



The psychological and behavioral outcomes of migrant and left-behind children in China



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ABSTRACT

With China's urbanization and its development in market economy, mass rural-to-urban migration greatly expanded over the past decades. Consequently, migrant and left-behind children have greatly increased in number. Using data from the 2011 Survey on Social Integration of Migrant Children in Wuhan, China, this study examined psychological and behavioral problems of migrant and left-behind children. Results showed that left-behind and migrant children had poorer psychological and behavioral outcomes than local children. However, the difference disappeared after controlling for family and school characteristics. The findings provided implications on improving psychological and behavioral outcomes of migrant and left-behind children through family intervention and education policy reform.

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1. Introduction

Since the late 1970s, China's fast urbanization, industrialization, development of market economy and privatization have led to a large number of surplus agricultural laborers and urban–rural income disparity (Chen, Wang, & Wang, 2009; Wong, Li, & Song, 2007). As a result, millions of rural laborers have migrated to cities to look for better job opportunities (Jia & Tian, 2010). These migrant workers, who usually work in manufacture and service industries in private sectors, generally work longer hours yet receive lower incomes and less welfare benefits than urban residents (Li & Li, 2007; Wong et al., 2007). Because of its great magnitude and social impact, the migrant worker population in China has triggered increasing discussion of the impacts of migration on individuals, families, and communities (Cai, 2003; Fan, Fang, Liu, & Liu, 2009; Wong et al., 2007).

With the increasing number of migrant workers, migrant children, who are relocated in urban areas with their migrant parents, as well as left-behind children, who are living without one or both of their parents that migrated to work, have substantially increased in number. According to the estimation of All-China Women's Federation (2013),

China now has approximately 61.03 million left-behind children, which represents an increase of 2.42 million since 2005, and this accounts for 21.88% of the Chinese child population today. At the same time, China also has 35.81 million migrant children, which represent a 41.4% increase since 2005, and this comprises 12.84% of the current Chinese child population.

Due to the transition in their internal family environment and external social context, these children face great challenges in psychological and social development. Migrant children face challenges of living in a new social and cultural environment in cities, although their internal family structure may not have changed (Fan et al., 2009). Facing the marginalization by the urban economic and welfare system and cultural differences, migrant children can hardly integrate into urban society (Chen et al., 2009; Li & Li, 2007).

On the other hand, as their parent(s) moved to other places for work, left-behind children have to adapt to challenges resulting from internal family structural change, such as emotional difficulties in separation from parents and inadequate parental care (Fan et al., 2009). Almost 20% of migrant parents left their children in their hometown when they were less than one year old. Among these parents, 30% left when their children were between one to three months in age (All-China Women's Federation, 2013). In addition, left-behind children's long-term separation with parent(s), as well as inadequate family supervision and emotional care, greatly impacts their life quality, as well as their physical and psychological well-being as they grow-up (All-China Women's Federation, 2013; Su, Li, Lin, Xu, & Zhu, 2012; UNICEF, 2010).

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The above issues are linked to certain institutional factors. In the 1950s, the Chinese central government established the *Household Registration System* that registered all Chinese citizens as residents in a specific region, which usually was their birthplace. The system also required changes in the residency to be approved by both the local government at the person's place of origin as well as the government at the destination (Liang & Chen, 2007; Wong et al., 2007). Particularly, the registration system divided citizens into two types – agricultural (generally rural residents) and non-agricultural (urban residents) (Chan, 2009). Depending on the type of registration, individuals' access to public services differed from each other. Urban residents were entitled to a wide range of benefits, such as healthcare and housing subsidies, and opportunities, such as higher-paid jobs and advanced child education, that were rarely available to rural residents (Cai, 2003; Wong et al., 2007; Xu, Guan, & Yao, 2011). At the same time, individuals' "local" residency was also associated with eligibility for benefits provided by local governments; people that were registered in one place could rarely enjoy benefits at another place (Chan, 2009).

On the one hand, the urban–rural disparity motivated rural residents to move to cities in search for a better life for themselves or their families; on the other hand, these migrants could hardly enjoy the same benefits as other urban residents in the city because of their "agricultural" registration status and "non-local" residency. This was also true for their children and other family members (Wong et al., 2007; Xu et al., 2011; Zhao, 2000).

In response to issues and challenges that the migrant population and their children face, the Chinese government initiated a series of policy reforms with respect to the control of population migration and welfare programs in relation to migrant populations. In the late 1980s, the Chinese central government began to allow individuals to move and stay at a different place from their registered residency temporarily. In the early 1990s, with the decentralization of the Household Registration System governance, local governments in some big cities, such as Beijing and Guangzhou, began to abolish the differences between agricultural and non-agricultural registration status, while the distinctions between local and non-local residents still remained (Chan, 2009). Later on during that decade, Chinese governments began to provide benefits, such as pension, occupational injury insurance, and basic healthcare, to migrant workers in state-owned enterprises and big private corporations (Xu et al., 2011). These initiatives, however, have not fundamentally changed the Household Registration System, and had limited effects on improving migrant worker and their children's well-being. The place of residency and type of registration remain significant determinants of individuals' access to public services and life opportunities (Chan, 2009).

2. Literature review

2.1. Migration and child development

Family migration can generate significant impacts on child development. Parents' migration often results in family dysfunction and adverse child psychological outcomes (Steinhausen et al., 1990; Stevens & Vollebergh, 2008). Children affected by migration are at a great risk of suffering from a broad range of psychological problems, such as depression, anxiety, loneliness, and negative self-perception; they may also exhibit behavioral problems (Jia & Tian, 2010; Pottinger, 2005; UNICEF, 2010). Researchers have shown that migration leads to vulnerability and a loss of wellbeing for migrant children, as well as an increased risk in morbidity (Gwyther & Jenkins, 1998; Kouider, Koglin, & Petermann, 2014; Rosado, Johnson, McGinnity, & Cuevas, 2013; Slesinger, Christenson, & Cautley, 1986; Washbrook, Waldfogel, Bradbury, Corak, & Ghanghro, 2012). Although migration of children is a global issue, migration of children in China is a unique problem. China's Household Registration System and mass domestic migration is a special case in the world; therefore, making China's migration of children and its

following consequences different from other countries. This paper will examine the extent of previous findings on children from migrant families in China.

Studies found that, for instance, although living in cities, migrant children's life experience was limited within school, home, and neighborhood, which led to their insufficient communication with urban residents, inadequate social skills, and self-perceived marginalization (Guo, Yao, & Yang, 2005; Li & Li, 2007). Migrant children also had an averaged 0.16 points higher level of loneliness (1.95 vs. 1.79, on a 1–4 scale) than children who were neither migrant nor left-behind (Fan et al., 2009).

Left-behind children are also faced with similar problems. Rural children whose parents had both migrated were found to have lower level of life satisfaction and higher level of loneliness than non-left-behind children. Children with one parent who had migrated also had higher level of loneliness than non-left-behind children (Su et al., 2012). Similarly, Jia and Tian (2010) suggested that left-behind children were more likely to suffer from loneliness and more likely to experience severe loneliness than non-left-behind children. Fan et al. (2009) also argued that children whose parents had both migrated had lower level of self-esteem, higher level of depression, and higher level of loneliness than children who were neither migrant nor left-behind.

There are, however, mixed findings with respect to the effect of migration on child psychological outcomes. Guo et al. (2005) found that many migrant children were very positive toward life and believed that their condition would improve in future. Some studies also depicted that left-behind and non-left-behind children did not differ significantly in self-perceived happiness, in which positive coping strategies and social support might be the protective factors (Hu, Liu, Shen, & Fan, 2008; Zhang, Tang, Hu, & Xu, 2006).

2.2. Family environment and child development

Family environment plays a significant role in child psychological and social development. Due to migrant parents' long work hours and relatively low level of education, migrant parents often lack time and skills to tutor their children's homework; the insufficient parent–child communication makes migrant children more likely to feel lonely than urban children. Parents are also concerned more about children's academic performance than their psychological and emotional needs (Guo et al., 2005).

A similar result was found for left-behind children. Jia and Tian (2010) pointed out that left-behind children's relationship with their parents was substantially weaker than non-left-behind children, which in turn might lead to psychological problems. Children who were raised by grandparents, had poorer relationships with parents, or infrequently communicated with parents, would encounter more frequent and severe loneliness. Su et al. (2012) also found that more frequent parent–child communication was linked to children's higher level of life satisfaction, academic satisfaction and happiness.

2.3. School environment and child development

Under China's Household Registration System, children's access to and quality of education can vary significantly among regions (Liang & Chen, 2007). Students who want to enroll in public schools need to be registered and residing in the same school district since local governments are responsible for paying for educational expenses. Migrant children, who usually are not registered in urban areas, are often denied access to or enrolled with additional charges in urban schools (Dong, 2010; Liang & Chen, 2007; Wong et al., 2007).

As the migrant child population continues to grow, China's Ministry of Education articulated that migrant children should primarily be enrolled in local schools in cities (Liang & Chen, 2007). Many local governments, such as the government of Hubei Province, also began to require local urban schools to admit migrant children to guarantee

the basic right of education of migrant children (Wuhan Education Bureau, 2012). In 2010, 11.6 million migrant children received public education in urban areas with the financial support from governments (Ministry of Education of the People's Republic of China, 2011). Despite these efforts, many migrant children still do not have equal access to urban schools (Dong, 2010), or have difficulties interacting with teachers and peers in urban schools (Guo et al., 2005).

As a result, private schools that are established specially for migrant children in urban areas have become another choice for migrant families. These migrant schools typically have relatively low tuition fees, poor infrastructure and poor teaching quality (Dong, 2010). Migrant schools might have much less diverse curricula and fewer extracurricular activities than urban schools. Music, art, and physical education classes, for instance, were rarely offered by qualified teachers in migrant schools; activities such as field trips were also much less likely to be organized in migrant schools (Guo et al., 2005). The disparities between migrant and urban schools, in turn, negatively affect migrant children's development in many ways.

Poor school environment, such as crowded classrooms and a lack of qualified teachers, is linked to migrant children's poor academic performance, especially in studying English. The frequent transfers among schools also impede migrant children to build long-term friendships with schoolmates. These factors may lead to more frustration for migrant children (Guo et al., 2005), fewer social skills and school leadership roles than their peers at urban schools (Chen et al., 2009).

School environment also plays an important role in the development of left-behind children, most of whom reside and study in underdeveloped rural areas, where school environment and education quality are highly differentiated from urban areas (Hu, 2008). Most rural schools in China lack basic infrastructures such as libraries, dining halls, laboratories, computer and Internet access, and sports equipment. The poor conditions of rural schools can hardly attract highly qualified teachers; on average, teachers in rural areas have lower levels of education than teachers in urban schools (Hu, 2008). In response, the Chinese central government allocated 73.2 billion yuan to support rural elementary schools and middle schools in 2010. The government's financial support facilitated the education fee exemption and benefited 130 million rural students, which included a great number of left-behind children (Ding, 2008). Rural schools, however, are still faced with problems such as limited budget, poor school facility, and high teacher–student ratio (Hu, 2008).

In light of the potential effects of migration on child development, this study focuses on two research questions. First, it examines the psychological and behavioral outcomes of migrant and left-behind children, compared to the outcomes of local children in Wuhan, China. Second, given the potential impacts of family and school on child development, this study also discusses the effects of the family and school environment on the three groups of children. This study used data from a survey, which was designed to explore the psychological and behavioral outcomes of migrant (migrated from other places), left-behind (at least one of their parents migrated to work elsewhere for over half a year) and local (registered locally and living with parents) children, in Wuhan, one typical city in central China. The purpose of this study is to fill the gap of knowledge and comprehensive understanding of psychological and behavioral outcomes of these types of children, and the effects of family and school environment on their psychological and behavioral outcomes in China.

3. Hypotheses

Based on the literature, we propose the following hypotheses. First, due to migration and insufficient parenting, migrant and left-behind children have worse psychological and behavioral outcomes than local children, and left-behind children have the worst psychological and behavioral outcomes. Second, besides individual characteristics, family environment makes a significant difference on children's psychological

and behavioral outcomes, and a harmonious family relationship, higher household income level, and stable marital status of parents are positively associated with psychological and behavioral outcomes. Third, the school environment also significantly influences children's psychological and behavioral outcomes, and children in schools located in rural areas and schools with a higher ratio of migrant children to total students (more severe shortage of education resources for per child) are associated with worse psychological and behavioral outcomes.

4. Methodology

4.1. Data

The data used in this study was collected from Wuhan, Hubei Province of China in 2011. To explore the psychological and behavioral outcomes of migrant and left-behind children, the China Communist Youth League Wuhan Municipal Committee and the Wuhan Mental Health Research Institute conducted the *Survey on Social Integration of Migrant Children in Wuhan* in April and May 2011. A total number of 30 schools, including 15 elementary schools and 15 middle schools, were selected randomly through a multi-stage stratified sampling; within each school, one class was randomly selected from each grade. The investigators contacted parents and guardians of the children in the selected classes, to ask permission to complete the interviews. The Parents, either mother or father, or other guardians, of these children were asked to provide information about their children by filling out the questionnaires. The original sample included parents and guardians of 4574 children; 3473 with complete information on key variables were included in this study.

This survey was conducted in Wuhan, which includes both an urban center and surrounding rural areas, and has a population of more than 10 million, including local residents and migrant laborers. Mixed with industrialized market economy and traditional agriculture, Wuhan is a region of China that has a large laborer immigration and emigration population. The characteristics made Wuhan an ideal region for this study.

4.2. Measures

4.2.1. Dependent variables

Five dimensions of child psychological and behavioral outcomes were employed as the dependent variables in this study: emotional symptom, conduct problem, hyperactivity or inattention problem, peer relationship, and prosocial behavior. These dimensions were measured by the parent-reported version of Strength and Difficulties Questionnaire (SDQ), a scale that was created in the U.S. and proved to be culturally adaptable in Chinese population by the Shanghai Mental Health Center (Kou, Du, & Xia, 2005). SDQ includes 25 items, every five of which measure one dimension of child difficulties or strengths (Goodman, 1997; Youth-in-Mind, 2012).

To measure child difficulties, *emotional symptom* was measured by items that included “often complains of headaches, stomachaches and sickness”, “many worries or often seems worried”, “often unhappy, depressed or tearful”, “nervous or clingy in new situations”, and “many fears, easily scared.” *Conduct problem* was measured by items including “often loses temper”, “generally well-behaved, usually does what adults request”, “often fights with other children or bullies them”, “often lies or cheats” and “steals from home, school, or elsewhere.” *Hyperactivity/inattention problem* was measured by items of “restless, overactive, cannot stay still for long”, “constantly fidgeting or squirming”, “easily distracted, concentration wanders”, “thinks things out before acting” and “good attention span, sees tasks through to the end.” *Peer relationship problem* was measured by items of “rather solitary, prefers to play alone”, “has at least one good friend”, “generally liked by other children”, “picked on or bullied by other children”, and “gets along better with adults than with other children.”

Parents were asked to report their levels of agreement to the description of their children's behavior over the last six months or the school year, on a 3-point Likert scale (*not true to certainly true*); the answers were coded "0" for "not true", "1" for "somewhat true", and "2" for "certainly true." For positive items such as "generally well-behaved, usually does what adults request", "good attention span, sees tasks through to the end", and "has at least one good friend", the answers were reversely coded as "0" for "certainly true", "1" for "somewhat true", and "2" for "not true" (Goodman, 1997; Youth-in-Mind, 2012). Each dimension was measured by the summed scores of the five items and therefore ranged from 0 to 10. A higher score indicated more serious psychological or behavioral problem.

In addition, *total difficulty*, measured by the summed score of the four dimensions (i.e., emotional symptom, conduct problem, hyperactivity/inattention problem, and peer relationship problem), was also employed as a dependent variable. Ranging from 0 to 40, a higher total difficulty score represented more serious psychological and behavioral problems in general.

To evaluate child strengths, SDQ also measured *prosocial behavior* by five items that included "considerate of other people's feelings", "shares readily with other children", "helpful if someone is hurt, upset or feeling ill", "kind to younger children" and "often offers to help others." Using the same 3-point Likert scale, answers were coded as "0" for "not true", "1" for "somewhat true", and "2" for "certainly true". Scores ranged from 0 to 10; a higher score indicated higher level of prosocial behaviors (Goodman, 1997; Youth-in-Mind, 2012). All dependent variables were coded as continuous.

4.2.2. Independent variables

Child category was employed as the main independent variable in this study. In this study, children that were registered and living with parents in Wuhan were defined as *local children*. Children that were not registered but still living in Wuhan were defined as *migrant children*. Children that were registered and living in Wuhan, but had at least one of their parents migrated to work elsewhere for over half a year were defined as *left-behind children*. These left-behind children usually live with guardians other than their parent(s), such as grandparents and other family members.

The study also controlled for children's individual characteristics, including *gender*, *age* and *physical health status*. Gender was coded as "0" for girl, and "1" for boy. Age was coded as a continuous variable. Physical health status was coded as an ordinal variable (0 = good, 1 = fair, and 2 = poor).

Parents' marital status, *household income level*, *harmonious family relationship*, and *mother's years of education* were also employed as independent variables to examine the effects of family environment on child outcome. Parents' marital status was employed as a categorical variable (0 = married, 1 = unmarried, 2 = remarried, 3 = divorced or separated, and 4 = other). Household income level was measured by respondents' self-rated income level in local area. Answers were coded 0–2 from "low" to "high". Harmonious family relationship was measured by the question "Is your family relationship harmonious?" (0 = no; 1 = yes). Mother's years of education was employed as a continuous variable.

In this study, we used the *ratio of migrant students to total students in school* as a proxy indicator of schools' openness to migrant children. The Wuhan local government mandatorily requested that schools admit migrant children who live nearby; however, how many migrant children the school wanted to admit was left to the school's own determination. That means *ratio of migrant students to total students in school* is a good proxy variable for a school's open attitude and extent. The ratio ranged from 0 to 1; higher ratio indicated a higher proportion of students in a school were migrant children. Given urban schools usually were allocated with more adequate and higher quality of education resources than rural schools (e.g., teachers and facilities; Lu & Zhang, 2004), we also examined the effects of school location on

child psychological and behavioral outcomes. *School location* was coded "0" for urban schools and "1" for rural schools.

4.3. Analytic strategy

Descriptive analyses of main variables were conducted, followed by bivariate analyses of key variables by child category, the main independent variable. Multivariate regressions were performed to examine the effects of independent variables on children's psychological and behavioral outcomes. The model estimations were explained by the following equation, with β representing the estimated coefficients, and ε as the error term.

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon.$$

Y referred to child psychological and behavioral outcome; x_1 represented child category (local children as reference category); x_2 represented individual demographic characteristics, such as gender, age and physical health status; x_3 represented family characteristics (i.e., parents' marital status, household income level, harmonious family relationship, and mother's years of education); and x_4 represented school characteristics (i.e., ratio of migrant students to total students and school location). We used Ordinary Least Square (OLS) regression to examine the effects; specifically, nested regression models were utilized to estimate the effects of independent variables on dependent variables.

5. Results

5.1. Sample description

Table 1 presents the descriptive statistics for all variables. On a 0–40 scale, the average total difficulty score for the 3473 children was 11.24 points, with a standard deviation of 5.04. Specifically, children had averagely 2.12 points emotional symptom, 1.85 points conduct problem, 4.24 points hyperactivity/inattention problem, and 3.03 points peer relationship problem, on a 0–10 scale. In addition, the average level of prosocial behavior was 6.43 points, with a standard deviation of 2.24. Local children comprised the largest component of our sample (42.53%), followed by migrant children (35.47%) and left-behind children (22%). About half of the sample was boys and the average age was 11 years.

Most sampled parents were married (92%). Most children were from medium-income families (62%), followed by low-income (29%) and high-income families (9%); the majority of families had a harmonious relationship (94%). Migrant students comprised 35% of total students in the sampled schools, 43% of which were located at a rural area.

5.2. Bivariate results

Table 2 presents the bivariate analysis results of key dependent variables by child category. It suggested that levels of psychological and behavioral problems differed significantly among the three child categories. Left-behind children had the highest level of total difficulty, emotional symptom, conduct problem, and peer relationship problem, and the lowest level of prosocial behavior. Migrant children had the highest level of hyperactivity/inattention problem; they also had higher levels of total difficulty, conduct problem, and peer relationship problem, as well as lower levels of prosocial behavior, than local children. The total difficulty score, for instance, was 11.96 points for left-behind children, followed by migrant children (11.28 points) and local children (10.84 points). The level of hyperactivity/inattention problem was 4.42 points for migrant children, followed by left-behind children (4.2 points) and local children (4.11 points). In general, left-behind children had the poorest outcomes among the three child

Table 1
Descriptive statistics of key variables.

Variables (range)	Mean or percentage (S.D.)
Total difficulty (0–40)	11.24 (5.04)
Emotional symptom (0–10)	2.12 (1.86)
Conduct problem (0–10)	1.85 (1.63)
Hyperactivity/inattention (0–10)	4.24 (2.21)
Peer relationship (0–10)	3.03 (1.72)
Prosocial behavior (0–10)	6.43 (2.24)
Child category [%]	
Local	42.53
Left-behind	22.00
Migrant	35.47
<i>Child characteristics</i>	
Boy [%] (1 = boy; 0 = girl)	50.79
Age (5–17)	10.95 (2.66)
Physical health [%]	
Good	57.44
Fair	40.43
Poor	2.13
<i>Family characteristics</i>	
Parents' marital status [%]	
Married	91.56
Unmarried	1.35
Remarried	2.22
Divorced or separated	3.02
Other	1.84
Household income level [%]	
Low	29.40
Medium	61.47
High	9.13
Harmonious family relationship [%] (1 = yes; 0 = no)	94.18
Mother's years of education (0–22)	9.00 (3.10)
<i>School characteristics</i>	
Ratio of migrant students to total students (0–1)	0.35 (0.28)
Rural location [%] (1 = rural; 0 = urban)	43.05

Note. N = 3473.

groups; migrant children also had significantly poorer psychological and behavioral outcomes than local children.

Table 2 also indicates that the individual characteristics, family characteristics, and school environment of the three types of children were significantly different, except for the gender variable. In general, left-behind children's physical health was worse than local and migrant children, their parents' marital status was more likely to be unmarried, and their parents were also less likely to be in a stable marriage relationship than their counterparts. The household income of left-behind children was the lowest among the three types of households. The mother's education level of local children was higher than the other two types of children, and migrant children's mothers had the lowest level of education. Local children were more likely to enter schools with lower ratio of migrant children to total students, and migrant children were more likely to enter that with higher ratio, while left-behind children were more likely to be located in a rural area.

5.3. Regression results

Tables 3 presents the regression results of child total difficulty. Nested models were used to estimate the effects of child category, as well as child, family, and school characteristics, on child total difficulty. While controlling for child category only, left-behind children and migrant children had higher levels of total difficulty, 1.12 points and 0.44 points respectively, than local children. The difference for left-behind and migrant children was reduced to 0.9 points and 0.36 points higher, respectively, than local children when we factored in other child characteristics (i.e., gender, age and physical health). When family characteristics (i.e., parents' marital status, household

Table 2
Bivariate statistics by child category.

	Local	Left-behind	Migrant	F/chi-square test
Total difficulty	10.84 (4.95)	11.96 (5.15)	11.28 (5.03)	12.53***
Emotional symptom	2.05 (1.80)	2.42 (1.99)	2.02 (1.83)	12.58***
Conduct problem	1.76 (1.61)	1.99 (1.64)	1.86 (1.63)	5.30**
Hyperactivity/inattention	4.11 (2.16)	4.20 (2.13)	4.42 (2.29)	6.52**
Peer relationship	2.92 (1.69)	3.34 (1.76)	2.98 (1.70)	16.48***
Prosocial behavior	6.63 (2.23)	6.01 (2.21)	6.45 (2.25)	19.19***
Boy	48.48%	53.27%	52.03%	5.80 ⁺
Age	11.10 (2.71)	11.32 (2.79)	10.55 (2.47)	19.38***
Physical health [%]				
Good	58.23%	46.60%	63.23%	
Fair	40.01%	51.05%	34.33%	57.35***
Poor	1.76%	2.36%	2.44%	
Parents' marital status				
Married	92.69%	85.99%	93.67%	
Unmarried	1.08%	1.83%	1.38%	
Remarried	1.96%	3.93%	1.46%	44.23***
Divorced or separated	2.51%	5.50%	2.11%	
Other	1.76%	2.75%	1.38%	
Household income level				
Low	8.19%	13.35%	7.63%	
Medium	65.81%	64.27%	54.55%	82.83***
High	26.00%	22.38%	37.82%	
Harmonious family relationship	95.33%	91.23%	94.64%	16.17***
Mother's years of education	9.87 (3.03)	8.51 (3.13)	8.26 (2.91)	109.90***
Ratio of migrant students to total students	0.27 (0.24)	0.14 (0.18)	0.58 (0.21)	1121.82***
Rural location	44.89%	86.39%	13.96%	1000.00***

Note.

⁺ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

income level, harmonious family relationship, and mother's year of education) were included in model 3, the difference between left-behind and local children was reduced to 0.5 points, and there was no longer significant difference in total difficulty between migrant and local children. Finally, model 4 in Table 3 suggests that the differences in left-behind, migrant, and local children's total difficulty were no longer significant after controlling for child, family, and school characteristics.

While holding all other variables constant, boys had 0.46 points higher level of total difficulty than girls; younger children had higher levels of total difficulty. Children whose parents' marital status was unmarried or remarried had higher levels of total difficulty than their peers whose parents were married. Children from medium-income families and high-income families had lower level of total difficulty than children from low-income families. Children who lived in harmonious family relationship, at rural schools, and children at schools with higher ratio of migrant students had higher levels of total difficulty. Tables 4 to 8 present the regression results of child psychological and behavioral outcomes within each dimension. Table 4 presents the regression result of emotional symptom. Model 1 showed that left-behind children had 0.37 points higher level of emotional problem than local children. The difference was reduced to 0.31 points when other child characteristics were included in the model, and was further reduced to 0.21 points when family characteristics were included. Finally, the difference became no longer significant when controlling for all independent variables. Model 4 also suggested that being girls, younger in age, worse physical health status, parents' unmarried status

Table 3
Regression estimates of total difficulty.

N = 3473	Model 1	Model 2	Model 3	Model 4
Child category				
Left-behind	1.117*** (0.224)	0.904*** (0.216)	0.501* (0.216)	0.222 (0.227)
Migrant	0.444* (0.194)	0.363+ (0.187)	0.019 (0.190)	0.034 (0.219)
Child characteristics				
Boy		0.455** (0.164)	0.458** (0.161)	0.459** (0.160)
Log (age)		−3.398*** (0.324)	−3.568*** (0.325)	−3.533*** (0.328)
Physical health				
Fair		2.123*** (0.169)	1.860*** (0.167)	1.799*** (0.168)
Poor		3.735*** (0.571)	3.361*** (0.561)	3.257*** (0.560)
Family characteristics				
Parents' marital status				
Unmarried			1.343+ (0.695)	1.299+ (0.694)
Remarried			1.046+ (0.546)	0.983+ (0.545)
Divorced or separated			0.421 (0.473)	0.601 (0.473)
Other			−0.123 (0.598)	−0.123 (0.596)
Household income level				
Medium			−1.485*** (0.295)	−1.361*** (0.296)
High			−1.021** (0.316)	−0.874** (0.318)
Harmonious family relationship			−2.847*** (0.353)	−2.757*** (0.353)
Mother's years of education			−0.161*** (0.028)	−0.125*** (0.029)
School characteristics				
Ratio of migrant students to total students				1.398** (0.481)
Rural location				1.264*** (0.258)
Constant	10.841*** (0.131)	17.777*** (0.789)	23.790*** (0.956)	22.229*** (1.026)
F	12.525	54.644	35.735	32.965
Adjusted R ²	0.007	0.085	0.123	0.128

Note. Standard errors are in parentheses.

+ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

(compared to parents' who were married), low family income (compared to medium family income), as well as not in harmonious family relationship were associated with higher levels of emotional problem. Notably, children at rural schools experienced 0.33 points higher level of emotional problem than children at urban schools.

Table 5 presents the regression results of conduct problem. When controlling for child category only, left-behind children and migrant children respectively had 0.23 points and 0.1 points higher level of conduct problem than local children. When factoring in other child characteristics, left-behind children had 0.18 points higher level of conduct problem than local children, and no significant difference was found between migrant and local children. The difference between left-behind and local children became no longer significant when family characteristics were included. School location and ratio of migrant students also had significant impact on child conduct problem. Students at migrant schools and students at rural schools had higher levels of conduct problem than their peers.

Table 6 presents the regression results of child hyperactivity/inattention problem. Migrant children had 0.3 points higher level of hyperactivity/inattention problem than local children. The difference was reduced

Table 4
Regression estimates of emotional symptom.

N = 3473	Model 1	Model 2	Model 3	Model 4
Child category				
Left-behind	0.365*** (0.083)	0.307*** (0.082)	0.214** (0.083)	0.102 (0.087)
Migrant	−0.032 (0.072)	−0.006 (0.071)	−0.104 (0.073)	−0.005 (0.084)
Child characteristics				
Boy		−0.278*** (0.062)	−0.278*** (0.062)	−0.276*** (0.061)
Log (age)		−0.339** (0.122)	−0.392** (0.124)	−0.424*** (0.126)
Physical health				
Fair		0.661*** (0.064)	0.596*** (0.064)	0.574*** (0.064)
Poor		0.854*** (0.216)	0.762*** (0.215)	0.716*** (0.214)
Family characteristics				
Parents' marital status				
Unmarried			0.613* (0.266)	0.629* (0.266)
Remarried			0.040 (0.209)	0.037 (0.209)
Divorced or separated			0.144 (0.181)	0.204 (0.181)
Other			−0.303 (0.229)	−0.289 (0.228)
Household income level				
Medium			−0.373*** (0.113)	−0.321** (0.113)
High			−0.218+ (0.121)	−0.152 (0.122)
Harmonious family relationship			−0.560*** (0.135)	−0.535*** (0.135)
Mother's years of education			−0.043*** (0.011)	−0.033** (0.011)
School characteristics				
Ratio of migrant students to total students				0.052 (0.184)
Rural location				0.332*** (0.099)
Constant	2.052*** (0.048)	2.714*** (0.298)	4.121*** (0.366)	3.870*** (0.393)
F	12.582	28.102	16.767	15.788
Adjusted R ²	0.007	0.045	0.060	0.064

Note. Standard errors are in parentheses.

+ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

to 0.21 points when other child characteristics were included, and vanished when family characteristics were included. Children at migrant schools had 0.59 points higher level of hyperactivity/inattention problem than children at schools without migrant students; children at rural schools had 0.24 points higher level of hyperactivity/inattention problem than their peers at urban schools.

Table 7 presents the regression results of peer relationship problem. Left-behind children had 0.43 points higher level of peer relationship problem than local children; the difference was reduced to 0.37 points and 0.21 points, respectively, when we factored in other child characteristics and family characteristics. There was no longer significant difference among the three groups of children when school characteristics were included in the model. As suggested in model 4, children whose parents were unmarried or remarried had marginally significantly higher level of peer relationship problem than those whose parents were married (0.47 and 0.36 points respectively). In not harmonious family relationship and low-income family were associated with higher level of peer relationship problem. Children at rural schools had 0.31 points higher level of peer relationship problem than children at urban schools.

Table 5
Regression estimates of conduct problem.

N = 3473	Model 1	Model 2	Model 3	Model 4
Child category				
Left-behind	0.234** (0.072)	0.181* (0.071)	0.062 (0.071)	−0.001 (0.075)
Migrant	0.104+ (0.063)	0.089 (0.062)	0.045 (0.062)	−0.005 (0.072)
Child characteristics				
Boy		0.110* (0.054)	0.118* (0.053)	0.118* (0.053)
Log (age)		−0.724*** (0.107)	−0.690*** (0.107)	−0.656*** (0.108)
Physical health				
Fair		0.512*** (0.056)	0.436*** (0.055)	0.421*** (0.055)
Poor		0.843*** (0.189)	0.769*** (0.184)	0.748*** (0.184)
Family characteristics				
Parents' marital status				
Unmarried			0.556* (0.229)	0.526* (0.228)
Remarried			0.247 (0.180)	0.220 (0.179)
Divorced or separated			0.127 (0.155)	0.175 (0.156)
Other			−0.141 (0.197)	−0.149 (0.196)
Household income level				
Medium			−0.818*** (0.097)	−0.791*** (0.097)
High			−0.827*** (0.104)	−0.798*** (0.105)
Harmonious family relationship			−0.944*** (0.116)	−0.917*** (0.116)
Mother's years of education			−0.025** (0.009)	−0.014 (0.009)
School characteristics				
Ratio of migrant students to total students				0.611*** (0.158)
Rural location				0.388*** (0.085)
Constant	1.760*** (0.042)	3.205*** (0.261)	5.043*** (0.315)	4.471*** (0.337)
F	5.297	25.993	25.645	23.975
Adjusted R ²	0.002	0.041	0.090	0.096

Note. Standard errors are in parentheses.

+ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

Table 8 shows the regression results of prosocial behavior. Left-behind children and migrant children had significantly lower level of prosocial behavior (0.62 points and 0.18 points lower, respectively) than local children. Both differences were reduced when other child characteristics were included. When controlling for family characteristics, the difference between left-behind and local children was further reduced to 0.37 points, while no significant difference was found between migrant and local children. Finally, when school characteristics were included in the model, the difference between left-behind and local children decreased to 0.27 points. While holding all other variables constant, having harmonious family relationships and studying in urban schools were associated with higher levels of prosocial behavior.

In short, in accord with our hypotheses, these findings show that both migrant and left-behind children have worse psychological and behavioral outcomes than local children; and left-behind children have the worst outcomes on almost all psychological and behavior indicators. However, after controlling all family and school variables, there is no longer significant psychological and behavioral differences among different types of children.

Table 6
Regression estimates of hyperactivity/inattention.

N = 3473	Model 1	Model 2	Model 3	Model 4
Child category				
Left-behind	0.092 (0.098)	0.051 (0.094)	0.014 (0.096)	0.003 (0.101)
Migrant	0.304*** (0.085)	0.207* (0.082)	0.133 (0.084)	0.037 (0.098)
Child characteristics				
Boy		0.510*** (0.072)	0.514*** (0.071)	0.513*** (0.071)
Log (age)		−2.120*** (0.142)	−2.183*** (0.144)	−2.134*** (0.146)
Physical health				
Fair		0.472*** (0.074)	0.432*** (0.074)	0.427*** (0.075)
Poor		0.900*** (0.250)	0.790** (0.249)	0.789** (0.249)
Family characteristics				
Parents' marital status				
Unmarried			−0.287 (0.309)	−0.324 (0.309)
Remarried			0.396 (0.242)	0.369 (0.242)
Divorced or separated			0.227 (0.210)	0.247 (0.210)
Other			0.069 (0.265)	0.054 (0.265)
Household income level				
Medium			0.363** (0.131)	0.367** (0.132)
High			0.646*** (0.140)	0.644*** (0.142)
Harmonious family relationship			−0.768*** (0.157)	−0.752*** (0.157)
Mother's years of education			−0.020 (0.012)	−0.014 (0.013)
School characteristics				
Ratio of migrant students to total students				0.589** (0.214)
Rural location				0.235* (0.115)
Constant	4.112*** (0.057)	8.694*** (0.345)	9.373*** (0.424)	8.916*** (0.456)
F	6.520	56.483	28.527	25.485
Adjusted R ²	0.003	0.087	0.100	0.101

Note. Standard errors are in parentheses.

+ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

6. Discussion

6.1. The effects of migration

In line with previous findings, this study suggests that left-behind and migrant children have poor psychological and behavioral outcomes (Fan et al., 2009). Both migrant and left-behind children experience problems such as loneliness, frustration, and depression, and may exhibit behavioral problems (Fan et al., 2009; Jia & Tian, 2010; Pottinger, 2005). Our findings suggest that family migration negatively affects children's psychological and behavioral development. Particularly, parent-only migration, which leaves children living with only one or neither parents, results in more challenges and worse child outcomes.

Our study also shows that children's psychological and behavioral outcomes differ by their gender and age, which is in line with previous findings (Ortega, Pascual, Ripalda, & Etxebarria, 2012; Posick, Farrell, & Swatt, 2013; Sartawi, AlMuhairy, & Abdat, 2011). Boys have higher levels of conduct problems, hyperactivity/inattention problems, and peer relationship problems, as well as less prosocial behaviors; girls have higher levels of emotional symptoms, which suggest that boys

Table 7
Regression estimates of peer relationship problem.

N = 3473	Model 1	Model 2	Model 3	Model 4
Child category				
Left-behind	0.426*** (0.076)	0.366*** (0.076)	0.212** (0.076)	0.119 (0.080)
Migrant	0.068 (0.066)	0.073 (0.065)	−0.055 (0.067)	0.007 (0.077)
Child characteristics				
Boy		0.112+ (0.057)	0.103+ (0.056)	0.104+ (0.056)
Log (age)		−0.216+ (0.114)	−0.303** (0.114)	−0.320** (0.115)
Physical health				
Fair		0.477*** (0.059)	0.396*** (0.059)	0.378*** (0.059)
Poor		1.138*** (0.200)	1.040*** (0.197)	1.003*** (0.197)
Family characteristics				
Parents' marital status				
Unmarried			0.461+ (0.244)	0.468+ (0.244)
Remarried			0.363+ (0.192)	0.357+ (0.191)
Divorced or separated			−0.077 (0.166)	−0.025 (0.166)
Other			0.252 (0.210)	0.261 (0.209)
Household income level				
Medium			−0.657*** (0.104)	−0.615*** (0.104)
High			−0.622*** (0.111)	−0.569*** (0.112)
Harmonious family relationship			−0.576*** (0.124)	−0.553*** (0.124)
Mother's years of education			−0.072*** (0.010)	−0.064*** (0.010)
School characteristics				
Ratio of migrant students to total students				0.146 (0.169)
Rural location				0.309*** (0.091)
Constant	2.917*** (0.044)	3.164*** (0.276)	5.254*** (0.336)	4.971*** (0.361)
F	16.480	21.388	19.318	17.858
Adjusted R ²	0.009	0.034	0.069	0.072

Note. Standard errors are in parentheses.

+ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

may express problems more externally whereas girls may express internally. Given this study mainly measured external problems, the gender differences in internal psychological outcomes warrant future exploration. In accordance with previous studies (Fan et al., 2009; Su et al., 2012), our findings also suggest that younger children have higher levels of psychological and behavioral problems than older children. This may be because younger children have less mental resources and capacity to deal with traumatic changes than older children. Therefore, younger children may face the most difficulties in coping with challenges resulted from parents' migration or their own relocation.

6.2. The effects of family environment

The differences in child outcome, however, largely reduced after controlling for family environment. Our study showed that children whose parents were married had lower levels of total difficulty and peer relationship problem than children whose parents were unmarried or remarried; they also had less emotional symptoms and conduct behavior problems than those whose parents were unmarried. Harmonious family relationship was an important protective factor in

Table 8
Regression estimates of prosocial behavior.

N = 3473	Model 1	Model 2	Model 3	Model 4
Child category				
Left-behind	−0.615*** (0.099)	−0.523*** (0.097)	−0.374*** (0.098)	−0.269** (0.102)
Migrant	−0.175* (0.086)	−0.146+ (0.084)	−0.055 (0.086)	0.014 (0.099)
Child characteristics				
Boy		−0.556*** (0.074)	−0.554*** (0.073)	−0.553*** (0.072)
Log (age)		0.921*** (0.146)	0.913*** (0.147)	0.862*** (0.148)
Physical health				
Fair		−0.705*** (0.076)	−0.608*** (0.076)	−0.583*** (0.076)
Poor		−0.881*** (0.258)	−0.759** (0.253)	−0.723** (0.252)
Family characteristics				
Parents' marital status				
Unmarried			−0.377 (0.313)	−0.333 (0.313)
Remarried			−0.188 (0.246)	−0.146 (0.246)
Divorced or separated			0.415+ (0.213)	0.338 (0.213)
Other			0.031 (0.270)	0.043 (0.269)
Household income level				
Medium			0.908*** (0.133)	0.863*** (0.133)
High			0.901*** (0.143)	0.852*** (0.144)
Harmonious family relationship			1.280*** (0.159)	1.237*** (0.159)
Mother's years of education			0.049*** (0.013)	0.032* (0.013)
School characteristics				
Ratio of migrant students to total students				−0.938*** (0.217)
Rural location				−0.617*** (0.116)
Constant	6.628*** (0.058)	5.009*** (0.356)	2.442*** (0.431)	3.334*** (0.462)
F	19.185	37.968	28.552	27.035
Adjusted R ²	0.010	0.060	0.100	0.107

Note. Standard errors are in parentheses.

+ p < 0.10.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

children's total difficulty and all dimensions of psychological and behavioral outcomes measured in this study.

Previous studies demonstrated that parental skills might influence child academic performance and psychological development, while parents who were migrant workers usually lack adequate knowledge or skill to help with children's schoolwork and meet their emotional needs (Guo et al., 2005). Our findings indicate that mother's education level was negatively correlated with children's psychological and behavioral outcomes, in line with previous studies. The possible explanation is that mothers who possess a higher education level may be better equipped to: assist children with their schoolwork, help lessen children's stress and frustration in school, pay attention to their children's emotional needs, and maintain more parent–child communication. All of which can protect children from psychological and behavioral problems.

6.3. The effects of school and policy

Our study also found that school environment and policy were significantly associated with psychological and behavioral outcomes of

the three types of children, and these findings call our attention to why school location and ratio of migrant students have such significant impacts on children's outcomes.

Our analysis of the policy and social context of Wuhan suggests that the effects of these school characteristics on child outcomes are linked to the inequity in public education resource allocation between urban and rural areas, as well as the inequality in educational benefits that are tied to individual registered residency. In 2001, China's average financial education support from governments was 4015 *yuan* for every student in urban areas, but only 900 *yuan* for those in rural areas, which meant a rural–urban difference of over 3000 *yuan*. Despite the governments' efforts of narrowing the gap, the disparity in rural–urban resources allocation and subsequent lower educational quality remain to be significant challenges facing rural students. That is, children in rural schools were more disadvantaged than their counterparts in urban schools. Therefore, children studying at rural schools were more likely to have psychological and behavioral problems due to the existing sense of relative deprivation, which includes a feeling of marginalization in society.

In 2000, the Wuhan Education Bureau implemented the *Open-door Education* policy to meet the increasing education demands of migrant children. The policy articulated that schools were obligated to open their doors to admit migrant children who live in nearby districts. Since then, the government of Wuhan enacted a series of new policies to ensure the equitable education for migrant children. Given local governments did not provide sufficient financial support to schools that implemented this policy, along with the fast increase of the number of compulsively admitted migrant children, the unintended consequence was a resource shortage (e.g., amount of teachers and school space) in urban schools as the number of migrant students in urban schools dramatically increased. In 2007, the Wuhan government allocated 3 million *yuan* to subsidize schools that admitted migrant students. Given the amount of migrant students was 150,000 that year, the average subsidy for each migrant student was merely 20 *yuan* annually (approximately US dollar \$3.3) (Wuhan Education Bureau, 2007). Therefore, urban schools with higher ratio of migrant students were faced with more financial challenges and poorer education quality than schools that consist of more local students.

Our study's results show that higher ratio of migrant children to total students, indicating more severe insufficiency of per capita of education resources in one school, was negatively associated with children's mental and behavioral health. Without enough financial support or other resource allocation, simply "opening doors" of schools to migrant students would not make a difference in quality education for all children.

7. Conclusion

Using data from the 2011 Survey on Social Integration of Migrant Children in Wuhan, this study examined the psychological and behavioral outcomes of migrant and left-behind children. Our descriptive findings suggest that left-behind children have the poorest psychological and behavioral outcomes among the three child groups in all measured dimensions, except for hyperactivity/inattention problem. Although migrant children show better outcomes than left-behind children, they have higher levels of psychological and behavioral problems than their local peers.

The difference of psychological and behavioral outcomes among three types of children, however, disappeared after controlling for family and school characteristics. The findings indicated that family migration, particularly parent-only migration, negatively impacts child development. However, parents' stable marital status, harmonious family relationship, and mother's more years of education are important protective factors for child development. At the same time, children at rural schools and children at schools with higher ratio of migrant students are more likely to have psychological and behavioral problems.

These findings shed light on the importance of family intervention and policy reform in children's healthy development.

Family intervention and related community support are of great importance for improving child psychological and behavioral outcomes (All-China Women's Federation, 2013). From the individual level, developing an effective prevention program will help left-behind children and migrant children improve their coping skills with the separation from parents, other family members, or friends, as well as with subsequent social and emotional problems (Su et al., 2012).

From the family level, parenting skill workshops that focus on children's emotional needs, more frequent and effective parent–child communication, and building supportive family environments, are to be provided to migrant parents. From the community level, community-based campaigns to advocate for improving the economic and educational situations of migrant and left-behind children are needed; communities can also provide care and support services to migrant families (Jia & Tian, 2010).

The fact that school location and ratio of migrant children in school make significant differences in children's psychological and behavioral outcomes highlights the need of policy reform. The policy reform should aim at promoting equality in education and relevant resource allocation, increasing governments' financial support to migrant schools and rural schools, and reducing urban–rural stratification through the reform of the Household Registration System. However, if local government does not allocate an increased amount of education resources with a synchronous increase of the number of migrant children admitted by schools, or does not realize more equitable allocation of education resources between rural and urban areas, the current education policies and education resource allocation would likely lead to negative consequences, including the decline of psychological and behavioral outcomes of children.

In 2011, the Chinese central government announced its *12th Five-Year Plan*, which stated its goal of granting more qualified migrant workers and their family members urban residency during 2011 to 2015. The *Plan* also articulated the goal of ensuring migrant children receive equal access to compulsory education, with the support of local full-time public schools. Governments will also provide housing subsidy, healthcare, and other benefits to migrant workers who have a stable job in urban enterprises (The Central People's Government of the People's Republic of China, 2011). These policies are expected to facilitate the interaction between local and migrant children and help migrant children engage in the urban environment. More welfare benefits for migrant workers may also improve their family socioeconomic status and family relationship, both of which are protective factors for children's healthy development.

Focusing on the effects of family migration, family environment and school characteristics on child development, our case study in Wuhan provides implications for future studies with a new perspective to look at this issue. Through multi-level intervention strategies, our study also proposes potential measures to address this issue with respect to individual adjustment, family intervention, community support, school improvement, and policy reform.

It should be noted that this study does have some limitations. First, some variables used, such as harmonious relationship, were not measured comprehensively, which may undermine the accuracy of the concept. Second, because of the limitation of data, this study cannot examine the association between number of parents (as in, one or two parents) at home and the psychological and behavioral outcomes for migrant children. Future studies could address these limitations while examining psychological and behavioral issues of migrant and left-behind children in China.

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