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Intergenerational Care, Intergenerational Support and Subjective Well-Being of the Elderly: An Empirical Study Based on CGSS (2017) Micro Data

Abstract: Using the micro data of Chinese General Social Survey (CGSS) in 2017, this paper analyzes the logical relationship between intergenerational care, intergenerational support and subjective well-being of the elderly. The study found that intergenerational care can significantly enhance the subjective well-being of the elderly, and there are age and income heterogeneity. Further analysis found that there is a partial mediating effect of intergenerational support in the effect of intergenerational care on the subjective well-being of the elderly. Based on this, it is necessary to build an elderly care service system that is coordinated by home-based community institutions and combined with medical care and health care, vigorously develop an inclusive nursery service system, establish and improve the nursery policy and mechanism, and promote the professional and standardized development of infant care services.

Keywords: intergenerational care, intergenerational support, subjective well-being, mediating effect

Introduction

With the development of economy and society, the improvement of medical technology and the change of national population policy, the transformation of China's population reproduction type lead to the trend of aging of the population structure. Under the reverse effect of the double factors of the general increase in life expectancy and the persistently low fertility rate, the aging society will definitely become the new normal of China's social development in the future. Moreover, with the continuous advancement of China's aging society, the problem of aging has attracted great attention of the government and has been included in the key objectives and tasks of the "*14th Five Year Plan*" for national economic and social development of the People's Republic of China and the outline of long-term objectives for 2005. In recent years, the physical health, mental health and happiness index of the elderly have been paid more and more attention by scholars at home and abroad. It

can be seen that under the social background of population aging, improving the subjective well-being and sense of acquisition of the elderly is an important topic worthy of discussion.

Elderly play an active supporting role in child care. According to the survey, about 25% of children under the age of 5 in the United States are cared by the elderly (Laughlin 2013), and about one quarter (26%) of children in Australia are cared by grandparents (He et al. 2021). The proportion of intergenerational care for the elderly in Europe is about 50% (Glaser et al. 2010), which is relatively high in southern Europe and relatively low in northern Europe (Igel, Szydlik 2011). The proportion of intergenerational care for grandchildren among the elderly in China is as high as 58% (Ko, Hank 2014). Based on the theory of intergenerational exchange, the elderly in intergenerational care are more likely to obtain the financial, daily and emotional intergenerational support of their adult children. Studies have found that intergenerational support can not only reduce the psychological stress of caring for children by the elderly, but also enhance the physical and mental health of the elderly (Lou et al. 2013), which is conducive to improve the subjective well-being of the elderly (Hayslip et al. 2014). However, high-intensity intergenerational care not only increases the mental stress and labor burden of the elderly, but also squeezes the time for physical exercise and medical treatment (Baker, Silverstein 2008), which is not conducive to health of the elderly, thereby reducing their happiness index. So, how do intergenerational care behaviors affect the subjective well-being of the elderly? Is there heterogeneity between the intergenerational care behaviors and subjective well-being of the elderly? Can intergenerational support improve the participation rate of intergenerational care? Is there a mediating effect of intergenerational support between intergenerational care behavior and subjective well-being of the elderly? Based on this, this paper intends to use the micro data of Chinese General Social Survey (CGSS) in 2017 to explain the above problems, in order to provide policy suggestions for the high-quality development of China's aging society, which has important practical significance for promoting China's "healthy aging" and improving the subjective well-being of the elderly.

Literature Review

Regarding the impact of intergenerational care on the subjective well-being of the elderly, early labor economics usually ignored the research on this issue, but only focused on intergenerational care behavior and health effect of the elderly. Studies have found that when the stress of intergenerational care exceed to the physical and psychological endurance of the elderly, it may become a source of "chronic stress" that is unfavorable to health, which will not only affect the physical health of the elderly, but also increase the probability of depression in the elderly (Chen, Liu 2012; Leder et al. 2007). Compared with the elderly who did not participate in intergenerational care, participate in intergenerational care increased the frequency of medical care visits and poorer health among the elderly (Musil, Ahmad 2002). However, some studies believe that intergenerational care behavior can not only improve the physical and mental health of the elderly, but also improve the life satisfaction of the elderly (Ku et al. 2013). The interaction between grandparents and grandchildren in cross-generational care can not only reinvigorate the instinct of the elderly

to teach the new generation and enrich their later life (Goodfellow, Laverty 2003), but also promote the elderly to maintain good cognitive function (Balukonis et al. 2008) , which should play a positive role in promoting the health effect of the elderly. In addition, a few studies believe that intergenerational care has no significant impact on the health effects of elderly (Reinkowski 2013).

With the deepening of intergenerational care behavior research, scholars have paid more attention to the impact of intergenerational support, care intensity, cultural background, gender, age, marital status and other factors on intergenerational care. Recent research evidence shows that the intensity and participation rate of intergenerational care vary by country (Kim et al. 2017). Research by Ko and Hank (2014) shows that although China and South Korea are located in the same East Asian cultural circle, due to the influence of different traditional Confucian culture, the proportion of intergenerational care for the elderly in China is as high as 58%, while that in South Korea is only 6%. In sixteen European countries with different cultural backgrounds such as Poland and France, there are significant differences in the effect of intergenerational care on depressive symptoms in the elderly (Bordone, Arpino 2019). Research based on SHARE data shows that intergenerational care behavior is relatively common in Northern European countries such as Denmark and Sweden, while it is relatively rare in Southern European countries such as Spain and Italy (Igel, Szydlik 2011). Similar to China, Poland is a country with a deep-rooted culture of family care, and the phenomenon of grandparents taking care of grandchildren across-generations is also very common. However, unlike China, Poland has a relatively high coverage rate of formal childcare institutions, and the availability of childcare is relatively easy. Therefore, the frequency and intensity of grandparents' intergenerational care for grandchildren are generally low.

In a narrow sense, intergenerational support considers that economic or non-economic resources flow two-way between children and parents within the family, so intergenerational support has an impact on intergenerational care for the elderly. Research shows that intergenerational care can significantly enhance the intergenerational support of adult children to their parents and contribute to improve the health status of the elderly (Leder et al. 2007). However, intergenerational support of adult children to their parents may also generate greater intergenerational conflicts (Tao et al. 2018). With the accumulation of intergenerational care time, the impact of care intensity on the health of the elderly has a nonlinear relationship. Appropriate care intensity is conducive to improving the health level of the elderly (Han, Wang 2019), and high-intensity care shows a significant improvement in the cognitive function of grandfathers, but there is a risk of damage to grandmothers (Song et al. 2013). It can be seen that there are gender differences in the cognitive function of intergenerational care for the elderly. Moreover, there are age heterogeneity (Chen, Sun 2019) and urban-rural heterogeneity (Wu 2018) on the impact of intergenerational care on the physical health of elderly.

Although the above studies are valuable and enlightening, there is little literature on the impact of intergenerational care on the subjective well-being of the elderly, especially the research on the impact of intergenerational support on the subjective well-being of the elderly is still blank. Therefore, this paper attempts to explore the mechanism and logical connection of the impact of intergenerational care on the subjective well-being

of the elderly, and the mediating effect of intergenerational support on the impact of intergenerational care on the subjective well-being of the elderly. Based on this, this paper may make breakthroughs in the following three aspects. Firstly, it analyzes the impact and heterogeneity of intergenerational care on the subjective well-being of the elderly. Secondly, it discusses the impact of intergenerational support on subjective well-being of the elderly. Third, explore whether there is a causal relationship between intergenerational care, intergenerational support and subjective well-being of the elderly.

Theoretical Analysis and Research Hypothesis

There are two competing theories about intergenerational care behavior and health effects of the elderly, namely role tension theory (Goode 1960) and role promotion theory (Sieber 1974). Role tension theory assumes that individuals are in a state of psychological discomfort due to conflicts in the allocation of time, place, energy, and obligations in multiple role-playing. Intergenerational care not only consumes the time and energy of self-care for the elderly and reduces the opportunities for health management and medical treatment (Chen, Sun 2019), but also makes the elderly endure the dual pressure of physiological and psychological, which has a negative impact on their daily activities, self-assessed health status and mental health (Xiao 2017). Therefore, the role tension theory proposes that intergenerational care has a negative impact on the health effect of the elderly, which is not conducive to improve the subjective well-being of the elderly. Contrary to this view, the role promotion theory assumes that individuals gain family and social recognition due to role cognition in multiple role-playing, and these positive incentives can resist the risk of role tension caused by role conflict. Therefore, the role promotion theory believes that intergenerational care plays a positive role in the health effect and contributes to enhance the subjective well-being of the elderly. Based on the above two competitive theories, it is not difficult to find that the impact of intergenerational care on the subjective well-being of the elderly depends on the importance of the two theoretical effects. In fact, in the context of "4-2-1" family structure in China, grandfathers and grandmothers take care of grandchildren together, and intergenerational care has no significant inhibitory effect on the ability of daily activities and self-evaluated health status of the elderly. On the contrary, intergenerational care enables the elderly to obtain more social resources and intergenerational support, enhance the cognition of social roles and promote the harmonious coexistence of families. Therefore, this paper proposes *hypothesis 1*.

H_1*: According to the role theory, intergenerational care can significantly improve the subjective well-being of the elderly.*

According to the two competing role theories, the effect of intergenerational care on the subjective well-being of the elderly depends on which of the two theoretical effects is more important. As the age of the elderly increases, the marginal utility of the role promotion theory of intergenerational care on the subjective well-being of the elderly decreases gradually, and the marginal utility of the role tension theory increases continuously. It is speculated that the influence of age on the subjective well-being of the elderly is nonlinear. When the age of the elderly is below the nonlinear inflection point, intergenerational care

promotes the subjective well-being of the elderly. However, once beyond the inflection point, intergenerational care has an inhibitory effect on the subjective well-being of the elderly, and the marginal utility of inhibition increases gradually with age. Therefore, the total effect of age on the subjective well-being of the elderly shows a nonlinear relationship of first promotion and then inhibition, which accorded with the characteristics of inverted U-shaped curve. Therefore, this paper proposes *hypothesis 2*.

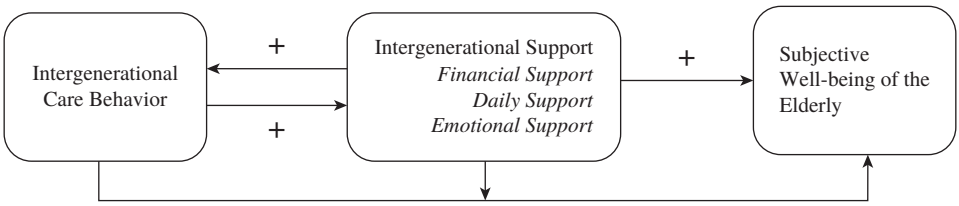
hangfromH_2: There is age heterogeneity on the impact of intergenerational care on the subjective well-being of the elderly, and the relationship between the age of the elderly and the subjective well-being is an inverted U-shaped curve.

Studies have found that intergenerational care can significantly promote the labor participation of adult children, and can also improve adult children's work engagement (Dimova, Wolff 2011). Therefore, it is speculated that intergenerational care behavior is conducive to improve the economic welfare of families. Fei (1983) believed that, different from the "relay model" in Western society, the parent-child relationship in China is a "feedback model" of two-way support and mutual benefit. The elderly help their adult children to take care of children, and adult children gratitude and feedback to their parents in the form of intergenerational support such as financial, labor and emotional support. Thus, intergenerational care enhances the intergenerational support of adult children to their parents. Studies has confirmed that providing financial assistance, daily care and emotional care to parents by adult children has an important protective effect on the physical health of the elderly (Cong, Silverstein 2008), which contributes to alleviate the psychological pressure of intergenerational care and improve the subjective well-being of the elderly. It can be seen that intergenerational support plays a mediating role between intergenerational care and subjective well-being of the elderly. Therefore, this paper proposes *hypothesis 3*:

hangfromH_3: Intergenerational support has a mediating effect on the impact of intergenerational care on the subjective well-being of the elderly.

Figure 1

Research Framework of the Logical Relationship between Intergenerational Care, Intergenerational Support and the subjective Well-being of the Elderly



Model Setting and Data Sources

Ordinary Ordered Probit Model

This paper focuses on the impact of intergenerational care and intergenerational support on the subjective well-being of the elderly. We use the Chinese General Social Survey (CGSS)

database to measure the subjective well-being "*Always, do you think your life is happy or not*". The value of subjective well-being (*happiness*) is 1–5, where "*Very unhappy = 1, Relatively unhappy = 2, Not happy or not = 3, Relatively happy = 4, Very happy = 5*". The higher the assignment, the stronger the subjective perceived well-being of the elderly.

Since the explained variable *happiness* in this study is ordered data, OLS estimation is not applicable at this time. Therefore, this paper adopts the ordered probit model widely used in the literature for estimate. The model was first proposed by McKelvey and Zavioina. As an extension of probit model, it specially deals with the case that the explanatory variable is ordered data (McKelvey, Zavoina 1975). The basic model of this paper is as follows.

$$happiness_i = \beta care_i + \gamma support_i + \theta X_i + \varepsilon_i$$

Among them, $happiness_i$ represents the explained variable, $care_i$ represents the explanatory variable, $support_i$ represents intergenerational support, and X_i represents the control variable. β, γ are the parameters to be estimated, ε_i is the error term.

Mediating Effect Model

Intergenerational support enhances the two-way circulation between adult children and parents within the family, and affects the participation rate of intergenerational care behavior of the elderly. Therefore, intergenerational support has a mediating effect on the impact of intergenerational care on the subjective well-being of the elderly. Based on this, this paper constructs a mediating effect model of intergenerational care, intergenerational support and subjective well-being of the elderly. The mediation effect model is as follows.

$$\begin{aligned} happiness_i &= \alpha + \beta care_i + \theta X_i + \varepsilon_i \\ support_i &= \alpha + \beta care_i + \theta X_i + \varepsilon_i \\ happiness_i &= \alpha + \beta care_i + \gamma support_i + \theta X_i + \varepsilon_i \\ X_i &= \lambda_1 age_i + \lambda_2 age_i^2 + \lambda_3 health_i + \lambda_4 marry_i \lambda_5 live_i + \lambda_6 insurance_i \end{aligned}$$

Variable Selection and Measurement Method

Explained variable: Subjective well-being of the elderly (*happiness*). Subjective well-being is the overall emotional and cognitive evaluation of the elderly on their own quality of life. The survey question of subjective well-being in Chinese General Social Survey (CGSS) (2017) is "*Always, do you think your life is happy*?", and the alternative is "*Very unhappy = 1, Relatively unhappy=2, Not happy or not = 3, Relatively happiness = 4, Very happy = 5*". The higher the assignment, the stronger the subjective well-being of the elderly.

Explanatory variable: Intergenerational care (*care*). Generally, the academic community defines the intergenerational care as the behavior of the elderly to care and raise their grandchildren. The question about intergenerational care in the questionnaire is "*In the past year, did you often help to take care of children for your adult children*", and the alternative is "*Very often = 4, Often = 3, Sometimes = 2, Rarely = 1, None at all = 0*". The higher the assignment, the more frequently the elderly provide intergenerational care.

Mediating variable: Intergenerational support (*support*). Generally speaking, intergenerational support includes financial support (*finsup*), daily support (*daisup*) and emotional support (*emosup*). The three questions about intergenerational support in the questionnaire are "*In the past year, did adult children often provide you with ① Money, ② Do housework, ③ Listening to your thoughts or ideas*", and the alternative is "*Very often = 4, Often = 3, Sometimes = 2, Rarely = 1, None at all = 0*". The higher the assignment, the better the adult children's intergenerational support to their parents.

Control variables: In order to avoid estimation errors caused by omission of variables according to the influencing factors of existing research on intergenerational care behavior, this paper selects micro-individual characteristic variables, including *age*, *sex*, *marry*, *health*, *economic*, *insurance* and *living with children*. Considering that the intergenerational care squeezes a lot of time and energy for the elderly, the marginal utility of intergenerational care on the promotion of subjective well-being of the elderly shows a decreasing trend with the increase of age. Therefore, this paper introduces the age square term (age^2) to investigate the age heterogeneity of the impact of intergenerational care on the subjective well-being of the elderly.

Data Sources

The data of this paper comes from the micro database of Chinese General Social Survey (CGSS) in 2017, which is considered to be recognized authoritative database for studying subjective well-being and financial behavior (Shi, Yi 2020). The Chinese General Social Survey (CGSS) is the first nationwide, comprehensive and continuous large-scale social survey project in China. The project started in 2003, systematically and comprehensively collects micro data of different levels such as society, community, family and individual. So far, it has released data for 10 times to the public. Based on the micro data of Chinese General Social Survey (CGSS) in 2017, a random sampling survey was conducted to investigate the demographic characteristics, social perception and internet behavior of the respondents from 28 provinces (*excluding Tibet Autonomous Region, Xinjiang Autonomous Region, Hainan Province and Hong Kong, Macao and Taiwan Regions*). A total of 12582 valid samples were collected, with wide geographical representation. Since the research object is the elderly participating in intergenerational care, the sample data of the respondents under the age of 45 were excluded, and the invalid data such as "*refuse to answer*", "*not applicable*" and "*don't know*" in the questionnaire were deleted. After comprehensive processing, 2371 valid sample data were obtained, which can basically meet the research needs.

Econometric Regression and Result Analysis

Benchmark Regression Results

Generally speaking, in order to avoid errors in estimation results caused by multicollinearity problems, multicollinearity tests should be carried out on each variable before regression analysis to observe the correlation between each variable. Through the correlation analysis,

it is found that the correlation coefficients among all variables are lower than 0.5, and it is preliminarily judged that the model did not have multicollinearity. Then, continue to use the variance expansion factor test, and find that the average value of VIF is 1.21, and all VIF are lower than 1.5, which further confirms that the model does not have serious multicollinearity problems.

The Effect of Intergenerational Care on the Subjective Well-being of the Elderly

Column (1)–(2) of Table 1 reports the estimated results of the impact of intergenerational care on the subjective well-being of the elderly. The results of model (1) show that the regression coefficient of the impact of intergenerational care on the subjective well-being of the elderly is significantly positive, indicating that intergenerational care contribute to improve the subjective well-being of the elderly. Research hypothesis 1 is verified. Without considering endogeneity, intergenerational care increased by 1%, and the subjective well-being of the elderly increased by 2.7%, which was significant at the statistical level of 10%. After introducing the control variables, the results of model (2) show that intergenerational care improves the subjective well-being of the elderly by 3.1%, which is statistically significant the level of 10%. Thus, it can be seen that by introducing control variables on the basis of model (1), intergenerational care is more conducive to improve the subjective well-being of the elderly. The reason may be that there may be endogenous problems such as reverse causality or missing variables between intergenerational care and subjective well-being of the elderly, resulting in the negative correlation between random disturbance term and explanatory variables, resulting in the underestimated estimation coefficient of explanatory variables in model (1). This conclusion is consistent with that of Goodman and Silverstein (2002), and the reasons behind it can be explained from two aspects. Firstly, based on traditional Chinese Confucian culture, grandparents obtain value recognition and role promotion during intergenerational care, which has a positive effect on their physical and mental health, and improves the subjective well-being of the elderly, which is in line with the theoretical hypothesis of role promotion. Secondly, the interaction between grandparents and grandchildren during intergenerational care can make up for the lack of emotional support for their adult children, obtain more intergenerational support and emotional care, enhance social cognition and improve the happiness index of the elderly.

From the control variables, the influence of age on subjective well-being of the elderly shows an inverted U-shaped curve. This is basically consistent with the existing research conclusions. Positive age perception helps improve cognitive function, mental health and subjective well-being of the elderly (Shrira et al. 2016). On the contrary, the elderly with negative age perception have poor physical and mental health, cognitive function deterioration, and are prone to anxiety and depression, and their subjective well-being is generally low (Jose, Cherayi 2017). Marriage has a positive effect on the subjective well-being of the elderly and conducive to improve the subjective well-being of the elderly. The regression coefficient of the impact of social insurance on subjective well-being of the elderly is significantly positive, which indicates that social security can significantly enhance the security and subjective well-being of the elderly. The influence of health status and financial level on the subjective well-being of the elderly both shows a positive

role, which is basically consistent with the objective facts. The estimated coefficient of the impact of living with children on the subjective well-being of the elderly is negative, but it is not statistically significant. Although living with children may enhance the emotional communication between adult children and their parents, it may also bring more intergenerational contradictions (Song et al. 2013). On the one hand, the elderly who live with their children usually interfere with the lives of adult children in the role of elders, which is easy to intensify intergenerational contradictions and reduce the subjective well-being of the elderly. On the other hand, living with children can enhance communication between parents and adult children, promote family harmony, enhance intergenerational support among family members, and improve the subjective well-being of the elderly.

The Influence of Intergenerational Support on the Subjective Well-being of the Elderly

The regression results of the impact of intergenerational support on the subjective well-being of the elderly are reported in columns (3)–(4) of Table 1. Model (3) estimates show

Table 1

Estimated Results of the Impact of Intergenerational Care and Intergenerational Support on the Subjective Well-being of the Elderly

Variable	*Model* (1)	*Model* (2)	*Model* (3)	*Model* (4)	*Model* (5)	*Model* (6)
care	0.027*	0.031*			0.002	0.011
	(0.016)	(0.019)			(0.017)	(0.019)
age		0.063***		0.062***		0.061***
		(0.024)		(0.024)		(0.024)
$age^2/100$		−0.035*		−0.035*		−0.033*
		(0.019)		(0.018)		(0.019)
marry		0.096*		0.108*		0.106*
		(0.058)		(0.060)		(0.060)
health		0.267***		0.269***		0.268***
		(0.023)		(0.025)		(0.025)
economic		0.371***		0.365***		0.365***
		(0.028)		(0.029)		(0.029)
insurance		0.220**		0.211**		0.210**
		(0.092)		(0.093)		(0.093)
live		−0.028		−0.035		−0.046
		(0.056)		(0.053)		(0.056)
finsup			0.033*	0.037*	0.033*	0.036*
			(0.020)	(0.022)	(0.020)	(0.022)
daisup			0.031	0.027	0.030	0.025
			(0.023)	(0.026)	(0.023)	(0.026)
emosup			0.110***	0.091***	0.110***	0.090***
			(0.061)	(0.027)	(0.026)	(0.027)
Obs	2371	2371	2371	2371	2371	2371
R-squared	0.001	0.081	0.008	0.086	0.008	0.086
Wald test	2.53	386.57	37.81	443.50	37.88	443.32
Log likelihood	−2751.805	−2531.236	−2731.650	−2517.179	−2731.645	−2517.030

*Note: ***, ** and * represent statistically significant at the level of 1%, 5% and 10% respectively; the regression coefficients in brackets are robust standard errors.*

that financial support and emotional support have a significantly positive impact on the subjective well-being of the elderly. Although the estimation coefficient of daily support is positive, it is not statistically significant. After introducing the control variables, the estimation coefficient of the impact of financial support on the subjective well-being of the elderly in model (4) increased slightly, while the estimated coefficient of emotional support decreased significantly, and there was no significant difference in the level of significance. Judging from the estimated coefficients, emotional support has a greater contribution to the marginal utility of the elderly's subjective well-being than financial support. With the accelerating of aging society in China, the scale of the elderly living alone or empty-nesters is growing rapidly. The lonely and desolate elderly are more eager to get the emotional care of their adult children. Therefore, the emotional care of "often go home" can significantly improve the subjective well-being of the elderly than financial support.

Columns (5)–(6) of Table 1 shows the regression results of the impact of intergenerational care including intergenerational support on the subjective well-being of the elderly. The results show that the impact of financial support and emotional support on the subjective well-being of the elderly are still statistically significant and positive, but the estimated coefficient of the impact of intergenerational care on the subjective well-being of the elderly is positive and statistically insignificant. Comparing with the regression results of models (5)–(6), it is found that the estimated coefficient and significance of the impact of intergenerational support on the subjective well-being of the elderly are close to the same, but the estimated coefficient of the impact of intergenerational care on the subjective well-being of the elderly is significantly improved, and it is not statistically significant. Therefore, it is speculated that intergenerational support plays an intermediary role in the impact of intergenerational care on the subjective well-being of the elderly, which needs to be further tested below.

Heterogeneity Analysis

Gender Heterogeneity

According to the comparative advantage theory of family economics, women have a comparative advantage in family division of labor. Therefore, the female elderly are more likely to take care of children in the family division of labor. Based on this, this paper attempts to analyze the gender differences in the effect of intergenerational care on the subjective well-being of the elderly. Columns (1)–(2) of Table 2 report the estimated results of the impact of intergenerational care on the subjective well-being of the elderly of different genders. The study found that intergenerational care has a greater impact on the subjective well-being of the female elderly, but it was not statistically significant. Due to the influence of traditional Confucian culture, Chinese original families pay more attention to the intergenerational exchange among family members. Therefore, child care is usually mainly undertaken by family members. However, when families face the dual choice of personal care and intergenerational care, according to the principle of maximizing family interests, most of them will choose the elderly to undertake the burden of caring for children.

Therefore, the participation of the elderly in caring for children may be the limitation of the actual conditions of adult children, or the bondage of the traditional Confucian culture of "having to help." Of course, there may also be some special reasons (*death of adult children, divorce, illness, imprisonment etc.*) that lead to the involuntary assumption of intergenerational care responsibilities by the elderly. Therefore, from the perspective of gender, intergenerational care has no significant effect on the subjective well-being of the elderly, which is basically consistent with social facts.

Age Heterogeneity

As we all know, intergenerational care not only squeezes the leisure time of the elderly, but also consumes a lot of physical and energy. Therefore, the older the elderly, the more difficult it is to take on the responsibility of caring for their grandchildren. So, is there age heterogeneity in the effect of intergenerational care on the subjective well-being of the elderly? Based on this, this paper divides the age of the elderly into 45–59 years old (old_1) and over 60 years old (old_2) for heterogeneity analysis. The regression results are shown in columns (3)–(4) of Table 2. The impact of intergenerational care on the subjective well-being of the "younger" elderly is significantly positive at the statistical level of 10%, but the estimated coefficient of the impact on the subjective well-being of the "older" elderly is low and statistically insignificant. The results show that there is age heterogeneity in the impact of intergenerational care on the subjective well-being of the elderly. Further research found that in the "older" elderly over 60 years old, the impact of age on the subjective well-being of the elderly showed an inverted U-shaped curve, which was significant at the statistical level of 1%. It shows that the inhibition effect of intergenerational care on the subjective well-being of the "older" elderly increases gradually with the increase of age. Research hypothesis 2 is verified.

Income Heterogeneity

According to the respondents' subjective perception of their own financial status, the respondents will select "middle and lower" and "lower" as the low-income group, and "middle," "middle and upper" and "upper" are as the high-income group. Columns (5)–(6) of Table 2 report the regression results of the impact of intergenerational care on the subjective well-being of the elderly with different incomes. The estimation shows that the impact of intergenerational care on the subjective well-being of low-income elderly is significantly positive at the statistical level of 5%, while the estimation coefficient of the impact on the subjective well-being of high-income elderly is negative and not significant. It shows that the participation of low-income elderly in intergenerational care conduce to improve the subjective well-being of the elderly, while high-income does not. Therefore, there is income heterogeneity in the impact of intergenerational care on the subjective well-being of the elderly. With the introduction of the "Comprehensive three-child" policy, the market demand for child care of newborn families has increased sharply. However, the existing childcare institutions are insufficiency, the childcare mechanism is imperfect, and the childcare services are imperfect. As a result, intergenerational care will become

the main way of child care for newborn families in China. Due to the opportunity cost of child care, the low-income elderly are more likely to voluntarily choose to assume the responsibility of intergenerational care, so as to improve the effective supply of adult children's labor participation and improve the family's economic income level. Therefore, intergenerational care has a significant positive effect on the subjective well-being of low-income elderly. However, providing intergenerational care in order to improve the family's economic interests is not in line with the choice preference of high-income elderly. In fact, providing intergenerational care for high-income elderly may be constrained by traditional Confucianism that "have to help" or limited by some special reasons, and most of which are involuntary behaviors. Therefore, it is reasonable to find that intergenerational care has no significant effect on the subjective well-being of high-income elderly.

Table 2

Heterogeneity Analysis Results of the Impact of Intergenerational Care on the Subjective Well-being of the Elderly

Variable	*Sex*		*Age*		*Income*	
	(1)	(2)	(3)	(4)	(5)	(6)
	male	*female*	old_1	old_2	*low*	*high*
care	0.012	0.034	0.058*	0.014	0.047**	–0.003
	(0.030)	(0.025)	(0.030)	(0.025)	(0.024)	(0.032)
age	0.041	0.085***	–0.131	0.226***	0.061**	0.076*
	(0.033)	(0.033)	(0.226)	(0.072)	(0.029)	(0.041)
$age^2/100$	–0.018	–0.050*	0.145	–0.147***	–0.035	–0.042
	(0.026)	(0.026)	(0.217)	(0.050)	(0.023)	(0.032)
marry	0.165*	0.083	0.177	0.071	0.078	0.120
	(0.092)	(0.080)	(0.111)	(0.070)	(0.072)	(0.104)
health	0.240***	0.304***	0.278***	0.261***	0.268***	0.265 ***
	(0.037)	(0.034)	(0.039)	(0.033)	(0.031)	(0.043)
economic	0.361***	0.375***	0.335***	0.401***	0.434***	0.369***
	(0.042)	(0.040)	(0.044)	(0.038)	(0.060)	(0.118)
insurance	0.343**	0.140	0.171	0.270**	0.331***	–0.057
	(0.147)	(0.116)	(0.131)	(0.130)	(0.108)	(0.172)
live	0.037	–0.081	–0.095	0.017	–0.017	–0.045
	(0.080)	(0.075)	(0.080)	(0.075)	(0.070)	(0.088)
Obs	1075	1296	1027	1344	1473	898
R-squared	0.075	0.089	0.078	0.082	0.056	0.045
Wald test	173.51	219.01	154.45	235.41	176.54	70.89
Log likelihood	–1160.484	–1364.073	–1094.144	–1429.671	–1699.058	–823.323

*Note: ***, ** and * represent statistically significant at the level of 1%, 5% and 10% respectively; the regression coefficients in brackets are robust standard errors.*

Endogeneity and Instrumental Variables

Although the estimation results of the above models have confirmed that intergenerational care can improve the subjective well-being of the elderly, it is still possible that the estimation results may be biased due to problems such as endogenous or missing variables. The endogeneity of intergenerational care may originate from two aspects. First, there may

be a reverse causal relationship between intergenerational care and happiness. On the one hand, Intergenerational care contribute to enhance the intergenerational bond between adult children and their parents (Cong, Silverstein 2012), and improve the sense of happiness and gain of the elderly. On the other hand, the higher the perceived happiness index of the elderly, the more willing they are to take the initiative to take care of their grandchildren. Therefore, there may be a reverse causality relationship between intergenerational care and well-being, leading to biased estimation results. Second, the subjective well-being of the elderly may be related to many factors that are difficult to observe, such as environmental factors, human factors and economic conditions, and these factors that cannot be observed directly may cause biased estimation results due to the omission of variables. In a word, whether it is reverse causality or missing variables, it may lead to errors in the model estimation results, but the direction of bias is uncertain.

For the endogenous problems of intergenerational care caused by reverse causality and missing variables, the instrumental variable (*IV*) method (Compton, Pollak 2014) or simultaneous equation model (Dimova, Wolff 2011) are usually used to solve them. The existing foreign literatures usually use the geographical distance of grandparents living (Compton, Pollak 2014), whether grandparents are alive (Boca 2002), and whether they live with grandparents (Ogawa, Ermisch 1996) as instrumental variables for intergenerational care. Based on the availability of data from Chinese General Social Survey, this paper selects "children's gender preference" as an instrumental variable (*preference*) for intergenerational care. The question about "children's gender preference" in the questionnaire is "*If you could only have one child, would you prefer it to be a boy or a girl*", and the alternative is "*Boy = 1, Girl = 0*". First of all, from the perspective of exogenous, there is no correlation between the gender preference of children and other factors that may affect the subjective well-being of the elderly, which meets the exogenous conditions. Secondly, according to the data of "*China Family Development Report 2015*", about 32.4% of children aged 0–5 are provided daily life care by their grandparents, and only 5.6% are provided by their maternal grandparents. It is speculated that the male preference of the elderly is positively correlated with the willingness to participate in intergenerational care. From the perspective of correlation, the gender preference of children is directly related to whether the elderly need to participate in intergenerational care, which meets the requirements of the correlation between instrumental variables and endogenous variables.

It should be noted that instrumental variable laws such as two-stage least squares (*2SLS*) will fail when both the explained variable and the explanatory variable are ordered data (Angrist 2001). In recent years, econometricians have begun to pay attention to this issue. Among them, the bivariate ordered probit model proposed by Sajaia (2008), compared with the two-stage estimation method and the two-stage least squares method, uses the complete information maximum likelihood method to estimate and Monte Carlo simulation method estimates better results, and this method has been widely recognized and used in academia (Russo 2012; Hyll, Schneider 2013). Columns 1–4 of Table 3 report the two-stage results of bivariate ordered probit model regression with children's gender preference as the instrumental variable of intergenerational care.

It can be seen from Table 3 that the estimation coefficient of the auxiliary parameter atanhrho of endogenous test is significant at the statistical level of 5%, rejecting the null

hypothesis that children's gender preference is an exogenous variable. From the first stage results in columns 1–4 of Table 3, it can be found that the impact of children's gender preference on intergenerational care behavior is significantly positive, which is in line with the previous analysis. The estimated results of the control variables are consistent with the above research conclusions. On the basis of controlling endogeneity, the estimation coefficient of intergenerational care is significantly positive at the statistical level of 1%, indicating that intergenerational care significantly improves the subjective well-being of the elderly.

Generally, the robustness test is carried out by replacing the core explanatory variables or different statistical methods. Based on this, this paper uses different statistical methods for robustness test. Since the ordered pobit estimation method is used for regression analysis above, ordered logit and OLS estimation methods are respectively used for regression analysis below. By comparing the sign, size and significance of the estimation coefficients of the main explanatory variables, the robustness of the model can be judged. Columns (5)–(6) of Table 3 respectively report the regression results using ordered logit and OLS estimation methods. First of all, from the perspective of significance, the two estimation

Table 3

IV Oprobit Instrumental Variable Estimation and Robustness Test

Variable	*IV-Oprobit (CMP)*				*Robustness Test*	
	Phase 1	*Phase 2*	*Phase 1*	*Phase 2*	*OLogit*	*OLS*
care		0.071***		0.071***	0.193**	0.087***
		(0.027)		(0.027)	(0.083)	(0.033)
preference	0.198***		0.207***			
	(0.056)		(0.060)			
age		0.066***	0.068**	0.062**	0.118***	0.050***
		(0.024)	(0.030)	(0.024)	(0.041)	(0.017)
age^2/100		−0.037*	−0.065***	−0.033*	−0.066**	−0.029**
		(0.019)	(0.023)	(0.019)	(0.032)	(0.013)
marry		0.108*	0.234***	0.097*	0.228**	0.104**
		(0.058)	(0.073)	(0.058)	(0.108)	(0.043)
health		0.268***	0.105***	0.263***	0.489***	0.198***
		(0.023)	(0.029)	(0.023)	(0.046)	(0.018)
economic		0.367***	0.014	0.367***	0.646***	0.261***
		(0.028)	(0.035)	(0.028)	(0.053)	(0.020)
insurance		0.237***	0.178	0.227**	0.419**	0.201***
		(0.092)	(0.115)	(0.092)	(0.167)	(0.072)
live		−0.032	0.971***	−0.072	−0.006	0.016
		(0.056)	(0.079)	(0.060)	(0.091)	(0.036)
_cons	0.548***		−2.043**			0.363
	(0.040)		(0.982)			(0.551)
Obs	2355		2355		2355	2355
atanhrho	−0.096**		−0.097**			
	(0.047)		(0.047)			
Wald chi2	433.52		668.77		364.37	
R-squared						0.176

*Note: ***, ** and * represent statistically significant at the level of 1%, 5% and 10% respectively.*

results of the impact of intergenerational care on the subjective well-being of the elderly are both significantly positive at the statistical level of 5%, indicating that intergenerational care contributes to enhance the subjective well-being of the elderly. Secondly, in terms of estimated coefficients, the estimated coefficients of ordered probit are slightly lower than those of ordered logit and OLS, and the there is little difference. Therefore, no matter which estimation method is used, the estimation coefficients and significance of the main explanatory variables in the model tend to be consistent, indicating that the model is robust.

Mediating Effect Test

In fact, this paper contains three mediating variables, financial support, daily support and emotional support. While Sobel test can only test the mediating effect of a single mediating variable. Therefore, this paper needs to use the structural equation model (*SEM*) to test the mediating effect. The results show that the direct effect estimation coefficient of intergenerational care on the subjective well-being of the elderly is 0.005, but it is not significant at the statistical level (−0.021, 0.031). The estimated coefficient of the indirect effect of intergenerational support on the subjective well-being of the elderly in intergenerational care is 0.020, which is significant at the statistical level of 1% (0.013, 0.028). From the perspective of mediating variables, daily support (−0.005, 0.067) and financial support (0.040, 0.119) play a significant mediating role in the impact of intergenerational care on the subjective well-being of the elderly, with the mediating effects of 0.031 and 0.080 respectively, while the mediating effect of financial support (−0.010, 0.052) is not significant.

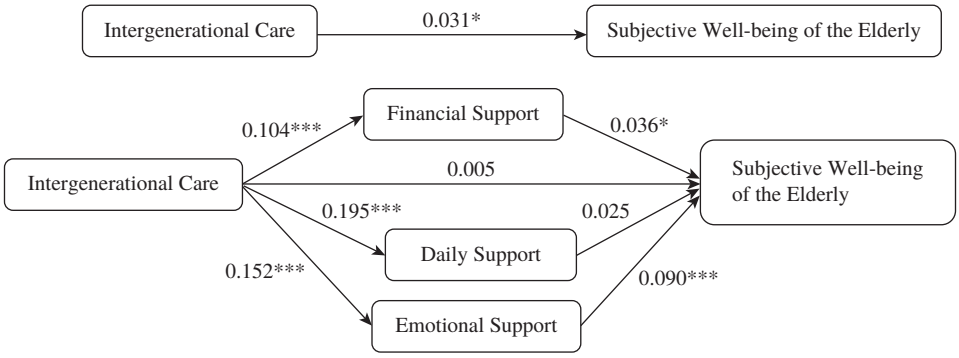
Column 2 of Table 1 reports the regression results of the model without intergenerational support mediators when other variables are controlled. The results show that the impact of intergenerational care on the subjective well-being of the elderly is significantly positive at the statistical level of 10% ($\beta = 0.031$, $p = 0.096$). For further analysis, three mediating variables of financial support, daily support and emotional support are introduced into the mediating effect model at the same time to test the mediating effect of intergenerational support on the impact of intergenerational care on the subjective well-being of the elderly, as shown in Figure 2. The study found that intergenerational care and financial support ($\beta = 0.104$, $p = 0.000$), daily support ($\beta = 0.195$, $p = 0.000$) and emotional support ($\beta = 0.152$, $p = 0.000$) are significantly positive at the statistical level of 1%, indicating that the elderly in intergenerational care receive the financial, daily and emotional support from their adult children. As mediating variables, financial support ($\beta = 0.036$, $p = 0.085$), emotional support ($\beta = 0.090$, $p = 0.001$) and the subjective well-being of the elderly are significantly positive at the statistical level of 10%, while daily support ($\beta = 0.025$, $p = 0.305$) is not statistically significant. Research shows that adult children provide financial security and emotional care to the elderly who participate in intergenerational care, which conduce to improve the subjective well-being of the elderly.

The mediating effect test results show that financial support and emotional support have a complete mediating effect on the impact of intergenerational care on the subjective well-being of the elderly, while daily support has no mediating effect. It can be seen that intergenerational care plays an intermediary role on the subjective well-being of the elderly

through two paths of financial support and emotional support, that is, intergenerational support has a partial mediating effect on the impact of intergenerational care on the subjective well-being of the elderly. Research hypothesis 3 was verified. Then, from the perspective of intermediary effect, the direct effect is 0.005, the indirect effect is 0.020, and the total effect is 0.025. Therefore, the proportion of partial mediating effect in the total effect is 80%.

Figure 2

Mediating Effect Path of Intergenerational Care, Intergenerational Support and the Subjective Well-being of the Elderly



Conclusions and Suggestions

Research Conclusion

With the deepening of population aging, how to achieve a sense of security and fulfillment for the elderly, and to make the sense of happiness and gain of the elderly more substantial, is an important issue of livelihood during the period of the "14th Five-Year Plan" in China. The report of the 19th National Congress of the Communist Party of China put forward that "the main social contradiction in China has been transformed into the contradiction between the people's growing needs for a better life and unbalanced and insufficient development." How to solve the contradiction between the people's growing child care needs for child care and the unbalanced and insufficient care resources, and realize children's care and education is also a practical problem to be solved urgently. Based on this, using the micro data of Chinese General Social Survey (CGSS) in 2017, this paper empirically analyzes the causal relationship and heterogeneity between intergenerational care, intergenerational support and the subjective well-being of the elderly, and further tests the mediating effect of intergenerational support on the impact of intergenerational care on the subjective well-being of the elderly. Based on this research, the following conclusions are drawn. First, intergenerational care can significantly enhance the subjective well-being of the elderly, and there is heterogeneity in age and income. Second, financial support and emotional support play a positive role in improve the subjective well-being of the elderly. Third, living with

children and receiving intergenerational support can contribute to improve the participation rate of intergenerational care for the elderly. Fourth, intergenerational support has some mediating effect on the impact of intergenerational care on the subjective well-being of the elderly.

Policy Recommendations and Future Research Directions

Based on the above research conclusions, the following suggestions are put forward. First of all, accelerate the construction of inclusive care service system, improve the policy mechanism of child care service, promote the professional and standardized development of infant care services, and improve the quality and level of childcare. Secondly, promote the coordinated development of the elderly care business and the elderly care industry, build an elderly care service system that is coordinated by home-based community institutions and combined with medical care and health care, improve the social elderly care service mechanism, and strengthen the supply of public welfare and basic elderly care services. Thirdly, establish and improve the policy mechanism of childcare, cultivate formal childcare institutions, expand the supply of infant care resources, reduce the psychological and mental pressure of the elderly to care for children, and improve the subjective well-being of the elderly. Fourth, carry forward the traditional virtues of filial piety and respect for the elderly, strengthen the intergenerational support of adult children to their parents, improve social role cognition, obtain more intergenerational support, and enhance the self-worth and identity of the elderly. Fifth, comprehensively weigh the "comprehensive three-child" and "delayed retirement" policies, pay attention to the matching between the policies, realize the care for the young and the support for the old, and give play to the synergistic integration effect of the dual policies.

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