

# Left Too Early: The Effects of Age at Separation From Parents on Chinese Rural Children's Symptoms of Anxiety and Depression

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The massive exodus of rural population to urban areas spurred by the economic boom and dramatic societal changes in China during the past 2 decades has been called the largest migration in human history.<sup>1</sup> With relaxation of migration restrictions by the Chinese government, an enormous number of rural residents, variously estimated at 120 to 150 million, have moved to cities in search of work.<sup>2</sup> This massive peasant migration, mostly of young adults, has fundamentally altered the Chinese demographic landscape. Although some rural migrants have brought their families to cities,<sup>3</sup> most parents have opted not to take their children with them because they cannot afford to raise them in the city. An estimated 23 to 30 million children have remained in their rural communities to be cared for by a single parent, grandparents, other relatives, or themselves.<sup>4</sup> Often neglected, they are known as *liu shuo er tong* [left-behind children]. Only recently have left-behind children begun to draw significant media and societal attention. Most research on these children, however, has been qualitative.<sup>5</sup> Little empirical work has been conducted on the psychological effects of early separation from parents on these children.

Research on children who experienced parental death or divorce has documented significant consequences associated with childhood separation from parents, including depression,<sup>6–9</sup> lower educational attainment,<sup>10</sup> early age at marriage,<sup>11</sup> and higher risk of divorce.<sup>11</sup> However, risk for psychopathology associated with separation from parents appears to vary by the form of separation. For example, Kendler et al. found that depression and anxiety were associated with separation from, but not death of, a parent.<sup>9</sup> Similarly, McLeod found that parental divorce had a stronger effect than did parental death.<sup>12</sup>

Little is known about the mental health consequences of other forms of parental

absence. We focused on Chinese rural children left behind by parents who migrated to cities for employment, a form of separation spurred by explosive economic growth. We were interested in diverse forms of parental absence, including families with fathers, mothers, or both parents living away from their children.

Even less is known about the mental health impact of age at separation from parents. Previous research indicated that children's age at parental loss is significant. For instance, Brown and Harris identified maternal loss before age 11 as a risk factor for depression.<sup>13</sup> Subsequent studies showed that separation from parents for more than a year before age 17 represents a significant risk for major depression.<sup>14–16</sup> Experiencing parental loss before age 9 has been shown to engender more severe consequences than experiencing it in late childhood or adolescence.<sup>17</sup> The risk associated with separation from parents at early ages is also suggested by a developmental perspective such as attachment theory.<sup>18–20</sup> Indeed, some studies have shown that early deprivation exerts persistent effects on children's development.<sup>21,22</sup> Therefore, we

**Objectives.** We examined the effect of age at separation from parents on symptoms of anxiety and depression among children in rural communities in China whose parents migrated to cities in search of employment opportunities during the country's rapid economic development.

**Methods.** Students in 3 rural areas, Anhui, Chongqing, and Guizhou (N=592; age=10–17 years), completed questionnaires that asked about symptoms of state and trait anxiety, as well as depression and age at separation from parents.

**Results.** Children who were separated from parents at a younger age had more symptoms of anxiety and depression. This effect was especially pronounced for children who were separated from their mothers or from both parents.

**Conclusions.** China's explosive economic growth appears to exact a significant toll on left-behind children's mental health, particularly on children whose parents left early in their lives. The unintended consequences of the economic boom on child development need to be further examined in prospective studies. (*Am J Public Health.* 2009;99:2049–2054. doi:10.2105/AJPH.2008.150474)

hypothesized that the younger the age at separation, the more symptoms of depression and anxiety a child would manifest.

We were also interested in whether the effect of age at separation from parents would be generalizable across regions, because China's economic development has been geographically uneven. For example, the per capita annual income in rural areas was RMB 2969 yuan for Anhui province (in eastern China), RMB 2874 yuan for Chongqing municipality (in southwestern China) and only RMB 1985 for Guizhou province (in southwestern China). We focused on these 3 regions because they sent many migrant workers to the cities but differed in their development.

## METHODS

In April and May 2006, we collected data from children and adolescents in 3 rural areas in China (Anhui, Chongqing, and Guizhou) whose parents left for cities to seek employment opportunities. Large numbers of China's rural-to-urban migrant workers came from these 3 regions.

## Procedures

We randomly selected 8 counties—2 in Chongqing, 2 in Guizhou, and 4 in Anhui (this province had the largest population). In each county, we randomly selected 2 middle or high schools. We then randomly selected students, aged 10 to 17 years, from rosters of 2 randomly chosen classes, for a total of 2515 (570 in Chongqing, 394 in Guizhou, and 1551 in Anhui). We analyzed data from 592 students whose parents had left for cities and who provided information on their age at parents' departure.

Permission to conduct the research was obtained from school administrators or principals. Students were invited to participate voluntarily in the study. Those who consented stayed after school in groups in their classrooms. After explaining the research purposes and procedures, trained research staff distributed the questionnaires to the students. Teachers remained in the classroom during the data collection. Members of the research team were available to answer any questions from the students. Students were told that there were no right or wrong answers and that they could withdraw from the study at any time. Once the data were cleaned, personal identifying information was removed from the data to ensure confidentiality and anonymity.

## Measures

**Demographic information.** Participants reported their age, gender, ethnicity, grade, parents' educational background, family residential conditions, and perception of family socioeconomic status (SES). Because the overwhelming majority of the participating students were of Han ethnic origin, we did not include ethnicity in our analyses. To assess family SES, participants answered the question, "How would you rank your family's economic condition in your locality?" with a 5-point scale ranging from 1=lowest to 5=highest.

**Symptoms.** Symptoms of depression were assessed with the Children's Depression Inventory.<sup>24</sup> This scale is designed to assess depressive symptoms in children aged 7 to 17 years. It includes 27 items, each of which contains 3 statements describing the responder's mood and feelings during the past week. Item 1, for example, includes 3 statements about sadness: "I am sad once in a while," "I am sad many

times," and "I am sad all the time." Item 8 includes 3 statements about self-blaming: "I feel that all bad things are my fault," "I feel that many bad things are my fault," and "I feel that bad things are not usually my fault." Respondents were asked to circle the number next to the statement that best described how they felt. This scale was translated into Chinese, back-translated into English, and is widely used in China. It showed an acceptable reliability in our study ( $\alpha=0.84$ ). The mean was 41.6 (SD=7.50; range=27–67).

Symptoms of state anxiety were assessed with the revised version of the State-Trait Anxiety Inventory,<sup>25</sup> a 40-item self-report instrument. The first 20 items measure state anxiety, which is characterized by feelings at the moment, including tension, nervousness, and worry. On a 4-point scale ranging from 1=not at all to 4=very obvious, respondents are asked to indicate how they feel about themselves at the time of assessment. Sample items include "I feel nervous," "I feel that I am a failure," and "I feel happy" (reverse coded). This measure has been translated into Chinese, back-translated into English, and is widely used in Chinese settings. The scale used in our study was internally consistent ( $\alpha=0.87$ ). The mean was 45.10 (SD=8.18; range=26–76).

Symptoms of trait anxiety were assessed with the second half of the State-Trait Anxiety Inventory.<sup>25</sup> Trait anxiety is a more general, long-standing, stable individual difference variable than state anxiety. It measures an individual's proneness to perceive stressful situations as dangerous or threatening and to respond to these situations with an elevated state of anxiety. On a 4-point scale ranging from 1=almost never to 4=almost always, participants are asked to choose the statement that mostly closely describes how they generally feel. Sample items include "I feel nervous and restless," "I feel like a failure," and "I am happy" (reverse coded). This measure has also been translated into Chinese, back-translated into English, and is widely used in Chinese settings. In our sample, the scale was internally consistent ( $\alpha=0.82$ ). The mean was 42.43 (SD=9.46; range=22–78).

**Age at separation from parents.** In Chongqing and Guizhou, participants chose from 5 responses to indicate age at separation from parents: (1) younger than 3 years, (2) 3 to 6 years, (3) 7 to 9 years, (4) 10 to 12 years, or (5)

13 years or older. These age categories correspond roughly to commonly accepted developmental stages in China: infancy and toddlerhood, early childhood, middle childhood, late childhood, and adolescence. In Anhui, we calculated this variable by first subtracting years of parental absence from the child's chronological age and then assigning the result to 1 of the 5 age categories used in the other 2 regions.

We also took age at the time of study participation and gender of the child into consideration when testing the effects of age at separation. Controlling for age and gender was important for several reasons. First, the child's current age could be a confounder because older children might have had a more prolonged separation from their parents. Second, it is well-known that there are significant age differences in symptoms of anxiety and depression in childhood and adolescence.<sup>23</sup> Third, evidence suggests that parental separation exerts a stronger effect on women than on men.<sup>12</sup>

## RESULTS

Table 1 shows the distribution of participants by region, age when their parents left, and forms of parental absence (i.e., father, mother, or both parents absent). Absence of both parents was the predominant form of separation (ranging from 50.4% in Chongqing to 68.9% in Guizhou), followed by father absence (ranging from 23.0% in Guizhou to 36.5% in Anhui). In a smaller percentage of families, only the mothers migrated to cities (ranging from 7.8% in Anhui to 17.1% in Chongqing).

No significant differences in symptoms of state anxiety ( $t=0.11$ ;  $P=.91$ ), trait anxiety ( $t=0.54$ ;  $P=.59$ ), or depression ( $t=1.71$ ;  $P=.09$ ) were found between students who were included in this study and those who were not.

We first examined the effect of age at separation from parents on students' symptoms of depression, state anxiety, and trait anxiety. Figure 1 shows levels for each type of symptom for each age bracket of separation. As shown in Figure 1a, the Children's Depression Inventory score was highest for children whose parents left before they reached their third birthday (mean=43.97; SD=9.03), followed by children whose parents were away when they were

**TABLE 1—Left-Behind Children by Region, Age at Separation From Parents, and Form of Parental Absence: China, April–May 2006**

	Anhui			Chongqing			Guizhou			Total, No.
	Father Absent, No. (%)	Mother Absent, No. (%)	Both Parents Absent, No. (%)	Father Absent, No. (%)	Mother Absent, No. (%)	Both Parents Absent, No. (%)	Father Absent, No. (%)	Mother Absent, No. (%)	Both Parents Absent, No. (%)	
Age at Separation, y										
<3	11 (10.7)	1 (4.5)	11 (7.0)	10 (25.0)	2 (9.5)	11 (17.7)	6 (14.0)	1 (6.6)	15 (11.6)	68
3–6	26 (25.2)	3 (13.6)	30 (19.2)	10 (25.0)	3 (14.3)	17 (27.5)	7 (16.3)	2 (13.3)	28 (21.7)	126
7–9	22 (21.4)	4 (18.2)	28 (17.8)	8 (20.0)	4 (19.0)	16 (25.8)	8 (18.6)	7 (46.7)	23 (17.8)	120
10–12	31 (30.1)	6 (27.3)	60 (38.2)	8 (20.0)	7 (33.3)	11 (17.7)	11 (25.6)	3 (20.0)	28 (21.7)	165
≥13	13 (12.6)	8 (36.4)	28 (17.8)	4 (10.0)	5 (23.9)	7 (11.3)	11 (25.6)	2 (13.3)	35 (27.1)	113
Total (% in region)	103 (36.5)	22 (7.8)	157 (55.7)	40 (32.5)	21 (17.1)	62 (50.4)	43 (23.0)	15 (8.0)	129 (68.9)	592

aged 3 to 6 years (mean=41.94; SD=7.20). Results generated by SAS version 9.2 (SAS Institute Inc, Cary, NC) PROC GLM indicated that children whose parents left after they entered school (aged 7 years or older) showed significantly fewer symptoms of depression ( $F=8.91$ ;  $df=1$ ;  $P<.01$ ; for children aged 7–9 years, mean=40.65; SD=8.27; for children aged 10–12 years, mean=40.86; SD=7.56; for adolescents aged ≥13 years, mean=40.46; SD=6.93), than did students whose parents went away before they reached their seventh birthday. Further analyses suggested that the significant difference was primarily between children whose parents left before and after age 7. There were no significant differences between the oldest 3 age brackets (7–9, 10–12, and ≥13 years).

Children whose parents went away before their third birthday had the most symptoms of trait anxiety (mean=47.56; SD=8.73; Figure 1b), followed by those whose parents were away when they were aged 3 to 6 years (mean=45.08; SD=8.73). We found an age pattern in trait anxiety: as the child's age at separation from parents increased, their trait anxiety symptoms decreased. We also saw an overall significant difference across the 5 age groups ( $F=10.03$ ;  $df=4$ ;  $P<.01$ ). Post hoc comparisons suggested that children whose parents left before they were aged 3 years reported significantly higher levels of trait anxiety than did the rest of the sample ( $t=6.87$ ;  $df=1$ ;  $P<.01$ ). We found no significant differences between the remaining 4 groups.

Figure 1c shows the differences in symptoms of state anxiety among the 5 groups. Children

whose parents left before their seventh birthday reported significantly more symptoms than did children whose parents left after they reached school age ( $F=3.27$ ;  $df=1$ ;  $P<.05$ ). We found no significant differences between those whose parents left when they were younger than 3 years and those who were aged 3 to 6 years at separation. No differences were found between age groups among students whose parents left after they were aged 7 years.

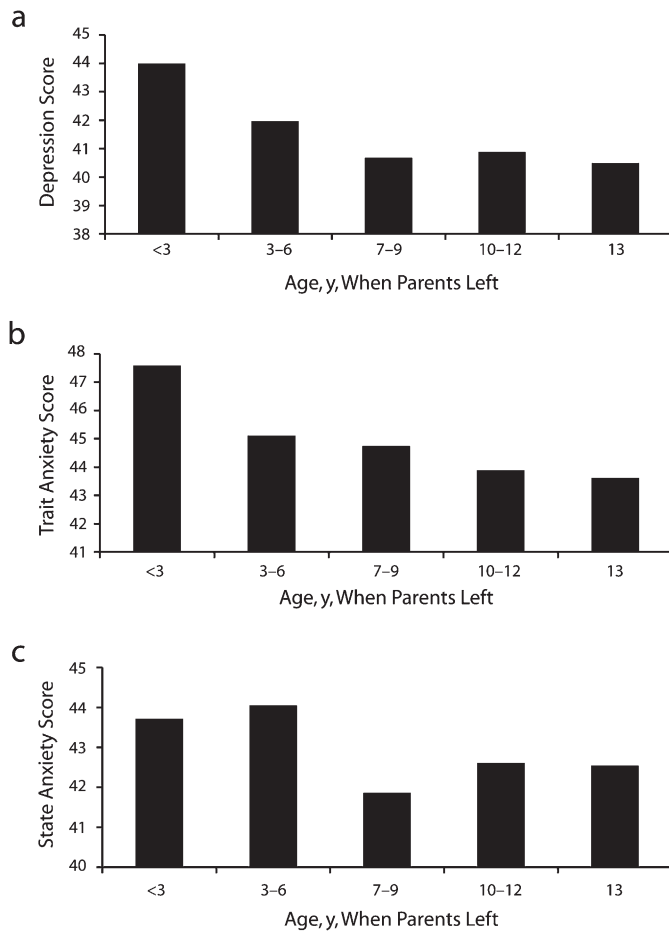
We next conducted a series of regression analyses to examine the effect of age at separation from parents by the forms of parental separation (i.e., father, mother, or both parents absent). Because symptoms of depression and anxiety have been shown to vary by age and gender,<sup>23</sup> we considered children's chronological age at the time of the assessment and gender as covariates. We also examined the interactions between age at separation from parents and children's chronological age, gender, and region. We found no significant statistical interaction, suggesting that the effect of separation did not vary by these factors. Therefore, we reported the main effects.

We found a significant regional difference in levels of depressive symptoms (Table 2). The coefficients associated with Guizhou were significant ( $b=4.56$  for father absent,  $b=6.41$  for mother absent, and  $b=3.14$  for both absent;  $P<.01$  for all), indicating that children in Guizhou reported more depressive symptoms than did children in Anhui. We also observed regional differences in symptoms of trait and state anxiety for children whose father or both parents left. For instance, children in Guizhou whose father or both parents left for cities

reported higher levels of trait anxiety ( $b=3.75$ ;  $P<.05$ ) and state anxiety ( $b=3.68$ ;  $P<.05$ ) than did children in Anhui ( $b=3.24$ ;  $P<.01$ ; and  $b=4.42$ ;  $P<.01$ , respectively). As expected, age had a consistent and significant effect on all 3 categories of symptoms, except for trait anxiety among children whose fathers were away ( $b=0.81$ ; not significant). Female students had higher levels of trait anxiety ( $b=2.33$ ;  $P<.001$ ) and depression ( $b=1.12$ ;  $P<.01$ ) than did male students when both parents left for the cities.

Among children with absent fathers, those with higher SES reported lower levels of depression ( $b=-1.88$ ;  $P<.05$ ) and trait anxiety ( $b=-1.87$ ;  $P<.05$ ). Among children with absent mothers, no results reached significance, likely because the size of this group was small. Among students separated from both parents, children with higher family SES reported fewer symptoms of depression ( $b=-1.54$ ;  $P<.01$ ) and state anxiety ( $b=-1.86$ ;  $P<.01$ ) than did those with lower family SES.

Regarding age at separation from parents, the results indicated that the younger children were when separated from their mothers, the more symptoms they reported ( $b=-3.06$ ;  $P<.05$  for state anxiety;  $b=-3.24$ ;  $P<.01$  for trait anxiety; and  $b=-2.07$ ;  $P<.05$  for depression). These independent variables explained the largest proportion of variance for children whose mothers were absent from home ( $R^2=0.31$  for depression;  $R^2=0.26$  for trait anxiety; and  $R^2=0.29$  for state anxiety). When fathers were absent, age at separation was associated with higher levels of trait anxiety ( $b=-1.02$ ;  $P<.05$ ). For children whose parents were both away, younger age at separation was



Note. Depression scores were computed by summing 27 items of the Children's Depression Inventory. Trait anxiety scores were based on the total of the 20 items on the State-Trait Anxiety Inventory. State anxiety scores were calculated by summing the other 20 items on the State-Trait Anxiety Inventory. Higher scores in each scale indicate more severe psychological problems.

**FIGURE 1—Age at separation among rural children and adolescents in China and symptoms of (a) depression, (b) trait anxiety, and (c) state anxiety: April–May 2006.**

significantly associated with higher levels of depression ( $b = -1.54$ ;  $P < .01$ ) and trait anxiety ( $b = -0.97$ ;  $P < .01$ ).

## DISCUSSION

Forms of childhood parental deprivation have become increasingly diversified in contemporary societies. In China, dramatic economic growth has produced a large number of children in rural areas whose parents have migrated to cities to seek employment. Understanding of the psychological adjustment of these left-behind children is urgently needed. We examined the effect of age at separation from parents on anxiety and depression in 592

left-behind children. Consistent with previous research, our results indicated that separation from parents in childhood, even for reasons other than parental death or divorce, significantly increased risks for anxiety and depression. The effect of separation remained after we controlled for demographic characteristics of the children, geographic region, and children's perception of their families' socioeconomic conditions. The effect of age at separation did not vary by the children's chronological age, gender, or region, suggesting that this effect may be generalizable. Regardless of age at the time of study participation, gender, or region, early separation was a risk factor for children's psychological problems.

The negative effect of separation from parents at an early developmental period suggests the importance of early parenting. Our results are consistent with Bowlby's emphasis on the importance of attachment and the negative consequences of early parental deprivation.<sup>18,19</sup> Our findings also corroborate extant literature on institutionalized orphans who are deprived of parental care,<sup>20–22,26,27</sup> children who experience parental death,<sup>8,9</sup> and children whose parents divorce.<sup>9,12</sup> These results suggest that lack of adequate parental care, as suggested by Bifulco et al.<sup>14</sup> and Kendler et al.,<sup>9</sup> may help explain the effect of separation. The disrupted attachment behavior found in institutionally deprived children may also constitute a critical explanatory link between parental deprivation and the psychological maladjustment displayed by the left-behind children in China.<sup>20–22,26</sup> We collected only limited information regarding how these children were cared for after their parents left and by whom. Future studies should explore the details of child care during separation from parents.

Our study had several limitations. First, students were only specifically asked about age at separation from parents in Chongqing and Guizhou. In Anhui, this information was derived indirectly from 2 questions (student's age and length of separation from parents). This limited our sample to those who answered both questions. Second, because it was fairly common for parents to go back and forth between rural homes and urban workplaces for varying periods, we were not able to directly control for the confounding effects of length of separation. Therefore, age at separation should not be viewed as a sole predictor, and length of separation from parents may well be an important factor in increasing anxiety and depression in left-behind children. Third, the source of our data about SES was children's subjective perception of their family economic conditions, rather than objective measures. Although we found no appreciable differences in SES and parents' education across various groups (data not shown), it is still noteworthy that the SES of the migrant parents may have been a potential confounder, because more economically deprived parents likely left their children at a younger age to seek urban employment.



**TABLE 2—Differences in Symptoms of Depression and Anxiety Among Left-Behind Children by Region, Age at Separation From Parents, Gender, Socioeconomic Status, and Form of Parental Absence: China, April–May 2006**

	Depression			Trait Anxiety <sup>a</sup>			State Anxiety <sup>b</sup>		
	Father Absent, b (SE)	Mother Absent, b (SE)	Both Parents Absent, b (SE)	Father Absent, b (SE)	Mother Absent, b (SE)	Both Parents Absent, b (SE)	Father Absent, b (SE)	Mother Absent, b (SE)	Both Parents Absent, b (SE)
No.	175	56	338	169	56	328	167	55	324
Intercept <sup>c</sup>	41.21 (3.66)**	40.43 (6.10)**	43.29 (2.47)**	46.55 (3.81)**	42.14 (6.89)*	42.60 (2.91)**	40.41 (4.31)**	41.26 (8.31)**	40.90 (3.30)**
Chongqing	2.58 (1.51)	4.25 (2.43)	0.98 (1.05)	2.28 (1.57)	4.00 (2.76)	2.13 (1.23)	4.63 (1.78)*	2.89 (3.30)	4.24 (1.44)**
Guizhou	4.56 (1.49)**	6.41 (2.60)**	3.14 (0.83)**	3.75 (1.54)*	3.34 (2.92)	3.24 (0.98)**	3.68 (1.76)*	-0.02 (3.52)	4.42 (1.15)**
Age, y	1.42 (0.56)*	3.64 (0.96)**	1.44 (0.37)*	0.81 (0.59)	3.16 (1.08)**	1.21 (0.43)**	1.55 (0.67)*	4.47 (1.29)**	1.22 (0.50)*
Gender <sup>d</sup>	0.21 (1.23)	-1.97 (2.18)	1.12 (0.76)**	1.55 (1.28)	1.38 (2.46)	2.33 (0.89)**	0.52 (1.45)	1.90 (2.96)	1.88 (1.04)
SES	-1.88 (0.76)*	-0.33 (1.29)	-1.54 (0.53)**	-1.87 (0.76)*	0.49 (1.48)	-1.25 (0.61)*	-1.02 (0.89)	-1.18 (1.79)	-1.86 (0.71)**
Age at separation, y	-0.36 (0.49)	-2.07 (0.96)*	-1.54 (0.31)**	-1.02 (0.49)*	-3.24 (1.10)**	-0.97 (0.36)**	-0.85 (0.56)	-3.06 (1.32)*	-0.47 (0.42)
R <sup>2</sup>	0.14	0.31	0.17	0.11	0.26	0.12	0.10	0.29	0.11
df	6	6	6	6	6	6	6	6	6

Note. SES=socioeconomic status.

<sup>a</sup>Trait anxiety refers to an individual's proneness to perceive stressful situations as dangerous or threatening and to respond to these situations with elevated anxiety.

<sup>b</sup>State anxiety is characterized by feelings at the moment, including tension, nervousness, and worry.

<sup>c</sup>Anhui province was the reference region.

<sup>d</sup>For the variable gender, male=0 and female=1.

\* $P < .05$ ; \*\* $P < .01$ .

Fourth, the forms of caregiving the left-behind children receive during separation vary significantly: they may be in the custody of a single parent, grandparents, or other relatives, or they may be left to care for themselves.<sup>4</sup> Information about the quality and forms of caregiving would be useful in designing interventions. Fifth, we focused exclusively on a sample of left-behind children. Future studies could compare left-behind children with children living with 2 parents. Finally, the study design was cross-sectional, which limited our ability to evaluate any prospective effect of early separation. We are still following these children to examine the long-term effects of separation from parents.

Despite these limitations, our study underscores the risks associated with parental absence in childhood among Chinese rural children left behind when their parents migrate to cities for employment. As more rural residents migrate to cities for work, the number of children left behind in rural areas is also on the rise.<sup>5</sup> China's explosive economic growth appears to exact a significant toll on left-behind children's mental health. Our understanding of the unintended consequences of the economic boom would be significantly enhanced by

prospective studies of the development of these children over their life course. ■

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### Contributors

Z. Lui helped conceptualize the project and design and implement data collection. X. Li helped implement data collection and write the article. X. Ge led the conceptualization of the study, interpretation of the findings, and writing of the article.

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### Human Participant Protection

This study was approved by institutional review board of the Institute of Psychology, Chinese Academy of Sciences.

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