Living with Grandparents, Family Relations, and Grandchildren's School Achievement in Taiwan

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Population aging has become an important issue in most industrialized countries. In recent decades, medium-income nation-states in Asia are also facing this demographic problem. Scholars researching aging issues are primarily concerned about elderly people's medical and social welfare liability, and the determinants of the elderly's living arrangements. Few probe the *consequences* of having grandparents in grandchildren's lives. Although research has found that having grandparents to live close-by helps children's development (Elder, Conger, and King, 2000), scholars rarely examine how grandparents' co-residence – zero residential distance –influences grandchildren. The lack of this type of research is due to the fact that grandparents-grandchildren coresidence is an uncommon phenomenon in the U.S. and most other Western countries where research on population aging is prevalent. In these countries, grandparents live with their adult children and grandchildren out of needs rather than a tradition. Such selection bias prevents a more accurate evaluation of the influence of grandparents' coresidence with their grandchildren. In this study we use data from Taiwan where grandparents' coresidence with grandchildren is more of a cultural norm than a necessity. We examine the following research questions: (1) Is living with grandparents associated with academic achievement among Taiwanese school children? (2) How does this association vary by the length of coresidence with grandparents? (3) Are there gender differences in this relationship between grandparents' coresidence and grandchildren's school performance? (4) Do family relations accounts for the observed association?

Relevant Literature

Previous research of the effects of family structure focused primarily on family structure as defined by parents' marital status and the relationships between adults at home. Single-parent families, stepfamilies, and cohabitating couples with children are often compared to nuclear families in which children live with two biological parents (Amato and Keith 1991; Amato 2001; McLanahan and Sandefur 1994; Sandefur and Wells 1999; Carlson and Corcoran 2001). Multigenerational family is a neglected family type in this literature, and we know little about the benefits or detriment associated with living with grandparents.

To answer the question of the effects of grandparents' coresidence on grandchildren's development, we need to first understand why the elderly choose to live with their adult children. Living arrangements of the elderly population in the U.S. and abroad has been an important topic in demography (see, for example, Angel (1991), Spitze, Logan, & Robinson (1992), Mutchler & Burr (2003), Martin (1989), Frankenberg, Chan, and Morgan (2002)). The coresidence decisions of the elderly are often due to old people's incomes and wealth, education, cost of housing, health problems, attitudes, norms, and family traditions. In the U.S., low income or poor health among the elderly is often the driving force behind grandparents' coresidence.

Education is associated with grandparents' ability to live independently. Bryson and Casper (1999) reported that in the U.S. many co-resident grandparents have not completed high school. Also, highly educated parents tend to prefer non-relatives' care for their children to grandparent care (Network 1997), possibly because grandparents tend to have different views from parents over childrearing. The younger generation may

view their parents' childrearing practices as traditional and therefore outdated, and not suitable for today's children. The amount of remuneration for grandparents' labor could be a source of strain as well. Thus, less educated grandparents in the household may be more of a liability than a resource for children. A study using longitudinal data from Maryland in the U.S. found that for black children, time spent with poorly-educated grandparents was associated with lower levels of academic performance (Patillo-McCoy, Kalil and Payne, 2003).

The preference towards nuclear families by married couples is no longer a phenomenon only in Western industrialized countries. In many less developed nations, such as Taiwan, elderly chooses to live in close proximity rather than in the same household as their grandchildren, so they can be independent from their children and grandchildren but maintain close contact with them (Frankenberg, Chan, and Morgan 2002). Anecdotal evidence suggests that this is true among highly educated grandparents who do not only hold such a "modern" view more strongly; they also are more able to afford an independent household.

Increasingly, however, grandparents' coresidence also arises as grandparents' help is needed in non-intact families where one or both parents are absent (Casper and Bryson 1998; DeLeire and Kalil 2002). Researchers have found that in "grandparent maintained families," where grandparents take charge of the household, children outperform their counterparts in single-parent families without grandparents (Solomon & Marx, 1995; Entwisle & Alexander, 1996; Aquilino, 1996).

Would grandparents help grandchildren in their cognitive and behavioral development in traditional families where both parents are present? Elder, Conger, and

King (2000) found, in the U.S., the proximity of grandparents' residence to be associated with better school and behavioral outcomes of grandchildren. But residential proximity is qualitatively different from living under the same roof. This leaves a substantial gap in our understanding of the important role coresident grandparents play in the lives of their grandchildren.

Taiwan Context

The population changes in Taiwan more or less follow the path of other industrialized countries in the last decades. That is, increasing total population along with declining fertility rate. The total population was about 7 million in 1951, and increased to 23 million in 2004. At the same time, the total fertility rate (TFR) achieved its tip point at 7.0 in 1951, sharply decreased to 1.7 in 1986, and moderately declined to 1.1 in 2005. Despite the change of population size and fertility rate, the life expectancy and age composition demonstrate that the aging population (50^+ year-olds) increases in Taiwan society. The life expectancy is 79 years in 2005, whereas the 0-14 year-olds represent 20% of total population, 15-50 year-olds is 57%, and 23% 50^+ year-olds. Among the 50^+ year-olds, the old people (65^+ year-olds) is 9%.

Among the 50^+ year-olds, most people are married or cohabitating, about 82.8% for the 50-64 age group and 57.5% for 60^+ age group, and their living arrangement present different patterns. More than half of 50-64 year-olds live in nuclear family (56.1%), 21.7% of them live in extended family (three-generation family), 14.7% live with partner only, and 4.9% live alone. Unlike the 50-64 year-olds, more old population live in extended families (about 37.9%) and they also have more proportion of people

live alone (13.7%). Besides the two types of living arrangement, there are 22.5% of old people live in nuclear family and 22.2% live with their partners only.

Another noticeable change in population is the changing marital status, which is mainly as a result of increasing divorce rate in the last 10 years. More and more married people prefer to divorce rather than keeping marital tie with their partners. The divorce rate was 0.9 in 1976, continuously and moderately increased to 2.6 in 1993, and then speeded up to 5.6 in 2005. In the divorced population, women have higher divorce rate at 6.9 than men at 4.4. However, the remarriage rate for men is 27.4, much higher than women, who have remarriage rate at only 7.0.

Theoretical Considerations

The educational benefits of grandparent-grandchild coresidence require at least two conditions. First, there must be a close multigenerational bond between grandparents and grandchildren so that grandparents provide emotional support for grandchildren. Second, grandparents are resourceful in terms of their income and education. The idea that a close adult-child relationship with educational resources flowing from the adult to the child has educational benefits to the child is the family-based "social capital" explanation of school outcomes (Coleman 1988). Coleman conceptualized adult-child relationship as a form of social capital that enhances the production of human capital, i.e., education in children. This concept of social capital is useful for understanding possible influence of co-resident grandparents on grandchildren's schooling. Compared to nuclear families, extended families consist of greater and more varied adult-child relationships. Adult-child bonds could be between parents and children, or between grandparents and grandchildren, and between grandparents and parents. There is "intergenerational

closure" within an extended family (Coleman 1988), providing a child more monitoring and supervision. One can imagine an idealized version of an extended family where grandparents provide support and connections between the grandchild and his/her parents. If wisdom comes with age, the help provided by grandparents may be even more useful than the help given by parents.

Such an idealized scenario depends, to a large extent, family relations and parenting styles in the multigenerational family. If grandparents' coresidence occurs by necessity rather than by choice, conflict between grandparents and parents are likely to happen. Conflict between grandparents and parents will cause psychological stress to the child, which hampers the child's social and cognitive development. On the other hand, if grandparents' coresidence occurs as a result of family tradition, when parents consider complete caretaking of their elderly parents as their responsibility; intergenerational conflict may not be a problem. However, these parents are likely to adopt more parenting styles, are more supportive of seniority rules and preference towards boys rather than girls. Children raised in these traditional families do not learn skills that enable them to function independently in school and in their studies. Previous research has found authoritarian parenting to be negatively associated with children's school achievement (Dornbusch). Girls may suffer more from such traditionalism in the family than do boys, when parents and grandparents give favors to their brothers.

There is no theoretical basis for *a priori* predictions about the gross effect of co-residence with grandparents. Although previous studies suggested that there are benefits of multigenerational families, there are also reasons for a negative association between multigenerational family and child outcomes. Despite these ambiguities, we expect that

family relations differ in nuclear and multigenerational households. The association between grandparents' coresidence would be revealed after controlling for family relations. Furthermore, this association varies by parental structure. In single-parent families, stepfamilies, or guardian families, grandparents are likely to compensate for the absence of one or both birth parents.

Data

Our data come primarily from the first wave of the Taiwan Educational Panel Survey (TEPS) conducted under the auspices of Academic Sinica in Taiwan, Ministry of Education, and National Science Council. Fielded in 2001, the first wave of the survey is a clustered multistage stratified probably sample of two populations: (1) students in the first year of junior secondary school, i.e., 7^{th} graders, and (2) students in the 2^{nd} year of senior secondary school, i.e., 11^{th} graders. We use only one variable from the second wave which was fielded two years later to aid the construction of the grandparent coresidence variable (to be discussed below). In this paper, we analyze only the 7^{th} graders in wave I, totaling 13,978 students selected from 333 junior high schools. For details of this survey see Chang (2003).

Our study sample is based on 13,761 seven-grade students who gave valid responses on family structure and test scores. Among these 13,761 seven-grade students, (78%) live with grandparents, suggesting prevalence of multigenerational families in Taiwan. The percentage of residing with grandparents is about as high as that of residing with both parents, which is 79 percent (n=10,830) among these 7^{th} graders. Single-parent families are not uncommon; they make up 13 percent (n=1,767). Stepfamilies and no-

parent guardian families are rare, however, and they make up 2 and 6 percent (n=272, 892), respectively.

Variables and Measures

Our dependent variable is the 7th grade "cognitive ability score" which combines test scores from 4 domains: math, language, science, and problem solving. The last domain, problem solving or logical reason is not based on the school curriculum.

Our major independent variables measures coresidence with grandparents. One is a dummy variable indicating whether the child is living with grandparents in 7th grade. The other is an ordinal variable that specifies the timing of grandparent's coresidence. In wave I, a question is asked whether the child currently lived with his/her grandparent(s). In wave II, when the child was in 9th grade, he/she was asked if he/she lived with his/her grandparent(s) before grade 7. From these two indicators we created a variable that measures the following four situations in 7th grade: living with grandparent(s) in 7th grade (*this year only*), living with grandparents before 7th grade but not during 7th grade (*before 7th grade*), living with grandparents before and during 7th grade (*all the time*), and never lived with grandparents up to 7th grade (*never*). Dummy variables are then created with "never" as the reference category.

Family relation variables, extracted from wave I, include conflict in the home, parenting practices, seniority rules, and preference for boys. The child was asked whether he/she fights with their mother or father, measured in a scale from 1 (never) to 4 (always). We took the average of these two indicators to create the variable: *conflict* in the home.

Parenting styles are represented by a question posed to parents, "when you have conflict with your child, how do you resolve it?" From this question we created 5 types of parenting in terms of decision making: unilateral youth decisions, unilateral parental decisions with force, unilateral parental decisions with persuasion, joint decisions, and ambiguous decisions and other practices. The reference category is joint decisions.

Family relationships are represented by seniority rule and boy preference. Seniority rule is derived from a question to the child asking if family relations are governed by a clear demarcation of age, which has a scale from 1 (always) to 4 (never). We reverse recoded these values such that the highest score means a stricter seniority rule. Information about boy preference comes from the question to the child asking if family relations are governed by the differential treatment of boys and girls favoring the former. This variable also has 4 values and was reverse coded such that the highest score represented greater practice of boy preference.

Family socioeconomic status is measured by both family income and parental education. Family income which has 5 categories: less than NTD 20,000, NTD 20,000 - 50,000 (not including 50,000), NTD 50,000 - 100,000, NTD 100,000 - 150,000, NTD 150,000 - 200,000, more than NTD 200,000. Parents' education has 5 categories measuring the highest level of education attained: less than junior high (JH), high school graduate, junior college, university degree, and graduate school. High school graduation is the reference group.

Family structure variables are created from the wave I parent survey. The adult who filled out the survey was asked if he/she was the student's (a) father or mother, (b) stepfather or stepmother, or (c) adopted father or adopted mother. In addition, the adult

was asked if he/she was married, widowed, divorced, separated, or co-habiting. From these indicators we created dummy variables representing four types of families: two-parent (reference), stepparent, single-parent, and no-parent family. We include mother's work which is a dummy variable with 1 representing mother in the labor force, and 0 otherwise.

Several demographic variables are used as controls. They include the child's age, gender, and ethnicity, and the fluency of the official language of Mandarin. Ethnicity has four categories: Hakka, Mainlander, Aborigine, and Taiwanese. The first three groups are minority populations. The largest population, the Taiwanese, is the reference group.

Results

Table 1 shows structural characteristics and average cognitive ability scores for four groups of children classified by grandparent's coresidence. The group of children who have grandparents all the time has the highest cognitive ability scores, followed in the order by those who never lived with grandparents up to 7^{th} grade, then by those whose grandparents lived with them only in 7^{th} grade, and finally by those who lived with grandparents before 7^{th} grade but not currently. The last group is likely to have experienced a death of a grandparent or family change such that they can no longer lived with a grandparent. Interestingly, family socioeconomic status does not appear to vary substantially by the type of grandparent coresidence, but children in single-parent or guardian families are more likely to be spending time with grandparents.

Multivariate analysis in Table 2 verifies what we have already observed in Table 1. Model 1 shows what we typically find in studies on student achievement, that higher cognitive scores are positively associated with parental education, family income, and the

fluency in the official language (Mandarin), but negatively associated with age, being male and minority. Adding the living arrangement with grandparents does not change these relationships. The result in Model 2 shows a positive association between living with grandparent and grandchildren's cognitive scores. This positive relation remains the same when family structure is controlled. And the coefficients for the various time measures of grandparents' coresidence confirm that children who lived with grandparents all the time have the highest cognitive scores, whereas children who lost their grandparents, either due to their death or moving away, scored the lowest. Children who lived with their grandparent only in 7th grade do not differ from children who never lived with grandparents.

Table 3 shows gender difference in this relationship. Boys and girls have different cognitive scores at different ages, and the oldest boys have the lowest cognitive scores. The positive association between parental education and students' cognitive scores does not differ by gender, and girls of parents with graduate school degree have higher cognitive scores than boys who also have parents graduate from graduate school. Grandparents' coresidence affects boys more than girls. Boys who lived with grandparents all the time have highest cognitive scores, and boys are also more likely to have lower cognitive scores than girls when they lost their grandparents. Not living with two biographical parents is negatively associated with cognitive scores for both boys and girls. However, the negative coefficients are larger for boys than for girls, suggesting that boys are more affected by nonintact families than are girls.

Unexpectedly, adding family relations and parenting style variables in Table 4 does not alter the results of grandparents' coresidence as we have seen in the previous

table (Table 3). However, in general the coefficients of parenting styles are what we expected: unilateral youth or parental decision-making practices are significantly more detrimental to children than are joint decision-making. Favoritism towards boys is also significantly associated with low cognitive scores. However, the association between cognitive scores and conflict at home, or between cognitive scores and seniority rule, is curvilinear. Some conflict or seniority rule helps, but after a threshold, conflict or seniority hurts the child.

Summary and Conclusion

Using data from Taiwan, this study examine the association between coresidence with grandparents and grandchildren's cognitive development measured by the cognitive ability score. Our results suggest that the timing of coresidence with grandparent matters. Grandchildren benefit from having grandparents on a long term basis. Living with grandparents for a short time is no different from not living with a grandparent at all. Furthermore, losing a coresident grandparent is significantly associated with lower cognitive scores. These relationships between grandparents' coresidence and grandchildren's cognitive achievement are not mediated or confounded by parental structure, family relations, or parenting styles.

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Table 1. Family characteristics and test score by grandparent coresidence

	Living arrangement with Grandparent				Full Sample
	This year only	Before 7th grade	All the time	Never	
Test Score	-.10	-.18	.20	.00	.00
Parent Education	2.14	2.13	2.23	2.20	2.19
Family Income	54.86	57.02	57.30	59.46	58.55
Working Mom	.24	.25	.25	.23	.23
Family Structure					
Two-parent	.77	.77	.77	.85	.83
Single-parent	.15	.14	.12	.09	.10
Cohabitation	.02	.01	.01	.01	.01
Step-parent	.00	.00	.00	.00	.00
No-parent	.01	.03	.06	.01	.01
N	1,303	863	1,641	9,217	13,024

Table 2. Analysis of Taiwanese Junior High Student's Cognitive Ability Test Score, Taiwan Education Panel Survey (TEPS)

	Model 1	Model 2	Model 3	Model 4	Model 5
Demographic Characteristics					
Age 11-12	-0.060**	-0.060**	-0.065**	-0.066**	-0.065**
Age 14-15	-0.579**	-0.568**	-0.514**	-0.513**	-0.521**
Male	-0.045**	-0.043**	-0.027+	-0.025+	-0.019
Hakka	-0.103**	-0.103**	-0.120**	-0.118**	-0.116**
Mainlander	-0.012	-0.012	-0.022	-0.022	-0.022
Aborigine	-0.675**	-0.667**	-0.605**	-0.601**	-0.596**
Fluent in Mandarin	0.602**	0.595**	0.514**	0.513**	0.510**
Parental Education					
Less than JH	-0.247**	-0.242**	-0.258**	-0.257**	-0.251**
Junior College	0.366**	0.368**	0.338**	0.339**	0.339**
University	0.555**	0.558**	0.536**	0.535**	0.535**
Grad School	0.617**	0.626**	0.607**	0.605**	0.603**
Family income	0.003**	0.003**	0.003**	0.003**	0.003**
Working Mom				-0.061**	-0.059**
Living arrangement: living with					
Grandparent (1=yes, 0=no)		0.097**	0.129**	0.130**	
Grandparent (ref: never)					
this year only					-0.001
before 7th grade					-0.081**
all the time					0.223**
Step-parent			-0.431**	-0.431**	-0.427**
Single-parent			-0.245**	-0.250**	-0.246**
No-parent			-0.617**	-0.620**	-0.623**
N	12847	12813	12813	12813	12847
R-square	0.23	0.23	0.26	0.26	0.27

+ p<0.1; * p<0.05; ** p<0.01

Table 3. Analysis of Taiwanese Junior High Students' Cognitive Ability Test Scores, by gender

	Model 6 Girls	Model 7 Girls	Model 6 Boys	Model 7 Boys
Living arrangement: living with				
Grandparent (ref: never)				
this year only	-0.009	-.005	0.006	.007
before 7th grade	-0.074	-.069	-0.089*	-.086**
all the time	0.139**	.103**	0.320**	.263**
Step-parent	-0.261**	-.261**	-0.555**	-.559**
Single-parent	-0.150**	-.162**	-0.335**	-.349**
No-parent	-0.575**	-.663**	-0.659**	-.719**
Interactions				
all the time*single-parent		.083		.137
all the time*no-parent		.319**		.350**
N	6314		6533	
R-squared	0.24		0.29	

+ p<0.1; * p<0.05; ** p<0.01

Table 4. Analysis of the mediating role of parenting styles and family relations

	Model 9	Model 8
Living arrangement: living with		
Grandparent (ref: never)		
this year only	0.001	0.008
before 7th grade	-0.078**	-0.074*
all the time	0.191**	0.195**
Step-parent	-0.428**	-0.338**
Single-parent	-0.246**	-0.245**
No-parent	-0.695**	-0.632**
Interactions		
all the time*no-parent	0.330**	0.292**
Parenting style:		
unilateral youth decisions		-0.109**
unilateral parental decisions with persuasion		-0.049**
unilateral parental decisions with force		-0.074*
Ambiguous decisions		0.004
Family Relations		
Conflict at home		0.260**
Conflict at home squared		-0.055**
Seniority rule		0.559**
Seniority rule squared		-0.102**
preference towards boys		-0.143**
N	12847	11804
R-squared	0.27	0.29

+ p<0.1; * p<0.05; ** p<0.01