levels higher than respondent’s education.

Income mobility is first calculated as the difference between the 3-category variable of children’s annual income and the comparable 3-category variable of respondent’s annual household income per capita. It is further coded it into a dummy variable indicating whether or not children’s income locates in a higher quartile than that of parents.

*Hukou* mobility is measured by the difference between the variable of whether any child has urban *hukou* and respondent’s own *hukou* status. Since it is very rare for respondents with urban *hukou* to have none urban *hukou* child, this category is merged into both children and the respondent are urban *hukou*. Therefore the three categories of this variable are

1=Both children and the respondent are rural *hukou*,

2=both children and the respondent are urban *hukou*, and

3=the respondent is rural *hukou* but has children of urban *hukou*.

Figure 1 presents the distribution of intergenerational social mobility in education, income, and *hukou* between adult children's and older parents' generation. The extent of upward intergenerational social mobility in education is substantial since 84.0% of adult children achieved higher education than their older parents. Among which, 36.5% of adult children attained an education degree that is 4 or more levels higher than that of their parents. There are also noticeable upward intergenerational social mobility in income and *hukou* status. Near a quarter of adult children achieved an income level locating on a higher quartile than that of their parents. 16.7% of adult children gained urban *hukou* while their parents are rural *hukou*.

- Figure 1 about here -

Control variables include older adults' age, gender, marital status, coresident status, and total number of adult children. The mean age of the 2011 sample is 62-year-old, the majority (86.7%) of them are married, and around half of them (51.6%) are coresident with adult children.

### Analytical Strategy

To answer the first research question about how adult children's SES influences older parents' health outcomes, the analytical strategy takes three steps. I begin with the baseline model of multivariate OLS regression using older parents' own SES ( $PSES_i$ ) and their demographic characteristics ( $PC_i$ ) to predict their FI. In the second model, I add adult children's SES ( $KSES_i$ ) to see how it helps to explain older adults' FI. In the third model, as illustrated by equation (1), instead of using adult children's SES I use

intergenerational social mobility in education, income, and *hukou* between adult children and older respondents (*MOBILITY<sub>i</sub>*) to predict older adults' FI. Measures of intergenerational social mobility capture the differences between older parents' and adult children's SES, thus better visualize the impact on older parents' health of adult children's additional socioeconomic attainment based on their SES of origin.

$$FI_i = \beta_0 + \beta_1 PC_i + \beta_2 PSES_i + \beta_3 MOBILITY_i + u_i \quad (1)$$

In order to answer the second research question that whether parents with lower SES benefit more from children's upward social mobility, interaction effects between older parents' own SES and adult children's intergenerational social mobility are tested for the OLS model of FI as illustrated by equation (2). The study tests one by one the interactions between adult children's intergenerational mobility in education and income and the according aspect of older parents' own SES<sup>1</sup>.

$$FI_i = \beta_0 + \beta_1 PC_i + \beta_2 PSES_i + \beta_3 MOBILITY_i + \beta_4 PSES_i * MOBILITY_i + u_i \quad (2)$$

Thirdly, to answer the research question about whether one of the mechanisms through which adult children's SES influences older adults' health outcomes is by changing their health behaviors, I use adult children's SES to predict older parents' smoking and drinking behaviors respectively in binary logistic regression models. Similar analytical strategies are taken as that for the first research question. I start with the baseline model including demographic controls of parents and parents' SES as independent variables. Then I add adult children's SES as predictors for older parents' health behaviors. In the third model, as illustrated by equation (3) I change key predictors

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<sup>1</sup> The study did not test the interaction between older parents' *hukou* status and adult children's intergenerational social mobility in *hukou*, because the measure of intergenerational *hukou* mobility already takes into account the actual *hukou* status of older parents.

from adult children's SES to children's intergenerational social mobility in education, income and *hukou*.

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 PC_i + \beta_2 PSES_i + \beta_3 MOBILITY_i + u_i \quad (3)$$

Cross-sectional analyses described by the abovementioned steps are carried out for both the 2011 and 2013 wave. Results of the two waves are quite similar. The sample of the 2013 wave is a follow up sample of the 2011 wave and the remaining respondents could be in general healthier than the 2011 sample due to the exclusion of deceased and lost to follow-up cases. Such an issue of selection could bias findings of the 2013 wave. Therefore for cross-sectional analyses the study only presents results of the 2011 wave.

Finally, the study takes the advantage of the panel data and uses the individual fixed-effects analysis to adjust for potential issues of endogeneity and validate the effect of children's SES on older parents' health outcomes and health behaviors. There could be characteristics within the individual respondents that impact or bias the relationship between adult children's SES and older respondents' health. Using the individual fixed-effects analysis helps to control for the effect of those unmeasured or unobservable time-invariant individual characteristics and to estimate the net effect of the predictors on the outcome variable (Teachman 2011). Although much of intergenerational social mobility in contemporary China could be credited to the rapid economic and social development, admittedly adult children's SES could be correlated with the socioeconomic resources of their parents. The individual fixed-effects approach holds parental influence on children's SES constant, thus helps to deal with the confounding effect of parents' own SES and other characteristics of the family background on the relation between children's SES and parents' health and health behaviors. Therefore, this investigation helps to strengthen the



argument that children's SES significantly influences older adults' health outcomes and health behaviors net of the characteristics of older adults themselves. Results of Hausman test suggest that this approach is suitable for the study. Different from education, which could be stable for adult children during a two-year interval, other aspects of children's SES such as income and *hukou* status could be quite different between the two waves. Especially, the difference in children's income directly reflects the difference in potential resources and the quality of support that children could provide to parents, which could be influential on older adults' health outcomes and health behaviors. Therefore, children's annual income and *hukou* status enter the fixed-effects models as key independent variables. Other time-varying control variables of parents' own SES and demographic characteristics are also included in the models. Different from the OLS or binary logistic regression models, time-invariant variables are dropped from the fixed-effects models, including parents' gender and education, as well as children's education. Fixed-effects OLS model is used to predict parents' FI, while separate fixed-effects logit models are used to predict parents' smoking and drinking behaviors. The equations are:

$$FI_{it} = \beta_0 + \beta_1 PC_{it} + \beta_2 PSES_{it} + \beta_2 KSES_{it} + \alpha_i + u_{it} \quad (4)$$

$$\ln\left(\frac{P_{it}}{1-P_{it}}\right) = \beta_1 PC_{it} + \beta_2 PSES_{it} + \beta_2 KSES_{it} + \alpha_i + u_{it} \quad (5)$$

where  $FI_{it}$  in equation (4) is older respondent  $i$ 's FI at time  $t$ .  $\ln\left(\frac{P_{it}}{1-P_{it}}\right)$  in equation (5) is whether older respondent  $i$  has the habit of smoking or drinking at time  $t$ . In both equations,  $KSES_{it}$  represents the income and *hukou* status of the adult children of respondent  $i$  at time  $t$ ,  $RSES_{it}$  represents respondent  $i$ 's income, *hukou* status, whether currently working for pay, and occupation at time  $t$ .  $PC_{it}$  represents time-varying demographic characteristics of the respondent such as marital status and coresident status.

$\alpha_i$  ( $i=1 \dots n$ ) is the unknown intercept for each individual respondent,  $u_{it}$  is the error term. Noted that the fixed-effects analysis could not be applied to validate the interaction effect between older adults' education and adult children's intergenerational social mobility in education on older adults' frailty, because older adults' education is time-invariant during the survey period.

## Results

Table 2 presents the results of OLS regression models predicting older parents' FI. Model 1 in Table 2 is the baseline model which controls for the effect of older adults' own SES and demographic characteristics on their FI. As expected, higher SES of older adults themselves is associated with better health outcomes indicated by lower FI scores. In Model 2 I add variables of adult children's SES. Compared to Model 1, the coefficients for older adults' own education, income and occupation decrease and the R-squared increases, indicating that adding children's SES helps to explain more variance in older parents' FI. Consistent with the first hypothesis, the results show that children's education has a negative effect on older parents' FI. Having adult children who attained educational level of junior high, senior high, and college or above decreases frailty by 0.020, 0.027, and 0.032, respectively. Similarly, children's income also brings health benefits to older parents. The higher income quartile the children locate, the lower level of frailty the parents have. Noted that the FI for parents with children of the middle-ranged income is 0.010 lower than parents with children of the lowest income, and such a decrease in frailty is more than doubled ( $=0.026$ ) if children locate in the highest income range. Model 3 presents the effect of intergenerational social mobility in adult children's education, income, and *hukou* status. Results further support the first hypothesis since

having children achieved higher education and income than parents brings significant health benefits to older parents. Specifically, having adult children who attained an educational level that is 1-3 levels higher than that of parents is associated with a reduction of 0.010 in parental frailty. While having children who achieved an educational level that is 4 or more levels higher than parents reduces frailty by 0.016. Having adult children whose income locates in a higher quartile than that of their parents reduces parental frailty by 0.017.

- Table 2 about here -

Model 4 in Table 2 presents the significant interaction effect. The results show that parents with different education level do benefit differently from their adult children's upward intergenerational social mobility in education. Figure 2 intuitively depicts the effect of the interaction term on the predicted FI holding other variables in the model at their means. Consistent with Hypothesis 2, adult children's upward educational mobility brings larger health benefits to older parents with education of elementary level or under. Specifically, having children achieved an education level which is 1-3 levels than that of the parents reduces the predicted FI by 0.020 for older adults with elementary or under education, but such a reduction in the predicted FI is only 0.003 and 0.008 respectively for older adults with junior high and senior high or above education. Having adult children attained an education degree that is 4 or more levels higher than that of themselves reduces the predicted FI to an even larger extent by 0.026 for older adults with elementary or under education. This health benefit is not observed for older adults with junior high education. However, contrary to Hypothesis 2, the largest health benefit brought by children's upward education mobility is not to lower-educated parents but to

older adults with senior high or above education. When their adult children achieved an education degree 4 or more levels than them, the predicted FI is reduced by 0.050, doubled the health benefits for lower-educated parents. In the discussion section I will elaborate on possible explanations for this finding.

- Figure 2 about here -

The study further examines whether influencing older parents' health behaviors is one of the possible mechanisms through which adult children's SES affects older parents' health. It is found that different aspects of children's SES have opposite effect on parents' health behaviors. As for smoking, Model 1 in Table 3 is the baseline model which controls for the effect of older adults' own SES and demographic characteristics on their likelihood of smoking. As is shown in Model 2, adding children's SES takes away the effect of parents' own SES. Consistent with the first part of Hypothesis 3, older parents are less likely to smoke if their adult children achieved a higher educational level. Compared to older parents whose children only have elementary or under education, the odds of smoking for older parents decrease by a factor of 0.761, 0.635, and 0.590 respectively if their adult children achieved junior high, senior high, and college or above education. Children's income and *hukou* do not significantly influence parents' likelihood of smoking. The results in Model 3 further support the third hypothesis. Upward intergenerational social mobility in education is associated with a lower likelihood of smoking for older adults. Compared to older parents whose adult children did not achieve higher education than them, the odds of smoking for older adults decrease by a factor of 0.863 and 0.714 respectively if their adult children have achieved the education 1-3 levels and 4 or more levels higher than them. It is also found that if both older parents and adult

children are urban *hukou*, the older parents are less likely to smoke (the odds of being smoking decrease by a factor of 0.798 compared to those rural older adults whose children also have rural *hukou*). However, upward intergenerational social mobility in children's income and *hukou* status do not significantly influence older parents' smoking behavior.

- Table 3 about here -

As for drinking, Model 1 in Table 4 is the baseline model with controls for the effect of older adults' own SES and demographic characteristics on the likelihood of drinking. The results in Model 2 show that adding children's SES does not take away the effect of parents' own SES. Adult children's education, income and *hukou* status does not significantly influence older parents' likelihood of drinking. Rather, the habit of drinking is associated with older adults' own SES. Older adults with higher income, who are currently working and holding jobs in both agricultural and non-agricultural sections are more likely to smoke. Consistent with the second part of Hypothesis 3, a positive effect is found for upward intergenerational mobility in income on older adults' drinking behavior. As is shown in Model 3, compared to older adults whose children did not achieve upward intergenerational social mobility in income, older adults whose children's income locates in a higher quartile than themselves are more likely to drink, with the odds of drinking being 1.381 times larger. However upward intergenerational social mobility in education and *hukou* status do not significantly influence older adults' drinking behavior.

- Table 4 about here -

The effect of controls are as expected. Men, married people, and those with better SES have a lower level of frailty. Older people and those who have more adult children have a higher frailty level. Moreover, men, rural *hukou* people, and those who are currently working for pay are more likely to smoke, while older, married people, those who have senior high or above education, and work only in the non-agricultural section are less likely to smoke. Furthermore, men, those who have higher income, are currently working for pay and holding job in both agricultural and non-agricultural sections are more likely to drink, while older people and those who coreside with adult children are less likely to drink.

Finally, fixed-effects analysis using panel data of the 2011 and 2013 wave further strengthens the findings for the influence of adult children's income on older parents' health. The results of Model 1 in Table 5 show that controlling for all time-invariant characteristics of older adults as well as their time-varying socioeconomic, marital and coresident status, having children achieved the highest income quartile is associated with a reduction of 0.008 in FI. This provides evidence to better support Hypothesis 1 that adult children's socioeconomic attainment could translate into health benefits for older adults. However, opposite to Hypothesis 1, it is found that having children with urban *hukou* is associated with a slight increase in FI by 0.009. The results in Model 2 show that the likelihood of smoking is more than doubled (the odds increase by a factor of 2.625) for older adults whose children achieved the highest income quartile compared to their counterparts whose children's income locates in the lowest quartile. This finding provides evidence to support the second part of Hypothesis 3. The results in Model 3

indicate that after controlling for time-invariant characteristics of older adults, children's income and *hukou* do not significantly predict older parents' drinking behavior.

- Table 5 about here -

## Discussion

This study in several important ways contributes to the burgeoning literature linking adult children's SES attainment to older parents' health (Friedman and Mare 2014; Torssander 2013, 2014; Zimmer et al. 2007, 2016). It extends the literature by investigating children's impact on parental frailty instead of mortality, providing insights into how adult children's socioeconomic attainment not only extends parents' life span but also helps to reduce parental frailty and improve life quality of the prolonged life span. The study also examines whether adult children's socioeconomic achievement yields larger health benefits for socioeconomically disadvantaged older parents. Few studies have addressed this issue before and results of the current study show that the multigenerational influence on older adults' health from adult children could at the same time alleviate and intensify socioeconomic inequalities in health among older adults. The study further sheds light on whether one of the mechanisms through which adult children's SES influences older parents' health outcomes is through changing their health behaviors of smoking and drinking. In addition, the study contributes to existing literature by incorporating more than just adult children's education as indicators of SES, which helps to disentangle different underlying mechanisms linking adult children's attainment to better health outcomes and health behaviors of older parents. Finally, the study is contextualized in contemporary China, where no research has studied the upward transmission of health benefits yield by adult children's SES to older parents.

Results suggest that adult children's SES do influence older parents' health outcomes, net of the effect of parents' own SES. After controlling for older adults' own SES, it is found that having children with higher education and income brings health benefits to older adults by reducing the level of frailty. The influence of adult children's income on older parents' health is further supported by the fixed-effects analysis. Taking into account of all time-invariant characteristics of older parents, having high earning adult children is associated with a significantly lower level of frailty. These findings provide evidence to support the first hypothesis. Adult children's SES represents the economic and social resources as well as the health-related knowledge and information that they have. It further implies the amount and quality of social support that adult children could provide to older parents, which may further influence parents' health and well-being. On the one hand, wealthier children may provide more financial support, which facilitates parents to get better healthcare services, utilize the newest health technology, and receive the most efficient medical treatment. Through these ways adult children's economic resources could translate into older parents' health benefits. In China, the upward financial support from adult children to older parents is the dominant stream of intergenerational economic support. Children's income level directly determines their ability to support parents financially. Newer and expensive imported prescription drugs are largely uncovered by general health insurance schemes in China. When parents are ill, whether adult children have the economic capability to push the use of these better but costly medical treatment translates into how well that parents could recover from serious illness. On the other hand, more-educated children could mobilize social resources in their social networks, for example, bring greater access to good



doctors to older parents. Children with higher SES may also disseminate up-to-date health-related knowledge and information to parents. This enables parents to better follow the instructions of health providers, make decisions about the use of health production, and stick to healthier lifestyles. More evidence to support the first hypothesis is provided by the influence of adult children's upward intergenerational social mobility on older adults' health. It is found that having children who have achieved higher status in education and income than older adults themselves is associated with lower scores in FI. Moreover, greater intergenerational social mobility in education promotes larger health benefits for older adults. These findings imply that the additional achievement that adult children attained beyond their SES of origin could bring the abovementioned health beneficial resources that are not otherwise available to older parents.

Results offer partial support for the second hypothesis. Older adults with elementary or less education do benefit more from their adult children's SES achievement in terms of health compared to those with junior high education, suggesting that adult children's attainment in SES could bring a buffering effect to health adversities faced by socioeconomically disadvantaged older adults. Interestingly, results also suggest that the largest reduction in frailty brought by adult children's education achievement is for those older adults who themselves are highly educated while their adult children also attained at least a master degree. This finding is in consistent with what Zimmer et al. (2007) found for Taiwanese population. As they suggested, having a highly educated child than having less educated child, the associated health benefit of reducing parental mortality risks is the largest for highly or middle educated older adults. The theory of cumulative inequality and cumulative advantage/disadvantage (Dannefer 2003; Ferraro et

al. 2009) suggests that advantage or disadvantage associated with different SES in earlier life stages accumulates and could develop to larger socioeconomic disparities in health in later life. Findings of this study inspire the application of a multigenerational network perspective to the theory. Adult children's socioeconomic achievement could be a potential buffer to cumulative disadvantage faced by lower SES older adults. At the same time, it also enlarges the health gap between the rest of others and higher SES older adults with top-educated adult children. Socioeconomic inequalities in health persist in old age in China. Higher SES older adults live with less health deficits than their lower class counterparts. Their better health conditions may enable them to gain more from the upward intergenerational transmission of adult children's SES achievement. Thus health benefits arise from their own SES and multiply by their children's SES. In addition, the network perspective on the multigenerational influence on older adults' health also has important policy implications. Results of this study pointed out that the most vulnerable older adults would be those who suffer health disadvantages associated with their own lower SES while do not have higher educated children as a source of health beneficial resources. Policy interventions should not only target on people who are put in a disadvantaged position by their own SES but more importantly should focus on those facing larger disadvantages resulting from few health benefits from intergenerational ties. Policies aiming at narrowing the SES gap of health could extend its intervention beyond disadvantaged older adults by developing programs promoting educational attainment of these people's offspring.

Results of the study further suggest that one of the mechanisms that adult children's SES influences older parents' health could work through influencing health

behaviors. For smoking, adult children's education and income level, as well as intergenerational social mobility in education influence the likelihood of smoking for older adults. While for older adults' drinking behavior, only intergenerational social mobility in income is found to be associated with older parents' likelihood of drinking. Consistent with the third hypothesis, it is found that different aspects of children's SES have opposite effect on parents' health behaviors. Having children achieved higher education the older adults are less likely to smoke. Also if children achieved higher education than that of the older parents, the latter are less likely to smoke. Knowledge about the harmfulness of smoking could be disseminated from higher educated children to older parents. Since highly educated children themselves are also less likely to smoke, described as a health spillover effect, this healthier behavior of highly educated children could also make parents less likely to smoke through shared behavioral norms or behavior imitation. However, the beneficial effect of adult children's education is not found for older adults' drinking behavior. Unlike smoking which is harmful for either moderate or heavy smokers, the health risk of drinking depends on its intensity. Excessive drinking is bad for health, but low to moderate drinking is not known to be harmful, and is even suggested to have health beneficial effects. The way that drinking is measured for this study does not clearly distinguish excessive and moderate drinking, because the respondent is coded as drinking if he/she drank more than once a month in the past year. To have a measure on the behavior of heavy drinking may help to unmask the health promoting effect of adult children's education on drinking.

On the contrary, children's income is found to have positive effect on parents' smoking and drinking behaviors. It is found that the higher earnings of children are

associated with a higher likelihood of smoking for older parents. In addition, if children's income locates in a higher quartile than that of their parents, parents are more likely to drink. These findings are not surprising in the Chinese social context. Studies have suggested that in a transitional society, a higher social status could be associated with a higher likelihood of drinking, because drinking is viewed as a high status activity and higher SES people also have a larger purchasing power to keep this habit (Chen et al. 2010; Du et al. 2002; Kim et al. 2004; Popkin 1998).

The study is not without limitations. Although substantial intergenerational social mobility is made by the rapid economic and social development in China, admittedly, children's SES can be transmitted from parents in the first place. Another aspect of possible endogeneity of children's SES with parental health could be that healthier parents may have children who achieve better in education and income. Instrumental variables method is one of the ways to deal with endogenous effects, but it is challenging to find appropriate instrumental variables for the analysis (Friedman and Mare 2014). This study tries to deal with this issue by using the individual fixed-effects analysis, and to investigate possible mechanisms that help to validate in a descriptive manner the causal order from adult children's SES to older parents' health. Besides, information of adult children's SES is reported by older respondents, thus could be inaccurate. Especially, adult children's income is reported on a rather crude scale instead of exact amount. Therefore, the study could not provide precise estimation of differences in health benefits for older parents brought by adult children's different income level. Adult children's cadre status was also tested in models as one of the indicators of their SES. However no significant effect is found, suggesting that adult children's cadre status does

not translate into older adults' privileges in accessing better healthcare resources.

Moreover, the survey asked adult children's occupation on a rather crude scale, limiting the study to examine whether adult children working in certain industries bring older parents better connections with doctors and greater access to other healthcare services.

Nonetheless, the study sheds light on the importance of adult children's SES on older parents' health. More importantly, the study provides evidence that the upward intergenerational transmission of SES benefits for health helps to understand the persistence of health disparities among Chinese older adults. Since adult children play an important role in shaping older adults health behaviors and further influencing their well-being, policy interventions aiming at enhancing the life quality for older adults could be more effective if taking into account both older parents' and adult children's generation. In addition, policy interventions should pay special attention to lower SES older adults with no adult children who have achieved higher SES. Future study could utilize more waves of the longitudinal data to understand how adult children's SES influences the health trajectories of older parents. I also plan to examine how adult children's SES influences the extent of parental smoking by adopting a more detailed measure of smoking frequency of older adults.

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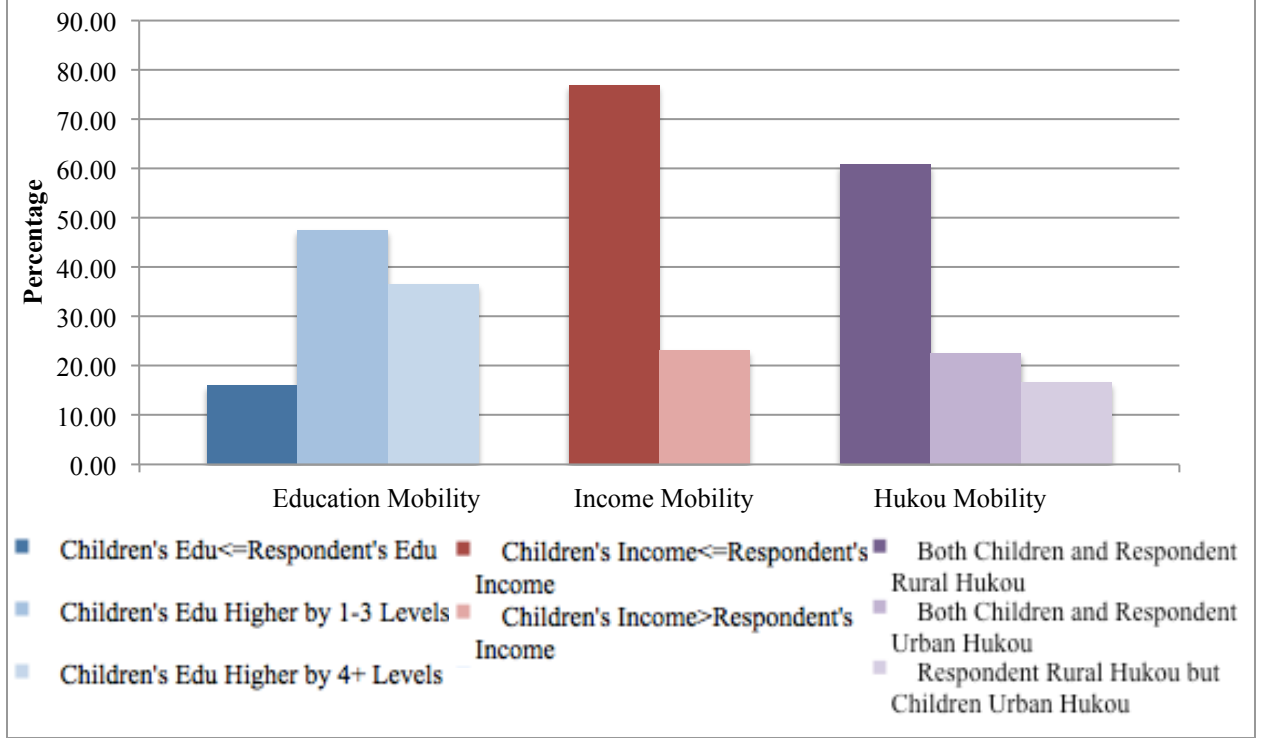
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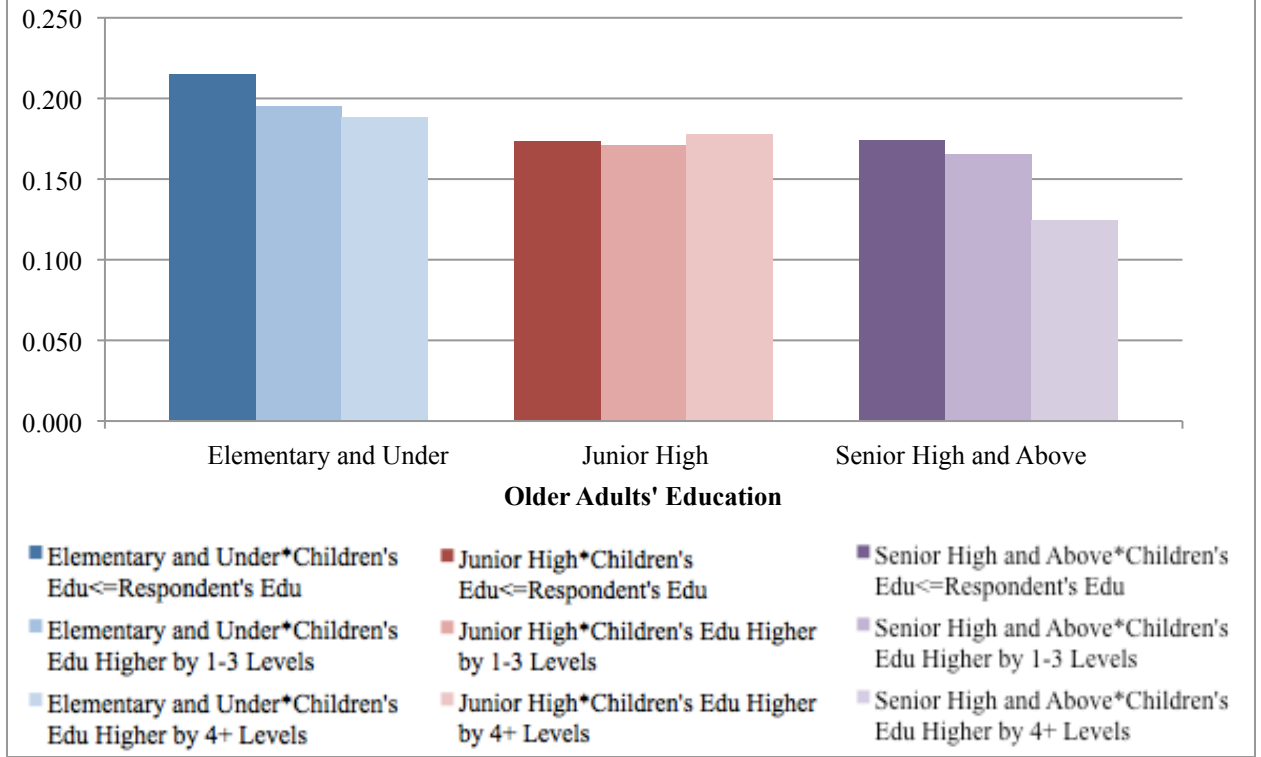
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**Figure 1. Intergenerational Social Mobility in Education, Income and Hukou 2011 (N=10,680)**



**Figure 2. Predicted Frailty Index for Older Adults by the Interaction between Their Education and Adult Children's Education Mobility 2011**



**Table 1. Descriptive Statistics for Variables, CHARLS, 2011, 2013**

	2011		2013	
	Mean	SD	Mean	SD
<b>Frailty Index</b>	0.187	(0.123)	0.180	(0.117)
<b>Smoking (Yes=1, No=0)</b>	0.317	(0.465)	0.380	(0.485)
<b>Drinking (Yes=1, No=0)</b>	0.254	(0.435)	0.270	(0.444)
<b>Respondent's Demographic Characteristics</b>				
Age	62.116	(8.352)		
Male (Yes=1, No=0)	0.494	(0.500)		
Married (Yes=1, No=0)	0.867	(0.340)	0.871	(0.336)
Coresident (Yes=1, No=0)	0.516	(0.500)	0.466	(0.499)
Number of Adult Children	2.834	(1.394)		
<b>Respondent's SES</b>				
Education				
<i>(Ref. Cat.=Elementary and Under)</i>				
Junior High	0.170	(0.376)		
Senior High and Above	0.112	(0.316)		
Annual Household Income Per Capita				
<i>(Ref. Cat.=The Lowest Quartile)</i>				
The Middle Quartiles	0.511	(0.500)	0.522	(0.500)
The Highest Quartile	0.248	(0.432)	0.270	(0.444)
Rural <i>Hukou</i> (Yes=1, No=0)	0.775	(0.417)	0.776	(0.417)
Currently Working for Pay (Yes=1, No=0)	0.648	(0.478)	0.652	(0.476)
Occupation				
<i>(Ref. Cat.=Agricultural Only)</i>				
Non-agricultural Only	0.272	(0.445)	0.248	(0.432)
Both Agricultural and Non-agricultural	0.082	(0.275)	0.090	(0.286)
<b>Adult Children's SES</b>				
Education				
<i>(Ref. Cat.=Elementary and Under)</i>				
Junior High	0.367	(0.482)		
Senior High	0.225	(0.418)		
College and Above	0.229	(0.420)		
Annual Income				
<i>(Ref. Cat.=The Lowest Quartile)</i>				
The Middle Quartiles	0.659	(0.474)	0.580	(0.494)
The Highest Quartile	0.147	(0.354)	0.256	(0.436)
Urban <i>Hukou</i> (Yes=1, No=0)	0.378	(0.485)	0.387	(0.487)
N	10680		7563	



**Table 2. OLS Regression Models Predicting Older Adults' Frailty Index in 2011**

	Model 1		Model 2		Model 3		Model 4	
Intercept	0.215	***	0.244	***	0.243	***	0.253	***
	(0.015)		(0.016)		(0.015)		(0.016)	
Age	0.001	***	0.001	**	0.001	***	0.001	***
	(0.000)		(0.000)		(0.000)		(0.000)	
Male (Yes=1, No=0)	-0.022	***	-0.023	***	-0.025	***	-0.025	***
	(0.002)		(0.002)		(0.002)		(0.002)	
Married (Yes=1, No=0)	-0.014	***	-0.011	**	-0.013	**	-0.013	**
	(0.004)		(0.004)		(0.004)		(0.004)	
Coresident (Yes=1, No=0)	0.001		-0.001		-0.001		-0.001	
	(0.003)		(0.003)		(0.003)		(0.003)	
Number of Adult Children	0.002		0.003	*	0.002	*	0.002	*
	(0.001)		(0.001)		(0.001)		(0.001)	
<b>Respondent's SES</b>								
Education								
<i>(Ref. Cat.=Elementary and Under)</i>								
Junior High	-0.021	***	-0.017	***	-0.025	***	-0.041	***
	(0.003)		(0.003)		(0.003)		(0.007)	
Senior High and Above	-0.025	***	-0.019	***	-0.032	***	-0.041	***
	(0.004)		(0.004)		(0.004)		(0.007)	
Annual Household Income Per Capita								
<i>(Ref. Cat.=The Lowest Quartile)</i>								
The Middle Quartiles	-0.009	**	-0.006		-0.019	***	-0.019	***
	(0.003)		(0.003)		(0.004)		(0.004)	
The Highest Quartile	-0.036	***	-0.027	***	-0.047	***	-0.047	***
	(0.004)		(0.004)		(0.005)		(0.005)	
Rural <i>Hukou</i> (Yes=1, No=0)	0.003		0.003					
	(0.004)		(0.004)					
Currently Working for Pay (Yes=1, No=0)	-0.045	***	-0.046	***	-0.045	***	-0.045	***
	(0.003)		(0.003)		(0.003)		(0.003)	
Occupation								
<i>(Ref. Cat.=Agricultural Only)</i>								
Non-agricultural Only	-0.035	***	-0.033	***	-0.034	***	-0.034	***
	(0.004)		(0.004)		(0.004)		(0.004)	
Both Agricultural and Non-agricultural	-0.027	***	-0.025	***	-0.027	***	-0.026	***
	(0.004)		(0.004)		(0.004)		(0.004)	
<b>Adult Children's SES</b>								
Education								
<i>(Ref. Cat.=Elementary and Under)</i>								
Junior High			-0.020	***				
			(0.004)					
Senior High			-0.027	***				
			(0.004)					
College and Above			-0.032	***				
			(0.005)					
Annual Income								
<i>(Ref. Cat.=The Lowest Quartile)</i>								
The Middle Quartiles			-0.010	**				
			(0.003)					
The Highest Quartile			-0.026	***				
			(0.005)					
Urban <i>Hukou</i> (Yes=1, No=0)			0.006					

(0.004)

**Intergenerational Social Mobility**

Education Mobility

(Ref. Cat.=Children's Edu<=Respondent's Edu)

Children's Edu Higher by 1-3 Levels

-0.010 \*\* -0.020 \*\*  
(0.003) (0.006)

Children's Edu Higher by 4+ Levels

-0.016 \*\*\* -0.026 \*\*\*  
(0.004) (0.006)

Income Mobility

(Ref. Cat.=Children's Income<=Respondent's Income)

Children's Income>Respondent's Income

-0.017 \*\*\* -0.017 \*\*\*  
(0.004) (0.004)

Hukou Mobility

(Ref. Cat.=Both Children and Respondent Rural Hukou)

Both Children and Respondent Urban Hukou

-0.002 -0.003  
(0.004) (0.004)

Respondent Rural but Children Urban Hukou

-0.002 -0.003  
(0.004) (0.004)

**Interaction Effect of Respondent's Education and Adult Children's Education Mobility**

Junior High\*Children's Edu Higher by 1-3 Levels

0.017 \*  
(0.008)

Junior High\*Children's Edu Higher by 4+ Levels

0.031 \*\*  
(0.009)

Senior High and Above\*Children's Edu Higher by 1-3 Levels

0.011  
(0.008)

Senior High and Above\*Children's Edu Higher by 4+ Levels

-0.023  
(0.018)

N 10,680 10,680 10,680 10,680

R<sup>2</sup> 0.1236 0.1337 0.1273 0.1284

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,892 clusters in the data.

**Table 3. Binary Logistic Regression Models Predicting Older Adults' Likelihood of Smoking in 2011**

	Model 1	Model 2	Model 3
Intercept	-1.378 *** (0.300)	-1.004 ** (0.316)	-0.916 ** (0.298)
Age	-0.019 *** (0.004)	-0.022 *** (0.004)	-0.020 *** (0.004)
Male (Yes=1, No=0)	2.979 *** (0.064)	2.973 *** (0.064)	2.931 *** (0.065)
Married (Yes=1, No=0)	-0.377 *** (0.089)	-0.341 *** (0.089)	-0.358 *** (0.089)
Coresident (Yes=1, No=0)	-0.046 (0.053)	-0.040 (0.055)	-0.049 (0.054)
<b>Respondent's SES</b>			
Education (Ref. Cat.=Elementary and Under)			
Junior High	0.021 (0.067)	0.092 (0.068)	-0.066 (0.072)
Senior High and Above	-0.211 * (0.083)	-0.124 (0.085)	-0.356 *** (0.093)
Annual Household Income Per Capita (Ref. Cat.=The Lowest Quartile)			
The Middle Quartiles	0.090 (0.066)	0.095 (0.066)	0.109 (0.086)
The Highest Quartile	0.032 (0.083)	0.079 (0.086)	0.075 (0.105)
Rural <i>Hukou</i> (Yes=1, No=0)	0.246 ** (0.082)	0.164 (0.092)	
Currently Working for Pay (Yes=1, No=0)	0.134 * (0.067)	0.124 (0.067)	0.129 (0.067)
Occupation (Ref. Cat.=Agricultural Only)			
Non-agricultural Only	-0.176 * (0.077)	-0.140 (0.077)	-0.164 * (0.077)
Both Agricultural and Non-agricultural	0.155 (0.085)	0.178 * (0.085)	0.165 (0.085)
<b>Adult Children's SES</b>			
Education (Ref. Cat.=Elementary and Under)			
Junior High		-0.273 *** (0.076)	
Senior High		-0.454 *** (0.088)	
College and Above		-0.528 *** (0.100)	
Annual Income (Ref. Cat.=The Lowest Quartile)			
The Middle Quartiles		0.098 (0.066)	
The Highest Quartile		0.111 (0.096)	
Urban <i>Hukou</i> (Yes=1, No=0)		-0.016 (0.075)	
<b>Intergenerational SES Mobility</b>			

<b>Education Mobility</b>			
<i>(Ref. Cat.=Children's Edu&lt;=Respondent's Edu)</i>			
Children's Edu Higher by 1-3 Levels			-0.147 *
			(0.071)
Children's Edu Higher by 4+ Levels			-0.337 ***
			(0.085)
<b>Income Mobility</b>			
<i>(Ref. Cat.=Children's Income&lt;=Respondent's Income)</i>			
Children's Income>Respondent's Income			0.017
			(0.087)
<b>Hukou Mobility</b>			
<i>(Ref. Cat.=Both Children and Respondent Rural Hukou)</i>			
Both Children and Respondent Urban Hukou			-0.226 **
			(0.085)
Respondent Rural but Children Urban Hukou			-0.026
			(0.076)
N	10,680	10,680	10,680
Chi <sup>2</sup>	2377.74	2392.77	2396.34
df	12	18	16
BIC	9879.398	9893.352	9897.526

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,892 clusters in the data.

**Table 4. Binary Logistic Regression Models Predicting Older Adults' Likelihood of Drinking in 2011**

	Model 1	Model 2	Model 3
Intercept	-2.232 *** (0.309)	-2.235 *** (0.321)	-2.286 *** (0.304)
Age	-0.011 ** (0.004)	-0.012 ** (0.004)	-0.011 ** (0.004)
Male (Yes=1, No=0)	2.220 *** (0.061)	2.224 *** (0.061)	2.215 *** (0.062)
Married (Yes=1, No=0)	-0.130 (0.088)	-0.134 (0.089)	-0.133 (0.089)
Coresident (Yes=1, No=0)	-0.238 *** (0.054)	-0.221 *** (0.055)	-0.211 *** (0.055)
<b>Respondent's SES</b>			
Education (Ref. Cat.=Elementary and Under)			
Junior High	0.051 (0.065)	0.053 (0.066)	0.005 (0.071)
Senior High and Above	-0.013 (0.085)	-0.008 (0.086)	-0.069 (0.094)
Annual Household Income Per Capita (Ref. Cat.=The Lowest Quartile)			
The Middle Quartiles	0.185 ** (0.068)	0.174 * (0.069)	0.391 *** (0.090)
The Highest Quartile	0.251 ** (0.084)	0.224 * (0.087)	0.499 *** (0.108)
Rural <i>Hukou</i> (Yes=1, No=0)	0.062 (0.081)	0.082 (0.090)	
Currently Working for Pay (Yes=1, No=0)	0.547 *** (0.068)	0.553 *** (0.068)	0.545 *** (0.068)
Occupation (Ref. Cat.=Agricultural Only)			
Non-agricultural Only	0.093 (0.077)	0.095 (0.077)	0.093 (0.077)
Both Agricultural and Non-agricultural	0.282 ** (0.084)	0.277 ** (0.084)	0.282 ** (0.084)
<b>Adult Children's SES</b>			
Education (Ref. Cat.=Elementary and Under)			
Junior High		0.001 (0.076)	
Senior High		-0.010 (0.088)	
College and Above		-0.091 (0.099)	
Annual Income (Ref. Cat.=The Lowest Quartile)			

The Middle Quartiles		0.053	
		(0.068)	
The Highest Quartile		0.165	
		(0.098)	
Urban <i>Hukou</i> (Yes=1, No=0)		0.064	
		(0.075)	
<b>Intergenerational SES Mobility</b>			
Education Mobility			
<i>(Ref. Cat.=Children's Edu&lt;=Respondent's Edu)</i>			
Children's Edu Higher by 1-3 Levels		-0.101	
		(0.071)	
Children's Edu Higher by 4+ Levels		-0.111	
		(0.086)	
Income Mobility			
<i>(Ref. Cat.=Children's Income&lt;=Respondent's Income)</i>			
Children's Income>Respondent's Income		0.323	***
		(0.089)	
<i>Hukou</i> Mobility			
<i>(Ref. Cat.=Both Children and Respondent Rural Hukou)</i>			
Both Children and Respondent Urban <i>Hukou</i>		-0.038	
		(0.085)	
Respondent Rural but Children Urban <i>Hukou</i>		0.020	
		(0.076)	
N	10,680	10,680	10,680
Chi <sup>2</sup>	1741.03	1746.46	1751.44
df	12	18	16
BIC	10033.800	10084.770	10054.500

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 6,892 clusters in the data.

**Table 5. Individual Fixed-Effects Models Predicting Older Adults' Frailty Index and Likelihood of Smoking and Drinking 2011-2013**

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
	<b>Frailty Index</b>	<b>Smoking</b>	<b>Drinking</b>
Intercept	0.200 *** (0.010)		
Married (Yes=1, No=0)	-0.021 * (0.008)	-0.374 (0.465)	0.453 (0.391)
Coresident (Yes=1, No=0)	0.005 * (0.003)	-0.321 * (0.160)	-0.230 (0.125)
<b>Respondent's SES</b>			
Annual Household Income Per Capita (Ref. Cat.=The Lowest Quartile)			
The Middle Quartiles	0.003 (0.003)	0.276 (0.145)	0.055 (0.123)
The Highest Quartile	0.005 (0.003)	0.339 (0.206)	0.123 (0.170)
Rural <i>Hukou</i> (Yes=1, No=0)	0.003 (0.007)	-0.398 (0.457)	0.356 (0.408)
Currently Working for Pay (Yes=1, No=0)	-0.009 ** (0.003)	-0.393 * (0.192)	0.464 ** (0.154)
Occupation (Ref. Cat.=Agricultural Only)			
Non-agricultural Only	-0.006 (0.005)	-0.080 (0.353)	0.537 (0.289)
Both Agricultural and Non-agricultural	-0.003 (0.003)	0.256 (0.227)	0.593 ** (0.206)
<b>Adult Children's SES</b>			
Annual Income (Ref. Cat.=The Lowest Quartile)			
The Middle Quartiles	-0.004 (0.003)	0.180 (0.166)	0.008 (0.136)
The Highest Quartile	-0.008 * (0.004)	0.965 *** (0.229)	0.077 (0.174)
Urban <i>Hukou</i> (Yes=1, No=0)	0.009 * (0.004)	0.234 (0.262)	-0.043 (0.217)
N	15,126	1,448	2,068

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Notes: Standard errors adjusted for 5,057 clusters in the data for the model of frailty index.

## Conclusion

The three papers comprising this dissertation together provide nuanced stories about intergenerational support to older parents and adult children's influence on older parents' health in changing demographic and family contexts of the United States and China. Intergenerational support to older adults varies by biological and step parent-child dyads, depends on older adults' marriage history, and is intercorrelated between sibling children. Lives of older parents and their adult children are interdependent. Health benefits of high socioeconomic status (SES) could be transmitted upwardly from adult children to older parents.

Findings from the first paper suggest that the U.S. older mothers and fathers with diverse marriage history receive different level of support from biological and stepchildren. Stepchildren in general are much less likely than biological children to provide elderly support in every dimension. The timing of parental divorce and repartnering also significantly differentiates support received by older parents in biological or step parent-child dyads and the patterns further differ for older mothers and fathers. This study contributes to existing literature on older adults' marriage history and intergenerational support by filling the gap of the unclear impact of repartnering, especially its timing, on upward support in stepparent-child dyads, by examining more aspects of intergenerational support, and by offering a holistic view that incorporates the nature of dyads, the timing of marital changes, and the gender of older parents.

Results of the second paper clearly show that responsibilities of elderly support are shared across sibling children at different living proximity to parents. In addition, the economic support from non-coresident children to parents involves more coordination



among siblings at different geographic proximity in rural families than urban families. Furthermore, patterns of sibling difference in providing elderly support are also conditional on older parents' living arrangement, children's gender, and parental support to children. Much of the previous research on the impact of living proximity on children's provision of support in China has been based on a cross-family design, treating parent-child dyads either within or between families independent from each other. This study advances our knowledge about this issue by revealing the within-family differences in children's living proximity and support behaviors. The study also extends the burgeoning literature on within-family differences and influences on elderly support to the non-western family context that is deemed as embedded with strong family solidarity and value of filial piety, possibly involving more coordination and influences between sibling children in supporting older parents. It also broadens the compensation model from depicting sibling cooperation in a certain aspect of elderly support to describing cooperation in multiple dimensions of support.

The third study finds that having children with higher SES is associated with health benefits for older parents indicated by a reduced level of frailty. In addition, adult children's socioeconomic achievement yields considerable health benefits for disadvantaged older parents, but brings the largest health benefit to high SES older parents. Moreover, health behaviors of older adults appear to be among the mechanisms that explain the influence of adult children's SES on older parents' health. Based on existing literature, our knowledge is limited to the impact of adult children's SES on parental mortality. This study broadens the understanding of adult children's influence by providing insights into how their SES not only extends parents' life span but also helps

improve parents' life quality of the prolonged life span. Second, Few studies have questioned how the multigenerational influence on older adults' health from adult children could alleviate or intensify socioeconomic inequalities in health among older adults. This study addresses the gap in literature. In addition, the study extends the investigation beyond the impact of children's education to that of children's income and *hukou* status, which contributes to disentangle different underlying mechanisms linking adult children's SES to better health outcomes and health behaviors of older parents. Finally, the study is contextualized in contemporary China, where no research has studied the upward transmission of health benefits yielded by adult children's SES for older parents.

Lives of family members are linked through out the life span. Generations of adult children and older parents are interdependent. Parent-child dyads within the family are also interdependent. Taking a broader network perspective helps us to better understand the complex process of intergenerational support in families with ambiguous boundaries or among multiple sibling children in the family. Adopting a multigenerational perspective and considering the influence of adult children also contributes to the understanding of the persistence of socioeconomic inequalities in health in old age.

This dissertation also tries to exert broader impacts by addressing different sets of challenges in intergenerational support and population aging for different societies and where policy interventions are needed. Identified by studies in this dissertation, older adults who are most vulnerable from potential decline in intergenerational support in times of need could be those older fathers who divorced at an earlier life stage and older repartnered mothers whose biological children are not available for support. Policy

interventions are needed to secure old age support for these older people from other sources, such as their pension and health insurance, as well as the neighborhood and community. The other group of vulnerable older adults would be those who suffer health disadvantages associated with their own lower SES while do not have higher educated children as a source of beneficial resources for health. On the one hand, policy interventions should not only target on people who are put in a disadvantaged position by their own SES but more importantly should focus on those facing larger disadvantages resulting from few health benefits from intergenerational ties. On the other hand, policies aiming at narrowing the SES gap of health could extend its intervention beyond disadvantaged older adults and develop programs promoting the socioeconomic attainment of their offspring.

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