

Social Determinants and Consequences of Early Childhood Development in China

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Introduction

Early childhood is a period of rapid development in a human life. From birth to age 5, infants and young children exhibit dramatic progress in their physical, cognitive, socio-emotional, and linguistic capacities. There is strong evidence that striking disparities in child development begin prenatally and in the first years of life. These differences are strongly associated with socio-economic background factors, such as parent's education, parent's occupation, and family's income (Duncan, Brooks-Gunn J, and Klebanov, 1994; Taylor, Dearing, and McCartney, 2004; Waldfogel, Han, and Brooks-Gunn, 2002). Early childhood interventions, aiming to support children with developmental delays or disabilities from birth to school entry and their families, yield significant benefits in the short and longer terms (Campbell et al.,2014). Unfortunately, nearly all studies on this subject have used data from the U.S. and Western European countries. Very few have examined this question in East Asian countries such as China. The paucity of studies in China partly results from the limited access to national representative data on family and children.

In this study, we capitalize on data from the China Family Panel Studies, a recently available national representative and longitudinal survey dataset, and investigate the factors that affect early childhood development and the impact that early childhood development has on future outcomes. Our study, by extending research to East Asian social contexts, will enhance our knowledge on early childhood development and social inequality.

Research Motivation and Theoretical Model

Social Inequality in Early Childhood Development

As shown in Figure 1, differences in socio-economic status lead to inequalities in early childhood development, which place children on a lower lifetime trajectory, with negative implications for educational attainment and adult productivity, thereby contributing to the intergenerational transmission of social inequality. To begin with, it is well understood that family socio-economic status exerts a strong influence on early childhood development, with children from higher-SES families outperforming those from lower-SES families in a range of domains (pathway b in Figure 1). For instance, the ages at which children learn language and start talking vary, and there is a negative relationship between family SES and the degree of language delay (Fernald, Marchman, and Weisleder,2013).Infants and young children from disadvantaged families are less likely to attain their developmental potential, primarily because of poverty, nutritional deficiencies, and inadequate cognitive

stimulation(Walker et al.,2011).These socio-economic gradients have been documented in many parts of the world (e.g., Fernald et al.,2011).

The Lifelong Effects of Early Childhood Development

There is growing recognition that children in their earliest years develop foundational capabilities on which subsequent development builds (pathway c in Figure 1). For instance, children's poor development under 5 years of age is associated with more than a 20% deficit in adult income (Grantham-McGregor et al. 2007). It has also been established that inequalities in early childhood development contribute to lifetime differences. More importantly, recent studies indicate that these disparities in early learning and development persist and even grow larger over time (Halle et al.,2009; Lee and Burkam,2002).Accordingly, relative to primary education and subsequent schooling, early childhood interventions are seen as the most cost-effective form of human capital investment (Heckman, Stixrud, and Urzua,2005). However, more evidence is needed on the long-term effects of early childhood development in developing or under-developed countries.

Research Questions

In this study, we wish to provide an empirical evaluation, in the context of contemporary China, of the social determinants and consequences of early childhood development. We use newly available data from the nationally representative, longitudinal China Family Panel Studies (CFPS) to address the following research questions:(1) What are the causes of inequities during early childhood and how do these inequities affect health and development during this period? (2) What is the relationship between health and development inequities during the early years and subsequent educational outcomes?

Data and Methods

Data. The CFPS is an on-going, nationally representative, longitudinal survey of Chinese communities, families, and individuals, launched in 2010 by the Institute of Social Science Survey at Peking University. The nation-wide CFPS baseline survey has successfully interviewed 14,960 families, along with 33,600 adults and 8,990 children within these families. The individuals are tracked through biennial follow-up surveys. The CFPS has a child module for all respondents below age 15. This module includes questions about children's growth and development as well as parenting behaviors and attitudes, covering four key periods: infancy, early childhood, middle childhood, and adolescence. Moreover, children aged 10-15 are administered cognitive tests on their math and reading ability. When children grow beyond the age of 0-15, they are automatically transferred into the adult module. One important feature of the CFPS is that it collects information on the family and the core family members, which allows us to link children with their families and to examine our research questions. In our study, we combine data from CFPS 2010, 2012, 2014, and the most recent available 2016 wave.

Early Childhood Development. We use several measurements to capture children's health and development in early years. The first measurement is birth weight. A parent or adult guardian was asked to recall the body weight of each child at birth in our sample. We also use four developmental milestones for babies, that is, when a baby starts to walk, talk, count, and urinate by him/herself.

Educational Achievement. Two standardized tests, including a math test and a word test, are administered in the CFPS to measure children's educational achievement. The math test asks the respondent children to solve the mathematical problems presented to them, ranging from 0 to 24. The word test asks them to read out characters, ranging from 0 to 34. Giving consideration to the different scales, we standardize the test scores and use the sample standard deviation as the dependent variable.

Parental Socio-economic Status. Family SES is generally measured by parent's education, occupation, and family's income. Our study is based upon retrospective data, in which a parent or adult guardian reports child development and socio-economic status. We assume that the adult population's educational attainment does not change. In this study, we thus use parent's education as the key indicator of family SES. To be sure, our results are not sensitive to this parametric specification, and we also use a subsample of new-born babies.

Covariates. We also control an extensive set of covariates, such as children's age, gender, father's age at birth, mother's age at birth, hukou type, residential area, etc.

Methods. Our analyses fall into two parts, each of which corresponds to one of our research questions. We employ conventional regression analyses. To examine our first question, we use early childhood development as the dependent variable and parents' education as the key independent variable. Similarly, we use educational achievement in adolescence as the dependent variable, whereas the key independent variable is early childhood development.

Preliminary Results

Results from preliminary analyses corroborate our theory. Figure 2 shows that children from disadvantaged families are more likely to be low birth-weight infants (less than 2,500 grams), as well as late walking (starting to walk alone later than age 18 months), late talking (starting to talk simple sentences later than age 30 months), late counting (starting to count from "one" to "ten" later than age 48 months), and late toilet-training (starting to urinate by themselves later than age 36 months). This suggests that inequalities in children's growth and development are substantial from the beginning. Table 1 summarizes the preliminary results from the regression analyses. In addition, as shown in Tables 2 and 3, developmental deficits in early childhood have significant negative relationships to children's verbal and mathematical scores. The early childhood period is the basis for later success in school and life.

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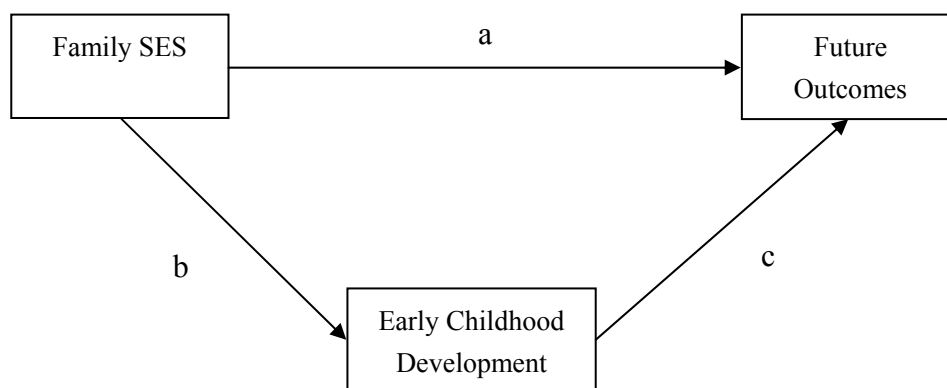


Figure 1. Parental Socioeconomic Status, Early Childhood Development, and Future Outcomes

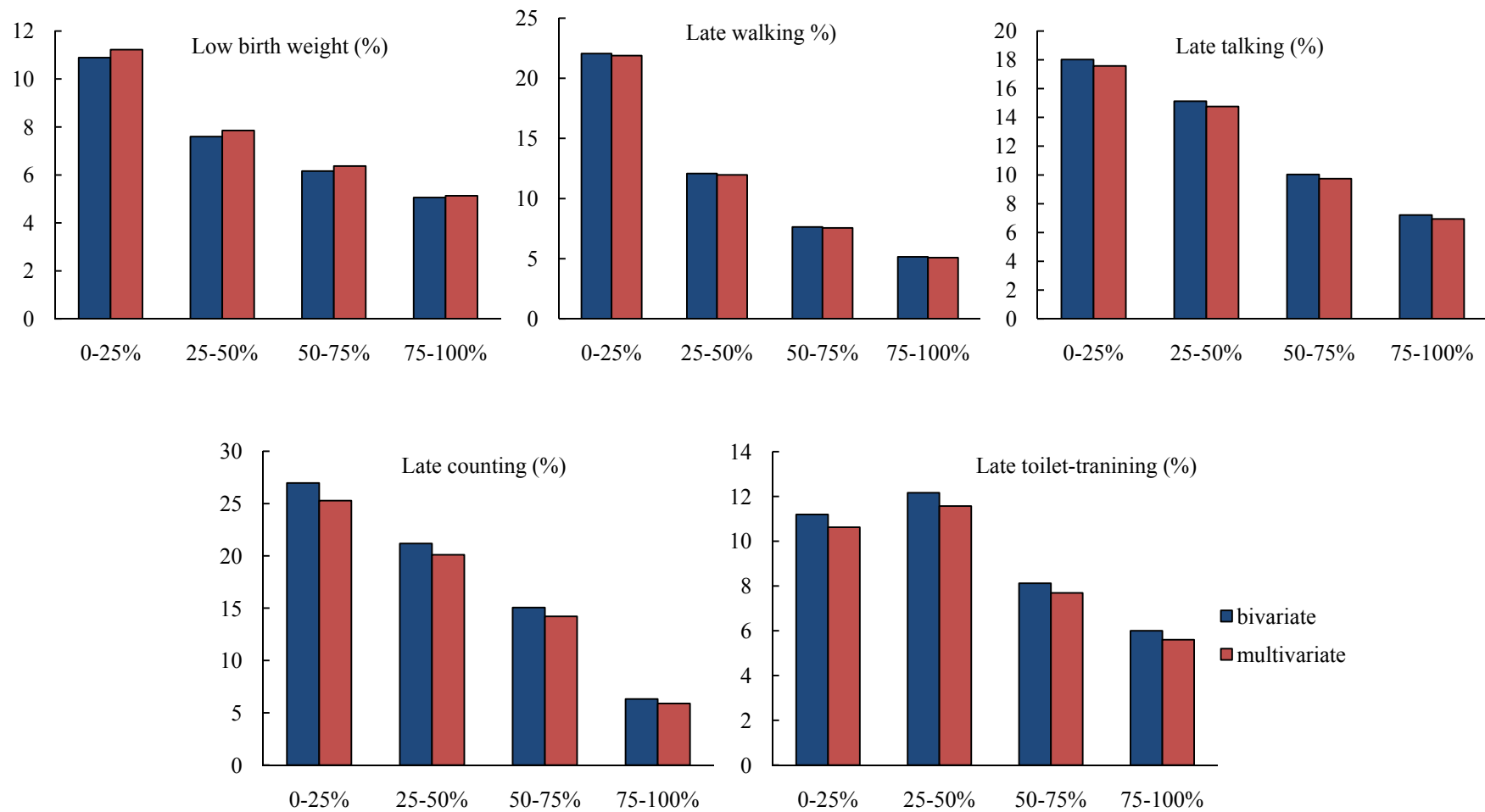


Figure 2. Parental education and early childhood health

Table 1. Parental education and early childhood development

	Low birth weight		Late walking		Late talking		Late counting		Late toilet-training						
	coff.	s.e.	coff.	s.e.	coff.	s.e.	coff.	s.e.	coff.	s.e.					
Parents' education (rf:0-25%)															
25-50%	-0.27	0.19	-0.61	0.21	**	-0.19	0.14	-0.16	0.15	0.04	0.17				
50-75%	-0.48	0.20	*	-1.03	0.22	***	-0.60	0.14	***	-0.47	0.16	**	-0.34	0.18	~
75-100%	-0.52	0.20	*	-1.20	0.23	***	-0.86	0.15	***	-1.14	0.16	***	-0.58	0.18	**
Age	0.02	0.02		0.07	0.02	***	0.07	0.01	***	0.13	0.01	***	0.14	0.01	***
Female	0.27	0.10	**	-0.09	0.08		-0.09	0.07		-0.11	0.08		0.00	0.07	
Gestation	-1.16	0.12	***	-0.21	0.09	*	0.11	0.12		-0.17	0.10	~	-0.08	0.10	
Area type at birth (urban=1)	-0.46	0.13	***	-0.53	0.15	**	-0.16	0.13		-0.44	0.11	***	0.05	0.14	
Father's age at birth	0.03	0.02		0.00	0.01		0.02	0.01		0.02	0.01	*	0.01	0.01	
Mother's age at birth	-0.01	0.02		0.02	0.01		0.00	0.02		0.01	0.01		0.02	0.02	
GDP at county level	-0.05	0.08		-0.17	0.11		-0.07	0.08		-0.34	0.10	**	-0.07	0.08	
Constant	8.34	1.32	***	1.27	1.25		-2.92	1.29	*	1.48	1.24		-2.78	1.16	*
N	6,720			7,755			7,382			6,958			7,101		
Pseudo R2	0.09			0.09			0.04			0.13			0.06		

Note: Standard errors in parentheses. ***p < 0.001. **p < 0.01. *p < 0.05. ~p < 0.1

Table 2. The long-term effects of early childhood health on children's verbal ability

	M1			M2			M3			M3			M3		
	coff.	s.e.		coff.	s.e.		coff.	s.e.		coff.	s.e.		coff.	s.e.	
Low birth weight	-1.762	0.610	**												
Late walking				-0.895	0.283	**									
Late talking							-1.059	0.391	**						
Late counting										-1.022	0.328	**			
Late toilet-training													-0.587	0.293	*
Parents' average years of schooling	0.038	0.055		0.071	0.052		0.054	0.052		0.060	0.049		0.061	0.049	
Parents' cognitive skills	2.187	0.320	***	2.155	0.329	***	2.199	0.331	***	2.060	0.291	***	2.131	0.284	***
Urban	0.147	0.288		0.068	0.278		0.116	0.279		0.141	0.280		0.106	0.279	
Age	0.885	0.044	***	0.925	0.041	***	0.920	0.040	***	0.905	0.042	***	0.909	0.041	***
Female	0.807	0.235	**	0.907	0.211	***	0.901	0.209	***	0.912	0.206	***	0.881	0.205	***
Gdp at county level (logged)	0.473	0.182	*	0.463	0.196	*	0.512	0.199	*	0.486	0.200	*	0.508	0.199	*
N	3223			4057			4069			3,978			3,982		

Note: Standard errors in parentheses. ***p < 0.001. **p < 0.01. *p < 0.05. ~p < 0.1

Table 3. The long-term effects of early childhood health on children's mathematical ability

	M1		M2		M3		M3		M3						
	β	se	β	se	β	se	β	se	β	se					
Low birth weight	-0.318	0.283													
Late walking			-0.380	0.150	*										
Late talking					-0.290	0.201									
Late counting							-0.671	0.174	***						
Late toilet-training									-0.229	0.134	+				
Parents' average years of schooling	-0.005	0.031	0.024	0.031	0.021	0.031	0.021	0.030	0.024	0.030					
Parents' cognitive skills	1.081	0.145	***	0.993	0.148	***	1.020	0.147	***	0.941	0.135	***	0.975	0.130	***
Urban	0.087	0.165		0.088	0.155		0.094	0.157		0.055	0.155		0.054	0.158	
Age	0.761	0.026	***	0.767	0.024	***	0.766	0.024	***	0.771	0.024	***	0.766	0.024	***
Female	-0.025	0.129		-0.059	0.120		-0.066	0.122		-0.073	0.123		-0.074	0.121	
Gdp at county level (logged)	0.316	0.089	***	0.331	0.085	***	0.350	0.082	***	0.335	0.083	***	0.357	0.085	***
N	3224		4058		4070		3,979		3,983						

Note: Standard errors in parentheses. ***p < 0.001. **p < 0.01. *p < 0.05. ~p < 0.1