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Family Structure and Quality of Life of Elderly in Rural China: The Role of the New Rural Social Pension

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Abstract

Using data from a survey in Ankang district of Shaanxi province of China in 2011, this paper examines the protective effect of the NRSP on quality of life of the rural elderly, as well the moderating effect on association between family structure and quality of life. An instrumental variable approach is used. NRSP is shown to significantly improve the quality of life of rural elderly, and a robustness check shows that this effect is consistent across different sets of subgroups. Compared with the elderly who have at least one son, the quality of life of those who are childless or have only one child is significantly lower. The NRSP is more likely to significantly improve the quality of life of the one-child elderly. In addition, the associations between the NRSP and the different facets of quality of life of the elderly are significant except for the facet of sensory abilities.

Keywords

NRSP; quality of life; family structure; elderly people; China

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Introduction

The population of China is aging rapidly, which will become a serious social problem in the next 20 to 40 years. Data from the sixth Chinese census in 2010 shows that the percentage of people above 65 years old has increased from 5.6% in 1990 to 8.9% in 2010, and the percentage of people above 60 years old has increased from 8.6% to 13.3% during the same period. By 2050, over 30% of the population will be 60 years old or older (Zimmer 2005). In conjunction with population aging, family structure in China is experiencing great changes due to the one-child policy and economic reform. The sixth census data also suggests that average household size has declined from 4.4 in 1982 to 3.1 at present. It is estimated that by 2030 and 2050, the rural-urban combined proportion of the elderly aged 65 and above living in empty-nest households among the total population will be 2.9 and 4.6 times, respectively, of that in 2000, when the percentage was 5.3% (Zeng et al. 2008).

In China, care of the elderly has traditionally been a family responsibility. However, the changing trend of family size has resulted in fewer potential children and kin to provide care for the elderly. This problem is exacerbated in rural China, as adult children may be migrating to urban areas for work, and the protection that elderly farmers usually obtain from their land has also been reduced since the direct benefit from farming has declined (Han 2010). The accelerated aging and weakening of traditional old-age security in rural China (Shen & Williamson 2010; Tang & Feng 2010) has led Chinese policy makers to recognize the need for a social security system for rural residents.

Based on a number of pilot studies in select rural areas, in 2009, China introduced a nationwide experimental rural social pension plan, called “New Rural Social Pension” (NRSP). The NRSP is a voluntary program that is financed by personal accounts, collective benefits and government subsidies. To qualify, a resident must be at least 60 (for males) or 55 (for females) and have contributed for at least 15 years. For those who are currently 60 years old, the required years of payment will be shortened. Those who are already 65 years old can receive the benefit from the basic pension without having contributed anything to the program, subject to the condition that all of their family members aged 16 and above participate in the pension plan (China News 2009). As part of the NRSP, the government contributes 55 Yuan per month (about US\$8) to the basic pension component – a figure that is close to the poverty line in rural China (about 99Yuan/month). However, the benefit level of basic pension has kept increasing and doubled by 2013. Depending on the level of economic development, which varies from region to region, the central government shares a different percentage of the cost of the basic pension component, and local governments are encouraged to make additional contributions. The NRSP has expanded rapidly since its implementation due to the incentive of government subsidies. However, whether the launch of the NRSP has effectively improved the quality of life of the rural elderly remains to be evaluated. With the great changes in family structure, does the NRSP relieve the difficulty of old-age support that usually affects the rural elderly in empty-nest households? The impact of the NRSP on quality of life of the rural elderly has attracted little attention so far.

Previous Studies and the Present Research Question

Family Support and Quality of Life of the Elderly

In most countries, adult children are the most important source of financial, instrumental and emotional support for their elderly parents (Brubaker 1990; Shi 1994). The quality of life of the elderly depends on whether their investment of time and finance in raising children can be returned as support from children in their later life. Hence, the protective function of family support on old people's health and quality of life has attracted broad attention from researchers.

In previous studies, it was found that adult children tend to provide care and support to their elderly parents and co-reside with them as necessary (Pezzin, Pollak & Schone 2007; Wald 2008); co-residence with older parents balances a variety of both children's and parents' needs (Sereny & Gu 2011). In China, adult children not living with their elderly parents still provide some kinds of support and care to fulfill their filial duties (Korinek, Zimmer & Gu 2011; Sereny 2011). Family structure is considered a good indicator of the actual or potential family support that old people may acquire from their children. Findings from previous studies confirmed that elderly parents who have more children are more likely to receive support and help (Kivett & Atkinson 1984), in contrast to the childless elderly, who have fewer social relationships and a higher risk of being socially isolated (McMullin & Marshall 1996). In China, the childless elderly are found to be less satisfied with their lives and to feel more anxious and lonely than do parents, and the number of children has a protective function for their parents' health outcome, which is more significant for the female elderly (Chen & Lei 2009; Zhang & Liu 2007). In a patriarchal society such as China, sons have the privilege to inherit, and the corresponding filial responsibility of providing all kinds of support to their aged parents (Yu & Su 2006). Hence, the gender composition of children may also determine the nature and amount of their parents' old-age support. Some studies confirmed that the number of sons was significantly correlated with a decline in mortality risk of parents (Hurt, Ronsmans & Quigley 2006). However, a study in Taiwan and mainland of China found that daughters were more likely to reduce their parents' mortality risk (Pham-Kanter & Goldman 2011). In China, the government policy of birth control has led to changes of family structure in both household size and gender composition of children. Little is known about how family structure, measured both in number and gender composition of children, affects the quality of life of the Chinese elderly.

Social Pension, Family Structure and Quality of Life of the Elderly

It is widely acknowledged that social pension acts as a safety net for poor households through income redistribution, which helps to sustain those elderly people and their households that are affected by poverty and vulnerability. Studies of social pensions in low and middle-income countries have shown that pensions reduce the poverty of both older people and others in their households (Williamson et al. 2009), and their impact on household poverty alleviation is different in different ethnic groups (Ferreira 2006). One study of the impact of a social pension on living conditions of the Basotho elderly also found that the social pension improved their life satisfaction and ensured their nutrition and decision status in the family (Nyanguru 2007).

In China, the NRSP is expected to improve the quality of life of rural elderly by increasing their economic independence and reducing family tensions. However, recent debate on NRSP has centered on its effectiveness in maintaining the daily life of the elderly. Two studies used data from focus group interviews in some areas of rural China and showed that the NRSP improved the economic conditions of the elderly, and relieved their economic dependence on their children (Tian et al. 2011; Zhang and Tang, 2008). It is argued that the NRSP is not enough for the elderly live on due to its low benefit level (Luo et al. 2012; Shen & Williamson 2010). A social pension may also improve quality of life of rural elderly by producing confidence in government and self-support and reducing worries about later life, especially for the childless and one-child elderly. Some studies confirm that the rural elderly who participate in the NRSP have an improved sense of personal security and self-esteem, and the disparity of worries between one-child elderly and others is also narrowed (Tang & Feng 2010; Zhang and Tang 2008). Hence, the rural elderly may still benefit from NRSP due to its psychological effect, even though the low benefit amount limits its protective effect, especially for the elderly with little family support available. However, no study has directly examined the association of the NRSP and quality of life of the elderly in China, and little is known about the impact of the NRSP on quality of life of the elderly in different family structures.

This study attempts to address gaps in the literature reviewed above by assessing the protective effect of NRSP on quality of life of the elderly, and exploring the moderating effect of NRSP on the relationship between family structure and quality of life of the elderly.

Data and Methods

Data Collection

Data used for this study come from the survey “Health and Well-being of the Rural Elderly (HWRE)” in Ankang district of Shaanxi province conducted in 2011 and 2013. The pilot of the NRSP was carried out in some counties in Ankang district in 2011. A questionnaire survey was conducted in these counties and again two year later when the NRSP had spread to the rest of Ankang. The respondents were identified using stratified multi-stage sampling within 15 randomly selected villages from 15 rural townships in five pilot counties at the end of 2011. With the same sampling method, the survey was also conducted in five other counties in the early 2013. Face to face interviews were administered to subjects over 60 years old. Of the 1320 elderly who were identified as eligible respondents in the two periods, 613 provided valid data in 2011, while 507 completed the survey in 2013. Of the 1120 valid samples used for the analysis (mean age, 70 years), 397 respondents were men; 45.30% were married, and more than half were illiterate. There are significant differences in age, educational attainment, family structure and quality of life between the elderly participating in the NRSP and those not participating in the NRSP (see Table 1 for details).

Variables and Measurement

Quality of life—Quality of life is measured according to the scale of the World Health Organization Quality of Life— Old Adult Module (WHOQOL-OLD), which was developed by the WHO in 1999. The scale has been widely tested and has been confirmed to have good

reliability and validity. A five-point Likert scale is used for the WHOQOL-OLD, the final version of which contains six facets of four items each. Although quality of life is conceived as a higher-order factor, the scores of these six facets, including “Sensory Abilities” (SAB), “Autonomy” (AUT), “Past, Present and Future Activities” (PPF), “Social Participation” (SOP), “Death and Dying” (DAD) and “Intimacy” (INT) can be combined to produce a general score for quality of life. Our analyses confirm that the scale has six distinct facets and Cronbach’s alpha reaches a satisfactory value for the total scales (0.868) as well for six facets (ranging between 0.704 and 0.909).

NRSP and family structure—In this study, NRSP is coded as a dichotomous variable: 1= “having participated in the NRSP”; 0= “not having participated in the NRSP”. Family structure is divided into four categories: childless household, only-daughters household, one-child household, and at-least-one-son household. Each of the four categories is coded as a dummy variable and the last one is used for reference in regression analyses.

Health condition—Health condition is assessed with two objective indicators of ADL and chronic disease. ADL refers to whether it is difficult to perform a set of personal activities of daily living, activities requiring physical strength, mobility and flexibility and instrumental activities of daily living. The responses “no difficulty,” “a little bit,” and “incapable of doing by oneself” were recorded as “3,” “2,” and “1,” respectively. The values of items are summed. Chronic disease is assessed with respect to thirteen diseases such as diabetes, hypertension, and stroke and is coded as a dichotomous variable: 1=“incidence of chronic disease”; 0=“no incidence”. Incidence of chronic disease occurs when respondents report they had at least one chronic disease.

Socio-demographic characteristics—Individual socio-demographic indicators were considered to be confounders in this study. Education is measured as the highest education level completed and is coded as three dummy variables: illiterate (for reference), primary school, and high school and above. Family income per capita was assessed by the total amount of earnings of all household members in the previous year, divided by number in the household, and is converted using $\ln+1$. Age is assessed as a continuous variable. Gender and marital status are coded as dichotomous variables: 0 = “others,” 1 = “men,” and “married.”

Analysis Strategy and Method

First, the *t*-test is used to compare the quality of life of the elderly, based on whether they have participated in the NRSP. The association between NRSP and quality of life in different kinds of family structure is also explored. Second, multiple regression models are used to analyze the effect of NRSP and family structure on quality of life, and the moderating effect of NRSP on the association between family structure and quality of life. In this study, the random disturbance may be correlated with NRSP due to endogeneity. The instrumental variable (IV) method is used for model estimation, and the percentage of participants in the NRSP in the village is used as the IV of individual NRSP. Endogenous test is conducted to confirm the validity of the IV.

Results

Difference of Quality of Life Based on NRSP and Family Structure

As table 1 shows, the quality of life of the elderly who have participated in the NRSP is significantly higher than that of elderly who did not participate, and the elderly who have participated in the NRSP have higher autonomy, activities, social participation, intimacy and lower death fear. However, the difference in sensory abilities is not significant. Figure 2 shows that the disparity in quality of life between the elderly who participate in the NRSP and those who do not depends on family structure. Among the childless and the elderly with one child, the quality of life of the elderly who participate in the NRSP is higher than that of the elderly who do not. Among the elderly with at least one son and with only daughters, the difference in quality of life between elderly who participate in the NRSP and those who do not is not significant.

NRSP, Family Structure and Quality of Life

Table 2 shows the regression estimates for NRSP, family structure and quality of life. Findings from the OLS estimation reveal that NRSP significantly improves the quality of life of the elderly, and its protective function is higher for childless elderly and one child elderly. However, there may be some missing variables in the equations, or a reverse causal relationship between social pension and quality of life, which biases the estimation. The coefficient ($\rho = \text{Corr}(\mu, v) = 7.84$, $F(1) = 14.93$) is significant at the 1% level, indicating that the variable NRSP is endogenous. The test for weakness IV, which is significant at 1% ($F(13) = 20.23$), also shows the IV is valid.

The estimated effect of NRSP on quality of life is even stronger in 2SLS models. The main effect and cross effect of NRSP and one child household remains significant in Models 2. But the cross effect of NRSP and childlessness is no longer significant in 2SLS while it is significant in OLS. For the impact of family structure, the quality of life of the childless elderly and the one child elderly are significantly lower than that of the elderly with at least one son. The quality of life of the elderly with at least one son is not significantly different from that of the elderly with only daughters.

Among the controlled variables, the married elderly have a higher quality of life, and quality of life is improved with increasing education. ADL is positively correlated with the quality of life of the elderly. Having chronic disease reduces the quality of life of elder people at a marginally significant level.

Robustness Check in Different Subgroups

Previous research showed that age is an important factor in the choice to participate in the NRSP (Zhou & Lu 2012); age also determines whether the elderly who have participated in the NRSP can receive the benefits from the basic pension. Additionally, there may be a difference in the benefit of the NRSP between the sample in 2011 and that in 2013 due to the increase in the basic pension and differences among counties. To examine whether our IV-2SLS estimate is robust to different samples, we restricted our sample to those who were below 80 years old and those above 64 years old separately; We again analyzed these both in

2011 and in 2013. Table 3 shows the estimates for the different samples based on the IV method. Results show that the IV-2SLS estimates of NRSP are largely consistent across different subgroups in terms of their statistical significance and effect magnitude. However, the main effect of childlessness in model 2, which is significant in the elderly who are above 64 years old and in the samples from 2013, is no longer significant in cases below 80 years old and in the samples from 2011. This difference may reflect that the elderly need more instrumental support from their children as they age, for which the NRSP can not compensate. The difference may also be attributed to the variation in additional supporting policies to the childless elderly among counties.

Facet-level Regression Analysis

To provide deeper understanding of which aspect of quality of life is most affected by NRSP and family structure, we conducted IV-2SLS regression of each facet in the WHOQOL-OLD. As table 4 shows, the protective effects of NRSP on different facets of quality of life are significant except for SAB. Models 2 suggest that the NRSP not only improves intimacy, social participation, and activities of the elderly with one child, but also narrows the disparities of death and dying fear between the childless elderly and the elderly with at least one son. NRSP also improves autonomy and reduces death and dying fear of the elderly with one child at a marginally significant level. However, the impact of family structure is inconsistent among different facets of quality of life. Compared to the elderly with at least one son, the childless elderly have lower intimacy and take part in fewer activities, and the elderly with one child have less autonomy, intimacy, social participation, death and dying fear, and take part in fewer activities. The elderly with only daughters also have lower intimacy than those with at least one son at a marginally significant level.

Conclusion and Discussion

Our findings show that NRSP has significantly improved the quality of life of the elderly in rural China. Robustness check confirms that the protective effect of the NRSP is stable. In addition, the main effect of the NRSP is still significant when controlling for family structure and its interaction with NRSP. These findings indicate that the NRSP can generically improve the quality of life of the elderly by increasing their self-confidence and ability to support themselves in rural China. Facet-level analysis also reveals that the NRSP is most likely to improve intimacy, autonomy, and social participation, but has no relationship with sensory ability, which suggests that the beneficial effect of NRSP seems to result from mitigating financial dependence on children rather than alleviating clinically relevant effects on quality of life.

Family structure also has a significant impact on quality of life of the elderly. The childless and one child elderly has lower quality of life than those with at least one son. However, the quality of life of the elderly with only daughters is not significantly reduced. These findings indicate that children are still an important resource for elderly support in rural China, but child number instead of having a son serve as an important protection for quality of life of elderly parents. Daughters have borne an increasing burden of support for their elderly parents, although it should be the duty of a son (Tang, Ma, & Shi 2009). Facet-level analyses

also show that the impact of family structure on quality of life differs by facets. Compared with the elderly with at least son, the childless and one child elderly have lower intimacy and take part in fewer activities; the childless elderly also have less autonomy, social participation and have greater death and dying fear. The impact of family structure on quality of life remains significant when controlled for the moderating effect of the NRSP. This suggests that family support still plays an important role in maintaining quality of life (Liu et al. 2012), for which the NRSP may not fully compensate.

The moderating effect of the NRSP on the association between family structure and quality of life was also tested. The NRSP is more likely to improve the quality of life of the elderly with one child, which indicates that the disparity between quality of life of the elderly with one child and those with at least one son will be narrowed due to the spread of the NRSP. The NRSP explains no difference in quality of life between the childless elderly and those with at least one son in some subgroups. This may be attributed to the childless elderly having been included in the system of five guarantees in some counties (Gao & Huang 2007), so that their quality of life has been protected by government financial support. Facet-level analyses show that the NRSP significantly narrows the disparity between intimacy, autonomy, death fear, social participation and activities of the elderly with one child and those with at least one son. These findings suggest that the one child elderly will benefit most from the spread of the NRSP, and their family relationship and social participation are likely to improve. The moderating effects of the NRSP on only daughters and intimacy and activities are significant, suggesting that the family relationship of elderly with only daughters, and their social activities should also improve.

This study suggests that the NRSP is a practical way for old-age support in rural China. The NRSP, which is customized to compensate for weakening family support, provides additional financial support in old age. Even though the benefit level remains low, it brings hope and confidence of self-support to the rural elderly, especially for the one-child elderly. Thus, they do not have to depend so heavily on their children for financial support, which may improve their social participation, family status and intimacy with their children. In public policy terms, this confirms that the social pension serves as a protective mechanism for old people and a potential mechanism for social equity in aging population. Spreading the NRSP and promoting current social support networks should be an important objective for the Chinese government in response to rapid aging. However, a universal non-contributory pension should be provided to ensure that all elderly people will be covered, especially the poorest of the elderly, whose children cannot afford to participate in the programme. Local governments are encouraged to enforce the protective role of five guarantees and subsistence allowance. The benefit level of pension should keep increasing with average income growth to further reduce the disparity of quality of life between rural elderly in different family structures. In addition, the NRSP alone is not sufficient to improve the quality of life of rural elderly particularly for childless elderly and those with sensory disability. Alternative elderly care and assistance programs should be considered. Changing the one-child policy is also necessary, because the role of family support cannot be fully replaced by social pension in China.

Among the limitations of this study is the use of cross-sectional data. The lack of longitudinal data makes it difficult to unequivocally determine the causal relationship between the NRSP, family structure and quality of life. In addition, the data used in this study are limited to one district of west China. Even though local governments in developed areas are encouraged to make additional contributions to the pension, in most districts, especially those in west and central part of China, few local governments make additional contributions to the NRSP (Xue & Xian 2014). A study conducted in one developed and one under-developed province found that the protective effect of the NRSP in reducing worries about later life and financial dependence on children is consistent (Tang & Feng 2010). Our findings suggest that even the basic pension from the NRSP with a low benefit level plays an important protection in the quality of life of rural elderly in under-developed areas. Given the great difference in economic development and variation in the NRSP among different areas of China, extension of our analysis of the impact of NRSP to a representative nationwide sample would be valuable to further identify which benefit level of NRSP is most effective in improving the quality of life of rural elderly.

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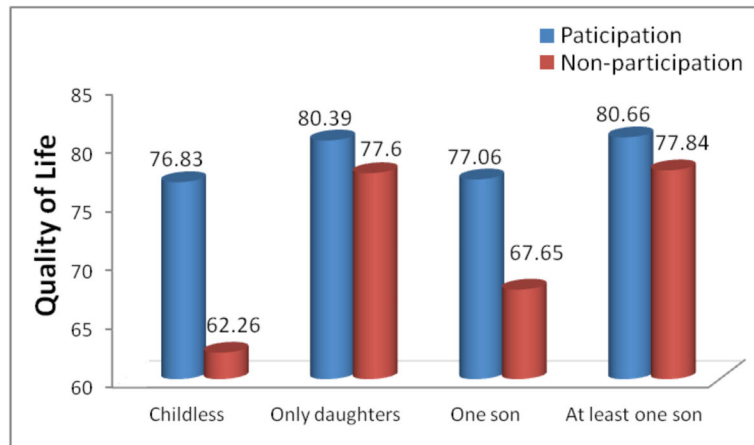


Figure 1. Difference in quality of life based on NRSP and family structure

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Table 1

Sample Characteristics

Variables	Total Cases (N=1070)	Participation (N=920)	Non-participation (N=150)
	Mean(SE)/%	Mean(SE)/%	Mean(SE)/%
Gender(Male)	64.76%	62.05%	69.65%
Age	70.24(0.31)	70.54(0.35)	68.75(0.69) *
Marital status(Married)	45.30%	45.34%	45.10%
Education			
Illiterate	50.34%	52.63%	39.22% **
Primary School	38.93%	36.84%	49.02% *
High school and above	10.74%	10.53%	11.76%
Household income per capita (Ln+1)	8.02(0.06)	7.98(0.05)	8.22(0.21)
Income square(Ln+1)	66.34(0.75)	65.15(0.75)	72.09(2.42) **
ADL	40.43(0.25)	40.61(0.27)	39.55(0.66)
Chronic disease	80.59%	79.96%	83.65%
Family structure			
Childlessness	8.13%	5.41%	21.36% ***
Only daughters	8.14%	8.81%	4.85%
One child	19.77%	19.64%	20.39%
At least one son	63.95%	66.13%	53.40% **
Quality of life	77.98(0.53)	79.19(0.54)	72.09(1.51) ***
SAB	11.87(0.14)	11.87(0.16)	11.89(0.31)
AUT	13.40(0.14)	13.51(0.15)	12.87(0.34) *
PPF	12.66(0.11)	12.85(0.12)	11.69(0.29) ***
SOP	12.77(0.12)	13.00(0.13)	11.61(0.32) ***
DAD	12.59(0.11)	12.80(0.12)	11.58(0.26) ***
INT	14.17(0.14)	14.53(0.14)	12.39(0.44) ***

Note:

P<0.001,**
P<0.01,*
P<0.05

Table 2

Estimates of OLS and LV-2SLS Regression Coefficients for Quality of Life

Variables	OLS		LV-2SLS	
	Model 1	Model 2	Model 1	Model 2
NRSP	5.26 ^{***}	2.97 [*]	13.98 ^{***}	9.70 ^{***}
Family structure				
Childlessness	-5.93 ^{***}	-11.45 ^{***}	-3.99 ^{**}	-9.00 [*]
Only daughters	-1.01	-0.57	-1.22	0.59
One child	-4.21 ^{***}	-9.18 ^{***}	-4.28 ^{***}	-18.28 ^{***}
Interaction				
Childlessness×NRSP		7.51 [*]		6.25
Only daughters)×NRSP		-0.43		-1.94
One child×NRSP		5.60 [*]		15.79 ^{**}
Gender (Female for reference)	0.90	0.86	1.20	1.13
Age	0.04	0.04	0.03	0.02
Marital status (Single for reference)	2.91 ^{***}	2.76 ^{**}	2.96 ^{***}	2.97 ^{***}
Education (illiterate for reference)				
Primary school	0.05	0.12	0.18	0.18
High school and above	3.04 [*]	2.97 [*]	3.33 ^{**}	3.33 ^{**}
Family income per capital(Ln+1)	-0.37	-0.50	-0.56	-0.58
Income square(Ln+1)	0.02	0.03	0.03	0.03
ADL	0.65 ^{***}	0.63 ^{***}	0.63 ^{***}	0.63 ^{***}
Chronic disease(Non for reference)	-1.42 [†]	-1.49 [†]	-0.72	-0.68
Constant	46.27 ^{***}	49.86 ^{***}	40.41 ^{***}	44.40 ^{***}
F	21.23	17.94	24.44	20.87
Adj R-squared	0.1975	0.2023	0.2218	0.2292
Df	13	16	13	16
N	1070	1070	1070	1070

Note:

P<0.001,**
P<0.01,*
P<0.05†
P<0.1

Table 3

Robustness checks: IV-2SLS regression for different subgroups

Variables	Cases of Age<80		Cases of Age>64		Cases in 2011		Cases in 2013	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
NRSP	12.39***	9.51***	13.74***	9.79***	16.10***	12.15**	18.94***	12.22***
Family structure(a)								
Childlessness	-4.30*	-6.68	-4.16**	-9.76*	-4.90*	-9.62+	-2.28	-11.51*
Only daughters	-1.12	4.99	-1.10	4.68	-1.01	7.37	-0.83	-14.18
One child	-3.96***	-16.23***	-4.99***	-17.16***	-3.83**	-15.19**	-4.51***	-14.71*
Interaction								
Childlessness×NRSP		2.73		7.24		5.27		9.33*
Only daughters×NRSP		-6.77		-6.31		-9.89		14.85
One child×NRSP		13.79***		13.85**		13.94*		11.13*
Gender (Female for reference)	0.58	0.46	1.51	1.46	1.96	1.93	0.46	0.29
Age	0.09	0.08	-0.01+	-0.01+	0.01	-0.02	0.03	0.04
Marital status (Single for reference)	2.32**	2.37**	2.52**	2.50**	2.83*	2.72*	3.72**	3.78**
Education (illiterate for reference)								
Primary school	0.45	0.46	0.26	0.28	2.99*	3.04**	3.19**	-3.22**
High school and above	2.56*	2.59*	3.35**	3.38**	5.58**	5.71**	0.54	0.33
Family income per capital(Ln+1)	-0.65	-0.63	-0.06	-0.12	-2.67*	-2.51+	0.28	0.17
Income square(Ln+1)	0.04	0.04	-0.01	0.00	0.19+	0.16	-0.01	0.00
ADL	0.63***	0.63***	0.71***	0.71***	0.58***	0.57***	0.58***	-0.59***
Chronic disease(Non for reference)	-0.95	-0.83	-0.33	-0.32	1.06	1.01	2.23+	-2.33*
Constant	38.32***	40.87***	37.79***	41.62***	54.62***	57.91***	71.56***	77.83***
N	741	741	942	942	613	613	507	507

Note:

*** P<0.001,

** P<0.01,

$1.0 > D_z$
 $P < 0.05$
*

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Table 4

IV-2SLS regression of each facet in the WHOQOL-OLD scale

Variables	S AB		AUT		PPF		SOP		DAD		INT	
	Model1	Model2	Model1	Model2	Model1	Model2	Model1	Model2	Model1	Model2	Model1	Model2
NRSP	0.24	0.35	2.24***	1.62*	1.89***	1.48**	2.79***	2.07***	2.69***	1.63+	3.86***	2.55***
Family structure(a)												
Childlessness	-0.15	0.16	-0.15	-1.02	-1.42***	-1.57*	-0.60+	-0.50	0.13	-2.66+	-1.80***	-3.41***
Only daughters	0.37	2.79	-0.26	0.53	-0.16	1.53	-0.09	-1.52	-0.49	0.29	-0.59+	-3.03+
One child	-0.39	-1.00	-0.64**	-2.64*	-0.67***	-2.90**	-0.66***	-3.71***	-0.79*	-3.59*	-1.14***	-4.44***
Interaction												
Childlessness×NRSP		-0.41		1.13		0.09		-0.40		3.83*		2.02
Only daughters×NRSP		-2.71		-0.87		-1.88		1.61		-0.85		2.76
One child×NRSP		0.69		2.26+		2.52*		3.44**		3.16+		3.73**
Gender	0.43	0.42	0.42	0.41	0.16	0.14	-0.13	-0.13	0.57	0.54	-0.25	-0.26
Age	-0.05**	-0.05**	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.03	0.03*	0.03*
Marital status	0.36	0.35	0.40	0.39	0.42*	0.42*	0.48**	0.50**	0.36	0.35	0.94***	0.95***
Education												
Primary school	-0.25	-0.25	0.50*	0.51*	0.05	0.05	0.25	0.23	-0.62*	-0.60*	0.24	0.24
High school and above	-0.12	-0.11	0.96**	0.96**	0.29	0.30	0.89**	0.87**	0.15	0.16	1.16***	1.14***
Family income per capital (Ln+1)	0.02	0.04	-0.03	-0.03	-0.08	-0.06	0.01	0.01	-0.33	-0.34	-0.15	-0.18
Income square(Ln+1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.01
ADL	0.14***	0.14***	0.14***	0.14***	0.08***	0.08***	0.15***	0.15***	0.05+	0.05+	0.07***	0.07***
Chronic disease	-0.95***	-0.95***	0.42	0.43	-0.19	-0.18	0.12	0.13	-0.20	-0.20	0.08	0.09
F	15.12	12.43	11.62	9.68	10.14	8.82	20.46	17.65	3.55	3.30	17.95	15.39
Adj R-squared	0.1465	0.1461	0.1144	0.1150	0.1001	0.1048	0.1914	0.1995	0.0301	0.0333	0.1709	0.1772

Note: The reference categories in table 4 are consistent with those in table 2.

*** P<0.001,

** P<0.01,

$1.0 > D_z$
 $P < 0.05$
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