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Passive parenting and its Association with Early Child Development

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ABSTRACT

This study aims to investigate the developmental status of rural Chinese children, the extent of interactive parenting they receive, and the relation between the two. A sample of 448 six to eighteen-month-old children and their caregivers were randomly selected from two rural counties in Hebei and Yunnan provinces. According the third edition of the Bayley Scales of Infant and Toddler Development, 48.7% of sample children exhibited cognitive delays, 40.6% language delays, and 35% social-emotional delays. According to responses from caregivers, parenting in rural China is largely passive, lacking in interactive practices like storytelling, singing, and playing. Children-with-siblings, left-behind children, and children with less-educated mothers were even less likely to receive interactive practices. Children of caregivers who did engage in best parenting practices showed better cognitive, language, and social-emotional development; however, the public health system provides no platform for learning about optimal parenting.

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Introduction

Previous studies have documented the importance of interactive parenting, where enriching caregiver–child interaction stimulates early developmental outcomes (Black et al., 2017; Francesconi & Heckman, 2016). Interactive parenting is also particularly important in less-developed countries, as poverty heightens the risk of sustaining developmental delays (Morris et al., 2017). Such delays are costly in terms of educational attainment, well-being, and adult productivity, reducing future income by as much as 25% and perpetuating the cycle of poverty (Gertler et al., 2014; Heckman, 2013). Despite this importance, there are some concerns that caregivers in low-income settings are less likely to engage with their children interactively (Bornstein & Putnick, 2012). In this study, we report on parenting practices and their quality in the understudied context of rural China.

Interactive parenting in low-income settings

The 1980s and early 1990s marked an expansion of focus within the field of Early Child Development (ECD), especially in low-income settings. While the previous focus emphasized biological markers of

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health, such as nutrition and immunization, the new focus investigated delays in cognitive and social-emotional development, both of which are estimated to be highly prevalent. Black et al. (2017), for example, estimate that 43% of children in low-income countries are held back from reaching their full developmental potential, with underlying factors including not only poor nutrition, sanitation, and immunization, but also a compromised early learning environment and suboptimal parenting quality. Similarly, the World Health Organization now stresses the importance of stable, interactive relationships with adults as a tenant of healthy development (WHO, n.d.).

Studies of parenting quality, in particular, resulted in two sets of findings; the first of which pertains to the substantial impact of interactive parenting. To measure this impact, most studies randomized interventions such as trainings for mothers or family visiting programs to improve and increase caregiver–child interaction. Children exposed to such interventions exhibited higher cognition (Chang et al., 2013; Lozoff et al., 2010), better communication skills (Newnham, Milgrom, & Skouteris, 2009), greater self-esteem (Kagitcibasi, Sunar, & Bekman, 2001), and better social-emotional development than children in control groups (Gardner, Walker, Powell, & Grantham-McGregor, 2003). The effect sizes were large, ranging from 0.5 to 1 standard deviation (SD) (Walker et al., 2007). Moreover, studies that tracked these children for long-term outcomes found evidence of fewer behavioural problems and higher academic achievement in primary school as well as substantially higher income in adulthood (García, Heckman, Leaf, & Prados, 2017; Gertler et al., 2014; Kitzman et al., 2010). Overall, the results were consistently positive in direction, large in magnitude, and when traced into the long-run, long-lasting.

External validity, however, represented a common problem among this group of studies. Most of the study samples were physically vulnerable or already disadvantaged children such as prematurely born infants, low birth-weight infants, or malnourished and stunted children (Gardner et al., 2003; Gertler et al., 2014; Lozoff et al., 2010). Consequently, the findings were insightful in that they shed light on how parenting can mitigate pre-existing biological disadvantages. However, they did not address how parenting might impact early development among biologically healthy populations, or on a more basic level, whether parenting is adequately practiced in these populations at large.

The second broad set of findings addressed this latter question with the advent of the Multiple Indicator Cluster Surveys (MICS) in the early 1990s. The MICS started with the goal of addressing women and children's health but it was not until the early 2000s that the survey incorporated an ECD and parenting component. Studies that analysed responses to the MICS found that positive parenting practices are uncommon in low-resource settings, employed by only half of caregivers or fewer (Britto, Ponguta, Reyes, & Karnati, 2015; Nonoyama-Tarumi & Ota, 2011). These findings, however, do not include China as the MICS was administered in China only once before parenting and ECD had been integrated in the survey. Consequently, the study of rural Chinese parenting and its implications remain primarily confined to sociological and small-scale studies.

Interactive parenting in rural China

China's economic progress over the past five decades has led the country to join the ranks of middle-income countries. It is worth noting, however, that due to severe inequality between rural and urban areas, the benefits of this progress are not as pronounced in rural areas, where we conduct our study (Xie & Zhou, 2014). In 2014, for example, the average rural household had a consumption expenditure below $1300 USD, only about one third of that of the average urban household (China Statistical Yearbook, 2015). Furthermore, basic problems in health and education have been heavily documented among the rural population (Li, Loyalka, Rozelle, & Wu, 2017; Li, Luo, Sylvia, Medina, & Rozelle, 2015). For these reasons, circumstances for families in rural China continue to be similar to those in low-income countries.

Despite these similarities, a regional focus on rural China is warranted when it comes to the study of ECD. First of all, China has an exceptionally large population of rural children: almost 6.5% of all children are born and living in rural China, and this percentage is expected to increase with the recent relaxation

of the one-child policy (UNICEF, 2016; Zeng & Hesketh, 2016). As such, the population of rural Chinese children is large enough to merit its own scholarship. Second, rural China has some peculiarities that make extrapolating from developing countries potentially inaccurate. One of these peculiarities, for example, concerns the phenomenon of left-behind children (LBC), whose parents migrate to work in the cities and whose grandparents stay in the countryside to assume the role of the primary caregivers (Wu, Young, & Cai, 2012). Unlike children in other developing counties, LBCs may suffer developmentally not because of a general parenting culture but rather because they are raised by a demographic that is typically less educated, less healthy, and older in age (Khor et al., 2016).

While current scholarship on rural Chinese parenting stands short, a few available studies show concerning trends. Wei et al. (2015), for example, show that depression is common among caregivers and, perhaps as a result, children enjoy few learning opportunities. More relevant to our question, Yue et al. (2017) study how rural caregivers in Shaanxi province interact with toddlers and find that interactive parenting is rare.

The goal of this study is to supplement these findings. We present an empirically based overview of ECD and parenting in two previously unstudied regions of China: Hebei in the north and Yunnan in the south. We first examine the prevalence of cognitive, motor, and social-emotional developmental delays among rural children to understand the extent to which ECD is compromised in rural China. We then examine parenting through answering four guiding questions: First, do rural caregivers parent their children interactively? Second, is parenting practiced differently by different types of children (males versus females, children raised by grandparents versus those raised by parents, for instance)? Third, are suboptimal parenting practices associated with compromised development? Finally, where do caregivers obtain information about optimal parenting practices?

Methods

Sample selection

We conducted our study in two prefectures located in Hebei and Yunnan provinces. From each of these two prefectures, one poor county was randomly selected to participate in the study. We then created a list of all townships (the middle level of administration between county and village) in each county, excluding townships at the county seat which are typically wealthier than the average rural township. From the resulting list of townships in each county, we randomly selected one township to participate in the study. All villages in each of the two townships were automatically included in our study.

To select the sample households, we obtained a list of all registered births from the local family planning official in each sample village. All children between 6 to 18 months and their caregivers were enrolled in the study. The resulting sample included 448 caregiver–child dyads from 51 villages.

Data description

We collected two types of information from each caregiver–child dyad: results from a direct assessment of early developmental outcomes that we administered to the child and caregiver's responses to a parenting-oriented survey. In this section, we describe these two types of information in detail.

Assessing child development

All children were administered the Bayley Scales of Infant and Toddler Development (BSID), an internationally recognized method of assessing ECD (Weiss, Oakland, & Aylward, 2010). More specifically, we administered the third – and most recent – edition of the test (BSID-III) which, to our knowledge, has not been previously used in China.

The BSID-III results are categorized into five standardized scales, three of which we use in the present study: the cognitive scale, which assesses information processing (attention to novelty,

attention to stimuli, and problem-solving), counting, and number skills; the language scale, which assesses both receptive and expressive communication skills; and the social-emotional scale which assesses functional emotional skills, like self-regulation and ability to use emotions in a purposeful manner (Weiss et al., 2010). Both the cognitive and language scales assess the child's performance on a series of tasks, whereas the social-emotional scale relies on caregiver's responses. Each of these three indices takes into account the child's gestational and chronological ages. Studies examining the validity of the BSID-III found that the three scales exhibit high inter- and intra-rater reliability agreement, high internal consistency, and high test-retest stability even when tested in other cultural contexts (Azari et al., 2017; Madaschi, Mecca, Macedo, & Paula, 2016; Weiss et al., 2010; Yu et al., 2013; Zakaria, Seok, Sombuling, Ahmad, & Iqbal, 2012).

We transform the raw scores into composite scores according to BSID-III guidelines (Bayley, 2005). These composite scores allow us to compare development levels among sample children who are exposed to different parenting styles. Before doing this, however, we first use these scores to assess the status of ECD in our sample in two ways: we assess the development level of the entire sample (using the sample average for each scale) and we examine the prevalence rate of developmental delays.

We define delays according to documented distributions of BSID scores in reference populations. In a healthy population, the mean score (SD) is expected to be 105 (9.6) for the cognitive scale (Lowe, Erickson, Schrader, & Duncan, 2012; Serenius et al., 2013), 109 (12.3) for the language score (Serenius et al., 2013), and 100 (15) for the social-emotional score (Bayley, 2005). Mild impairment is then defined as a score between two SDs to one SD below the mean. This means a child is delayed in the cognitive domain if he scores between 85.8 (inclusive) and 95.4; in the language domain if he scores between 84.4 (inclusive) and 96.7; and in the social-emotional domain if he scores between 70 (inclusive) and 85. A moderate or severe impairment is defined as a score that is more than two SDs below the mean. This translates to a score below 85.8 for the cognitive scale, 84.4 for the language scale, and 70.0 for the social-emotional scale.

Assessing interactive parenting

All caregivers were administered a general parenting-oriented survey. The survey questions were carefully adapted from two primary sources: the parenting module of the MICS survey (discussed earlier) and the National Survey of Early Childhood Health (NSECH), developed by the U.S. Centers for Disease Control and Prevention (CDC).

To assess interactive parenting, we asked questions about three focal practices: telling stories to the child, singing to the child, and playing with the child on the day prior to the survey. These questions were chosen based on the findings of psychological and biological literature that show these three indicators to be linked with adequate child development. Telling stories, reading, and talking to one's child increase both cognitive and early language development (Karrass & Braungart-Rieker, 2005; Murray & Egan, 2014; Raikes et al., 2006). Singing to infants has been shown to increase responsiveness (Shenfield, Trehub, & Nakata, 2003), capture attention (Nakata & Trehub, 2004), and elicit positive cognitive behaviour (de l'Etoile, 2006). Children whose caregivers engage with them in interactive play and pretend play are more likely to have better cognitive development, even when verbal interaction is controlled for (Ginsburg, 2007; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004; Tomopoulos et al., 2006).

We selected three additional indicators that describe caregiver–child interaction. The first is the number of times the caregiver showed affection in the two days prior to the survey. Display of affection and warmth helps the child improve behavioural response to stress and reduce disorganized attachments (Morris et al., 2017; Zhou et al., 2002). Further, we examined the average daily time that the child spends playing alone (henceforth referred to as *time alone*) and the average daily time that the child spends watching TV or videos (henceforth referred to as *screen time*). While the literature examining these latter two variables is mixed in terms of their link with child development, they were included for the following reasons. The time alone indicator points to the lack of interactive

caregiver–child behaviour exemplified by the three focal practices. The screen time indicator does a similar job, as watching TV is an activity that potentially substitutes away from caregiver–child interaction (Nathanson & Rasmussen, 2011). As some studies suggest, however, the effects of watching TV may be more complex to interpret because they depend on the content being viewed; for example, educational and age appropriate content may encourage language development whereas other inappropriate content may hinder interaction and creativity (Courage & Setliff, 2009; Linebarger & Walker, 2005). As such, results involving this variable should be interpreted with caution.

Finally, we collected information on sources of parenting knowledge among the sample caregivers. These included informal sources like TV, family, and friends as well as formal sources like doctors.

Sample participants

Table 1 presents basic socioeconomic and demographic characteristics of the study participants. Of the 448 children in this study, slightly over half (53.8%) were male – a ratio that is similar to the gender imbalance in China (China Statistical Yearbook, 2015). Around 4.2% of sample children were born prematurely. Only-children constituted 43.3% of the sample with the majority (96.5%) of the others having only one sibling. The mother was identified as the primary caregiver for 86.8% of the children; for most (83.3%) of the other children, the grandmother was identified as such. Maternal educational attainment was low overall, with the majority of the mothers (72.1%) having only completed a middle school education (9 years of schooling) or lower, and only 27.9% attaining a high school education or higher. Finally, about one in ten (12.5%) of the sample households reported receiving the Minimum Living Standard Guarantee Payments, a form of government welfare for the lowest income families nationwide. In the rest of the analysis, we use this characteristic as a proxy for poverty status.

Results

Developmental delays

We first examine the developmental outcomes of our sample children. BSID-III measures were available for all 448 children and show that the mean score (SD) was 98.2 (12.6) for the cognitive scale, 92.0

Table 1. Descriptive statistics of sample children and caregivers.

Characteristic	Percent	Observations
Gender of infant		
Female	46.2	207
Male	53.8	241
Infant is premature		
Yes	4.2	19
No	95.8	429
Number of siblings		
None (only child)	43.3	194
One sibling	54.7	245
Two siblings	2.0	9
Primary caregiver		
Mother	86.8	389
Grandmother	11.0	49
Others	2.2	10
Maternal educational level		
Middle school or lower	72.1	323
High school or higher	27.9	125
Maternal age		
25 years or younger	35.0	157
Older than 25 years	65.0	291
Family receives government welfare		
Yes	12.5	56
No	87.5	392

(13.3) for the language scale, and 88.3 (13.8) for the social-emotional scale. All three scales are below the averages observed in a healthy population. The mean score on the language scale, in particular, is more than one SD below the mean of a healthy population.

Table 2 presents the fraction of sample children exhibiting developmental delays, with a breakdown of the delay type and severity. In total, 48.7% of the sample children had cognitive scores below the cut-off, indicating some degree of delay in their cognitive development. Overall, about one quarter (30.8%) of the sample exhibited mild cognitive delays and 17.9% of the sample exhibited moderate or severe cognitive delays. Language delays were slightly less common, affecting 40.6% of the sample children, with 32.1% exhibiting mild delays and 8.5% exhibiting moderate or severe delays. Social-emotional delays affected 35% of the sample, with 30.8% of the sample exhibiting mild delays and 4.2% exhibiting moderate or severe delays.

The prevalence of interactive parenting practices

Having established that child development is compromised in our sample, we now describe the rates of interactive parenting practices followed by their caregivers (Table 3). We find that only 13.8% of the sample caregivers told stories to their child; 36.2% sang to their child; and 59.4% played with their child on the day prior to the survey. On average, the sample children spent over half an hour (34 minutes) per day watching TV, and about one hour (59.9 minutes) per day playing alone.

Parenting practices by caregiver and child characteristics

Table 4 presents bivariate associations between parenting practices and selected child and caregiver characteristics. We find no statistically significant differences in parenting either by gender of the child or poverty status as represented by the receipt of government welfare (a threshold for significance is set at $p = .05$ for all analyses). On the other hand, only-children received more interactive parenting than their counterparts with siblings ($p \leq .01$ in all cases). The margins were large: 75% of only-children were engaged with using storytelling, singing, and/or playing, as opposed to 62% of children-with-siblings. A similar pattern was recorded for children whose mothers were the primary caregivers ($p \leq .01$ in all cases): 70% of these children were engaged with using one or more of the three parenting practices as opposed to 54% of LBC (whose mother was not the primary caregiver). Finally, 81% of children whose mothers attained an education beyond middle

Table 2. Cognitive, language, and social-emotional development scores of sample children.

	Percent	Observations
Cognitive scale		
All delays	48.7	218
Mild delays	30.8	138
Moderate-severe delays	17.9	80
Language scale		
All delays	40.6	182
Mild delays	32.1	144
Moderate-severe delays	8.5	38
Social-emotional scale		
All delays	35.0	157
Mild delays	30.8	138
Moderate-severe delays	4.2	19

Notes: As described in detail in the Methods section, mild impairment is defined as a score between two SDs and one SD below the mean. This translates to a score between 85.8 (inclusive) and 95.4 on the cognitive scale; 84.4 (inclusive) and 96.7 on the language scale; and 70 (inclusive) and 85 on the social-emotional scale. A moderate or severe impairment is defined as a score that is more than two SDs below the mean (i.e. below 85.8 for the cognitive scale, 84.4 for the language scale, and 70.0 for the social-emotional scale).

Table 3. Parenting indicators.

	Mean	Observations
Focal indicators		
Caregiver told stories to infant	0.138	62
Caregiver sang to infant	0.362	162
Caregiver used toys to play with infant	0.594	289
Additional indicators		
Number of times caregiver showed affection	8.32	–
Daily screen time, in minutes	34.2	–
Daily time when child plays alone, in minutes	59.9	–

school engaged with them as opposed to 63% of children of less-educated mothers ($p \leq .01$ in all cases).

Are suboptimal parenting practices associated with compromised development?

How are parenting skills associated with child development in our sample? To answer this question, we first report a set of bivariate correlations that examine whether children whose caregivers engaged in more interactive parenting practices were similar to children whose caregivers did not follow the practices (Table 5). The results show significant differences.

The children's cognitive, language, and social-emotional composite scores were all higher when caregivers used any, or a combination, of the three parenting practices ($p < .01$ in all cases). The differences were 5.1 points (equivalent to 0.40 SD) on the cognitive scale, 4.8 points (0.36 SD) on the language scale, and 4 points (0.29 SD) in the social-emotional scale. The additional indicators (showing affection, time alone, screen time) were not associated with significant changes in developmental outcomes, with the one exception of time alone, which was weakly associated with cognitive development ($p < .05$).

To verify whether these associations are robust, we ran a multivariate analysis model, adjusting for child and caregiver characteristics (Table 6). Child characteristics include gender, age, premature birth, and whether he/she has siblings. Caregiver characteristics include whether the mother is the primary caregiver (indicating the child is not left-behind), maternal age and educational level (regardless of whether she is the primary caregiver), and household poverty status as represented by the receipt of government welfare.

Table 4. Parenting practices by child and caregiver characteristics.

	Caregiver told stories to infants		Caregiver sang to infant		Caregiver used toys to play		Caregiver did any of the three focal practices	
characteristics	Mean ± SD	*p*-Value	Mean ± SD	*p*-Value	Mean ± SD	*p*-Value	Mean ± SD	*p*-Value
Infant characteristics								
Gender								
Female	0.13 ± 0.34	.65	0.36 ± 0.48	.87	0.60 ± 0.49	.65	0.69 ± 0.46	.61
Male	0.15 ± 0.35		0.37 ± 0.48		0.59 ± 0.49		0.67 ± 0.47	
Only child								
No	0.09 ± 0.29	<.01	0.31 ± 0.46	.01	0.54 ± 0.50	<.01	0.62 ± 0.49	<.01
Yes	0.20 ± 0.40		0.43 ± 0.50		0.67 ± 0.47		0.75 ± 0.43	
Caregiver characteristics								
Mother is primary caregiver								
No	0.15 ± 0.36	.74	0.25 ± 0.44	.07	0.46 ± 0.50	.02	0.54 ± 0.50	.02
Yes	0.14 ± 0.34		0.38 ± 0.49		0.61 ± 0.49		0.70 ± 0.46	
Maternal education								
Middle school or lower	0.11 ± 0.32	<.01	0.32 ± 0.47	<.01	0.54 ± 0.50	<.01	0.63 ± 0.48	<.01
High school or higher	0.21 ± 0.41		0.46 ± 0.50		0.74 ± 0.44		0.81 ± 0.40	
Family receives government welfare								
No	0.14 ± 0.35	.76	0.37 ± 0.48	.21	0.60 ± 0.49	.73	0.69 ± 0.46	.13
Yes	0.13 ± 0.33		0.29 ± 0.46		0.57 ± 0.50		0.59 ± 0.50	

Table 5. Cognitive, language, and social-emotional development by parenting practices.

		Cognitive scale		Language scale		Social-emotional scale	
Parenting practices	Observations	Mean ± SD	*p*-Value	Mean ± SD	*p*-Value	Mean ± SD	*p*-Value
Tell stories to the child							
Yes	62	100.2 ± 11.6	.2	94.3 ± 13.7	.16	93.3 ± 14.5	<.01
No	386	97.9 ± 12.8		91.7 ± 13.3		87.5 ± 13.5	
Sing songs to the child							
Yes	162	99.7 ± 12.5	.07	95.1 ± 14.2	<.01	90.8 ± 13.6	<.01
No	286	97.4 ± 12.7		90.3 ± 12.5		86.9 ± 13.7	
Use toys to play with the child							
Yes	266	99.8 ± 13.0	<.01	93.3 ± 13.7	.02	89.5 ± 13.5	.03
No	182	96.0 ± 11.7		90.3 ± 12.7		86.7 ± 14.1	
Any of the above three parenting activities							
Yes	304	99.9 ± 12.7	<.01	93.6 ± 13.6	<.01	89.6 ± 13.4	<.01
No	144	94.8 ± 11.7		88.8 ± 12.2		85.6 ± 14.3	
Showed affection (higher than average)[a]							
Yes	152	98.2 ± 11.7	.99	92.5 ± 13.6	.60	89.2 ± 14.5	.35
No	296	98.2 ± 13.1		91.8 ± 13.2		87.9 ± 13.4	
Time alone (higher than average)[b]							
Yes	160	99.9 ± 12.3	.04	93.6 ± 14.3	.07	89.1 ± 14.7	.36
No	288	97.3 ± 12.7		91.2 ± 12.7		87.9 ± 13.2	
Screen time (higher than average)[c]							
Yes	100	96.7 ± 13.1	.16	92.1 ± 13.5	.96	89.9 ± 15.3	.21
No	348	98.7 ± 12.4		92.0 ± 13.3		87.9 ± 13.3	

[a]Nine times or more in the two days prior to the survey.
[b]35 minutes or more per day.
[c]60 minutes or more per day.

Whether the caregiver engaged in any of the three focal parenting practices maintained consistent associations with developmental scores in the multivariate regression (Table 6). In particular, when caregivers engaged in any of the three interactive parenting practices, children scored higher by 3.98 points (0.32 SD) on average on the cognitive scale ($p < .05$) and 3.22 points (0.24 SD) on the language score ($p < .05$). While the social-emotional score also increased substantially with caregiver's engagement (3.09 points or 0.22 SD), the result was statistically significant only at the 10% level and thus may be less precisely estimated. When corrected for confounders, the weak link between time alone and cognitive development (which initially showed in the bivariate analysis) disappeared. Finally, and consistent with the bivariate analysis, we do not detect a

Table 6. Multivariate association between parenting practices and child development.

	Cognitive scale			Language scale			Social-emotional scale		
	Coefficient	95% CI	*p*-Value	Coefficient	95% CI	*p*-Value	Coefficient	95% CI	*p*-Value
Told stories to child	0.87	(−1.94; 3.68)	.54	1.17	(−2.85; 5.18)	.56	4.01	(−0.52; 8.54)	.08
Sang songs to child	0.63	(−1.73; 3.00)	.59	3.17**	(0.17; 6.17)	.04	2.60	(−0.28; 5.47)	.08
Used toys to play	2.81**	(0.54; 5.08)	.02	1.64	(−1.31; 4.58)	.27	2.07	(−1.21; 5.35)	.21
Did any of the three focal activities	3.98***	(1.67; 6.29)	.001	3.22**	(0.14; 6.31)	.04	3.09	(−0.25; 6.43)	.07
Showed affection (higher than average)[a]	−0.47	(−2.89; 1.96)	.70	0.28	(−2.09; 2.65)	.81	0.97	(−1.71; 3.65)	.72
Time alone (higher than average)[b]	2.04	(−0.45; 4.53)	0.11	1.77	(−1.25; 4.78)	.25	0.11	(−2.89; 3.11)	.94
Screen time (higher than average)[c]	−1.19	(−4.22; 1.84)	.43	1.32	(−1.97;4.60)	.42	2.45	(−1.46; 6.35)	.22

Note: **significant at the 5% level. ***significant at the 1% level.
[a]nine times or more in the two days prior to the survey.
[b]35 minutes or more per day.
[c]60 minutes or more per day.

Table 7. Sources of information about parenting practices.

Information source	Percent	Number of observations
Family members	72.0	318
Friends	38.2	171
Internet	34.8	156
TV	25.7	115
Books	15.8	77
Local doctor, local bureaus of family planning, or Women's representative	14.7	66
Own experiences	12.3	55

significant association between developmental outcomes and the two additional variables of screen time and display of affection.

Sources of parenting knowledge

Having examined the link between children's developmental outcomes and parenting skills of the caregivers, we now investigate the sources of information available to caregivers (Table 7). We find that the most cited sources are informal in nature. For example, almost three in four caregivers cited family members as a source of information, with friends being the next most cited source. Formal sources such as local doctors, family planning bureaus, or women's representatives were only cited by 14.7% of the sample caregivers.

Discussion

The status of ECD and parenting in rural China

At one and a half years or younger, our sample children showed alarming rates of developmental delays: among every ten children, five exhibited cognitive delays, four exhibited language delays, and three to four children exhibited social-emotional delays. One way to understand the magnitude of these rates is to compare them to those in a healthy population. In a healthy population, the BSID-III scores are normally distributed (Weiss et al., 2010) and only 16% of children should score more than 1 SD below the mean. Therefore, the rates of developmental delays that we observe in our sample are about two to three times as high as they should be in a healthy population. Although studies in urban China are similarly sparse, the few that exist provide some useful insights for comparison. Bian et al. (2012), for example, use a parent-completed questionnaire and find that cognitive delays in Shanghai affect only one fifth (as opposed to one half in our study) of their similarly aged sample. Similarly, in neighbouring countries, like South Korea, social-emotional problems range between 14 to 16% (Heo & Squires, 2012), suggesting that early development in rural China is relatively compromised.

One reason behind these high rates – particularly the rates of cognitive and language delays – may be the fact that practices which involve verbal interaction were not sufficiently utilized by our sample caregivers. As discussed above, verbal interaction stimulates not just early language development but also cognitive development (Murray & Egan, 2014). Only 13.8% of the sample caregivers engaged in storytelling activities and 36.2% engaged in singing activities. Further, verbal interaction was also low compared to results from a large-scale multi-national study by Bornstein and Putnick (2012). Across their sample of 28 developing countries, they find that 35% of the mothers engaged in storytelling activities with their children and 50% in singing. While a part of this gap can be attributed to the different age ranges of the two examined populations (their sample included children up to five years old, while ours only includes children up to one and a half years) and the different recall periods (up to three days in their case, and only one day in the present study), it is unlikely that these two factors contribute to the entire magnitude of the difference. As such, it can be argued that not only are rural Chinese children

engaging in limited verbal communication, but they are also particularly disadvantaged in this regard when compared to children in many developing countries.

In addition to limited verbal interaction, our supplementary parenting indicators show evidence for a passive parenting style. For instance, the sample children watch an average of 34 minutes of TV everyday, a large departure from the recommendation by the American Academy of Pediatrics, which suggests that children under two years should not be exposed to any television (AAP, 2016). Additionally, the sample children were often left to play alone for an average of one hour per day. While no available studies report the equivalent duration for other countries, leaving the child alone for more than one hour per day is sometimes considered a proxy for suboptimal care (Bornstein & Putnick, 2012).

Some groups of children were particularly at-risk for suboptimal parenting. LBC, for instance, were less likely to be parented in an interactive, stimulating way – which is consistent with previous findings on their relatively poor health (Jia, Shi, Cao, Delancey, & Tian, 2010). Similarly disadvantaged in our sample were children-with-siblings and children of less-educated mothers. This result suggests that suboptimal parenting may be a function of two broad factors: time constraints and knowledge constraints. Caregivers may face time constraints if they have multiple children and are forced to allocate time among these children, potentially reducing the quality of caregiver–child interaction. Knowledge constraints, on the other hand, appear in the case of less-educated mother caregivers and grandmother caregivers. As evidenced by educational attainment patterns, grandmothers are less likely to be literate or formally educated, meaning that accessing parenting knowledge may prove challenging (Khor et al., 2016).

Interestingly, we do not find evidence that caregivers engaged differently with male and female children. This finding is consistent with recent literature that has documented a narrowing gender gap in China for many health and academic outcomes (Zhou et al., 2016). Moreover, we do not find a link between parenting practices and relative poverty. This contradicts the hypothesis that caregivers in poorer households may allocate less time and fewer resources towards parenting practices. One possible explanation for this, taking into account the absence of information on optimal parenting in these areas, may be that the relationship between poverty and parenting is not so straightforward. Yue et al. (2017), for example, suggest that compared to poorer caregivers, wealthier caregivers may indeed allocate more money, but not necessarily more time, towards parenting; purchasing toys and books that are often age-inappropriate or non-stimulating. If this is the case (that information, rather than wealth, represents the bottleneck towards caregiver–child interaction), then it is not so surprising that poverty is not significantly associated with parenting style.

The parenting-development link

The present study shows that the often documented link between how caregivers parent and how children develop applies in our rural Chinese context. We find that sample caregivers who utilized three focal parenting practices had children with better developmental outcomes, even when caregiver and child characteristics were taken into consideration. The differences in developmental outcomes (between children exposed to such practices and children who were not) are of non-negligible magnitude, falling between 0.22 and 0.32 SD. For comparison, a parenting intervention in rural China, emphasizing interactive engagement, increased cognitive scores by 0.34 SD, as measured by BSID-I (Sylvia et al., 2016).

We also find that the time that children spend alone or watching TV and videos is not statistically related to developmental outcomes. This may be because these activities are not substituting away from any rewarding activities. In other words, had the sample children who spent time alone or watching TV not done so, it is likely that they still would not have received interactive or engaging parenting practices.

Sources of parenting knowledge

Accurate and up-to-date parenting knowledge is an important input to parenting quality and to optimal development and acts as the mediator for the link between high socioeconomic status and optimal parenting observed in the literature (Francesconi & Heckman, 2016, pp. F13–F15; World Bank, 2014, p. 103). It is also a critical input because incorrect or outdated information can promote parenting styles that may be detrimental to child development.

Two important patterns emerged from our analysis on this topic. First, knowledge about optimal parenting is propagated primarily through informal networks of family members and friends. While a social network is not necessarily an inadequate medium in and of itself, it may be detrimental if there is no mechanism for stopping and correcting inaccurate information. This may be especially problematic in rural China, since the average educational attainment level among caregivers is quite low (Khor et al., 2016; Yue et al., 2017). Second, we find that formal public health institutions are largely uninvolved in the promulgation of information about parenting practices. Only 15% of caregivers in our sample cited local doctors, family planning bureaus, or women's representatives as sources of parenting information. This stands even though such institutions have the capacity to access, distil, and promote accurate knowledge on modern parenting. Moreover, this finding stands in contrast to the government's recent push (at least in terms of written laws and guidelines) towards ensuring better ECD outcomes (for a summary of ECD-related regulations, see Wu et al., (2012).

Policy implications

Our findings show that there is no reliable source that empowers caregivers with knowledge on how to optimally engage with infants and toddlers. Caregivers seem to rely heavily on the older generation for information about parenting that may no longer be well-adapted to China's rapidly changing society. A public platform that can be proactive in the provision of parenting information may thus be necessary.

To this end, we suggest that the healthcare system, generally, and the Health and Family Planning Commission (HFPC), specifically, extend its services to include a parenting education component. The HFPC is the government agency historically responsible for the enforcement of China's one-child policy. Since the ending of the policy in 2016, however, this role is being replaced, and its new focus on *quality* of children rather than quantity has the potential to yield promising results. Moreover, as one of the largest bureaucracies in the world, the HFPC already has a considerable experience doing village outreach and running informational campaigns. Such history makes them well-positioned to take on the responsibility of creating a modern parenting culture. Moreover, since grandmothers appear to play a large role in shaping parenting practices – either by caring for children directly, or by advising the younger generation – but also seem to be less engaged in interactive parenting practices, any programming done by the HFPC should target this demographic, making sure they can enjoy easy access to correct information without having to travel long distances or be hindered by illiteracy.

Limitations and future research directions

We acknowledge a few limitations to this study. First, one part of our analysis examines how parenting practices among sample caregivers relate to their children's developmental outcomes. This link, however, cannot be interpreted as causal due to the cross-sectional nature of our dataset. For our three focal parenting practices, this concern is alleviated by biological studies showing the neurological response to interactive caregiver–child practices (Shonkoff & Bales, 2011) as well as longitudinal and randomized studies that document how improved parenting leads to better developmental outcomes (Kitzman et al., 2010; Walker et al., 2007).

Second, in this study we use the BSID for assessing early childhood development, in part due to its high validity and its reputation as the gold standard for assessing child development. However, the most recent edition of the BSID (BSID-III, the version we use in this study) has not yet been administered to a healthy reference population in China. As such, we rely on reference populations from other countries (Lowe et al., 2012; Serenius et al., 2013; Weiss et al., 2010).

Finally, our indicators for parenting quality are unstandardized. Even though a standardized composite – such as the Parenting Sense of Competence Scale (Coleman & Karraker, 2003) or the Teti Maternal Self-efficacy Scale (Caldera et al., 2007) – could allow comparability with other studies, it occludes the specific mechanisms that may cause such a composite to be linked to developmental outcomes. As a result, we chose to include specific interactive practices emphasized by the developmental literature and included in international and national surveys on parenting quality (such as the MICS and the NSECH described earlier).

Future research directions should consider how to empower caregivers with parenting knowledge: more specifically, the best way to teach caregivers why and how to engage with young children interactively. Moreover, given the potential role for the HFPC that we have highlighted, behavioural and policy research should consider how to best align the incentives of public health institutions with better developmental outcomes for children. Such a step would ensure that their role does not end at providing specific knowledge but also extends to seeing that caregivers act upon it.

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References

American Academy of Pediatrics. (2016). American Academy of Pediatrics Announces New Recommendations for Children's Media Use. Retrieved February 27, 2017, from https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/american-academy-of-pediatrics-announces-new-recommendations-for-childrens-media-use.aspx.

Azari, N., Soleimani, F., Vameghi, R., Sajedi, F., Shashahani, S., Karimi, H., … Gharib, M. (2017). A psychometric study of the Bayley scales of infant and toddler development in Persian language children. *Iranian Journal of Child Neurology*, *11*(1), 50–56.

Bayley, N. (2005). *Bayley scales of infant and toddler development: Technical manual* (3rd ed.). San Antonio (TX): Harcourt Assessment.

Bian, X., Yao, G., Squires, J., Hoselton, R., Chen, C.-I., Murphy, K., … Fang, B. (2012). Translation and use of parent-completed developmental screening test in Shanghai. *Journal of Early Childhood Research*, *10*(2), 162–175. doi:10.1177/1476718X11430071

Black, M. M., Walker, S. P., Fernald, L. C. H., Andersen, C. T., DiGirolamo, A. M., Lu, C., … Grantham-McGregor, S. (2017). Early childhood development coming of age: Science through the life course. *The Lancet*, *389*(10064), 77–90. doi:10.1016/S0140-6736(16)31389-7

Bornstein, M. H., & Putnick, D. L. (2012). Cognitive and socioemotional caregiving in developing countries. *Child Development*, *83*(1), 46–61. doi:10.1111/j.1467-8624.2011.01673.x

Britto, P., Ponguta, L., Reyes, C., & Karnati, R. (2015). *A systematic review of parenting programmes for young children in low- and middle-income countries*. UNICEF. Retrieved from https://www.researchgate.net/publication/316268676_A_Systematic_Review_of_Parenting_Programmes_for_Young_Children_in_Low-_and_Middle-Income_Countries

Caldera, D., Burrell, L., Rodriguez, K., Crowne, S. S., Rohde, C., & Duggan, A. (2007). Impact of a statewide home visiting program on parenting and on child health and development. *Child Abuse & Neglect*, *31*(8), 829–852. doi:10.1016/j.chiabu.2007.02.008

Chang, S., Zeng, L., Brouwer, I. D., Kok, F. J., & Yan, H. (2013). Effect of Iron Deficiency Anemia in Pregnancy on Child Mental Development in Rural China. *Pediatrics*, *131*(3), 2011–3513. e755–e763. https://doi.org/10.1542/peds.2011-3513

China Statistical Yearbook. (2015). *Population by age and sex (2014)*. Retrieved from http://www.stats.gov.cn/tjsj/ndsj/2015/indexeh.htm

Coleman, P. K., & Karraker, K. H. (2003). Maternal self-efficacy beliefs, competence in parenting, and toddlers' behavior and developmental status. *Infant Mental Health Journal*, *24*(2), 126–148.

Courage, M. L., & Setliff, A. E. (2009). Debating the impact of television and video material on very young children: Attention, learning, and the developing brain. *Child Development Perspectives*, *3*(1), 72–78.

de l'Etoile, S. K. (2006). Infant behavioral responses to infant-directed singing and other maternal interactions. *Infant Behavior and Development*, *29*(3), 456–470. doi:10.1016/j.infbeh.2006.03.002

Francesconi, M., & Heckman, J. J. (2016). Child development and parental investment: Introduction. *The Economic Journal*, *126*(596), F1–F27. doi:10.1111/ecoj.12388

Garcia, J. L., Heckman, J. J., Leaf, D. E., & Prados, M. J. (2017). Quantifying the life-cycle benefits of a prototypical early childhood program. *National Bureau of Economic Research*, *Working paper*. http://www.nber.org/papers/w23479

Gardner, J. M., Walker, S. P., Powell, C. A., & Grantham-McGregor, S. (2003). A randomized controlled trial of a home-visiting intervention on cognition and behavior in term low birth weight infants. *The Journal of Pediatrics*, *143*(5), 634–639.

Gertler, P., Heckman, J., Pinto, R., Zanolini, A., Vermeerch, C., Walker, S., … Grantham-McGregor, S. (2014). Labor market returns to an early childhood stimulation intervention in Jamaica. *Science (New York, N.Y.)*, *344*(6187), 998–1001. doi:10.1126/science.1251178

Ginsburg, K. R. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, *119*(1), 182–191.

Heckman, J. (2013). *Giving kids a fair chance*. Boston, MA: The MIT Press. Retrieved from https://mitpress.mit.edu/books/giving-kids-fair-chance

Heo, K. H., & Squires, J. (2012). Cultural adaptation of a parent completed social emotional screening instrument for young children: Ages and stages questionnaire-social emotional. *Early Human Development*, *88*(3), 151–158. doi:10.1016/j.earlhumdev.2011.07.019

Jia, Z., Shi, L., Cao, Y., Delancey, J., & Tian, W. (2010). Health-related quality of life of "left-behind children": a cross-sectional survey in rural China. *Quality of Life Research*, *19*(6), 775–780. doi:10.1007/s11136-010-9638-0

Kagitcibasi, C., Sunar, D., & Bekman, S.. (2001). Long-term effects of early intervention: Turkish low-income mothers and children. *Journal of Applied Developmental Psychology*, *22*(4), 333–361.

Karrass, J., & Braungart-Rieker, J. M. (2005). Effects of shared parent–infant book reading on early language acquisition. *Journal of Applied Developmental Psychology*, *26*(2), 133–148. doi:10.1016/j.appdev.2004.12.003

Khor, N., Pang, L., Liu, C., Chang, F., Mo, D., Loyalka, P., & Rozelle, S. (2016). China's looming human capital crisis: Upper secondary educational attainment rates and the middle-income trap. *The China Quarterly*, *228*, 905–926.

Kitzman, H. J., Olds, D. L., Cole, R. E., Hanks, C. A., Anson, E. A., Arcoleo, K. J., … Holmberg, J. R. (2010). Enduring effects of prenatal and infancy home visiting by nurses on children: Follow-up of a randomized trial among children at age 12 years. *Archives of Pediatrics & Adolescent Medicine*, *164*(5), 412–418.

Li, H., Loyalka, P., Rozelle, S., & Wu, B. (2017). Human capital and China's future growth. *The Journal of Economic Perspectives*, *31*(1), 25–48.

Li, L., Luo, R., Sylvia, S., Medina, A., & Rozelle, S. (2015). The prevalence of anemia in central and eastern China: Evidence from the China health and nutrition survey. *Southeast Asian Journal of Tropical Medicine and Public Health*, *46*(2), 306–321.

Linebarger, D. L., & Walker, D. (2005). Infants' and toddlers' television viewing and language outcomes. *American Behavioral Scientist*, *48*(5), 624–645. doi:10.1177/0002764204271505

Lowe, J. R., Erickson, S. J., Schrader, R., & Duncan, A. F. (2012). Comparison of the Bayley II mental developmental Index and the Bayley III cognitive scale: Are we measuring the same thing? *Acta Paediatrica*, *101*(2), e55–e58. doi:10.1111/j.1651-2227.2011.02517.x

Lozoff, B., Smith, J. B., Clark, K. M., Perales, C. G., Rivera, F., & Castillo, M. (2010). Home intervention improves cognitive and social-emotional scores in iron-deficient anemic infants. *Pediatrics*, *126*, e884–e894. doi:10.1542/peds.2009-3535

Madaschi, V., Mecca, T. P., Macedo, E. C., & Paula, C. S. (2016). Bayley-III scales of infant and toddler development: Transcultural adaptation and psychometric properties. *Paidéia (Ribeirão Preto)*, *26*(64), 189–197.

Morris, A. S., Robinson, L. R., Hays-Grudo, J., Claussen, A. H., Hartwig, S. A., & Treat, A. E. (2017). Targeting parenting in early childhood: A public health approach to improve outcomes for children living in poverty. *Child Development*, *88*(2), 388–397. doi:10.1111/cdev.12743

Murray, A., & Egan, S. M. (2014). Does reading to infants benefit their cognitive development at 9-months-old? *An Investigation Using a Large Birth Cohort Survey. Child Language Teaching and Therapy*, *30*(3), 303–315. doi:10.1177/0265659013513813

Nakata, T., & Trehub, S. E. (2004). Infants' responsiveness to maternal speech and singing. *Infant Behavior and Development*, *27*(4), 455–464. doi:10.1016/j.infbeh.2004.03.002

Nathanson, A. I., & Rasmussen, E. E. (2011). TV viewing compared to book reading and Toy playing reduces responsive maternal communication with toddlers and preschoolers. *Human Communication Research*, *37*(4), 465–487. doi:10.1111/j.1468-2958.2011.01413.x

Newnham, C. A., Milgrom, J., & Skouteris, H. (2009). Effectiveness of a modified mother–infant transaction program on outcomes for preterm infants from 3 to 24 months of age. *Infant Behavior and Development*, *32*(1), 17–26. doi:10.1016/j.infbeh.2008.09.004

Nonoyama-Tarumi, Y., & Ota, Y. (2011). Early childhood development in developing countries: Pre-primary education, parenting, and health care. *Background Paper Education for All. Global Monitoring Report*. Retrieved from http://basiced.org/wp-content/uploads/Publication_Library/UNESCO-Early_Childhood_Development_in_Developing_Countries-2010.pdf

Raikes, H., Alexander Pan, B., Luze, G., Tamis-LeMonda, C. S., Brooks-Gunn, J., Constantine, J., … Rodriguez, E. T. (2006). Mother–child bookreading in low-income families: Correlates and outcomes during the first three years of life. *Child Development*, *77*(4), 924–953. doi:10.1111/j.1467-8624.2006.00911.x

Serenius, F., Källén, K., Blennow, M., Ewald, U., Fellman, V., & Holmström, G. … Strömberg, B ;EXPRESS Group. (2013). Neurodevelopmental outcome in extremely preterm infants at 2.5 years after active perinatal care in Sweden. *Jama*, *309*(17), 1810–1820.

Shenfield, T., Trehub, S. E., & Nakata, T. (2003). Maternal singing modulates infant arousal. *Psychology of Music*, *31*(4), 365–375. doi:10.1177/03057356030314002

Shonkoff, J. P., & Bales, S. N. (2011). Science does not speak for itself: Translating child development research for the public and its policymakers. *Child Development*, *82*(1), 17–32. doi:10.1111/j.1467-8624.2010.01538.x

Sylvia, S., Warrinnier, N., Luo, R., Shi, Y., Attanasio, O., & Rozelle, S. (2016). *From quantity to quality: Delivering a home-based parenting intervention through China's family planning workers* (Working Paper).

Tamis-LeMonda, C. S., Shannon, J. D., Cabrera, N. J., & Lamb, M. E. (2004). Fathers and mothers at play with their 2- and 3-year-olds: Contributions to language and cognitive development. *Child Development*, *75*(6), 1806–1820. doi:10.1111/j.1467-8624.2004.00818.x

Tomopoulos, S., Dreyer, B. P., Tamis-LeMonda, C., Flynn, V., Rovira, I., Tineo, W., & Mendelsohn, A. L. (2006). Books, toys, parent-child interaction, and development in young Latino children. *Ambulatory Pediatrics*, *6*(2), 72–78. doi:10.1016/j.ambp.2005.10.001

UNICEF. (2016). *The state of the world's children 2016: A fair chance for every child*. New York, NY: Author. Retrieved from https://www.unicef.org/publications/index_91711.html

Walker, S. P., Wachs, T. D., Meeks Gardner, J., Lozoff, B., Wasserman, G. A., Pollitt, E., & Carter, J. A. (2007). Child development: Risk factors for adverse outcomes in developing countries. *The Lancet*, *369*(9556), 145–157. doi:10.1016/S0140-6736(07)60076-2

Wei, Q. W., Zhang, J. X., Scherpbier, R. W., Zhao, C. X., Luo, S. S., Wang, X. L., & Guo, S. F. (2015). High prevalence of developmental delay among children under three years of age in poverty-stricken areas of China. *Public Health*, *129*(12), 1610–1617. doi:10.1016/j.puhe.2015.07.036

Weiss, L. G., Oakland, T., & Aylward, G. P. (2010). *Bayley-III clinical use and interpretation*. Academic Press. Retrieved from https://books.google.com/books?hl=en&lr=&id=IsEIVHFTXf0C&oi=fnd&pg=PP2&dq=Bayley%E2%80%90III+validity&ots=7xkXyFWcAJ&sig=sk6-2jV-wb-WJ4iYd4E0BjeVZcY

WHO. (n.d.). *10 facts about early child development as a social determinant of health*. Retrieved from http://www.who.int/maternal_child_adolescent/topics/child/development/10facts/en/

World Bank. (2014). *World development report 2015: Mind, society, and behavior*. Washington, DC: Author.

Wu, K. B., Young, M. E., & Cai, J. (2012). *Early child development in China:Early child development in China: Breaking the cycle of poverty and improving future competitiveness*. (pp. 33–37). Washington, DC: The World Bank http://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-9564-6

Xie, Y., & Zhou, X. (2014). Income inequality in today's China. *Proceedings of the National Academy of Sciences*, *111*(19), 6928–6933. doi:10.1073/pnas.1403158111

Yu, Y.-T., Hsieh, W.-S., Hsu, C.-H., Chen, L.-C., Lee, W.-T., Chiu, N.-C., … Jeng, S.-F. (2013). A psychometric study of the Bayley scales of infant and toddler development – 3rd edition for term and preterm Taiwanese infants. *Research in Developmental Disabilities*, *34*(11), 3875–3883. doi:10.1016/j.ridd.2013.07.006

Yue, A., Shi, Y., Luo, R., Chen, J., Garth, J., Zhang, J., … Rozelle, S. (2017). China's invisible crisis: Cognitive delays among rural toddlers and the absence of modern parenting. *The China Journal*, *78*, 50–80. doi:10.1086/692290

Zakaria, S., Seok, C. B., Sombuling, A., Ahmad, M. S., & Iqbal, S. (2012). *Reliability and validity for Malay version of Bayley scales of infant and toddler development – third edition (Bayley-III): Preliminary study* (Working paper). International Proceedings of Economics Development and Research. Retrieved from http://www.ipedr.com/vol40/024-ICPSB2012-P10017.pdf

Zeng, Y., & Hesketh, T. (2016). The effects of China's universal two-child policy. *The Lancet*, *388*(10054), 1930–1938. doi:10.1016/S0140-6736(16)31405-2

Zhou, Q., Eisenberg, N., Losoya, S. H., Fabes, R. A., Reiser, M., Guthrie, I. K., … Shepard, S. A. (2002). The relations of parental warmth and positive expressiveness to children's empathy-related responding and social functioning: A longitudinal study. *Child Development*, *73*(3), 893–915.

Zhou, H., Mo, D., Zhou, C., Medina, A., Shi, Y., Zhang, L., & Rozelle, S. (2016). The gender gap among school children in poor rural areas of western China: Evidence from a multi-province dataset. *International Journal for Equity in Health*, *15*, 225. doi:10.1186/s12939-016-0442-5