Article

Intergenerational Coresidence and Depressive Symptoms of Rural and Urban Older Adults in China

Journal of Family Issues
2020, Vol. 41(8) 1282–1306

DOI: 10.1177/0192513X19888256
journals.sagepub.com/home/jfi
SAGE

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Abstract

Objectives: This study aimed to examine whether gender and marital status of coresiding adult children are associated with depressive symptoms of Chinese older adults.

Methods: Using data from the China Health and Retirement Longitudinal Study, linear regression analysis was conducted to identify longitudinal associations of intergenerational coresidence with depressive symptoms in rural and urban older Chinese.

Results: Both rural and urban older adults living with unmarried sons had significantly higher depressive symptoms at four-year follow-up than those who did not live with children. Living with married sons was significantly associated with higher levels of depressive symptoms at four-year follow-up among rural elders only.

Discussion: This study sheds light on the heterogeneity in the relationship between intergenerational coresidence and Chinese older adults' psychological well-being by the gender and marital status of coresiding children. Further

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research is needed to understand the complex and dynamic household structures and health outcomes in later life.

Keywords
living arrangements, depressive symptoms, China, intergenerational coresidence

Introduction

Living arrangements in later life are of great interest to researchers and policymakers because of their robust associations with interpersonal support, social integration, and well-being of older adults across different countries and cultures (Hughes & Waite, 2002; Russell & Taylor, 2009; Silverstein, Cong, & Li, 2006; Zunzunegui, Beland, & Otero, 2001). Living with children, relative to living alone, provides more opportunities for older adults to interact with household members and to provide and receive social support, which could boost their physical and psychological well-being (Berkman, Glass, Brissette, & Seeman, 2000; Chen & Short, 2008; Chou & Chi, 2000; Mui, 1999; Russell & Taylor, 2009; Yeh & Lo, 2004). Living with children is also considered an important dimension of intergenerational solidarity and one of the primary ways that older Chinese adults receive financial, instrumental, and emotional support (Bengtson & Roberts, 1991; Isengard & Szydlik, 2012). However, living with others may intrude on personal privacy, increase caregiving burden, and lead to tensions, conflict, or other negative interactions that could harm individuals' well-being (Aquilino & Supple, 1991; Suitor & Pillemer, 1987). The relationship between living arrangements and well-being of older adults is thus complex.

This study focused on the association between coresidence with adult children and Chinese older adults' psychological well-being. Social and cultural norms could play an important role because they influence elders' preference, expectations, and attitudes toward certain living arrangements, which in turn shape the effects of living arrangements on their well-being. Therefore, we are particularly interested in whether the gender and marital status of coresiding children influences the effects of intergenerational coresidence and how the pattern differs between rural and urban Chinese older adults. The traditional values of filial piety in Chinese society and the rapid social change in recent decades in China provide a context for these questions.

Intergenerational coresidence has been considered a linchpin of intergenerational transfer and a form of household structure that is strongly associated

with cultural norms and supportive systems for older adults in Asian societies (Silverstein et al., 2006; Yamada & Teerawichitchainan, 2015). Chinese older adults have been embedded in the culture of filial piety, the norm that shapes family relations and values in East Asian countries (Koyano, 1996; Lai, 2010; Sung, 1995). Filial piety reinforces adult children's respect, support, and care for their older parents. Traditional filial piety holds distinct expectations for sons and daughters. Sons often bear the obligation of providing care to older parents, whereas daughters are expected to marry and take responsibility for their parents-in-law rather than their own parents after marriage (Antonucci, Akiyama, & Birditt, 2004; Whyte & Xu, 2003). Accordingly, living with married sons has been the predominant and presumed "ideal" arrangement for older adults in filial cultures (Bongaarts & Zimmer, 2002; Chen & Silverstein, 2000).

However, this "ideal" multigenerational household structure has become increasingly hard to realize, and its health implications remain unclear. The rapid pace of industrialization and urbanization in recent decades in China has increased geographic distance between older adults and their adult children and has shifted attitudes toward intergenerational coresidence (Cheung & Kwan, 2009; Luo & Zhan, 2012; Whyte, 2004). Although filial piety is still the norm governing interactions between adult children and older parents in China, living arrangements have become more diverse, indicated by the rise in empty-nest households and non-normative living arrangements such as living with daughters (Efron Pimentel & Liu, 2004; Liu & Guo, 2008; Logan & Bian, 1999; Sereny, 2011; Xie, Zhang, Peng, & Jiao, 2010). These changes raise a question about population aging and health: Does older adults' psychological well-being really benefit from the traditional ideal arrangement—living with married sons?

Intergenerational Coresidence and Health of Older Adults in China

Several studies based on data from the Chinese Longitudinal Healthy Longevity Survey, which focuses on the oldest-old Chinese adults (aged 80+), reported mixed results regarding the association between intergenerational coresidence and health outcomes of older adults in China (Chen & Short, 2008; Li, Zhang, & Liang, 2009; Wang, Chen, & Han, 2014). One study reported that living with children was significantly associated with better life satisfaction and emotional well-being among widowed oldest-old Chinese adults, but not among married oldest-old adults (Wang et al., 2014). Others suggested that compared to those living alone, oldest-old Chinese adults living

with children were less likely to report poor self-rated health but more likely to have limitations in activities of daily living (ADLs; Li et al., 2009). Compared to living with a son, coresiding with a daughter was associated with positive emotional well-being among oldest-old adults who did not live with spouse (Chen & Short, 2008). The sampling restriction of the Chinese Longitudinal Healthy Longevity Survey to the oldest-old adults inhibits generalization of findings to relatively younger members of the older population (aged 60 or older) in China. A study based on cross-sectional data from the 2005 Chinese General Social Survey found that living with children was negatively correlated with happiness among older adults in China, whereas living with grandchildren had a positive correlation with happiness (Chyi & Mao, 2012). The cross-sectional data limits examinations of longitudinal effects of intergenerational coresidence on psychological well-being of older Chinese adults. More importantly, none of these studies took the gender and marital status of coresiding children into consideration. Thus, it remains unclear whether the "ideal" living arrangement in filial cultures—living with married sons—confers benefits for Chinese older adults comparing to other living arrangements.

Importance of Gender and Marital Status of Coresiding Children

The hierarchical-compensatory model suggests that family members are normatively expected to provide support to older members in a serial order (Cantor, 1979; Litwak, Silverstein, Bengtson, & Hirst, 2003). In Chinese culture, the norm of filial piety dictates that sons shoulder the primary responsibility of supporting and caring for their older parents. Daughters' filial obligations vary by their marital status: Unmarried daughters are expected to bear the responsibility of caring for their parents, and their filial obligations shift to their parents-in-law after marriage (Cong & Silverstein, 2008; Lin et al., 2003; Whyte & Xu, 2003). Given these different filial expectations for sons and daughters, Chinese older adults may feel "normal" living with sons and may be "uncomfortable" living with a married daughter.

Although living with sons is consistent with cultural norms, the psychological benefits of this arrangement may depend on the marital status of the son. The gender-based distribution in family labor is reflected in the distribution of caregiving tasks between married sons and daughters-in-law. Research has shown that daughters-in-law usually carry out most personal care and household chores for Chinese older adults who need assistance with daily life activities (Cong & Silverstein, 2008; Zhan & Montgomery, 2003). A study of rural Chinese older adults found decreased depressive symptoms when they

received assistance from daughters-in-law but increased symptoms when such support was provided by married sons; additionally, these associations were strongest among older women living with their daughters-in-law (Cong & Silverstein, 2008). These findings suggest that married sons' contributions to their parents' psychological well-being are often made through their wives, who are responsible for daily life care of their parents-in-law.

Living with unmarried adult sons might be stressful for Chinese older adults. In China, marriage is culturally expected and socially desirable, and this has remained nearly universal (Raymo, Park, Xie, & Yeung, 2015). Being married is a marker of an individual's maturity and the continuation of the family line (Hesketh, 2009). However, men increasingly face the risk of being involuntarily single because of the abnormally unbalanced sex ratio resulting from preference toward sons in the filial culture and the one child policy since the 1980s. This phenomenon has been termed the *marriage squeeze* and will become more serious in the next couple of decades (Hudson & Boer, 2002; Poston & Glover, 2005). In this competitive marriage market, the cost of marriage is high for men and most rely on their parents' financial support to complete this rite of passage (Min & Eades, 1995; Wei & Zhang, 2011). In many parts of China, grooms' families are expected to pay for a new house for the young couple, a dowry for the bride, and the full cost of a wedding. The issue of marriage squeeze could lead to a financial and emotional burden on parents with sons. Given that marriage is traditionally concentrated in a relatively narrow age range, for many older adults in China, having an unmarried adult son in the household implies that they have not yet succeeded in continuing the family lineage and their parenting responsibility is not complete (Raymo et al., 2015). Living with unmarried sons may result in a higher burden of housework and risk of intergenerational tension related to the sons' challenges in the marriage market, which may in turn bring psychological stress to older adults.

In China, disparities in economic resources, mental health, and cultural norms exist between rural and urban areas (Chen et al., 2005; Norstrand & Xu, 2011; Shi, 1993). Rural older adults have limited access to government-sponsored public goods, such as health care, pension, and community services, which makes them more likely to rely on support from adult children. Rural older adults are more likely have higher levels of depressive symptoms than their urban counterparts, which is largely due to their lower socioeconomic status (Chen, Hu, Qin, Xu, & Copeland, 2004; Chen et al., 2005; Dong & Simon, 2010; Li et al., 2011; Li, Liu, Xu, & Zhang, 2016; Ma et al., 2008). When it comes to cultural norms, rural Chinese older adults may have stronger endorsement of traditional norms of filial piety and gender ideology and may place higher value on living with sons, especially married sons, than

their urban counterparts. Prior studies reported that rural Chinese older adults were more likely to live with adult children, especially sons (Chen & Short, 2008; Li et al., 2009). Marriage squeeze is a more serious issue in rural areas than urban areas in China (Jiang & Sánchez-Barricarte, 2012; Jin, Liu, Li, Feldman, & Li, 2013).

Present Study

To the best of our knowledge, this study is among the first to examine the intersection of adult children's gender and marital status with respect to the psychological implications of intergenerational coresidence for Chinese older adults. The central research question of this study is the extent to which intergenerational coresidence is associated with psychological well-being of older adults in China. Focusing on depressive symptoms, we used three waves of panel data from a national representative sample of older adults in China to test four hypotheses.

Hypothesis 1: Given cultural norms regarding responsibility for parents in Chinese society, older adults living with sons have lower depressive symptoms than those living with adult daughters and those who did not live with children.
Hypothesis 2: Based on prior research suggesting older Chinese adults benefit from the care provided by their daughters-in-law, older adults living with married sons have lower depressive symptoms than those who do not live with any adult children and those living with daughters.
Hypothesis 3: Due to the stress associated with the marriage squeeze for both generations, Chinese older adults living with unmarried sons have higher depressive symptoms than those who do not live with children and those living with married sons or adult daughters.
Hypothesis 4: Given the disparities in economic resources, mental health, and cultural norms between rural and urban older adults, the associations stated in the earlier hypotheses expected to be stronger in rural elders than those in urban areas.

Methods

Data

This study used data from the baseline and two follow-up surveys of the China Health and Retirement Longitudinal Study (CHARLS), a sibling project of the Health and Retirement Study in the United States (Zhao et al.,

2013). In 2011, the baseline survey (Wave 1) of the CHARLS involved interviews with a national representative sample of adults aged 45 years or older (main respondents) and their spouses, if available, in China. The sample was obtained through a multistage cluster sampling method. All provinces in mainland China, except Hainan, Tibet, Ningxia, and Gansu, were covered. Two follow-up CHARLS surveys (Wave 2 and Wave 3) were conducted in 2013 and 2015. More information about the research design of the CHARLS is available at the project website (Peking University, 2018).

The analytic sample of this study featured respondents who were 60 or older, had at least one living child, and had valid responses to the measure of depressive symptoms in both Wave 1 and Wave 2 ($n = 5{,}198$) or both Wave 1 and Wave 3 ($n = 4{,}730$). The final sample included 5,347 respondents at baseline who had follow-up data at Wave 2 ($n = 5{,}198$) or Wave 3 ($n = 4{,}730$).

Measures

The dependent variable, depressive symptoms, was measured by the widely used 10-item Center for Epidemiological Studies Depression Scale (Andresen, Malmgren, Carter, & Patrick, 1994), which has been validated among Chinese older adults in Hong Kong (Boey, 1999; Cheng & Chan, 2005) and used in recent studies involving the CHARLS (Li, Liu, Xu, & Zhang, 2016; Liu, Li, Zhang & Xu, 2016). The respondents were asked to rate their depressive symptoms in the past week on a four-point scale (from 0 = *rarely or none of the time* to 3 = *most or all of the time*). The summed score ranged from 0 to 30 (with two items reversed coded; Cronbach's alpha = .81).

Two key independent variables were coded to indicate living arrangements. To test Hypothesis 1, we coded living arrangements by gender of coresiding adult children, which differentiated among three mutually exclusive types: no child in the household, living with at least one son (including older adults living with sons and daughters), and living with daughters only (no sons living in the household). For Hypotheses 2 and 3, we coded living arrangements by gender and marital status of coresiding children, which resulted in four mutually exclusive categories: no child in the household, living with at least one married son (including those living with a married son and other children, such as unmarried sons or daughters), living with an unmarried son (including those living with unmarried sons and daughters), and living with a married or unmarried daughter (i.e., no son living in the household). In our data, the number of older adults living with adult daughters in rural ($n = 109$) and urban ($n = 142$) China was small, and those living with unmarried daughters was smaller ($n = 35$ and 53, respectively). Hence, we did not separate them by marital status.

In the regression analysis, we controlled for sociodemographic characteristics, physical health status, and other family characteristics at Wave 1, based on empirical evidence of the connections between these factors and living arrangements or mental health in later life (Chen, Liu, & Mair, 2011; Chen & Short, 2008; Cong & Silverstein, 2008; Hybels et al., 2006; Li et al., 2009; Pinquart & Sörensen, 2000; Richard et al., 2013). Three demographic characteristics were considered as covariates: age measured in years, gender (1 = *male*, 0 = *female*), and marital status (1 = *married*; 0 = *widowed, divorced, or separated*). Socioeconomic status was indicated by education and household assets. Education was coded in four categories: *illiterate, less than elementary school, up to elementary school*, and *middle school or beyond*. Household assets were indicated by an index derived from principal component analyses that weighted 35 asset variables in the rural sample and 20 asset variables in the urban sample (Bollen, Glanville, & Stecklov, 2002; Filmer & Pritchett, 2001).[1]

Physical health status of the older adults was indicated by two variables: limitations in ADLs and chronic conditions. Respondents were asked to report difficulties with six ADLs (i.e., dressing, bathing or showering, eating, getting in or out of bed, using the toilet, and bladder and bowel control). ADL limitation was a dichotomous variable, with 1 = *need help with one or more ADLs* and 0 = *do not need help with any ADL*. Chronic conditions was also a dichotomous variable, with 1 = *at least one chronic disease* and 0 = *no chronic diseases*, based on respondents' report of whether they have been diagnosed with hypertension, dyslipidemia, diabetes, cancer, chronic lung disease, liver disease, heart disease, stroke, kidney disease, stomach disease, psychiatric disease, memory-related disease, arthritis, rheumatism, and asthma.

Moreover, we controlled for family characteristics in the regression analysis, including educational achievement of children indicated by the highest level achieved by any children (1 = *high school or higher degree*, 0 = *less than high school degree*); non-coresiding unmarried sons (1 = *at least one unmarried son not coresiding with older adult*); contact with non-coresiding children (1 = *weekly contact with non-coresiding children by phone, text message, mail, or email*); living with grandchildren (1 = *at least one grandchild younger than 16 years old in the household*); and loss of spouse between baseline and follow-up surveys (1 = *lost spouse during study interval*).

Data Analysis

All analyses were completed in Stata 14.0 (StataCorp, 2015). A lagged dependent variable approach was used to test the three hypotheses. The basic equation of the model is:

$$\text{Depressive symptoms}_{w2/w3} = \beta_0 + \beta_1 \text{living arrangements}_{w1} + \beta_2 \text{depressive symptoms}_{w1} + \beta_z \text{Covariates}_{w1} + \varepsilon$$

Using the three-wave data, we examined the associations of living arrangements with depressive symptoms of Chinese older adults at two- and four-year follow-ups. We first examined the association between the living arrangements and depressive symptoms at Wave 2. To test Hypothesis 1, we regressed depressive symptoms at Wave 2 on living arrangements by gender of coresiding children at Wave 1, while controlling for sociodemographic characteristics, physical health status, depressive symptoms at Wave 1, and other family characteristics of rural and urban Chinese older adults (Models R1 and U1 in Table 2). For Hypotheses 2 and 3, we regressed depressive symptoms at Wave 2 on living arrangement by gender and marital status of coresiding children at Wave 1. To test Hypothesis 2, we used the older adults who lived with married sons as the reference group (Models R2 and U2 in Table 2). For Hypothesis 3, we ran the same analysis as we did for Hypothesis 2 and switched the reference group to those who lived with unmarried sons. We reported the results of testing Hypothesis 3 in text only. To test the associations over a four-year period, we regressed depressive symptoms at Wave 3 on the living arrangement variables at Wave 1 (Models R3 to U4 in Table 3). For Hypothesis 4, all regression models were estimated for rural and urban older Chinese adults, separately. A post-test using the Stata commands *suest* and *test* was conducted to explore differences in the association of each type of living arrangements with depressive symptoms at Waves 2 and 3 between rural and urban older adults. We also conducted sensitivity analyses to confirm the robustness of regression results.

Multiple imputation was used to address missing values (158 of 5,437 cases had missing values). In Tables 2 and 3, we report the results based on 10 random multiple-imputed replicates. Because the respondents were nested in households, we used the command *vce* in Stata to obtain standard errors corrected for the lack of independence of observations. The descriptive statistics were obtained from weighted data at Wave 1.

Results

Table 1 shows the weighted sample statistics of older adults in the CHARLS baseline survey. More than half did not live with any children, 31.66% lived with married sons, 7.31% lived with unmarried sons, and 5.57% lived with daughters. The average age of unmarried coresiding sons was 32.61 years

Table 1. Weighted Sample Statistics of Older Adults in China in 2011, CHARLS.

	Total	Rural	Urban
	(*N* = 5,437)	(*n* = 3,443)	(*n* = 1,994)
	M (*SE*) or %	*M* (*SE*) or %	*M* (*SE*) or %
Gender			
Male	49.54	50.06	48.88
Female	50.46	49.94	51.12
Age (range: 60–100)*	67.92 (0.11)	67.70 (0.13)	68.19 (0.20)
Marital status			
Married	78.21	77.40	79.25
Widowed, divorced or separated	21.78	22.60	20.75
Number of children (range: 1–10)***	3.34 (0.02)	3.56 (0.03)	3.05 (0.04)
Education***			
Illiterate	34.60	42.57	24.36
Less than elementary school	19.75	22.30	16.48
Completed elementary school	25.03	24.58	25.62
Middle school and higher	20.62	10.55	33.54
Household assets (range: 1–5)	2.78 (0.03)	2.75 (0.03)	2.82 (0.05)
ADL limitations***			
Yes	21.78	26.03	16.33
No	78.22	73.97	83.67
Chronic conditions*			
Yes	77.35	76.22	78.80
No	22.65	23.78	21.2
Highest educational level among children***			
Less than high school	57.32	71.98	38.48
High school or higher	42.68	28.02	61.52
Non-coresiding unmarried sons			
Yes	9.85	9.27	10.59
No	90.15	90.73	89.41
Contact with non-coresiding children***			
Weekly	69.27	65.98	73.49
Less than weekly	30.73	34.02	26.51
Coresiding with grandchildren*			
Yes	33.52	34.47	32.30
No	66.48	65.53	67.70

(continued)

Table 1. (continued)

	Total	Rural	Urban
	(N = 5,437)	(n = 3,443)	(n = 1,994)
	M (SE) or %	M (SE) or %	M (SE) or %
Loss of spouse between Wave 1 and Wave 2			
Yes	3.07	3.12	3.02
No	96.93	96.88	96.98
Living arrangements by gender***			
No children in household	55.46	55.73	55.12
Living with sons	38.97	40.47	37.05
Living with daughters	5.57	3.80	7.83
Living arrangements by gender and marital status***			
Living with married sons	31.66	32.63	30.42
Living with unmarried sons	7.31	7.84	6.64
Living with daughters	5.57	3.80	7.82
Depressive symptoms (range: 0–30)***	8.64 (0.10)	9.64 (0.12)	7.37 (0.15)

Note. Sample characteristics reported based on report at Wave 1. SE: standard error. *T*-test and Chi-square were used to compare rural–urban differences for all variables.
*$p < .05$. **$p < .01$. ***$p < .01$.

old. The average score of depressive symptoms was 8.64 (range = 0–30). Compared to their urban counterparts, rural Chinese older adults were more likely to be younger, have ADL limitations, have children with lower levels of education, live with grandchildren, report higher levels of depressive symptoms, and live with married or unmarried sons, whereas they were less likely to be educated, report a diagnosed chronic condition, have weekly contact with non-coresiding children, or live with daughters.

Table 2 reports the regression analysis results regarding the association between intergenerational coresidence at Wave 1 and depressive symptoms at Wave 2 (i.e., two-year follow-up) among rural and urban older adults respectively. The results of Models R1 and R2 show that neither living with sons nor living with married sons was associated with depressive symptoms of rural older adults at the two-year follow-up. However, rural older adults living with daughters reported significantly lower depressive symptoms than those living with unmarred sons ($b = 1.51, p < .05$). For urban older adults, no type of intergenerational coresidence at Wave 1 was associated with depressive symptoms at Wave 2 among urban older adults.

Table 2. Two-year Effects of Intergenerational Coresidence on Depressive Symptoms among Rural and Urban Older Adults in China.

	Rural (n=3,288)				Urban (n=1,910)			
	R1		R2		U1		U2	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Living arrangements by gender, Wave 1[a]								
Living with daughters	−0.98	0.57			−0.30	0.46		
No child in household	−0.32	0.25			−0.15	0.33		
Living arrangements by gender and marital status, Wave 1[b]								
Living with unmarried sons			0.66	0.45			0.09	0.53
Living with daughters			−0.84	0.58			−0.28	0.47
No child in household			−0.10	0.28			−0.12	0.37
Age	−0.04*	0.02	−0.04*	0.02	−0.07**	0.02	−0.07**	0.02
Female	0.95***	0.20	0.96***	0.20	0.44	0.23	0.44	0.23
Married	−0.21	0.26	−0.23	0.26	−0.33	0.32	−0.33	0.33
Number of children	0.06	0.07	0.06	0.07	0.09	0.09	0.09	0.09
Education[c]	0.77**	0.26	0.78**	0.26	0.31	0.36	0.30	0.36
Less than elementary school	0.17	0.25	0.18	0.25	−0.12	0.35	−0.12	0.35
Elementary school	0.37	0.34	0.38	0.34	0.00	0.36	0.00	0.36
Middle school or beyond	0.06	0.07	0.06	0.07	0.09	0.09	0.09	0.09
Household assets	−0.26***	0.08	−0.24**	0.08	−0.22*	0.10	−0.22*	0.10
ADL limitations	0.46	0.24	0.46	0.24	0.17	0.34	0.17	0.34

(continued)

Table 2. (continued)

	Rural (n=3,288)				Urban (n=1,910)			
	R1		R2		U1		U2	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Chronic conditions	1.06***	0.20	1.06***	0.20	0.86***	0.25	0.86***	0.25
Depressive symptoms, Wave 1	0.40***	0.02	0.40***	0.02	0.41***	0.02	0.41***	0.02
Child with high school or higher education[d]	−0.28	0.21	−0.30	0.21	−0.44	0.26	−0.44	0.26
Noncoresiding unmarried sons[e]	0.71*	0.31	0.67*	0.31	−0.33	0.39	−0.33	0.39
Weekly contact with noncoresiding children[f]	−0.13	0.22	−0.13	0.22	−0.01	0.28	−0.01	0.28
Living with grandchildren[g]	−0.06	0.24	0.06	0.25	0.07	0.31	0.09	0.34
Lost spouse between Wave 1 and Wave 2[h]	1.42*	0.63	1.42*	0.63	1.68**	0.65	1.67*	0.65

Note:
[a]Reference group was living with sons.
[b]Reference group was living with married sons.
[c]Reference group was illiterate.
[d]Reference group was no child with high school or higher educational degrees.
[e]Reference group was no noncoresiding unmarried sons.
[f]Reference group was no weekly contact with noncoresiding children.
[g]Reference group was not living with grandchildren.
[h]Reference group was older adults who did not lose spouse between Wave 1 and Wave 2.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Four-year Effects of Intergenerational Coresidence on Depressive Symptoms among Rural and Urban Older Adults in China.

	Rural (n=3,082)				Urban (n=1,648)			
	R3		R4		U3		U4	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Living arrangements by gender, Wave 1[a]								
Living with daughters	−0.20	0.59			−0.53	0.56		
No child in household	−0.82**	0.29			−0.31	0.41		
Living arrangements by gender and marital status, Wave 1[b]								
Living with unmarried sons			0.32	0.50			1.35*	0.63
Living with daughters			−0.14	0.60			−0.23	0.58
No child in household			−0.72*	0.33			0.10	0.45
Age	−0.05*	0.02	−0.05*	0.02	−0.03	0.03	−0.03	0.03
Female	1.27***	0.23	1.27***	0.23	0.89**	0.30	0.91**	0.30
Married	−0.04	0.31	−0.05	0.31	0.26	0.40	0.30	0.40
Number of children								
Education[c]	0.54	0.29	0.55	0.29	0.33	0.45	0.27	0.45
Less than elementary school	0.18	0.30	0.19	0.30	−0.10	0.43	−0.12	0.43
Elementary school	−0.76	0.39	−0.76	0.39	−0.27	0.44	−0.33	0.44
Middle school or beyond	−0.06	0.09	−0.06	0.09	0.20	0.11	0.19	0.11
Household assets	−0.37***	0.09	−0.36***	0.09	−0.25*	0.12	−0.20	0.12
ADL limitations	1.16***	0.28	1.15***	0.28	1.36**	0.45	1.39**	0.45

(continued)

Table 3. (continued)

	Rural (n=3,082)				Urban (n=1,648)			
	R3		R4		U3		U4	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Chronic conditions	1.52***	0.23	1.52***	0.23	1.04***	0.30	1.06***	0.30
Depressive symptoms, Wave 1	0.40***	0.02	0.40***	0.02	0.41***	0.03	0.40***	0.03
Child with high school or higher education[d]	−0.40	0.25	−0.40	0.25	−0.80*	0.31	−0.81**	0.31
Non-coresiding unmarried sons[e]	0.88*	0.39	0.86*	0.39	0.57	0.54	0.54	0.54
Weekly contact with non-coresiding children[f]	−0.12	0.25	−0.12	0.25	−0.18	0.35	−0.15	0.35
Living with grandchildren[g]	−0.05	0.28	0.01	0.29	0.40	0.39	0.61	0.40
Lost spouse between Wave 1 and Wave 3[h]	1.97***	0.50	1.98***	0.50	1.49*	0.70	1.46*	0.70

Note:
[a]Reference group was living with sons.
[b]Reference group was living with married sons.
[c]Reference group was illiterate.
[d]Reference group was no child with high school or higher educational degrees.
[e]Reference group was no non-coresiding unmarried sons.
[f]Reference group was no weekly contact with non-coresiding children.
[g]Reference group was not living with grandchildren.
[h]Reference group was older adults who did not lose spouse between Wave 1 and Wave 3.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3 shows the association between living arrangements at Wave 1 and depressive symptoms at Wave 3 (i.e., four-year follow-up). In rural China, older adults living with sons at Wave 1 reported significantly higher levels of depressive symptoms at Wave 3 than those who did not live with any child ($b = 0.82, p < .01$ in R3). Rural older adults living with a married son ($b = 0.72$, $p < .05$ in R4) or an unmarried son ($b = 1.05, p < .05$) reported higher levels of depressive symptoms than those without any child in the household. For urban older adults, living with sons or daughters was not associated with depressive symptoms at Wave 3 (U3). Depressive symptoms of urban older adults living with married sons were not significantly different from those without any child in household (U4). However, urban older adults living with an unmarried son reported significantly higher levels of depressive symptoms than those who lived with married sons ($b = 1.35, p < .05$), daughters ($b = 1.58, p < .05$), or no children ($b = 1.25, p < .05$).

The results of a posttest (using the *suest* and *test* commands in Stata) showed that the two-year and four-year effects of intergenerational coresidence were similar in the two subsamples of rural and urban Chinese older adults. However, as reported earlier, we observed that the four-year effects of living with married sons or unmarried sons differed among rural and urban older adults. In addition, the associations between some control variables and depressive symptoms also varied by rural/urban residence. For example, having non-coresiding unmarried sons was consistently associated with higher depressive symptoms among rural older adults (b=0.71, p<.05 in R1, b=0.67, p<.05 in R2, b=0.88, p<.05 in R3, b=0.86, p<.05 in R4), but the association was not statistically significant in the urban counterpart.

We conducted several sensitivity tests to investigate whether these regression results were affected by sample characteristics and coding methods. First, we tested whether living with young children aged 17 years old or younger changed the results. Only 10 older adults lived with young sons and six older adults lived with young daughters, which means that most coresiding children were adults. Excluding these older adults living with young children did not change the analysis results. Second, we tested whether the analysis results were affected by the coding of living arrangements. Very few older adults in rural ($n = 73$, 2%) and urban ($n = 50$, 3%) China lived with both sons and daughters, so we included them in the group of older adults living with sons. We conducted a sensitivity test by excluding these cases and found no changes in the results. For the same reason, older adults who lived with married sons and other children (112 rural, 46 urban) or with unmarried sons and daughters (27 rural, 23 urban) were not separated as independent groups in coding intergenerational coresidence. Third, we tested the results in different age groups of older adults. we repeated all regression models for

older adults aged 60 years to 79 years (3,277 rural older adults, 1,895 urban older adults) and found the results were similar to those for the total sample. Finally, the regression analysis was repeated among older adults whose living arrangements did not change across intervals (75% and 67% of older adults across two-year and four-year intervals, respectively). Results from this sample were similar to those reported here.

Discussion

Using nationally representative data, this study examined longitudinal associations of intergenerational coresidence with psychological well-being of rural and urban Chinese older adults over two- and four-year follow-up periods, separately. We illustrated the heterogeneity in the relationship between intergenerational coresidence and Chinese older adults' psychological well-being by the gender and marital status of coresiding adult children. The findings suggest the need for further research on these complex and dynamic household structures and health outcomes in later life.

In contrast to Hypothesis 1, this study found that living with sons, regardless of their marital status, was associated with greater depressive symptoms among rural older adults in a four-year interval. Prior studies suggested that rural Chinese older adults rely more on support from sons compared to their urban counterparts because of fewer economic resources and social services in rural communities (Chen & Silverstein, 2000; Xu, 2001). Our finding reflects two possibilities. One is that rural older adults may still largely rely on children's support, but residing with children does not make them happier and may even lead to more conflicts and tension in intergenerational interactions. The other possibility is that current cohorts of rural Chinese older adults may not rely on their children's support as much as previous cohorts because the Chinese government now promotes the Rural Pension and the New Rural Cooperative Medical Insurance programs, which bring financial support to rural Chinese older adults (Ebenstein & Leung, 2010; Wagstaff, Lindelow, Jun, Ling, & Juncheng, 2009). If that is the case, then living with sons may be due to the sons' need for support from older parents, such as sharing housing, babysitting grandchildren, or saving on living costs. Supporting coresiding sons may lead to feelings of burden and exhaustion and in turn, increase depressive symptoms.

Living with married sons did not appear to have psychological benefits; on the contrary, it was associated with higher levels of depressive symptoms among rural older adults at four-year follow-up compared to living without a child in household, which did not support Hypothesis 2. A study using regional data from the China Health and Nutrition Survey found that the birth

of grandchildren increased the likelihood of older adults and married children living together (Chen, 2005), which indicates that many older adults may be involved in caring for grandchildren. Although the presence of grandchildren was controlled for in the regression analysis of this study, we have no data to quantify the intensity of caregiving to grandchildren. Caregiving tasks might be demanding for older adults, even though such downward support could promote intergenerational solidarity (Cong & Silverstein, 2011; Goh, 2009). Another source of stress could be the tension between aging parents and daughters-in-law. Some researchers have used ambivalence, which is defined as contradictory relationships (e.g., mixture of solidarity and conflict) between intimates or groups, to characterize the bond between older adults and their children-in-law, especially the relationship between older women and daughters-in-law (Willson, Shuey, & Elder, 2003). Such intergenerational ambivalence with coresiding daughters-in-law in a household context might also generate stress and depressive symptoms for older adults (Kiecolt, Blieszner, & Savla, 2011). Compared with their counterpart in urban areas, rural older adults may have higher expectations of their daughters-in-law, which may lead to more conflicts. Further research is needed to explain the association between living with married sons and depressive symptoms of rural older adults.

As expected, living with an unmarried adult son was associated with greater depressive symptoms of older Chinese adults. In particular, it had a significant effect on depressive symptoms among both rural and urban Chinese older adults at the four-year follow-up, which supports Hypothesis 3. In these households, intergenerational interactions may be characterized by downward (from older parents to adult children) rather than upward (from children to parents) support. The mean age (32.61 years) of these sons indicates that they were normatively expected to be independent and have their own family at this life stage. These unmarried sons may have challenges in the marriage market, which may create stress for their parents. To our knowledge, this is the first study to report negative effects of living with an unmarried son on the psychological well-being of Chinese older adults. More studies are needed to replicate our findings and understand the mechanisms linking these associations.

It is also interesting to note that intergenerational coresidence was significantly associated with depressive symptoms at Wave 3, but weakly related to the mental health outcome at Wave 2. It may need more than 2 years to accumulate issues of intergenerational coresidence, such as tension, conflict, lack of privacy, and stress related to the marriage market, and thus may make older adults feel burdened, stressed, or even depressed. Using panel data

across more waves and longer periods, future research could examine whether the association between intergenerational coresidence and depressive symptoms of older adults varies by time.

In general, the associations between intergenerational coresidence and depressive symptoms were similar between rural and urban older adults in China. One divergence is that living with sons, married or unmarried, was associated with increased depressive symptoms at four-year follow-up among rural Chinese older adults, whereas among urban elders, only living with unmarried sons was associated with increased depressive symptoms at four-year follow-up. Further, having unmarried sons was associated with more depressive symptoms in rural but not urban elders. On one hand, the result indicates that rural and urban Chinese older adults may share similar expectation and attitudes regarding parent–child relationships in adulthood and have similar experiences in intergenerational coresidence (Sereny, 2011). On the other hand, our findings suggest that coresidence with sons and the marital status of those sons are sources of stress for rural Chinese older adults, whereas for their urban counterparts, coresiding with unmarried sons was stressful, which may be related to conflicts associated with coresidence (e.g., division of household chores) and parent–child boundaries (e.g., authority vs. autonomy; Stafford, McMunn, Zaninotto, & Nazroo, 2011). More research is needed to explain similarities and differences regarding the effects of intergenerational coresidence on mental health among rural and urban older adults in China.

Two limitations of this study should be noted. First, similar to many other studies on household contexts, we could not fully categorize living arrangements. Dividing the sample by gender and marital status of coresidential children resulted in small group sizes in some categories of intergenerational coresidence, so it was not possible to incorporate other characteristics of household members into the categorization. For the same reason, we could not test cohort differences even though the sample included a broad age range (60–100 years) of older adults. Second, we could not rule out the possibility of reverse or mutual associations between the independent and dependent variables.

Despite these limitations, our study involved a rigorous test using longitudinal data from a national representative sample of older adults in China and controlling for depressive symptoms at baseline, which had not been done by previous research on the living arrangements and well-being of Chinese older adults. This study sheds light on the association between different types of intergenerational coresidence and psychological well-being of Chinese older adults, whose life courses have been embedded in dramatic changes in family and social structures. Further research should explore

whether the process of determining living arrangements (e.g., Who made the decision? What was the reason for living with children or not?), intergenerational transfers, socioeconomic resources of both generations, and attitudes toward filial culture could explain why and how specific types of intergenerational coresidence are related to depressive symptoms of older adults in China. It would be also interesting to detect whether the effects are distinct among different cohorts, given the cultural and social changes in China. No intergenerational coresidence type was found to benefit the mental health of older adults, which indicates that living with children may no longer be preferred by Chinese older adults (Logan, Bian, & Bian, 1998). Across the three waves of CHARLS, more than 90% of older Chinese had at least one child living nearby. Future research should explore the preferred geographic distance from children among older adults in China today and what parent–child interactions are most beneficial to the psychological well-being of Chinese older adults.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Note

1. The asset variables for the rural sample belonged to one of three types: (a) household ownership of consumption durables (automobile, electric bicycle, motorcycle, refrigerator, washing machine, television, computer, stereo system, video camera, camera, air conditioner, mobile phone, valuable furniture, valuable musical instrument, valuable decorations and ornaments, jewelry or precious metal, antiques or valuable art work, or other durable assets worth 500 yuan or more); (b) household ownership of residential properties (ownership of current residence or ownership of other residential properties); and (c) quality of dwelling (type of structure, compound or independent unit, presence of a balcony, number of toilets, number of living rooms, number of bedrooms, toilet with a seat, flushable toilet, electricity, running water, shower or bath facility, gas supply, cooking fuel, telephone connection, and internet connection). For the urban sample, we used the former two types.

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