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论文题目：Grandparenting and Child Academic Performance: Evidence from China Family Panel Survey

Grandparenting and Child Academic Performance: Evidence from China Family Panel Survey

祖辈抚养与孩子学业表现：来自 CFPS 的证据

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Abstract: In China, over half families have three generations living together, and approximately 20 percent of children are taken care mainly by their grandparents. This paper uses cross-sectional data from the China Family Panel Survey of 2018 to explore the relationship between grandparenting and child academic performance. The results suggest negative effects, mainly from channels such as reduced time spent at school, increased cellphone use and web surfing, as well as reduced communication with parents. We use various measures for grandparenting care and academic performance and consider possible channels in our OLS and IV regressions analyses. The outcome is largely robust.

Keywords: Grandparenting, Child Academic Performance, CFPS

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I. Introduction

Grandparenting has become an increasingly common phenomenon in the world, driven by two demographic trends. First, people are living longer. Global lifespan has increased from 51 to 72 since 1960, with significant rapid growth rate in the past few decades. Second, family size is shrinking. The global fertility rate has decreased from 5 to 2.4 over the same period. Both trends lead to a rising ratio of living grandparents to children, presenting greater opportunity for children to be taken care of by grandparents (The Economist, 2023). Grandparenting appears to be more common in the Chinese society. The strict one-child policy adopted for more than three decades since the late 1970s is likely the most eminent contributing factor. A couple used to be required to have at most one child, which led to the continuous spread of a 4-2-1 family structure and made grandparenting even more prominent than other parts of the world.

The increasing trend of grandparenting influences all family members. For grandparents, they sacrifice their leisure time for the possibly joyful accompaniment with their grandchildren. For parents, they gain more time for their job to achieve higher family income at the expense of witnessing the entire process of their children's growth. For children, their growth would inevitably be influenced by an elderly generation. In China and other East Asian countries, grandparenting is more prevalent than Europe and other parts of the world, since the cultural tradition encourages the three generations to live under the same roof. Meanwhile, with the modernization of our society, more and more women work outside their families, leaving their children and grandparents at home.

Although grandparenting is still a less studied topic, there are quite a few studies in China, some of which are focused on children's health. Gao (2021) used the 2018 dataset of the China Family Panel Studies (CFPS 2018), the same dataset used in this paper, to study the influence of intergenerational rearing (i.e., grandparenting) on children's health and concluded that grandparenting could significantly reduce children morbidity rate. Han

(2016) used its own survey data from 15 village-and-town primary and junior high schools in Baoji City, Shaanxi Province, to study the effect of grandparenting on rural children's loneliness and mental health. Compared with children raised by parents only or by parents and grandparents jointly, children raised only by grandparents (i.e., the "left behind" children) have higher incidence of loneliness and mental health problems.

The most related studies to this paper are those on children's learning and development. Hu and Ning (2020) used CFPS 2010 and 2014 to find that grandparenting appears to be a significant contributor to children's internet addiction. Tian and Zhou (2021) used CEPS 2014-15 to study the effect of intergeneration rearing on cognitive and non-cognitive ability of youngsters and found positive effects regarding cognitive ability but only mixed effects on non-cognitive ability. In an early research, Chen et al. (2000) used China Health and Nutrition Survey (CHNS, 1991) to find that the presence of grandparents in the household significantly reduces mother's involvement in childcare.

Finally, in a literature review, Shen (2023) undertook a meta-analysis on the empirical studies during the past two decades with respect to grandparenting in China and found that most of the existing studies focused on its negative impact on children's development, but the results may be impacted by concept and measure, urban-rural difference, meta-hypothesis, or respondents of the surveys (parents vs. grandparents).

This paper focuses on the multiple effects of grandparenting on children's academic performance. We use the 2018 dataset from the China Family Panel Studies (CFPS 2018), a nationwide social panel survey aimed at reflecting the changes in the Chinese society. We use Ordinary Least Squares (OLS) and Instrumental Variable (IV) methods for our analysis. We found that grandparenting has negative effects on children's academic performance by various measures such as entering elite school or class and academic score rankings among various cohorts. The negative effects mainly arise from various children behaviors such as reduced time spent at school, increased cellphone usage and web surfing

time, as well as decreased communication with parents. This paper represents the first attempt to systematically investigate the impact of grandparenting on children's academic performance, encompassing various measures of academic performance. Additionally, the paper also explores potential implications to children behavioral aspects, including study time, web surfing and family communication, as channels through which children's academic performance would be influenced.

This paper has important implications for governments to establish policies to encourage parental involvement in children's development, such as setting the minimum time required for parents to accompany their children or creating a more accommodating social security system for parents to raise their children (e.g., a longer maternity leave). For grandparents, policies may be taken to encourage more engagement in community activities in order to relieve grandparents' possible loneliness once released from grandparenting.

The paper is organized as follows: Section 2 gives an overview of the conceptual framework, followed by Section 3 for the econometric models and estimation methods, and Section 4 for the data and variables. Section 5 presents the analytical results and Section 6 draws the conclusion.

II. Conceptual Framework

In this section we have a brief discussion on how grandparenting affects children's academic performance. Grandparenting is a collective decision of family members, primarily between parents and grandparents. As with any other economic decision, both parents and grandparents face trade-offs when they consider whether to choose grandparenting.

On the demand side of grandparenting are parents. Grandparenting enables them to focus

on work for better living of the family, provides them with increased leisure time and alleviates their burden of household chores. However, on the flip side, they have less time to spend with their children, and the parent-child bond is weakened.

On the supply side are grandparents. They obtain happiness and companionship from living with their grandchildren, as well as the possible sense of fulfillment of the Chinese tradition of getting together with and supporting for the family succession. On the other hand, they may have to choose early retirement and shoulder heavy household chores.

A family's decision on grandparenting is dependent on the factors of both parents (the demand side) and grandparents (the supply side). Our conceptual framework is straightforward, which can deliver some interesting predictions. For example, families where parents have high-earning jobs or grandparents have low-earning jobs are more likely to adopt grandparenting. Families with more children may have an ambiguous likelihood of grandparenting. Lower supply from grandparents (due to higher burden) would result in a lower likelihood, while in contrast greater demand from parents would result in a higher one in turn.

Just like many other family decisions, grandparenting has its good as well as bad sides on children's academic performance. On the one hand, due to their distinct motivations and educational backgrounds on nurturing grandparents may spoil children and cultivate children's incorrect value systems such as preventing them to develop independent abilities. On the other hand, household income might increase, thus more money is available for children's education and development. This paper will dig into the CFPS national survey data to see what happens with grandparenting and through what channels.

Our hypothesis for the study is as follows:

H0 (null). Grandparenting would have positive or no effects on children's academic performance.

H1(alternative). Grandparenting would have negative effects on children's academic performance.

III. Econometric Models and Estimation Methods

Our empirical model uses OLS method for cross-sectional data. Panel data fixed effect model is not adopted for this study, since grandparenting is often long-lasting without much time variants. Even if it varies, the reasons for variation may come from family changes that can also affect the child's development. Unless natural experiments can be employed, the identification would not benefit from panel data.

Consider a child indexed i from family j, the regression equation is the following:

$$Y_{ij} = \alpha + \beta * Grandparenting_{ij} + \gamma_1 * X_{1,ij} + \gamma_2 * X_{2,j} + u_{ij} \tag{1}$$

Where Y_{ij} represents the academic performance of child i in family j. We also consider possible channels through which grandparenting may affect a child's academic performance, and Y_{ij} may also represent some "intermediate" variables regarding a child's study behavior or habit. For example, Y_{ij} may be a child's frequency of absentee from school, frequency of using cellphone, and so on. $Grandparenting_{ij}$ is the measure of whether family j asks its grandparents to take care of child i. Some measures for grandparenting may not allow us to distinguish different children within the family. For example, we use whether grandparents cohabit in the family as one measure to reflect whether grandparenting happens. In such cases the variables are reduced to $Grandparenting_j$ accordingly. $X_{1,ij}$ are control variables for individual characteristics of child i in family j, such as age, gender or "hukou". $X_{2,j}$ are control variables for family characteristics of family j where the child lives, including family size, family income, the situation of parents, and so on.

We also use IV method to identify the causality between grandparenting and children's academic performance. We use the number of living grandparents (either maternal or paternal) as the instrument variable for grandparenting. The number of living grandparents would highly likely affect the possibility of grandparenting by affecting the number of

caregiving "suppliers". It can be argued that the number of living grandparents would only affect children's academic performance through its direct effects on grandparenting. It may be possible, however, that the passing-away of grandparents may also change the behavior of parents, for instance, by lifting their burden of elderly care, which may in turn affect their inputs on childcare. But we still believe such "side effects" are minor compared with its direct effect on grandparenting. Especially in the context of China, where children are often considered the focal point of the family, parents tend to prioritize decisions related to their children. In practice, grandparents typically take care of their own well-being most of the time. In addition, illness or death cannot be foreseen and is deemed as exogenous shocks to the dynamics of grandparenting.

The first stage of IV regression is:

$$Grandparenting_{ij} = \alpha + \beta * num\_living\_grandparents_j + \gamma_1 * X_{1,ij} + \gamma_2 * X_{2,j} + u_{ij} \qquad (2)$$

Where $num\_living\_grandparents_j$ is the number of living grandparents. The second stage of IV is just replacing the predicted value from equation (2), i.e., $\widehat{Grandparenting}_{ij}$ for $Grandparenting_{ij}$ in equation (1).

IV. Data and Variables

IV.1 Data

The data used in this paper originates from the China Family Panel Studies (CFPS 2018), an extensive undertaking conducted by the China Social Science Survey Center of Peking University. It aims to provide insights into the multifaceted transformations taking place in Chinese society, economy, population, education and health status through panel surveys of representative villages, households and individuals across the country. The sample covers 25 provinces, municipalities and autonomous regions, with a sample size of approximately 14,000 households. So far, a total of 7 rounds of full sample surveys have been conducted spanning from 2010 to 2020 (i.e., 2010, 2011, 2012, 2014, 2016, 2018, 2020). This article utilizes data from the 2018 survey. We do not use the most recent survey conducted in 2020, as the COVID-19 pandemic during 2020-2022 may have greatly impacted family behaviors, making the survey possibly unable to reflect the normal situation with regard to grandparenting and children's academic life, among many other factors.

IV.2 Main Explanatory Variables: Grandparenting

Variables description is provided in Table A1. Two measures of grandparenting are used as key explanatory variables. The first is a dummy indicating whether grandparents are cohabiting in the same family with children ($home\_gdpt_j$). Although cohabiting in the family does not necessarily imply grandparenting, the variable has one advantage: it is more likely to be exogenous than direct behavioral variable of grandparenting. It can be argued that cohabitation of grandparents in the family may be due to reasons other than grandparenting, but it will likely lead to more or less grandparenting.

The health condition of grandparents cohabiting in the family can be a very important factor. On the one hand, ailing grandparents are unable to take care of their grandchildren well enough, even if they want to. On the other hand, or even worse, ailing grandparents themselves may need to be taken care of, reducing time available for parents to spend on

their children. In the robustness check, in addition to $home\_gdpt$, another explanatory variable, $illhome\_gdpt$, is included to capture this possible side-effect. $illhome\_gdpt$ is a dummy indicating whether an ailing grandparent is cohabiting at home.[1] We will show that for grandparents cohabiting at home, whether their health conditions would matter for caregiving to grandkids.

The second variable used is the direct measure of grandparenting. The variable is a dummy indicating whether the major caregivers are grandparents. CFPS uses separate questions to ask the primary caregivers whether to take care of the children during the day or at night. The two questions are aggregated in the variable $kidcare\_gdpt_{ij}$, which indicates whether the primary caregivers are grandparents either during the day or at night. We believe that daycare or night-care of children should be highly correlated, and each would have material enough impact on children.

Two measures of grandparenting (i.e., $home\_gdpt_j$ and $kidcare\_gdpt_{ij}$) are used to cross check the main OLS regression results. In addition, the number of living grandparents ($alive\_ngdpt_j$) is used as the instrumental variable for grandparenting.

IV.3 Main Dependent Variables: Child Academic Performance and Study Behaviors
The following three groups of variables are employed to gauge children's academic performance: (1) enrollment in elite schools or classes; (2) class ranking and grade ranking; (3) acting as a student cadre and participation in student clubs. In China, students compete for elite schools and/or elite classes, which represent a good indicator for academic performance, as only students who achieve outstanding results in screening exams can join them. As score ranking may only reflect academic performance relative to the cohort from the same school or class, enrollment in elite schools or classes thus presents an indispensable cross-sectional measure for academic performance. Students with

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[1] CFPS categorizes the self-reported health condition of a person as one of the five: "extremely healthy", "very healthy", "pretty healthy", "less healthy", "unhealthy", in addition to "unknown" option. In present analysis, we regard the first four categories as "healthy". The result is essentially the same if we regard the first three categories as "healthy".

outstanding academic performance are also more likely to be elected or appointed as student cadres. Participation in student clubs may also present a positive indicator of academic performance: students with strong academic records would typically receive greater support from parents or teachers for club activities.

To explore the channels of how grandparenting affect academic performance, various behavior-related measures are incorporated as dependent variables, which encompass whether to ask for a leave or be absent in the recent month, study time in weekdays and weekends, cellphone usage and whether to surf online with mobile devices, and the time spent on surfing. We also include a variable indicating who the children would talk to (parents or grandparents) when they feel unhappy.

IV.4 Control Variables

Various individual and family characteristic variables are used as controls, including age, gender, family income per capita, family book stock, education of father and mother, marital status of father and mother, family size in 2018, and residential province. We also add controls indicating whether parents are living with their children, which may have a significant impact on grandparenting.

IV.5 Statistical Summary

Table 1 presents a statistical summary of all variables used in the regression analysis. Firstly, for backgrounds of the sample families in the survey, 51 percent of the families have at least one grandparent cohabit at home. 22 percent of them report that grandparents are primary caregivers of their children either during the day or at night. Among grandparents cohabiting at home, less than half (=0.22/0.51) report bad health conditions.

Table 1 Statistical Summary

Variable	Obs	Mean	Std. Dev.	Min	Max
home_gdpt	2483	0.5122835	0.4999498	0	1
kidcare_gdpt	2618	0.2276547	0.4193986	0	1
alive_ngdpt	2618	1.07754	0.9158852	0	4
illhome_gdpt	2618	0.223071	0.4163851	0	1
elite_school	2166	0.2488458	0.4324441	0	1
elite_class	828	0.3490338	0.4769528	0	1
class_rank	2009	0.6938402	0.245517	0.125	0.95
grade_rank	1632	0.6557751	0.2454709	0.125	0.95
stud_cadre	2618	0.2276547	0.4749174	0	1
stud_club	1463	0.3759398	0.4845302	0	1
leave	2476	0.1425687	0.3497031	0	1
absentee	2477	0.0177634	0.1321171	0	1
sttime_nwkd	2462	8.385621	2.754799	0	24
sttime_wkd	2460	3.630528	2.69054	0	20
cellphone	2503	0.495006	0.500075	0	1
surf_mobile	2502	0.5511591	0.4974753	0	1
surf_time	1483	9.065543	11.18299	0	105
talk_gdpt	2503	0.0351578	0.1842154	0	1
talk_prt	2503	0.3064323	0.4611035	0	1
age	2618	12.40642	1.688321	9	15
gender	2618	0.526356	0.4994003	0	1
fincome1_per	2576	17894.77	24245.69	0	540000
fbook	2513	62.20692	239.2158	0	6000
hukou_p	2608	0.8194018	0.3847587	0	1
edu_f	2557	8.056316	3.98775	0	19
edu_m	2575	6.947184	4.498503	0	19
marriage_f	2539	0.9531312	0.2113995	0	1
marriage_m	2547	0.9473891	0.2232993	0	1
age_f	2574	41.21678	5.507619	28	81
age_m	2576	39.14208	5.435375	26	71
familysize18	2618	5.113827	1.850351	1	15
home_f	2608	0.7511503	0.4324294	0	1
home_m	2604	0.8029954	0.3978122	0	1

Secondly, on academic performance, 24 percent of the children enroll in elite schools, while 35 percent enroll in elite classes (in elite or non-elite schools). The class rank and grade rank have reasonable means (around 0.5) and large enough variations. 23 percent of the children have acted as student cadres and 38 percent have joined at least one student club.

Regarding study behaviors, 14 percent of the children have asked for leave and merely 1 percent have absence records in the most recent month. The means of average daily study time on weekdays and weekends are 8.4 and 3.6 hours, respectively. 50 percent of the children have cellphones, and 55 percent use cellphones for web surfing, with weekly surfing time averaged at 9.1 hours. 31 percent of the children are willing to communicate with their parents when facing difficulties or emotional breakdown, while in contrast only 4 percent are willing to talk to their grandparents in the above-mentioned situations.

Finally, a few words about the personal and family characteristics. Children are defined in the CFPS survey as persons less than 16 years old, and the children in our sample have an average age of 12, with 52 percent being male, and 81 percent having rural hukou (although not necessarily living in rural areas). The average ages of fathers and mothers are 41 and 39, and their years of education averaged at 8 and 6, respectively. Most of the parents are married (over 95 percent) and living at home (over 75 percent). The average size of the sample families in 2018 is 5 people, with an average per capita annual income of 18 thousand yuan, and an average of 62 books at home.

Figure 1 shows whether grandparents cohabit at home by the stages of children's school education. As children grow up, grandparents seem to gradually leave their family. In fact, there are only very few reported cases for grandparents to cohabit when children advance to senior high school. Figure A1 demonstrates, among all possible caregivers, who takes care of kids either during the day or at night. Mothers are the primary caregivers, and children become independent and mainly self-cared when they grow up. Nevertheless, grandparents still play a non-negligible role as caregivers, accounting for around 20% of all cases in the survey sample.
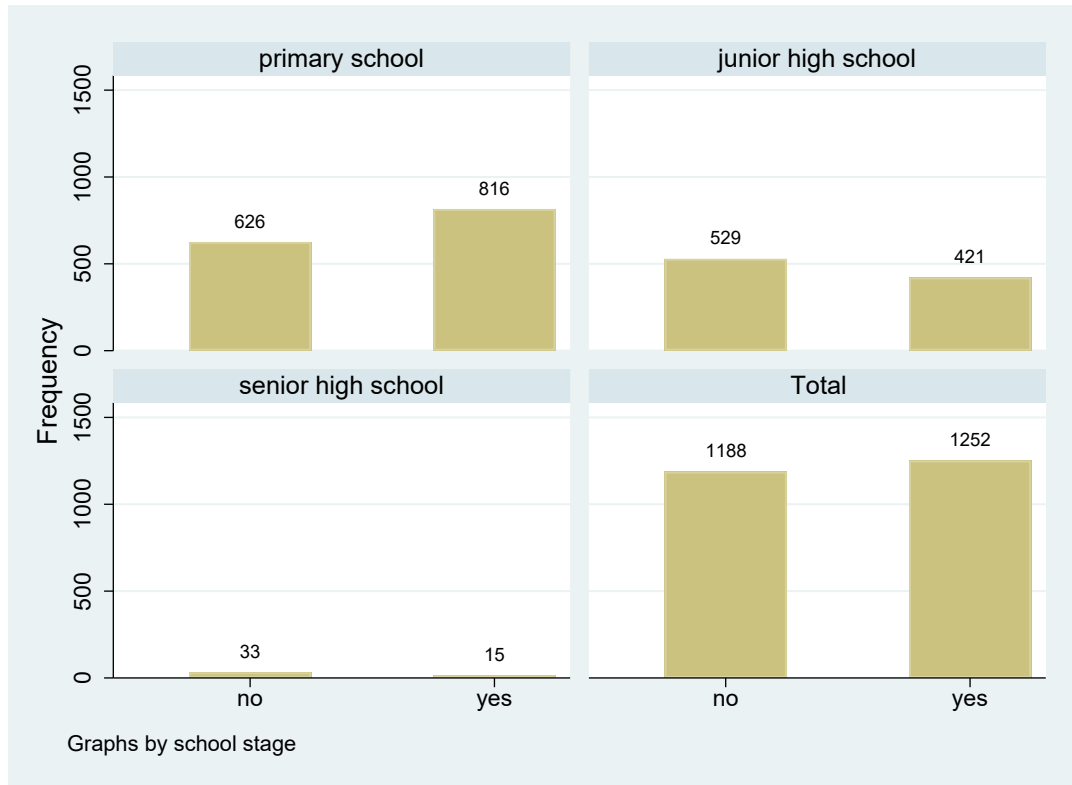
Figure 1 Grandparents Cohabiting at Home by Stages of Children's School Education.

V. Results

V.1 The Effect of Grandparenting on Child Academic Performance: OLS Results

V.1.1 Grandparents cohabiting at home as main explanatory variable

Table 2 reports the main regression outcomes regarding the impact of grandparenting on children's academic performance. The regression method is OLS and grandparenting is measured by whether (anyone of) grandparents cohabit with children. For each dependent variable gauging children's academic performance, we present three results using different sets of explanatory variables. The initial set contains merely the grandparenting variable ($home\_gdpt$). The second set adds control variables including children's personal characteristics (such as age, gender and hukou) and family backgrounds (such as family income and size, as well as parents' age, education and marital status). The third set further incorporates province fixed effect.

As shown in the table, grandparenting appears to significantly reduce the probability for a child to attend elite class by 6-9 percentage points, and significantly lower academic rank by 3-4 percentage points in his or her grade. It is also correlated to reduced likelihood of attending elite school or gaining leading class rankings and student club attendance, although most of those results are statistically insignificant. The only positive effect is the increase in the probability of becoming a student cadre, which is also statistically insignificant.

With respect to the control variables, boys generally perform not as well as girls. Children with rural hukou are less likely to join elite schools. Children from affluent families don't appear to stand out in academic performance, while those avid readers would. A well-educated father presents a positive factor for children's study, while a family with single father at home appears to have negative impacts on children's academic performance.[2]

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[2] An additional control variable indicating presence of a stay-at-home mother has been considered and eventually dropped due to small sample size. Stay-at-home moms may reduce the extent of grandparenting, thus affecting (probably positively) children's academic performance. In our CFPS sample, however, there are only 8 percent of children having stay-at-home moms. Adding this measure as control does not change the coefficients of grandparenting, likely due to its small sample.

Table 2 Main Result: Using Grandparent Cohabiting at Home as Explanatory Variable

VARIABLES	elite_school			elite_class			class_rank		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
home_gdpt	-0.0322	-0.0391	-0.0309	-0.0581*	-0.0946**	-0.0935**	-0.0257**	-0.0180	-0.0222
	(0.0203)	(0.0253)	(0.0255)	(0.0346)	(0.0444)	(0.0455)	(0.0116)	(0.0145)	(0.0147)
age		-0.00152	8.89e-05		0.0131	0.0129		-0.00381	-0.00401
		(0.00610)	(0.00600)		(0.0103)	(0.0105)		(0.00345)	(0.00348)
Gender (male=1)		-0.0132	-0.0150		-0.0233	-0.0346		-0.0599***	-0.0567***
		(0.0198)	(0.0196)		(0.0360)	(0.0364)		(0.0113)	(0.0114)
hukou_p		-0.0825***	-0.118***		-0.0459	-0.0549		0.0191	0.0274
		(0.0315)	(0.0319)		(0.0564)	(0.0610)		(0.0177)	(0.0181)
fincome1_per		-8.00e-08	3.67e-07		3.80e-07	3.39e-07		-6.13e-07**	-4.97e-07*
		(4.18e-07)	(4.65e-07)		(7.25e-07)	(8.26e-07)		(2.74e-07)	(2.84e-07)
familysize18		0.00299	-0.00380		0.00826	0.00580		-0.00151	0.00182
		(0.00660)	(0.00699)		(0.0139)	(0.0146)		(0.00491)	(0.00499)
fbook		5.59e-05	5.05e-05		0.000162	0.000134		6.21e-05***	6.07e-05***
		(7.05e-05)	(7.01e-05)		(0.000109)	(0.000115)		(1.85e-05)	(1.97e-05)
edu_f		-0.00169	-0.00264		0.00334	0.00469		0.00557***	0.00614***
		(0.00328)	(0.00334)		(0.00512)	(0.00526)		(0.00188)	(0.00192)
edu_m		0.00450	0.00647**		-0.00451	-0.00544		0.00332*	0.00421**
		(0.00308)	(0.00314)		(0.00495)	(0.00535)		(0.00176)	(0.00179)
marriage_f		-0.0638	-0.0836		-0.109	-0.0985		0.0904*	0.1000**
		(0.0867)	(0.0863)		(0.120)	(0.121)		(0.0504)	(0.0507)
marriage_m		0.0419	0.0422		0.000766	-0.0168		-0.0267	-0.0317
		(0.0774)	(0.0744)		(0.111)	(0.112)		(0.0515)	(0.0516)
age_f		-0.000612	0.000120		0.00198	0.00410		0.000434	0.000506

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		(0.00366)	(0.00370)		(0.00528)	(0.00554)		(0.00179)	(0.00185)
age_m		0.000316	-0.00151		-0.00916*	-0.0115**		0.000707	0.00129
		(0.00372)	(0.00379)		(0.00554)	(0.00583)		(0.00183)	(0.00190)
home_f		0.0210	0.0177		-0.0665	-0.0729		-0.0293*	-0.0261
		(0.0314)	(0.0313)		(0.0544)	(0.0559)		(0.0169)	(0.0168)
home_m		-0.0556	-0.0466		0.0429	0.0259		0.0234	0.0218
		(0.0394)	(0.0394)		(0.0609)	(0.0638)		(0.0223)	(0.0220)
province fix effect	N	N	Y	N	N	Y	N	N	Y
Observations	2,065	1,905	1,904	787	716	716	1,910	1,766	1,766
R-squared	0.001	0.014	0.051	0.004	0.023	0.057	0.003	0.044	0.065

Robust standard errors clustered on family are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 2 (Contd.) Main Result: Using Grandparent Cohabiting at Home as Explanatory Variable

VARIABLES	grade_rank			stud_cadre			stud_club		
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
home_gdpt	-0.0281**	-0.0348**	-0.0376**	0.0259	0.0393	0.0389	-0.0207	-0.00248	-0.0204
	(0.0127)	(0.0160)	(0.0166)	(0.0199)	(0.0253)	(0.0256)	(0.0265)	(0.0330)	(0.0331)
age		-0.0142***	-0.0136***		0.00607	0.00512		-0.0203**	-0.0196**
		(0.00392)	(0.00396)		(0.00631)	(0.00633)		(0.00850)	(0.00851)
Gender (male=1)		-0.0535***	-0.0523***		-0.0596***	-0.0653***		-0.0448*	-0.0481*
		(0.0126)	(0.0127)		(0.0203)	(0.0202)		(0.0271)	(0.0269)
hukou_p		-0.000727	0.00738		-0.0118	0.00951		-0.00148	0.0226
		(0.0200)	(0.0206)		(0.0321)	(0.0338)		(0.0409)	(0.0418)
fincome1_per		-2.59e-07	-1.39e-07		-4.22e-07	-9.01e-07**		3.89e-07	-4.50e-08
		(3.24e-07)	(3.13e-07)		(4.08e-07)	(3.96e-07)		(5.02e-07)	(5.33e-07)
familysize18		0.00550	0.00651		-0.0119*	-0.0139*		-0.0236***	-0.0183*
		(0.00533)	(0.00546)		(0.00689)	(0.00735)		(0.00904)	(0.00960)
fbook		3.74e-05***	3.15e-05**		-7.33e-06	3.58e-06		5.58e-05	7.66e-05
		(1.38e-05)	(1.46e-05)		(4.54e-05)	(4.17e-05)		(8.84e-05)	(9.40e-05)
edu_f		0.00590***	0.00602***		0.0116***	0.0109***		0.00913**	0.00825**
		(0.00222)	(0.00226)		(0.00313)	(0.00314)		(0.00415)	(0.00419)
edu_m		0.00267	0.00397**		0.00260	0.00271		0.00534	0.00282
		(0.00198)	(0.00200)		(0.00293)	(0.00306)		(0.00389)	(0.00409)
marriage_f		0.145**	0.151**		0.0259	0.0443		0.0456	0.0258
		(0.0591)	(0.0602)		(0.0775)	(0.0779)		(0.102)	(0.104)
marriage_m		-0.0570	-0.0648		0.0318	0.0216		-0.0439	-0.0509
		(0.0566)	(0.0579)		(0.0803)	(0.0797)		(0.0922)	(0.0950)
age_f		0.00166	0.00163		-0.00231	-0.00369		-0.00399	-0.00268

		(0.00200)	(0.00207)			(0.00319)	(0.00322)		(0.00392)	(0.00407)
age_m		0.000968	0.00159			0.000147	0.00157		-0.00129	-0.00255
		(0.00208)	(0.00216)			(0.00328)	(0.00335)		(0.00420)	(0.00435)
home_f		-0.0177	-0.0144			-0.0599**	-0.0597**		0.0646	0.0641
		(0.0189)	(0.0191)			(0.0303)	(0.0301)		(0.0398)	(0.0401)
home_m		-0.0153	-0.00794			0.0737**	0.0822**		-0.0317	-0.0222
		(0.0236)	(0.0240)			(0.0355)	(0.0356)		(0.0472)	(0.0492)
province fix effect	N	N	Y	N	N	Y	N	N	Y
Observations	1,558	1,446	1,446	2,347	2,163	2,162	1,397	1,271	1,271
R-squared	0.003	0.050	0.069	0.001	0.024	0.045	0.000	0.041	0.087

Robust standard errors clustered on family are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

V.1.2 Grandparental care as main explanatory variable

Table 3 reports the main regression outcomes by using an alternative measure of grandparenting, i.e., whether grandparents are taking care of their grandchildren during the day or at night. To save space, we only present the results with full controls. The results are similar to Table 2. Grandparental care corresponds to significantly reduced class rank by 3 percentage points. It is also linked to lower probability of attending elite schools or elite classes, lower grade rank, and lower probability of attending student clubs, although the results are not statistically significant.

Table 3 Main Result: Using Grandparental Care as Explanatory Variable

VARIABLES	elite_school	elite_class	class_rank	grade_rank	stud_cadre	stud_club
	(1)	(2)	(3)	(4)	(5)	(6)
kidcare_gdpt	-0.0368	-0.0641	-0.0305**	-0.0199	0.00369	-0.0154
	(0.0266)	(0.0515)	(0.0154)	(0.0175)	(0.0270)	(0.0356)
age	0.000168	0.0121	-0.00558	-0.0146***	0.00536	-0.0188**
	(0.00590)	(0.0105)	(0.00343)	(0.00392)	(0.00623)	(0.00839)
Gender	-0.0163	-0.0486	-0.0577***	-0.0523***	-0.0716***	-0.0545**
(male=1)	(0.0192)	(0.0363)	(0.0112)	(0.0125)	(0.0199)	(0.0265)
hukou_p	-0.106***	-0.0567	0.0255	0.0110	0.0124	0.0260
	(0.0310)	(0.0589)	(0.0172)	(0.0199)	(0.0328)	(0.0403)
fincome1_per	3.27e-07	3.88e-07	-5.03e-07*	-1.44e-07	-8.34e-07**	1.73e-08
	(4.70e-07)	(9.13e-07)	(2.74e-07)	(3.07e-07)	(3.91e-07)	(5.22e-07)
familysize18	-0.00764	-0.00241	-0.00190	9.33e-06	-0.00898	-0.0167**
	(0.00609)	(0.0120)	(0.00404)	(0.00456)	(0.00622)	(0.00831)
fbook	4.26e-05	0.000104	6.14e-05***	3.23e-05**	-1.06e-06	7.08e-05
	(6.78e-05)	(0.000119)	(1.93e-05)	(1.43e-05)	(4.37e-05)	(9.48e-05)
edu_f	-0.00203	0.00275	0.00628***	0.00629***	0.0112***	0.00881**
	(0.00325)	(0.00529)	(0.00187)	(0.00224)	(0.00308)	(0.00410)
edu_m	0.00658**	-0.00430	0.00363**	0.00330*	0.00326	0.00271
	(0.00305)	(0.00532)	(0.00177)	(0.00197)	(0.00300)	(0.00404)
marriage_f	-0.101	-0.127	0.109**	0.162***	0.0309	0.0253
	(0.0842)	(0.122)	(0.0478)	(0.0563)	(0.0770)	(0.0933)
marriage_m	0.0605	-0.00871	-0.0257	-0.0531	0.0220	-0.0622
	(0.0739)	(0.113)	(0.0509)	(0.0577)	(0.0784)	(0.0898)
age_f	0.00101	0.00452	0.000585	0.00140	-0.00408	-0.00197
	(0.00361)	(0.00526)	(0.00181)	(0.00201)	(0.00314)	(0.00399)
age_m	-0.00211	-0.00946*	0.00113	0.00194	0.00174	-0.00233
	(0.00367)	(0.00560)	(0.00188)	(0.00210)	(0.00329)	(0.00425)
home_f	0.0128	-0.0897	-0.0242	-0.0123	-0.0612**	0.0605
	(0.0307)	(0.0552)	(0.0165)	(0.0188)	(0.0296)	(0.0396)

home_m	-0.0568	0.0233	0.0171	-0.00551	0.0782**	-0.0117
	(0.0383)	(0.0644)	(0.0213)	(0.0237)	(0.0351)	(0.0487)
province fix effect	Y	Y	Y	Y	Y	Y
Observations	1,972	741	1,833	1,496	2,244	1,314
R-squared	0.050	0.053	0.067	0.066	0.042	0.086

Robust standard errors clustered on family are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

V.2 How Grandparenting May Affect Children's Academic Performance: OLS Results on Channels

In this part we report results regarding the channels through which grandparenting would affect a child's academic performance. Table 4 and 5 show the result with the same set of channel variables but different grandparenting variables, as used in Table 2 and 3.

Table 4 showcases the regression results (with full controls) concerning the impact of grandparenting on children's study behavior, divided into three categories of variables: study time, web surfing and communication.

As illustrated in the table, grandparenting appears to significantly elevate the likelihood of school absence by 1 percentage point, almost doubling the mean value of this variable in the sample. Additionally, despite statistically insignificant, it does correlate to increased school absence and reduced study time on weekdays. Surprisingly, grandparenting appears to increase children's study time on weekends, although statistically insignificant. One possible explanation is that parents spend more time at home on weekends, and thus can supervise children to make up for their shorter study hours on weekdays.

Internet and web surfing become an increasingly important source of information and one of the most popular activities for young students, but its overuse has become a global problem. As the results show, grandparenting appears to significantly contribute to the increased use of cellphones by as much as 8 percentage points, on top of the already significant mean value of cellphone use for all children in the sample, i.e., 50

percent. It also correlates to the increased surfing time on both mobile and all devices, though statically insignificantly.

Communication with parents proves to be important for children's personal development, since parents are typically the ones who have the highest level of education and most up-to-date knowledge on the society in a family. As the results show, not surprisingly, grandparenting appears to have significantly increased the likelihood for children to communicate with grandparents, by as much as 3 percentage points, doubling the mean of this variable, while having a crowding-out effect on children's communication with parents. As the last column (column (9)) shows, it leads to reduced child-parent communication, although insignificantly by statistical measures.

Some of the coefficients of the control variables are particularly worth noting. In Table 4, as kids grow, they spend more time on study and surfing, but less time to communicate with either parents or grandparents. Children in affluent families spend more time on study as well as surfing. Children in book lover families spend more time on study but less time on cellphones. Having well-educated parents would encourage children to study hard while also surfing more. Children are more likely to talk to married father or single mother.

Table 4 Channels: Using Grandparent Cohabiting at Home as Explanatory Variable

VARIABLES	Study Time				Surf			Communication	
	leave	absentee	sttime_nwkd	sttime_wkd	cellphone	surf_mobile	surf_time	talk_gdpt	talk_prt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
home_gdpt	0.0229	0.0139**	-0.0645	0.158	0.0775***	0.0323	0.323	0.0334***	-0.0131
	(0.0196)	(0.00700)	(0.143)	(0.139)	(0.0245)	(0.0245)	(0.797)	(0.00914)	(0.0249)
Age	-0.00346	-0.00108	0.478***	0.199***	0.0979***	0.0985***	0.924***	-0.00834***	-0.0382***
	(0.00490)	(0.00191)	(0.0345)	(0.0333)	(0.00580)	(0.00577)	(0.204)	(0.00214)	(0.00617)
Gender (male=1)	0.0188	-0.00207	-0.0963	-0.320***	0.0156	0.0329*	0.997	-0.00799	0.0256
	(0.0153)	(0.00517)	(0.112)	(0.110)	(0.0197)	(0.0195)	(0.667)	(0.00771)	(0.0195)
hukou_p	-0.00785	-0.000760	-0.179	-0.142	-0.0599*	-0.0809***	1.418	-0.000775	-0.101***
	(0.0243)	(0.00773)	(0.177)	(0.170)	(0.0324)	(0.0304)	(0.880)	(0.00991)	(0.0322)
fincome1_per	7.70e-08	-7.46e-08	7.04e-06***	2.58e-06	1.55e-06***	2.26e-06***	-1.00e-06	4.23e-07	1.56e-07
	(2.78e-07)	(8.26e-08)	(2.17e-06)	(2.29e-06)	(4.27e-07)	(4.79e-07)	(1.13e-05)	(3.00e-07)	(4.84e-07)
familysize18	-0.000886	8.15e-05	-0.0259	-0.107***	-0.0157**	-0.0133*	0.137	-0.000931	-0.00872
	(0.00664)	(0.00224)	(0.0408)	(0.0403)	(0.00720)	(0.00715)	(0.308)	(0.00277)	(0.00701)
Fbook	5.12e-05	-1.08e-05**	0.000310*	0.000352	-5.39e-05*	-2.50e-05	-0.000228	-1.33e-06	-3.32e-05
	(5.69e-05)	(4.77e-06)	(0.000182)	(0.000296)	(3.02e-05)	(2.92e-05)	(0.00113)	(7.24e-06)	(3.51e-05)
edu_f	0.000999	-0.000166	0.0307*	0.0859***	0.000768	0.00703**	-0.0585	0.000386	-0.00407
	(0.00248)	(0.000750)	(0.0186)	(0.0171)	(0.00321)	(0.00320)	(0.107)	(0.00120)	(0.00320)
edu_m	-0.00320	-0.000743	0.0193	0.0314*	0.00784**	0.00713**	0.0670	-0.00130	0.00599**
	(0.00239)	(0.000741)	(0.0178)	(0.0176)	(0.00312)	(0.00313)	(0.0999)	(0.00122)	(0.00305)
marriage_f	0.114**	0.00579	-0.412	-0.256	-8.67e-05	-0.129*	-0.318	-0.0117	0.161***
	(0.0503)	(0.0265)	(0.360)	(0.548)	(0.0718)	(0.0731)	(3.601)	(0.0432)	(0.0550)
marriage_m	-0.155**	-0.00866	0.549	0.493	-0.0467	0.0929	-1.473	-0.0140	-0.139**
	(0.0623)	(0.0296)	(0.362)	(0.446)	(0.0759)	(0.0759)	(3.770)	(0.0457)	(0.0677)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
age_f	0.000795	0.000503	0.00174	-0.0164	0.00151	0.00246	-0.0352	0.000294	-0.00390
	(0.00270)	(0.000832)	(0.0191)	(0.0179)	(0.00331)	(0.00327)	(0.113)	(0.00108)	(0.00356)
age_m	0.00162	0.00102	-0.0100	0.0280	-0.000450	-0.00340	0.207	-0.00188	0.00534
	(0.00282)	(0.000888)	(0.0198)	(0.0191)	(0.00342)	(0.00329)	(0.145)	(0.00118)	(0.00358)
home_f	0.0107	0.00807	-0.251	-0.158	-0.0583**	-0.0441	-0.0292	-0.0143	0.0646**
	(0.0226)	(0.00697)	(0.164)	(0.181)	(0.0294)	(0.0291)	(0.836)	(0.0114)	(0.0284)
home_m	-0.0360	-0.0129	0.0663	0.0925	0.0293	0.0694*	-0.231	-0.0530***	0.0610*
	(0.0316)	(0.0109)	(0.201)	(0.206)	(0.0370)	(0.0362)	(1.049)	(0.0175)	(0.0341)
province fix effect	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,172	2,172	2,164	2,158	2,197	2,196	1,310	2,196	2,196
R-squared	0.024	0.021	0.144	0.145	0.180	0.200	0.063	0.057	0.065

Robust standard errors clustered on family are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5 demonstrates the similar results as Table 4, by using grandparental care instead of grandparent cohabiting at home as the key explanatory variable. Notably, children under grandparental care are more likely to use cellphones and talk to their grandparents, but less likely to talk to their parents. The results are statistically insignificant for other study behaviors.

In general, our regressions on channel variables point to some possible reasons why grandparenting may negatively affect children's academic performance. Children appear to be absent from schools more frequently, possibly because grandparents have greater level of concerns and tend to over-react on children's signs of illness than their parents do. The higher likelihood of using cellphone may indicate that grandparents may not monitor their grandkids closely. It is also possible that working parents tend to use cellphones to keep in contact with their kids, which may unintendedly lead to cellphone overuse.

Table 5 Channels: Using Grandparental Care as Explanatory Variable

VARIABLES	Study Time				Surf			Communication	
	leave	absentee	sttime_nwkd	sttime_wkd	cellphone	surf_mobile	surf_time	talk_gdpt	talk_prt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
kidcare_gdpt	-0.0146	0.00883	-0.00465	0.0421	0.0497*	0.0174	0.596	0.0659***	-0.0933***
	(0.0200)	(0.00760)	(0.147)	(0.151)	(0.0266)	(0.0263)	(0.860)	(0.0143)	(0.0264)
age	-0.00299	-0.00115	0.485***	0.200***	0.100***	0.0994***	0.969***	-0.00618***	-0.0424***
	(0.00480)	(0.00199)	(0.0341)	(0.0323)	(0.00574)	(0.00568)	(0.199)	(0.00214)	(0.00613)
Gender (male=1)	0.0207	-3.02e-05	-0.103	-0.318***	0.0184	0.0342*	1.058*	-0.00467	0.0250
	(0.0149)	(0.00505)	(0.110)	(0.108)	(0.0194)	(0.0191)	(0.637)	(0.00765)	(0.0190)
hukou_p	-0.0121	0.000651	-0.107	-0.163	-0.0670**	-0.0849***	1.505*	-0.00876	-0.0866***
	(0.0237)	(0.00746)	(0.172)	(0.168)	(0.0313)	(0.0295)	(0.843)	(0.0112)	(0.0307)
fincome1_per	6.27e-08	-6.63e-08	7.04e-06***	2.86e-06	1.62e-06***	2.29e-06***	1.19e-07	3.68e-07	1.70e-07
	(2.77e-07)	(8.15e-08)	(2.18e-06)	(2.30e-06)	(4.21e-07)	(4.78e-07)	(1.12e-05)	(2.83e-07)	(4.67e-07)
familysize18	0.00217	0.00136	-0.0454	-0.0758**	-0.00370	-0.00582	0.190	0.00123	-0.00768
	(0.00545)	(0.00186)	(0.0349)	(0.0342)	(0.00605)	(0.00609)	(0.242)	(0.00245)	(0.00583)
fbook	4.85e-05	-9.87e-06**	0.000312*	0.000385	-5.67e-05*	-2.30e-05	-0.000188	7.19e-07	-3.55e-05
	(5.60e-05)	(4.33e-06)	(0.000179)	(0.000285)	(3.08e-05)	(2.85e-05)	(0.00111)	(7.12e-06)	(3.55e-05)
edu_f	0.00148	-0.000185	0.0383**	0.0834***	2.51e-05	0.00711**	-0.0381	-0.000264	-0.00341
	(0.00242)	(0.000759)	(0.0186)	(0.0165)	(0.00314)	(0.00310)	(0.103)	(0.00122)	(0.00308)
edu_m	-0.00387	-0.000753	0.0196	0.0261	0.00891***	0.00739**	0.0718	-0.00127	0.00581**
	(0.00236)	(0.000726)	(0.0175)	(0.0170)	(0.00306)	(0.00306)	(0.0966)	(0.00118)	(0.00296)
marriage_f	0.115**	0.00515	-0.383	-0.601	0.00937	-0.120*	-0.316	-0.00390	0.149***
	(0.0477)	(0.0253)	(0.341)	(0.537)	(0.0686)	(0.0715)	(3.419)	(0.0414)	(0.0505)
marriage_m	-0.156**	-0.0109	0.587*	0.589	-0.0450	0.0729	-1.597	-0.0226	-0.134**

	(0.0606)	(0.0291)	(0.347)	(0.440)	(0.0726)	(0.0747)	(3.629)	(0.0444)	(0.0640)
age_f	0.000439	0.000542	0.00677	-0.0120	0.00224	0.00297	-0.0492	0.000415	-0.00446
	(0.00260)	(0.000840)	(0.0186)	(0.0175)	(0.00319)	(0.00316)	(0.110)	(0.00115)	(0.00354)
age_m	0.000940	0.00106	-0.0179	0.0220	-0.00136	-0.00341	0.209	-0.00177	0.00553
	(0.00273)	(0.000867)	(0.0191)	(0.0184)	(0.00331)	(0.00320)	(0.139)	(0.00125)	(0.00350)
home_f	0.0166	0.0100	-0.257	-0.119	-0.0532*	-0.0389	0.219	-0.0118	0.0525*
	(0.0219)	(0.00683)	(0.160)	(0.174)	(0.0288)	(0.0284)	(0.819)	(0.0111)	(0.0279)
home_m	-0.0388	-0.00959	0.0701	0.220	0.0358	0.0618*	0.372	-0.0412**	0.0468
	(0.0305)	(0.00967)	(0.198)	(0.199)	(0.0360)	(0.0355)	(0.985)	(0.0172)	(0.0336)
province fix effect	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,254	2,254	2,245	2,239	2,279	2,278	1,352	2,278	2,278
R-squared	0.023	0.017	0.149	0.144	0.179	0.201	0.062	0.074	0.071

Robust standard errors clustered on family are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

V.3 IV Regressions

Table 6 utilizes $alive\_ngdpt_j$ (i.e., the number of living grandparents) as the instrumental variable for $home\_gdpt_j$. Column (1) shows the first stage regression result. A greater number of living grandparents indeed significantly increases the likelihood for grandparents to cohabit with their grandkids: an additional living grandparent would increase the likelihood of grandparents cohabitation by 24 percentage points. The rest of Table 6 shows all the 2SLS regression results concerning grandparenting effects. Those results are largely consistent with our OLS regression results. In particular, grandparenting decreases children's class and grade rankings significantly. For channels, it encourages cellphone use as well as communication with grandparents. It also increases study time on weekends, the same result as we see in OLS regressions.

Table 7 employs $alive\_ngdpt_j$ as the instrumental variable for $kidcare\_gdpt_j$, the alternative measure for grandparenting. An additional living grandparent significantly increases the possibility of grandparental care by 8 percentage points. IV-2SLS results show that grandparenting leads to lower grade ranking and more cellphone usage, while contributing to more study-time on weekends. The results are consistent with both OLS and IV results using $home\_gdpt_j$ to measure grandparenting.[3]

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[3] The results are essentially the same for IV regression when using 4 dummies, each indicating whether the respective grandparent is alive. Those dummies capture all the possibly heterogeneous effects of who would be the caregiver(s) among all the grandparents.

Table 6 Using the Number of Living Grandparents as IV for Grandparents Cohabiting at Home

Panel A: Firs stage and ISLS on academic performance

VARIABLES	first stage	IV(2SLS)					
	home_gdpt	elite_school	elite_class	class_rank	grade_rank	stud_cadre	stud_club
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
alive_ngdpt	0.243***						
	(0.0131)						
home_gdpt		-0.0386	-0.140	-0.0595*	-0.104***	0.0915	0.0548
		(0.0574)	(0.106)	(0.0318)	(0.0351)	(0.0556)	(0.0792)
control variables	Y	Y	Y	Y	Y	Y	Y
province fix effect	Y	Y	Y	Y	Y	Y	Y
Observations	2,271	1,904	716	1,766	1,446	2,162	1,271
R-squared	0.484	0.051	0.055	0.061	0.057	0.043	0.083

Panel B: ISLS on Channels

VARIABLES	IV(2SLS)								
	leave	absentee	sttime_nwkd	sttime_wkd	cellphone	surf_mobile	surf_time	talk_gdpt	talk_prt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
home_gdpt	0.0255	0.00734	-0.139	0.753**	0.187***	0.0677	0.118	0.0423**	-0.0112
	(0.0405)	(0.0145)	(0.326)	(0.337)	(0.0564)	(0.0553)	(1.893)	(0.0195)	(0.0557)
control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y
province fix effect	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,172	2,172	2,164	2,158	2,197	2,196	1,310	2,196	2,196
R-squared	0.024	0.021	0.144	0.137	0.172	0.199	0.063	0.057	0.065

Robust standard errors clustered on family are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 7 Using the Number of Living Grandparents as IV for Grandparental Care

Panel A: Firs stage and ISLS on academic performance

VARIABLES	first stage	IV(2SLS)					
	kidcare_gdpt	elite_school	elite_class	class_rank	grade_rank	stud_cadre	stud_club
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
alive_ngdpt	0.0797***						
	(0.0114)						
kidcare_gdpt		-0.0588	-0.552	-0.119	-0.236**	0.227	0.205
		(0.160)	(0.430)	(0.0972)	(0.104)	(0.164)	(0.228)
control variables	Y	Y	Y	Y	Y	Y	Y
province fix effect	Y	Y	Y	Y	Y	Y	Y
Observations	2,357	1,972	741	1,833	1,496	2,244	1,314
R-squared	0.207	0.050		0.048		0.012	0.058

Panel B: ISLS on Channels

VARIABLES	IV(2SLS)								
	leave	absentee	sttime_nwkd	sttime_wkd	cellphone	surf_mobile	surf_time	talk_gdpt	talk_prt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
kidcare_gdpt	0.125	0.0348	-0.110	2.465***	0.509***	0.184	2.341	0.0869	-0.00248
	(0.118)	(0.0420)	(0.936)	(1.009)	(0.170)	(0.156)	(4.983)	(0.0593)	(0.155)
control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y
province fix effect	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,254	2,254	2,245	2,239	2,279	2,278	1,352	2,278	2,278
R-squared	0.001	0.012	0.149	0.033	0.062	0.185	0.059	0.072	0.066

Robust standard errors clustered on family are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

V.4 Robustness Checks

V.4.1 Grandparents' Health Condition

In Table A2, the health condition of grandparents living at home, $illhome\_gdpt$, is added as additional explanatory variable, which absorbs much significance from the original grandparenting variable, $home\_gdpt$. In particular, it seems that ailing grandparents cohabiting at home may have more significantly negative effects on child academic performance, but the original variable still has some marginal significance (as in column (2) and (4), for elite class and grade rank, respectively.) However, in the channel regressions, the (negative) effects on absence from school, cellphone use and personal communication are still dependent on any grandparents living at home, regardless of their health. The results suggest that more attention should be paid to ailing grandparents as the caregivers, and the channels are yet to be discovered.[4]

V.4.2 Regressions on Urban Subsample

More than 80% of the children in the CFPS 2018 dataset have rural hukou (see Table 1). Since rural and urban families may have noticeable differences, it is possible that the results are driven by rural samples only. Our second robust check is to run regression on urban samples. However, it is worth noting that the urban sample is small in CFPS 2018, with only around 300 sample units.

Table A3 (panel A and B) shows the results for urban sample by using OLS. Panel A is on academic performance while Panel B is on channels. All results become statistically insignificant, with the only exception that grandparenting significantly decreases the likelihood of attending student clubs. It can be noted that the signs of most coefficients are consistent with the full-sample results, such as the ones on elite school, grade ranking, school absence, cellphone usage, and communication with grandparents and parents. As a whole, the urban subsample show the similar pattern as the full-sample.

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[4] We also consider the possible effect of education level of grandparents cohabiting at home on children. In our sample, the education level of grandparents is relatively low, with only approximately 4-years of education - almost all of them do not graduate from junior high school, while over one third are illiterate. We add a dummy indicating whether any grandparent cohabiting at home is literate (at any level), similar to what we did for their health. The coefficients of the dummy are insignificant in almost all regressions and do not affect the coefficient of $home\_gdpt$ at all.

VI. Conclusions

This paper uses the CFPS 2018 dataset to study the effects of grandparenting on children's academic performance. Both OLS and IV regression are employed to consider various measures for grandparenting, child academic performance and possible channels. The results show that grandparenting has negative effects on a children's academic performance including entering elite school or class and academic score rankings among their cohorts. The negative effects mainly arise from channels such as reduced time spent at school, increased cellphone usage and web surfing time, as well as decreased level of communication with parents.

This paper has brought into light the important issue of the relationship between grandparenting and children's personal development. Children are the world's future and the focus of the family especially in China. Although we find evidence that grandparenting may negatively affect children's academic performance, it would be thoughtless to come to a policy recommendation such as "keeping grandma and grandpa out of our home". It is not easy to simply say goodbye to grandparenting, as it is deeply rooted in the demographic trends and culture of the Chinese society. Yet the paper does raise an issue that warrants attention. Parents should lean more towards their kids even at their early age when balancing between work and family. Building a happy environment for children's personal development and the well-being of all the family members need not only a warm heart but also a cool head. People will have to make wise tradeoffs.

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Table A1 Variable Description

Variable Type	Variable Name	Meaning	Role
Grandparenting	home_gdpt	whether any grandparent cohabiting at home	core explanatory var
	kidcare_gdpt	whether child taken care by any grandparent either during the day or at night	core explanatory var
	alive_ngdpt	the number of living grandparents	IV
	illhome_gdpt	whether any ill grandparent cohabiting at home	additional explanatory var
Child academic performance and study behavior	elite_school	whether entering an elite school	core explained var
	elite_class	whether entering an elite class	core explained var
	class_rank	rank in class	core explained var
	grade_rank	rank in grade	core explained var
	stud_cadre	whether acting as a student cadre	core explained var
	stud_club	whether participating any student club	core explained var
	leave	whether asking for leave in the recent month	channel var
	absentee	whether absent in the recent month	channel var
	sttime_nwkd	study time in weekdays (hrs/day)	channel var
	sttime_wkd	study time in weekends (hrs/day)	channel var
	cellphone	whether using a cellphone	channel var
	surf_mobile	whether surfing by mobile devices	channel var
	surf_time	surfing time during leisure time (hrs/week)	channel var
	talk_gdpt	whether talking to grandparents	channel var
	talk_prt	whether talking to parents	channel var
Personal info and family background	age	Age	control var
	gender	gender (male=1)	control var
	fincome1_per	family income per capita	control var
	fbook	family book stock	control var

hukou_p	hukou(rural=1)	control var
edu_f	education of father (years)	control var
edu_m	education of mother (years)	control var
marriage_f	marital status of father (married=1)	control var
marriage_m	marital status of mother(married=1)	control var
age_f	age of father	control var
age_m	age of mother	control var
familysize18	family size in 2018	control var
home_f	whether father living at home	control var
home_m	whether mother living at home	control var
province	residential province	control var

Table A2 Adding Ailing Grandparent at Home as Explanatory Variable

Panel A: Child Academic Performance

VARIABLES	elite_school (1)	elite_class (2)	class_rank (3)	grade_rank (4)	stud_cadre (5)	stud_club (6)
home_gdpt	-0.0168	-0.0693	-0.00462	-0.0204	0.0355	-0.0220
	(0.0283)	(0.0503)	(0.0168)	(0.0193)	(0.0287)	(0.0369)
illhome_gdpt	-0.0314	-0.0562	-0.0419**	-0.0381**	0.00925	0.00416
	(0.0298)	(0.0523)	(0.0173)	(0.0193)	(0.0297)	(0.0384)
joint_sig(Prob>F)	0.297	0.0735*	0.0141**	0.00823***	0.293	0.826
control variables	Y	Y	Y	Y	Y	Y
province fix effect	Y	Y	Y	Y	Y	Y
Observations	1,904	716	1,766	1,446	2,162	1,271
R-squared	0.052	0.059	0.069	0.072	0.045	0.087

Panel B: Channels

VARIABLES	leave (1)	absentee (2)	sttime_nwkd (3)	sttime_wkd (4)	cellphone (5)	surf_mobile (6)	surf_time (7)	talk_gdpt (8)	talk_prt (9)
home_gdpt	0.00994	0.0186**	-0.0471	0.175	0.0669**	0.0281	-0.286	0.0366***	-0.0132
	(0.0218)	(0.00918)	(0.158)	(0.152)	(0.0279)	(0.0278)	(0.880)	(0.0115)	(0.0279)
illhome_gdpt	0.0219	-0.0116	-0.0200	-0.0292	0.0196	0.00640	1.358	-0.0105	0.00348
	(0.0230)	(0.00813)	(0.161)	(0.157)	(0.0291)	(0.0292)	(0.940)	(0.0139)	(0.0282)
joint_sig(Prob>F)	0.393	0.130	0.921	0.488	0.00700***	0.441	0.333	0.00196***	0.890
control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y
province fix effect	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,172	2,172	2,164	2,158	2,197	2,196	1,310	2,196	2,196
R-squared	0.028	0.022	0.145	0.145	0.181	0.200	0.065	0.060	0.065

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A3 OLS Regressions Using Urban Subsample

Panel A: OLS on academic performance

VARIABLES	elite_school	elite_class	class_rank	grade_rank	stud_cadre	stud_club
	(1)	(2)	(3)	(4)	(5)	(6)
home_gdpt	-0.00243	-0.0199	0.0330	-0.0271	-0.0309	-0.184**
	(0.0729)	(0.165)	(0.0406)	(0.0469)	(0.0732)	(0.0886)
Observations	346	119	310	232	383	261
R-squared	0.199	0.237	0.206	0.236	0.110	0.224

Panel B: OLS on channels

VARIABLES	leave	absentee	sttime_nwkd	sttime_wkd	cellphone	surf_mobile	surf_time	talk_gdpt	talk_prt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
home_gdpt	-0.0230	0.00256	0.190	0.410	0.0259	-0.0148	-1.783	0.0391	-0.0567
	(0.0536)	(0.0178)	(0.384)	(0.362)	(0.0696)	(0.0630)	(1.616)	(0.0274)	(0.0717)
Observations	386	386	384	385	387	387	303	387	387
R-squared	0.108	0.069	0.298	0.266	0.164	0.220	0.140	0.215	0.138

Robust standard errors clustered on family are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
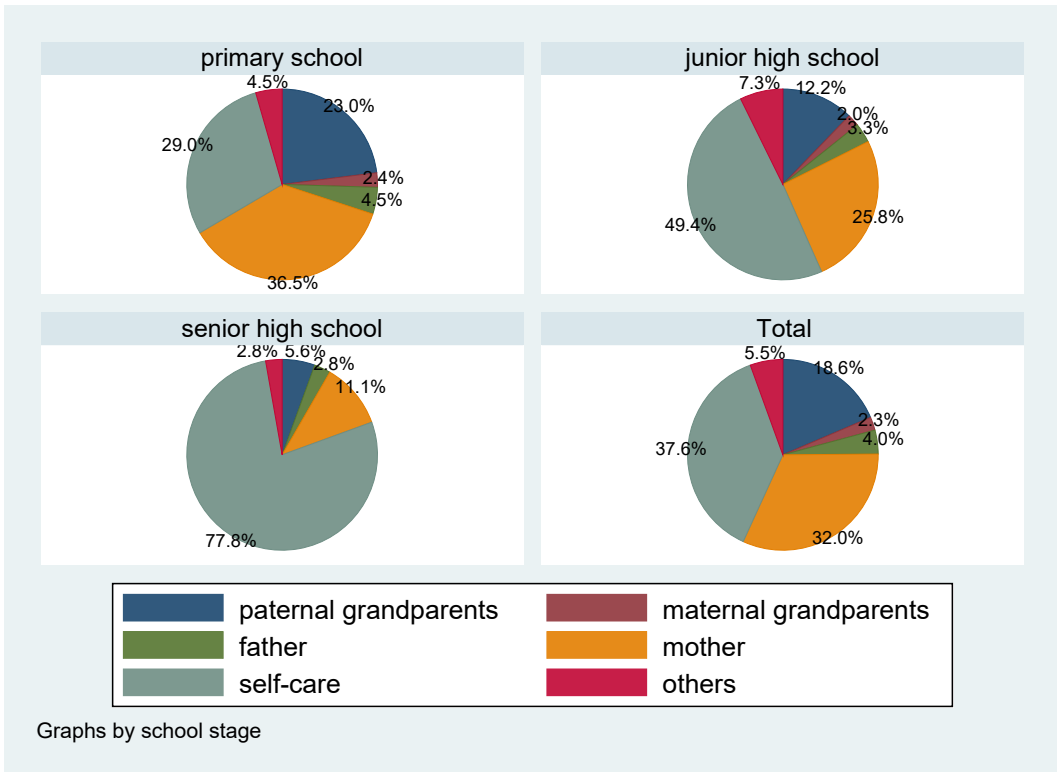
Panel A: During the Day
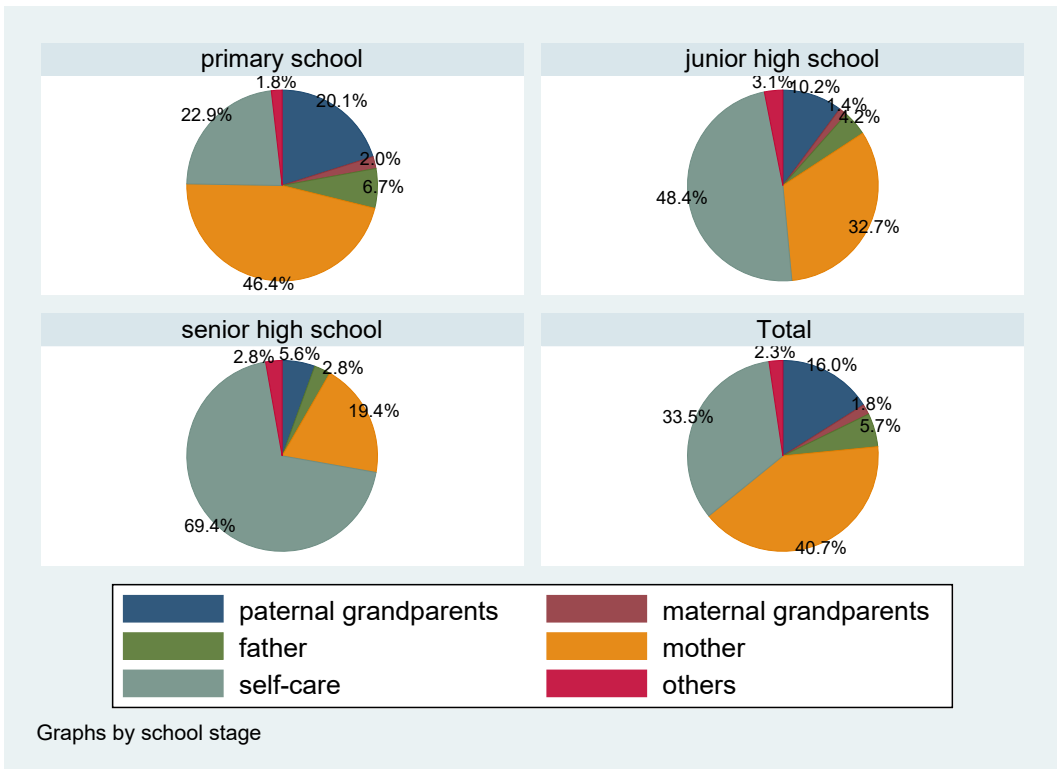
Panel B: At Night

Figure A1 Caregivers by Stages of Children's School Education

Acknowledgement

The research topic was inspired by my own experience with my beloved grandparents. My grandma and grandpa spent most of their time to take good care of me during my primary school from 2013 to 2019. After my grandpa passed away, grandma still visits us frequently and I love the dinner she cooked so much.

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