

How Do Different Elderly-care Patterns Affect Subjective Well-being of Elderly People in Rural China? Case of Shandong Province¹

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Abstract: The alarmingly high suicide rate among elderly people warrants improvements in elderly-care patterns in rural China. By using first-hand data from rural areas in Shandong, a typical province in China, this paper employs overall well-being and emotional well-being to measure Subjective Well-being (SWB) and further examines the impact of three elderly-care patterns, as well as their respective dimensions /determinants. Comparative studies are also made between empty nesters and non-empty nesters. The empirical findings show that family elderly-care is still important to elderly people's SWB, although its influence is in decline. The New Rural Pension Insurance Scheme, representing social elderly-care, while improving life satisfaction, currently plays a limited role due to the fact that the pensions are very low. Those elderly people who rely on self-care, featuring an independent source of income, living with spouse, and engaging frequently in social and entertainment activities, are prone to make positive assessment on SWB. Compared with non-empty nesters, the empty nesters' SWB is more dependent on personal sources of income and elderly-care facilities.

Keywords: Elderly-care pattern; subjective well-being (SWB); empty nesters

Introduction

Sustainability has become a buzz topic globally. The Millennium Development Goals (MDGs) established in the year 2000, has made a real difference in people's lives, and this progress will be expanded with the launch of sustainable development agenda in September 2015. This new agenda goes far beyond "we can end poverty" by MDGs and proposes more sustainable development goals for which "to ensure healthy lives and promote wellbeing for all at all ages" is an important issue. Under the background of global aging population, it is more realistic to promote wellbeing for elderly people.

China's aging population has given rise to some thorny problems, especially in the rural areas. The alarmingly high suicide rate among elderly people is one of them and has revealed a slew of problems that the government and the society as a whole should attend to. According to *China Daily's* report on August 6, 2014, the suicide rate among the rural elderly has increased from 100 per 100,000 to 500 per 100,000 in two decades. "It seems that death is nothing to fear, and suicide is a normal, even a happy, end" (Liu, 2014). A research by

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Hong Kong University further indicates that the 70-74 age group has been keeping a high rate of completed suicide from 2002 to 2011, reaching 41.7 per 100,000, which is four to five times higher than the world average and ranks the first in the world (Wang et al., 2014).

There is more to it than the alarming figures. On the one hand, suicide rates among elderly people are much higher in rural areas than in urban areas, and the gap between rural and urban becomes wider with age advancement. As indicated in Figure 1, the gap of suicide rate is around 20.0 per 100,000 for the 60-74 age group, 40.0-50.0 per 100,000 for the 75-84 age group, and 70.0 per 100,000 for the over-85 age group in 2012. On the other hand, in the 1980s, younger people accounted for 64 percent of all suicides committed in rural areas, while elderly people made up only about 15 percent. A drastic reversal in the suicide trend has been noticed in China in the 21st century, with 80 percent of reported suicides in rural areas being committed by elderly people as opposed to only 10 percent by younger people. All of these facts make it a major task in the long-term battle to curb the rising suicide rate, improve wellbeing of elderly people, and accomplish sustainable development in rural China.

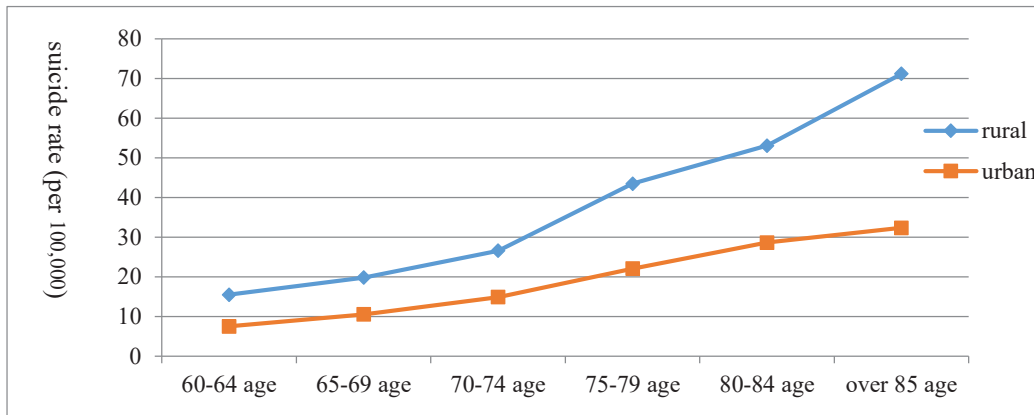


Figure 1. Rural and Urban Difference in Suicide Rate among the Elderly in China in 2012²

Harsh living conditions, critical illness, and emotional loneliness drive the wave of suicides among the rural elderly (Liu, 2014). In other words, suicide is always a combination of both physical and mental problems. It is important to improve elderly-care patterns with economic and social changes to cut suicide rates. As we know, it has been a tradition for several thousand years in China's rural areas to "raise children to provide for old age" and to value filial piety to attend to the elderly. However, many elderly people in rural areas can no longer depend on their children, since hundreds of millions of young farmers rush to coastal cities as migrant workers. Even if they have made some money and want to settle down, they usually choose to bring their children, who were once raised by grandparents, to the city and leave the elderly at home unattended. Although the over-60 age group can resort to social elderly-care and receive a monthly pension (less than 100 yuan) from the government, such a low pension is far from being sufficient for a decent living. Then, the rural elderly has no choice but to rely on themselves. At the same time, the dire shortage of elderly-care facilities in most of China's rural areas is making things worse. When left-behind, rural elderly are unable to take care of

² Ministry of Health, China. China Health Statistics Yearbook. Available at <http://www.moh.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html>

themselves and nursing homes are not available, it is natural for them to feel desperate and hopeless, and, finally, many choose to end their life. To a great extent, the increasing suicide rate and deteriorating well-being among elderly people puts forward higher requirements for improvement of elderly-care patterns in rural China.

The ensuing question is how to measure the well-being of elderly people. The China Central Television Network (CCTV) once made a social investigation of the question "Are you happy?" The investigation ended in miscellaneous answers, but these answers point out that well-being is subjective, involving material and mental qualities (Knight et al., 2009), as well as positive and negative emotions. Therefore, this paper attempts to adopt subjective well-being (SWB) to measure living quality, defining three elderly-care patterns: family elderly-care, social elderly-care and self-care, and then examines how the different elderly-care patterns affect SWB among elderly people in rural China.

Literature Review

Elderly-care Patterns in Different Countries

The existing literature indicates the elderly-care pattern varies across countries. The developed countries have long established full-fledged elderly-care systems, and the elderly have independent sources of income. Correspondingly, research focus is mainly on life care and living arrangement. In other words, the issue with whom the elderly live --- a partner, children, parents, siblings, or unrelated persons --- is extensively studied (Joutsenniemi, 2007). For example, Orsini (2010) found elderly people prefer to live with relatives and friends to get informal care, since less generous reimbursement policies lead to a greater fraction of elderly giving up independent living, while the elderly living alone are in greater need of formal care provided by the government. The two elderly-care patterns are substitutive in developed countries. Similarly, there are many formal long-term elderly-care patterns, besides the informal one, in the U.S. (Engelhardt & Stanley, 2010). Unlike developed countries, there are three basic patterns in China, which are family elderly-care, social elderly-care, and self-care. Researchers have reached consensus regarding the dimensions in different elderly-care patterns, i.e., source of income, living arrangement, life care, and spiritual comfort for elderly people.

Impact of Elderly-care Pattern on Living Quality

So far, the existing research regarding the impact of elderly-care patterns and dimensions on living quality mainly center around two areas. One is the effect of elderly-care patterns on death rates or life spans of elderly people. Lund et al. (2002) showed in the US that individuals living alone had a significantly higher mortality than those living with someone else. Li et al. (2009) also found the baseline living arrangements significantly affect mortality, activities of daily living (ADL), disabilities, and self-rated health (SRH). The other area is the effect of elderly-care patterns on the health of elderly people. For example, Zunzunegui et al. (2001) used multivariate analysis controlling for age, gender, education, and functional status to show that low emotional support and reception of instrumental aid were significantly associated with poor SRH. A widower living with children has better SRH than a widower living alone, and depressive symptoms are usually associated with a lack of emotional support and reception of instrumental help. Similarly, Hughes and Waite (2002) focused on people aged 51-61 and found prospective links between household structures and SRH, mobility limitation, and depressive symptoms. Married couples living alone or with children are the most advantaged, while single women living with children appear disadvantaged on all health indicators.

With the increasing demand for better living quality, it is not enough to purely study health and the life span of the elderly. As SWB could comprehensively measure health conditions, economic well-being, and emotional states (Diener et al., 1999), it has been widely used and becomes a hotspot of academic research. That's why more and more scholars are inclined to examine the effect of elderly-care patterns and dimensions on the well-being of elderly people. Chen and Silverstein (2000) studied the relationship between intergenerational social support and psychological well-being of older parents in China and found the support from children and parents' satisfaction of children can significantly improve the psychological well-being of older parents. Chen and Short (2008) investigated the importance of the household context to SWB among the oldest old (aged 80 years and over) in China. Using data from the Chinese Longitudinal Healthy Longevity Survey (CLHLS), they found that living arrangements have strong implications for elderly people's emotional health, and living alone is associated with lower subjective well-being. Poterba (2014) found social security is the most important source of support for the elderly individuals in the bottom half of the income distribution, and program changes would directly affect their well-being.

In sharp contrast, the literature about the impact of different elderly-care patterns on SWB of elderly people in rural China leaves much to be desired, although the alarmingly high suicide rate among elderly people warrants greater attention and effort. The reason is rooted in the long-term deficiency of social elderly-care in rural China. As we know, the Chinese government introduced the New Rural Pension Insurance Scheme (NRPIS) in 2009. By March 2010, pilot programs had been launched in 320 experimental counties in 27 provinces and four municipalities, including Beijing, Tianjin, Shanghai and Chongqing, covering 11.8 percent of the total elderly population; 15.7 million rural residents aged 60 and over in the pilot areas have received the basic pension and 46.85 million (more than 50 percent of local residents) participated in the pension scheme with individual contributions. NRPIS could provide rural residents with a stable source of income in their old age and, thus, help improve elderly people's standard of living. Nevertheless, the policy has been implemented for just several years, and its effect is waiting to be examined yet.

A special group, named as empty nesters, in rural China requires additional attention. A report on China's Aging Development released by the Chinese Academy of Social Sciences revealed that China's elderly aged 60 and over totaled 194 million by the end of 2012; 51 percent were empty nesters. By 2030, the proportion of empty-nest elderly household will reach 90 percent of the elderly population. This is especially true for the rural elderly, since a vast number of the youngsters from low-income families have been emigrating from their hometowns to big cities (Clemens, 2011) to live and work. Existing literature indicates that empty nesters are more vulnerable than non-empty nesters because they have not only greater demand for family care, but also stronger loneliness and worse physical and psychological health (Corewell & Waite, 2009). However, so far, few researches have studied the impact of elderly-care patterns on the empty nesters' SWB, although they are in dire lack of family care and intergenerational support. For this reason, this paper also attempts to compare the impact of elderly-care patterns on the SWB of empty nesters and non-empty nesters.

The rest of the paper is structured as follows: Section 3 introduces the questionnaire survey in rural Shandong and describes the variables and the model. Section 4 uses the ordered probit model and presents the empirical findings for the impact of different elderly-care patterns on SWB; Comparative studies between empty nesters and non-empty nesters are further made in Section 5. Finally, the concluding section highlights the major findings and implications of our study.

Data and Modeling

Data Source

This paper selects Shandong as the research focus for good reasons. Shandong has the biggest agricultural sector (measured by share of provincial GDP) among all Chinese provinces, with farmer households accounting for 52.2 percent of its population. It follows that NRPIS involving rural residents is particularly important to the province. Furthermore, 19 counties in Shandong were chosen for the pilot program of NRPIS back in 2009, suggesting that the province's scheme is relatively more mature. The coverage of NRPIS is extensive in the province as all of its counties had implemented NRPIS by the end of 2012. Last, the NRPIS policy across Shandong prefectures is almost the same. The consistency of the NRPIS policy makes comparison possible.

To ensure that the sample is representative of the target population and to reduce sampling errors, a multi-stage stratified cluster-sampling method was followed. First, three to five counties were randomly selected from each of the 17 prefectures in Shandong Province, making 91 counties in total. Second, one to three townships had been randomly selected from each county, having 195 townships in total. Finally, depending on the size of the township, 5 to 20 elderly people whose age is 60 and over from each township were randomly selected for the survey. A total of 1700 old people were surveyed in 2011.

The survey was conducted via a face-to-face interview, unless the respondents preferred to answer the questionnaires in writing. Excluding the invalid ones, 1580 questionnaires were collected, with a validity rate of 92.9 percent.

Table 1 shows some demographic statistics of the respondents. The proportion of male respondents is higher than female ones, which is consistent with the reality in rural China. Among the 1580 respondents, over 38 percent are aged 70 and over, which is consistent with the aging trend. A noticeable feature is that 39 percent of elderly people are illiterate, and only 10 percent have finished junior secondary school and above, reflecting the fact that the majority of the rural elderly are poorly educated.

Table1
Demographic Statistics of Sampled Elderly People

Gender		Age		Schooling	
Male	56%	60-65	35.89%	Illiteracy	39%
Female	44%	66-69	26.08%	Primary school and below	51%
		70-74	18.35%	Junior secondary and above	10%
		75-79	12.53%		
		80 and over	7.15%		

Dependent Variable

The dependent variable is the SWB of elderly people, comprising overall well-being and emotional well-being. The former is designed to capture respondents' subjective assessment of their living standard, life satisfaction, and SRH. The respondents are asked to rate the three variables on a five-point scale from excellent to poor. The latter is used to reflect the respondents' positive and negative emotions in one recent week, which is rated from 2 to 8 by degree by respondents.

As indicated in Figure 2, almost 86 percent of respondents make positive assessments on life satisfaction, but 44 percent rates poor in living standard, which is the worst among the three variables. Seventy percent say SRH is fine, but they have big differences among them. The overall health condition is not as good as expected.



Figure 2. Sampled Frequency Histogram of Overall SWB (%)

Figure 3 reports the statistics on four questions to reflect positive and negative emotions respectively. Only less than 40 percent of respondents have positive emotions, while 30 percent and 21 percent seldom feel hopeful for the future and happy most of time, respectively. Although 66 percent and 42 percent of respondents are seldom in negative emotions, 24 percent and 37 percent feel lonely and depressed most of the time.

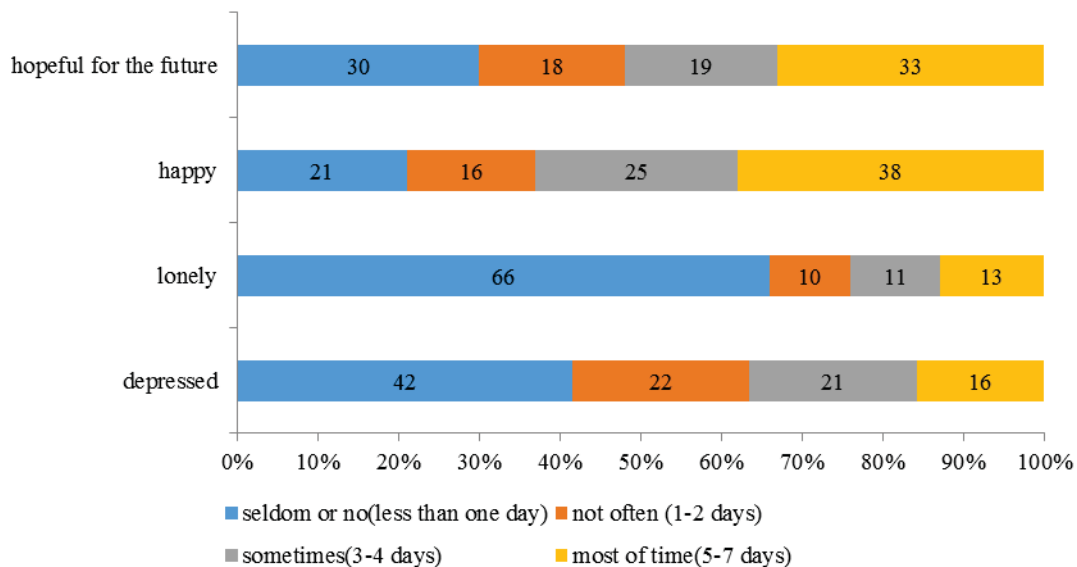


Figure 3. Stacked Bar Chart of Positive and Negative Emotions (%)

Independent Variables

To examine the impact of elderly-care pattern on SWB, three dimensions to measure elderly-care patterns are adopted i.e., family elderly-care, social elderly-care, and self-care. Theoretically, the three dimensions are most idealized and simplest among all complicated and diversified dimensions. On the one hand, elderly-care resources come from nothing but family members, social organization (government and social institutions), and elderly people themselves. On the other hand, these three dimensions are easily distinguished by finance source, living arrangement, life care, and spiritual comfort. Practically, though various elderly-care patterns are mixed in reality, three dimensions in this paper are most prominent in certain dimensions to discriminate the impact of each pattern on SWB respectively. Our survey in rural Shandong justified this case, as well. The summary statistics of independent variables are shown in Table 2.

As for family elderly-care pattern, the source of income is represented in the questionnaire as “economic support by children or not.” If yes, this variable takes the value of 1. Otherwise, it is 0. The average is 0.61, which means economic support from children is essential to the well-being of the rural elderly population and the family elderly-care pattern is still playing an important role. Living arrangement is expressed as the number of children or neighbor with whom an elderly lives. On average, there are only 1.28 children / neighbors who choose to live with the elderly, while 35.43 percent of the respondents have to live alone. This illustrates that it is very common for children to be far away from their elderly parents, and the traditional family elderly-care pattern is on the edge of collapsing in rural China. Consistent with living arrangement, life care and spiritual comfort are all measured by the number of children / neighbors living with an elderly person.

For the social elderly-care pattern, the source of income is defined by whether or not a respondent has participated in NRPIS. If yes, it assumes the value of 1, and, otherwise, is 0. The statistical results show that the participating rate by respondents was only 30 percent in 2011, indicating the impact of social elderly-care was still limited at that time. The elderly-care facilities, service and cultural construction are measured by the status of whether there are nursing homes, community service centers, and activity centers for the aged in the respondents' villages. Likewise, if yes, it is 1, and, otherwise, it is 0. In the majority of the villages, there is no nursing home, community service center, or activity center for the elderly, and the average for the three facilities is only 0.07, 0.02 and 0.25 respectively. These statistical results prove that social elderly-care is in dire deficiency, which increases elderly people's dependence on family elderly-care.

With regard to self-care, the source of income is measured by the sum of cash, bank deposits, and treasury owned by respondents. The statistical results show that, on average, each respondent has only 3,200 yuan as liquid assets, which is far from being enough for a decent living. The living arrangement is measured by the status of whether or not the respondent lives with a spouse. If yes, it is assigned the value of 1. Otherwise, it is 0. Likewise, independent life care is expressed by ARL and gets the value of 1 if a respondent is living with a spouse and 0 if not. Spiritual comfort is measured by the answer to the question “Have you participated in social events in villages?” As a matter of fact, here, social events refer to contact with friends, all entertainment, and social activities. In other words, the events cover all the means elderly people can use to socialize with others and entertain themselves. The sampled data illustrate 20 percent of the respondents need to be taken care of, and only 47 percent participate in social events in recent days. The majority of respondents feel life is more than boring and cannot enjoy spiritual comfort at all.

Control Variables

Considering the limits of the questionnaire and the reality, we introduce six control variables: age, gender,

education, cognitive ability, reverse intergenerational support, and death of children. A summary of the dependent variables, independent variables, and control variables is shown in Table 2.

Table 2
Summary Statistics

Variables	Dimension	Indicators	Definition	Average	Max	Min	Std. Error
SWB	Overall SWB	Living standard	1=very high, 2=high, 3-moderate, 4=low, 5=poor	3.54	5	1	0.77
		Life satisfaction	1=extremely satisfied, 2=very satisfied, 3=satisfied, 4=less satisfied, 5=dissatisfied	2.89	5	1	0.73
		SRH	1=very good, 2=good, 3=moderate, 4=bad, 5=very bad	3.10	5	1	0.89
	Emotional SWB	Positive emotion	2=extremely low, 3=very low, 4=low, 5=moderate, 6=high, 7=very high, 8=extremely high	5.36	8	2	1.99
		Negative emotion	2=extremely low, 3=very low, 4=low, 5=moderate, 6=high, 7=very high, 8=extremely high	3.87	3.81	8	2
Family Elderly-care	Finance Source	Economic support by children	No=0, Yes=1	0.63	1	0	0.48
	Living Arrangement	Number of children living	Number (constant value)	1.26	7	0	1.34

		together or as neighbors					
	Life Care	-	From children living together or as neighbors	-	-	-	
	Spiritual Comfort	-	From children living together or as neighbors	-	-	-	-
Social Elderly-care	Finance Source	Participate in NRPIS or not	No=0, Yes=1	0.34	1	0	0.47
	Living Arrangement	Nursing home or not	No=0, Yes=1	0.06	1	0	0.25
	Life Care	Community service center in village or not	No=0, Yes=1	0.03	1	0	0.17
	Spiritual Comfort	Activity center in village or not	No=0, Yes=1	0.28	1	0	0.45
Self-care	Finance Source	Personal liquid assets (10 thousand yuan)	Number (constant value)	0.36	90	0	3.00
	Living Arrangement	Live with spouse or not	No=0, Yes=1	0.67	1	0	0.47
	Life Care	ARL or not	No=0, Yes=1	0.82	1	0	0.39
	Spiritual Comfort	Participate in social events recently or not	No=0, Yes=1	0.47	1	0	0.50
Control Variables	Socio-demographic Characteristics	Age	60~64=1, 65~69=2, 70~74=3, 75~79=4, 80 and over=5	2.29	5	1	1.27
		Gender	Female=0, Male=1	0.56	1	0	0.50
		Education	Illiteracy=1, incomplete study in primary school=2, old-style private school=3, primary school=4, middle school=5, junior school=6, technical	2.46	9	1	1.52

			secondary school=7, college=8, undergraduate=9				
		Cognitive ability	1~6 from the lowest to highest	4.53	6	1	0.84
	Family Feature	Reverse support for children	No=0, Yes=1	0.04	1	0	0.20
		Number of death of children	Number (constant value)	0.13	6	0	0.52

Model Specification

Considering the value of dependent variables is both discrete and ordered, the ordered probit model is, thus, adopted to examine the impact of the different elderly-care patterns on SWB. The modeling is expressed as follows:

$$y_k^* = \beta_{k0} + \sum_{i=1}^2 \beta_{ki} x_{1i} + \sum_{i=1}^4 \beta_{k,i+2} x_{2i} + \sum_{i=1}^4 \beta_{k,i+6} x_{3i} + \sum_{i=1}^7 \beta_{k,i+10} c_i + \varepsilon_k \quad (1)$$

where y_k stands for SWB of elderly people as a continuous dependent variable. k, j, i are positive integers. When $k=1\sim3, j=1\sim5$; when $k=4\sim5, j=2\sim8$. Concretely speaking, when k is nominated as 1, 2 and 3, y_k corresponds with three dependent variables, “living standard” (Y_1), “life satisfaction” (Y_2) and “SRH” (Y_3) respectively. They are rated as a five-point scale from excellent to poor, and then scored as $j=1\sim5$. Likewise, when k is nominated as 4 and 5, y_k refers to “positive emotion” (Y_4) and “negative emotion” (Y_5) and scored as $j=2\sim8$, as defined in Table 2. The above five regressive models share the common independent variables and include x_{1i} in the family elderly-care pattern, x_{2i} in social elderly-care pattern, x_{3i} in self-care pattern and control variables (c_i). β_{k0} and ε_k represent constant term and disturbance term respectively.

Baseline Regression and Results

The correlation matrix of all independent variables is tested prior to baseline regression. The result suggests no collinearity among all variables. Then, baseline regression on Model (1) are conducted and the results reported in Table 3.

Table 3

Baseline Regression: Ordered Probit³

			Overall well-being			Emotional well-being	
			Living standard Y ₁	Life satisfaction Y ₂	SRH Y ₃	Positive Y ₄	Negative Y ₅
Family Elderly-care X ₁	Source of income	X ₁₁	-0.12*	-0.17***	0.09	0.01	-0.05
	Living arrangement	X ₁₂	-0.03	-0.03	0.03	-0.00	-0.05**
Social Elderly-care X ₂	Source of income	X ₂₁	-0.03	-0.04	0.01	-0.05	-0.11*
	Living arrangement	X ₂₂	0.03	-0.17	0.22	-0.02	-0.02
	Life care	X ₂₃	-0.51***	-0.41**	-0.09	-0.17	-0.02
	Spiritual comfort	X ₂₄	-0.06	0.17	-0.06	0.18***	-0.12*
Self-care X ₃	Source of income	X ₃₁	-0.04***	-0.01	-0.01	0.01	-0.09***
	Living arrangement	X ₃₂	0.03	-0.05	0.09	0.02	-0.33***
	Life care	X ₃₃	-0.27***	-0.23***	-0.56***	0.34***	-0.35***
	Spiritual comfort	X ₃₄	-0.20***	-0.17***	-0.16***	0.17***	-0.13**
Control Variables	Age	C ₁	-0.02	-0.03	-0.01	-0.00	-0.04
	Gender	C ₂	0.02	-0.02	0.05	-0.01	-0.21***
	Education	C ₃	-0.00	0.00	-0.01	0.04*	-0.02
	Cognitive ability	C ₄	-0.02	-0.02	-0.05	0.06*	-0.04
	Reverse intergenerational support	C ₅	-0.13	0.08	-0.16	-0.04	-0.02
	Number of death of children	C ₆	0.02	-0.02	0.01	-0.09	0.07

With regard to the family elderly-care pattern, financial support from children (X₁₁), as a source of income for elderly people, is significantly and positively associated with their living standard (Y₁) and life satisfaction (Y₂) while insignificantly related to emotional SWB (Y₃ and Y₄). Accordingly, the living arrangement represented by the number of children/neighbors living with an elderly (X₁₂) significantly affects negative emotions (Y₅). Moreover, the greater the number of children living with an elderly, the higher is his or her emotional SWB, since elderly people's negative emotions could be alleviated by the children living with him or her. Thus, it can be seen that family elderly care, characterized as children's financial support and emotional comfort, is still

³ *, **, and *** indicate statistical significance at 10, 5, and 1 percent levels respectively.

irreplaceable and helpful for improving elderly people's SWB in rural China.

We have some unexpected results for the variables related to the social elderly-care pattern. Theoretically, participating in NRPIS (X_{21}) should contribute to the elderly's positive assessment, as it increases his or her income. However, our study shows that this variable has no statistical significance on living standard (Y_1), life satisfaction (Y_2) or SRH (Y_3). Such insignificance could be due to the fact that the pension they receive is minimal and not very helpful in improving their living standard. The influence of living arrangement (X_{22}) on elderly people's SWB is not obvious, either. As mentioned earlier, only 7 percent of villages have established nursing homes, and elderly-care facilities are in severe shortage. On the contrary, although community service center (X_{23}) at villages is emerging only in recent years, and the coverage rate is only 2 percent, it has statistical significance on the living standard (Y_1) and life satisfaction (Y_2). This suggests community service centers should be promoted and could improve elderly people's SWB effectively. Spiritual comfort (X_{24}) is significantly associated with emotional SWB (Y_4 and Y_5). Currently, 25 percent of villages have activity centers for the aged and are more common than nursing homes and community service centers. These activity centers provide entertainment and social venues for elderly people, help them enrich their spiritual lives and remain optimistic. From these findings, it can be concluded that with the weakening of family elderly-care, elderly people need more social elderly-care.

Personal liquid assets (X_{31}), as the most important indicator measuring economic independence of elderly people in the self-care pattern, is statistically significant to living standard (Y_1) and negative emotion (Y_5). The more personal liquid assets the elderly have, the more likely they will make a positive assessment on living standards and reduce negative emotions, such as depression and loneliness. However, the source of income is still traditional and limited for the rural elderly. With the transition from the extended family to the nuclear family and the growing number of empty nesters, as well as the decline in land security, the exposure for elderly people to make self-care is growing in rural China. The sampled respondents have only 3,200 yuan on average, which is far from being enough for economic independence. This is one of the important reasons why family elderly-care has to be maintained and encouraged. Living arrangement (X_{32}) is significantly related to negative emotions, since living with spouse can effectively alleviate loneliness, depression, and others. Different from living arrangement, both life care (X_{33}) and spiritual comfort (X_{34}) are statistically significant to five independent variables (what are they?). This follows good ADL, which has reduced children's burdens and social pressures greatly. At the same time, rich and colorful social events can give elderly people entertainment and distraction and spiritual comfort, which prove to be effective ways to improve elderly people's SWB.

As for the control variables, gender (C_2) has significant influence on negative emotions and indicates negative emotions are lower for males than or females. Education (C_3) and cognitive ability (C_4) have a similar influence on positive emotions and suggest elderly people who are more educated or with greater cognitive ability are more apt to be optimistic and happy.

Comparative Studies on Empty Nesters

Empty nesters, as a special group in the elderly-care pattern, do not have family care and support from children. Thus, they have different needs for elderly-care and then affect their assessment on SWB. In this paper, empty nesters are defined as those who have no children or their children are far away from them. Accordingly, in light of X_{12} (the number of children living together or as neighbors), the respondents are divided into empty nesters and non-empty nesters. That is, X_{12} will be 0 for all the empty nesters and 1, 2 or other positive

integers for the non-empty nester. The number of empty nesters is 583, or 37 percent of the total sample, which implies empty nesters are very common in rural China. Table 4 reports the regression results for empty nesters and non-empty nesters.

Table 4

Regression between Empty Nesters and Non Empty Nesters⁴

		Living standard Y ₁		Life satisfaction Y ₂		SRH Y ₃		Positive emotions Y ₄		Negative emotions Y ₅	
		E	N	E	N	E	N	E	N	E	N
Family Elderly-care X ₁	X ₁₁	-0.15	-0.09	-0.13	-0.21***	0.13	0.06	0.00	0.02	0.03	-0.09
	X ₁₂	0.11	-0.10	-0.04	-0.02	0.05	-0.01	-0.11	-0.02	-0.01	-0.16**
Social Elderly-care X ₂	X ₂₁	-0.21	0.15	-0.10	-0.19	0.24	0.19	0.08	-0.07	0.09	-0.07
	X ₂₂	-0.82**	-0.42*	-0.39	-0.43**	0.21	-0.29	-0.37	-0.07	0.26	-0.13
	X ₂₃	-0.05	-0.02	0.15	0.21**	-0.15	0.01	0.29***	0.11	-0.24**	-0.08
	X ₂₄	-0.19***	-0.03***	-0.07*	-0.01	-0.04	-0.01	0.02	0.01	-0.08*	-0.08**
Self-care X ₃	X ₃₁	0.23	-0.06	0.05	-0.11	0.04	0.11	-0.02	0.05	-0.34***	-0.33** *
	X ₃₂	-0.36***	-0.22**	-0.07	-0.31***	-0.51***	-0.57***	0.28**	0.38***	-0.31***	-0.38** *
	X ₃₃	-0.02***	-0.30	-0.11	-0.20***	-0.09	-0.21***	0.15*	0.18**	-0.07	-0.16**
	X ₃₄	0.00	-0.05	-0.05	-0.03	0.01	-0.00	-0.01	0.00	-0.03	-0.06*
Control Variables	C ₁	0.20*	-0.05	-0.10	0.03	0.05	0.04	0.02	-0.03	-0.16	-0.22** *
	C ₂	-0.03	0.02	0.02	-0.00	-0.01	-0.02	0.04	0.04	-0.04	-0.00
	C ₃	-0.17**	0.06	-0.17***	0.05	-0.10	-0.01	0.01	0.07*	-0.15**	0.01
	C ₄	-0.02	-0.25	0.33	-0.12	0.07	-0.43**	-0.27	0.16	0.04	-0.08
	C ₅	0.11	0.01	0.03	-0.04	0.07	-0.01	-0.22*	-0.05	0.04	0.08
	C ₆	0.04	0.06	0.03	0.04	-0.32***	-0.30***	0.30***	0.11	-0.31***	-0.16**

As far as overall SWB is concerned, the imports of life care (X₃₃) measured by ADL on living standard (Y₁) and SRH (Y₃) are significantly different for empty nesters and non-empty nesters. Compared with non-empty nesters, only those empty nesters with good ADL are likely to make positive assessment of the living standard and SRH. The difference becomes more prominent with life satisfaction (Y₂). Moreover, only personal liquid assets (X₃₁) has a statistical significance on empty nesters, while support from children (X₁₁), community service center (X₂₂), activity center (X₂₃), ADL (X₃₃) and social events (X₃₄) are all significantly related to life satisfaction for non-empty nesters. That is to say, compared with non-empty nesters, empty nesters are more sensitive to personal sources of income. The more personal liquid assets they have, the more satisfied they are

⁴ SRH is the acronym of Self-rated Health; E stands for empty nesters and N represents non empty nesters. *, **, and *** indicate statistical significance at 10, 5, and 1 percent levels respectively.

with life.

With regard to emotional SWB, the sharp contrast of X12, X33, and X34 proves that accompany from children, good ADL, and social events can improve emotions for non-empty nesters, while there's no such effect on empty nesters. The significance of X23 indicates that community service center at a village can help empty nesters in boosting positive emotions and alleviating negative emotions.

The differences between empty nesters and non-empty nesters indicate both overall well-being and emotional well-being of empty nesters are affected by different elderly-care dimensions. First, empty nesters' SWB is sensitive to personal source of income relative to intergenerational and social support. As we all know, empty nesters have no company from children and minimal interactions with family and others. Such insecurity in life could easily lead to heavy dependence on personal liquid assets. In this sense, empty nesters have greater demands for financial aid than spiritual comfort. Second, the participating rate of NRPIS was merely 30 percent in 2011 and plays a limited role in improving their SWB. Though the current pension amount is consistent with the basic principle of NRPIS, our study shows the pension should be raised in the future to ensure a decent living for such special rural population groups. Third, lack of company from children makes them in greater need of social care, such as a community service center at the village. Therefore, this kind of elderly-care facility should be extended to more groups, including empty nesters. Given that activity centers for the aged are helpful for boosting empty nesters' SWB, they should be encouraged to serve as an alternative to children's company in providing spiritual comfort to more empty nesters.

Conclusions and Implications

Under the background of the new sustainable development agenda and global aging population, it is more realistic to promote well-being for elderly people. The alarmingly high suicide rate among elderly people put forward higher requirement for improvement of elderly-care pattern in rural China. By using first-hand data in rural Shandong, a typical province in China, this paper adopts overall well-being and emotional well-being to measure Subjective Well-being (SWB); then, it examines the impact of three elder-care patterns, as well as corresponding dimensions on it. The comparative studies between empty nesters and non-empty nesters are further made.

The statistical results show that almost 86 percent of respondents make positive assessment on life satisfaction, but 44 percent feel poor in living standard; 70 percent think SRH is fine but have big differences among them. Only less than 40 percent of respondents have positive emotions, while 24 percent and 37 percent feel lonely and depressed most of the time. The empirical results further show that, family elderly-care is still very important for the SWB of elderly people in rural China, although its effect is on the decline. NRPIS, representative of social elderly-care, improves life satisfaction, but currently plays a limited role due to the low-level of the pensions. The elderly people relying on self-care are prone to make more positive assessment on SWB. Compared with the non-empty nester, the empty nesters' SWB is more dependent on personal income and elderly-care facilities.

The above-mentioned conclusions suggest that great changes have taken place in rural China. One profound change is that a vast number of young farmers from low-income families choose to emigrate from their hometowns and work in big cities. Consequently, the tradition to "raise children to provide for old age" faces great challenges. It follows that family elderly-care cannot be sustained as the predominant elderly-care pattern, and a new social elder-care system like NRPIS is required. That being said, it is still important to

encourage filial piety as a traditional social value and educate the younger generation to respect and follow tradition, as an increasing number of elderly people are committing suicide or experiencing deteriorating SWB because of the treatment meted out to them by their un-filial children. On the other hand, despite the fact that NRPIS is still limited in providing for old age, it represents the future direction toward which the government and society as a whole should endeavor.

SWB can be effectively improved and the suicide rate can be accordingly cut in China's countryside if more proactive, people-oriented measures are taken in terms of social elderly-care systems. For example, as the low pension by NRPIS cannot afford elderly-care cost, it is necessary, therefore, for governments at all levels to provide higher pensions to the rural elderly, especially to those above 70, and to provide more subsidies to those lonely and sick old people at the same time.

Better elderly care-facilities, such as nursing homes, activity centers, and community service centers, can, also, boost SWB. Therefore, governments at all levels are advised to invest more in nursing homes and apartments for the elderly and encourage private institutions to build elderly care facilities in the countryside.

Moreover, community life is not as colorful in rural areas as in big cities. Most of rural people have nothing to do and feel bored and lonely when quitting farming at an old age. Local officials should make greater efforts to enrich the cultural and social activities for rural associations by, for instance, giving elderly people greater opportunities to voice their opinions on public affairs. It also cannot be denied that poor education in rural elderly people undermine their emotional well-being. Therefore, it is an alternative to build learning institutions for the rural elderly, just as the universities for senior citizens in big cities. At the same time, organizing volunteers to regularly interact with those lonely and sick people can also reduce the frequency of suicides and improve their emotional well-being.

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References

- Chen, X., & M. Silverstein. (2000). Intergenerational social support and the psychological well-being of older parents in China. *Research on Aging*, 22(1), 43-65.
- Chen, F., & S. E. Short. (2008). Household context and subjective well-being among the oldest old in China. *Journal of Family Issues*, 29(10), 1379-1403.
- Wang, C., Cecilia, L. W., Chan & Paul S. F. Yip. (2014). Suicide rates in China from 2002 to 2011: An update. *Social Psychiatry Epidemiology*, 49(6), 92-941.
- Clemens, M. (2011). Economics and emigration: Trillion-dollar bills on the sidewalk? *Journal of Economic Perspectives*, 25(3), 83~106.
- Cornwell, E.Y., & Waite. L.J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior*, 50(1), 31-48.
- Diener, E., Suh, E., & Lucas, R. et al. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276-302.
- Engelhardt, G., & Stanley, N. G. (2010). Home health care and the housing and living arrangements of the

- elderly. *Journal of Urban Economics*, 67(2), 226-238.
- He, Z. X., & Lester, D. (2001). Elderly suicide in China. *Psychological Reports*, 89(3), 675-676.
- Hughes, M., & L. J. Waite. (2002). Health in household context: Living Arrangements and health in late middle age. *Journal of Health Social Behavior*, 43(1), 1-21.
- Joutsenniemi, K. (2007). *Living arrangements and health*. Publications of the National Public Health Institute.
- Knight, J., Song, L., & Gunatilaka, R. (2009). Subjective well-being and its determinants in rural China. *China Economic Review*, 20(4), 635-649.
- Li, L. W., Zhang, J., & Liang, J. (2009). Health among the oldest-old in China: Which living arrangements make a difference? *Social Science & Medicine*, 68(2), 220-227.
- Liu, Y. W. (2014). Cut suicide rate by aiding rural elderly. *China Daily USA*, August 6.
- Lund, R., Due, P., Modvig, J., Holstein, B. E., Damsgaard, M. T., & Andersen, P. K. (2002). Cohabitation and marital status as predictors of mortality - an eight year follow-up study. *Social Science and Medicine*, 55(4), 673-679.
- Orsini, C. (2010). Changing the way the elderly live: Evidence from the home health care market in the United States. *Journal of Public Economics*, 94(1-2), 142-152.
- Poterba, J. M. (2014). Retirement security in an aging population. *American Economic Review*, 104(5), 1-30.
- Zunzunegui, M. V., F., Beland, & A. Otero. (2000). Support from children, living arrangement, self-rated health and depressive symptoms of older people in Spain. *International Journal of Epidemiology*, 30(5), 1090-1099.