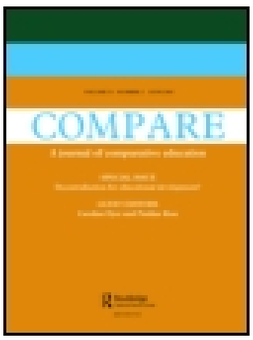

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Feeling bad and doing bad: student confidence in reading in rural China

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ABSTRACT

This article reports on research conducted to investigate student confidence in reading by collecting data from 135 primary schools in rural China. In the survey, we adopted the PIRLS scales of confidence in reading and reading skills test items. Our analysis shows that compared to the other countries and regions, rural China ranks last with regard to student confidence in reading and reading achievement. The correlation analysis reveals that in rural China there is a strong correlation between student confidence in reading and reading achievement. Additionally, school and teacher factors are associated with student confidence in reading. Specifically, having an accessible classroom library is associated with higher reading confidence, especially among the poor readers. Teacher instruction in reading correlates with higher confidence in readers for high achievers. Our findings indicate that the government should develop effective policies to improve student confidence in reading and reading skills in rural China.

KEYWORDS

Confidence in reading; reading achievement; rural China; primary school

Introduction

The development of adequate reading skills at an early age can have an enormous influence on the educational outcomes of students over the long term (Clark and Rumbold 2006; Suk 2017). Reading is an important way to gain knowledge and interpret information; thus, it has been believed that reading is a critical factor for success in school (Bastug 2014). Without sufficient reading skills, children who fail to develop reading competence in early grades usually continue to do poorly in subsequent grades (Good, Simmons, and Kame'enui 2001; Lee and Jonson-Reid 2016). For these reasons, it is imperative that reading challenges are addressed early to decrease the likelihood that children suffer poor educational outcomes.

Student confidence in reading during the beginning years of schooling is believed to have a strong influence on reading achievement and other academic outcomes. Previous findings have revealed the connection of reading attitudes with student reading development as well as academic performance, especially for students at an early age (Bastug

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

2014; Cheung et al. 2017; Baki 2018). Readers with positive reading attitudes are more likely to perform better in reading and academic achievement (Bastug 2014; Kavanagh 2019; Nootens et al. 2019). Confidence in reading, a crucial dimension of reading attitudes, is also found to be positively correlated with student reading achievement (Noble and Holt 2018; Katzir, Lesaux, and Kim 2009). Studies have found that students who have confidence in their reading ability are more motivated readers and, in turn, are more likely to improve their reading skills by building on current levels of learning (Katzir, Lesaux, and Kim 2009; McGeown et al. 2015). Studies also have suggested that there is a causal effect of confidence in reading on student reading achievement (Rinehart 2001; Schunk and Swartz 1993).

School environment and teaching practices are among the most important factors that influence student confidence in reading (Arkebauer, MacDonald, and Palmer 2002; McGeown et al. 2015). The literature suggests that it is through the efforts of teachers to persuade students that they are capable and can acquire the skills needed to achieve academic success that student confidence can be increased (McGeown et al. 2015; Schunk and Pajares 2001). Previous research has shown that improving confidence and engagement in reading may also compensate for any reading disadvantages that have arisen due to low family income and social status (Korat and Schiff 2005). In some cases, confident readers from poor socioeconomic backgrounds may even achieve better reading outcomes (or improve more when given reading instruction) than less confident readers from more well-off socioeconomic backgrounds (Jonathan 2012; Wigfield and Guthrie 1997).

Although a large number of studies have been done to investigate student confidence in reading and its correlates, most of them focus on developed countries or high-income countries (Lonigan and Shanahan 2009; Snow, Susan Burns, and Griffin 1998). Developing countries or low/middle-income countries provide an interesting case to study how the school environment can affect student confidence in reading since they differ from developed countries or high-income countries in not only the degree of access to educational resources but also the culture and values that shape educational practices (Glewwe 2002; Glewwe et al. 2011). Studies have documented the low levels of literacy and deficits in reading ability in developing countries (Goldstein 2004; UNESCO 2012). However, to our knowledge, no empirical study has ever been conducted to assess the correlation between confidence in reading and reading achievement as well as how the school environment and teaching practices are associated with confidence in reading in developing countries.

China provides an interesting case to investigate student confidence in reading. China is not only representative of a developing country, but also of developing countries in Asia more specifically. Examining student confidence in reading in an Asian country may be of particular interest since students from Asian countries overall – when compared to students in other parts of the world – are often found to exhibit different degrees of confidence depending on the academic area or skill in question. The early studies on international differences in confidence regarding general knowledge (e.g. answering questions such as whether Europe is larger than America) showed that Asian students tended to be more confident than British or American students (Wright et al. 1978; Yates et al. 1989; Yates, Lee, and Shinotsuka 1996). In contrast, other studies have documented that Asian students were less confident than American students in the areas of

mathematics and other academic subjects in general (Krauthammer 1990; Salili, Chiu, and Lai 2001). In the case of reading, there might be one additional element that could affect student confidence because Chinese characters are more difficult to learn (as compared to a language based on an alphabet). It is possible that a character-based language, particularly one with as many characters as Chinese, may undermine student confidence in reading. Given such dynamics, and despite the potentially interesting findings that a cross-country reading confidence study that includes Asian countries might produce, to our knowledge no such studies have yet been conducted.

In this study, we mainly focus on primary school students from rural regions of China, where severe educational inequality between urban and rural areas threatens the nation's continued economic growth and social cohesion (Zhang et al. 2013). Specifically, it has been found that rural students consistently perform worse than urban students in core academic subjects, such as mathematics and science. These gaps are concerning because about 68% of students at the compulsory schooling level live in rural areas of the country (Ministry of Education of the People's Republic of China 2016). While it has been demonstrated that students in urban cities exhibit high levels of reading achievement (Cromley 2009; Ning et al. 2016; Cheung et al. 2017), considering the poor educational outcomes and deficient reading resources in rural areas, there are valid reasons to worry about student reading development in rural China. As increasing the focus on reading has been shown to be beneficial for educational outcomes in developed countries, it is possible that this could have a similar effect in rural China and, therefore, narrow China's educational gap (Kim and Quinn 2013; Kim 2006). However, there has been yet no study that compares China with other nations in regards to confidence in reading and its correlates.

Given this absence of evidence in the literature, in this paper our overall goal is to investigate student confidence in reading in rural China. To meet this goal, we have three specific objectives. First, in order to understand how rural Chinese students performed against the rest of the world, we compare student confidence in reading and reading achievement between rural Chinese students and students in other countries/regions that participated in the Progress in International Reading Literacy Study test (henceforth *PIRLS*). Second, we use our data to examine the relationship between confidence in reading and reading achievement among sample students with different levels of reading achievement. Finally, we explore the factors associated with the school environment and teaching practices that correlate with confidence in reading among sample students with different levels of reading achievement.

Literature review

Student confidence in reading

Student confidence in reading, also often described using terms like 'reading competency beliefs' and 'reading self-concept,' is used in the literature base to refer to beliefs about one's own reading ability (Morgan and Fuchs 2007; Chapman, Tunmer, and Prochnow 2000; Chapman and Tunmer 1995). As with self-belief, confidence in reading is likely to influence students' reading behaviours, which in turn improves their reading skills as research has demonstrated that the amount of time a child spends reading is a key factor

leading to reading skill development (Retelsdorf, Köller, and Möller. 2011; Kavanagh 2019). Because individuals tend to engage in tasks about which they feel competent and confident, there should be a strong link between reading confidence and ultimate reading achievement (Bandura 1986; Katzir, Lesaux, and Kim 2009). Further, because positive self-beliefs also help determine how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations, this may suggest that targeting improvements in reading confidence may be particularly helpful for students who have lower-levels of reading achievement (Schunk, Hanson, and Cox 1987; Bong and Skaalvik 2002; Bouffard et al. 2003).

Student confidence in reading in rural China

Although the Chinese government has recently launched a series of policies for an increased focus on reading, little is known about student confidence in reading in rural China (People.cn 2015). However, existing evidence indicated that research on this topic would be valuable. In addition to the debates over students' confidence in Asian countries, previous studies found that when compared to those students in urban China, rural Chinese students have lower levels of self-confidence in learning (Cui and Zhang 2019; Geng 2012; Wei and Yu 2015). Moreover, these studies also suggested that teaching in schools in rural China is typically of a lower quality, reading resources are insufficient and teachers are less capable than in urban schools, all of which contribute to the lower levels of self-confidence in learning of rural students (Wei and Yu 2015; Geng 2012).

Data collection and empirical methods

Sampling procedure and data collection

This paper draws on survey data collected by the authors in May 2015. The sample was chosen in several steps and covers primary schools in different regions of rural China. First, we sampled two provinces in China: Guizhou and Jiangxi, which are representative of the populous, predominantly rural provinces in China's hinterland. The average annual income of the rural residents of Jiangxi and Guizhou in 2014 was 2,005 USD, which was close to, but slightly lower than, the national average in China's rural areas (2,511 USD – National Bureau of Statistics of China 2015). Additionally, the GDP growth rate of these two provinces was around 10% in 2014, which was slightly higher than the national GDP growth rate of 7.5% in the same year (National Bureau of Statistics of China 2015).

After selecting the two sample provinces, we selected three counties within each province. These counties, themselves, are close to being representative in terms of several key socioeconomic indicators when compared to other areas in these two sample provinces. The average income of rural residents in these sample counties was around 2,025 USD in 2014, close to the average income in rural areas of the sample provinces (2,005 USD – National Bureau of Statistics of China 2015). Also, the average GDP growth in the sample counties in 2014 was around 13.8%, slightly higher than the provincial average around 10% at the same year (National Bureau of Statistics of China 2015).

Within these six counties, we randomly selected 135 rural primary schools. We then randomly chose at most two classes in the fourth grade of each sample school. In total, we included 4,616 students in grade 4 from 135 sample primary schools in the study. Given the way we collected the data, we believe the data from the sample schools to a certain degree can reflect a proportion of poorer rural populations in China.

We conducted the survey with the permission from the local government, school principals, and students' parents in these sample schools. In each sample school, we gathered data from sample students, their school teachers, and their school principals based on their willingness to participate. First, we adopted the test items and survey questions from the PIRLS test to assess student reading achievement and confidence in reading (Mullis et al. 2012). Prior to our study, the PIRLS test in 2011 was developed by IEA that was used to evaluate grade 4 students across 45 countries/regions of a variety of different development and income levels. The PIRLS scale of confidence in reading contains seven statements and the confidence score is calculated based on how the student responds to each statement. Moreover, students were also asked to complete a 30-minute reading test that was constructed by trained psychometricians using test items from the PIRLS pool. The test items were carefully translated according to the PIRLS translation guidelines and the content validity was reviewed by a panel of experts and local teachers who had a familiarity with rural China's education system. The translated reading tests then went through several rounds of pilot testing in a number of rural schools. In the analysis, in addition to evaluating the overall reading scores of students, we also separated the score into two specific types: 'score of retrieving and straightforward inferencing' and 'score of interpreting, integrating and evaluating' to determine whether student achievement levels in one of these skills drives differences in overall reading achievement (Downes 2012).

Besides the reading confidence scale and the reading achievement test, we also collected a set of school and teacher characteristics through the PIRLS survey questions. According to the answers from each sample school principal, we sought to capture information related to student access to books (e.g. whether the school library has 5,000 or more book titles, and whether the class has a classroom library). We also calculated student-teacher ratios based on answers to the survey questions answered by principals. Additionally, we interviewed reading teachers in each sample class. If there wasn't a designated reading teacher in the class, the Chinese teacher in the class was included instead. These sample teachers were surveyed about their gender, education levels, teaching experience, and the number of professional training hours in reading instruction they completed in past two years, as well as questions about at which grade level their school emphasises a set of eleven key reading skills and whether they use children's books in reading instruction (Table A1).

In addition to the school and teacher characteristics, we also administered two tests to evaluate student academic performance and surveyed students about their home learning environment as well as individual characteristics. Students were randomly chosen to complete a standardised mathematics or Chinese language test. With the assistance of the local education bureaus and a body of experts, the mathematics test items were selected from the question bank of the Trends in International Mathematics and Science Study and the Chinese language test items were selected from official examination books and exercise books in China (Luo et al. 2012; Mo et al. 2013; Mullis et al. 2011). Both the tests

were closely proctored and carefully timed by trained enumerators to ensure the test quality. Students were also asked to report information such as student gender, whether students have fewer than 10 books at home, whether students have their own room for studying at home, whether a student's mother graduated from middle school, and whether a student's father graduated from middle school.

Statistical approach

In investigating the correlates of confidence in reading, we regressed the outcome variable of the student score on the scale of confidence on the variables of reading test score, access to books at school, teacher characteristics and reading instruction, as well as a set of control variables. Specifically, in the paper we estimated the following ordinary least squares (OLS) model:

$$Y_{ijc} = \alpha + \beta' Score_i + \gamma' Access_{jc} + \delta' Teacher_{jc} + \theta' X_i + \phi_c + \varepsilon_{ijc} \quad (1)$$

where the dependent variable Y_{ijc} indicates the scaled score of confidence in reading of student i in school j and county c. $Score_i$ is the student's reading test score. The vector $Access_{jc}$ includes variables that indicate student access to books at school, i.e. whether the school library has 5,000 or more book titles and whether the student has a classroom library. $Teacher_{jc}$is a vector of variables that indicate teacher characteristics (teacher gender, teacher education, teaching experience, professional training hours in reading instruction in past two years) and teaching practices (whether students are taught key reading skills at grade 4 or higher and whether teacher uses children's books in reading instruction). X_i includes a set of control variables (student gender, student mathematics or Chinese test score, teacher-student ratio, whether a student has fewer than 10 books at home, whether a student has own room for study at home, whether a student's mother graduated from middle school, and whether a student's father graduated from middle school). We also add county fixed effects, ϕ_c to account for county-level heterogeneity.

In addition, we examine how correlates vary among students with better and worse reading skills. In doing so, we divided students into terciles based on their reading test scores and ran Equation (1) among the three subgroups of students. In all these regressions, we accounted for the clustered nature of our sample by constructing Huber-White standard errors corrected for class-level clustering.

Results

Confidence in reading and reading achievement of rural Chinese students

After comparing our results to the other 45 countries and regions in the PIRLS study, we found that rural China ranks at the very bottom in confidence in reading (Table 1). Only 11% of the students rated themselves as confident readers, 68% of the students rated themselves as (only) somewhat confident readers. Most of the top-ranked countries/regions are high-income economies, such as Israel, Finland, Austria and Sweden. In these countries, almost 50% of student participants were found to be 'confident.' Interestingly, despite the high levels of income and economic development, Chinese Hong Kong and Taiwan (henceforth *HK and Taiwan*) rank among the lowest with only around 20% of

Table 1. Student confidence in reading.

Country/Region	Confident (%)	Somewhat Confident (%)	Average Scale Score
Israel	49	43	10.60
Finland	48	47	10.50
Austria	48	44	10.60
Croatia	48	43	10.40
Sweden	47	48	10.50
Bulgaria	47	40	10.30
Germany	46	45	10.50
Ireland	44	49	10.30
Poland	44	45	10.30
Romania	44	44	10.30
Slovenia	43	48	10.40
Canada	41	51	10.20
Hungary	41	45	10.20
Norway	40	53	10.30
United States	40	49	10.20
Azerbaijan	39	54	10.30
Iran, Islamic Rep. of	39	54	10.20
Saudi Arabia	39	53	10.20
Malta	39	48	10.10
Denmark	38	54	10.10
Trinidad and Tobago	38	49	10.00
England	37	53	10.00
Australia	37	53	10.10
Slovak Republic	37	49	10.00
Netherlands	37	48	10.00
Czech Republic	36	51	9.90
Northern Ireland	35	55	10.00
Spain	35	54	9.90
Indonesia	34	62	10.10
United Arab Emirates	33	57	9.90
Lithuania	33	54	9.80
Portugal	32	60	9.90
Qatar	30	59	9.70
Oman	29	58	9.70
Belgium (French)	29	58	9.70
Italy	28	63	9.70
Russian Federation	28	59	9.60
Georgia	28	56	9.60
New Zealand	27	61	9.60
Singapore	26	61	9.50
France	26	60	9.60
Colombia	24	65	9.50
Chinese Taipei	21	57	9.20
Hong Kong SAR	20	62	9.20
Morocco	17	64	9.10
Rural China	**11**	**68**	**8.89**

Source: PIRLS and authors' own data

study participants calling themselves 'confident' readers. So what is the source of the poor levels of reading confidence in rural Chinese schools? While, in part, it could be due to being socioeconomically poorer, the results from HK and Taiwan suggest that it is possible that low confidence in reading is (at least in part) an Asian (or East Asian) trait, since the relatively low level of confidence in HK and Taiwan is clearly not an income issue.

The data from the reading tests show that rural China ranks again at the bottom of the list in reading achievement (Table 2). In other words, when comparing rural China relative to all other countries/regions, we find that readers in rural China are the weakest

Table 2. Student reading achievement.

Country/Region	Overall Scale Score	Retrieving and Straightforward Inferencing (Score)	Interpreting, Integrating and Evaluating (Score)
Hong Kong SAR	0.75	0.85	0.63
Northern Ireland	0.74	0.87	0.58
Russian Federation	0.73	0.83	0.61
Singapore	0.71	0.83	0.57
Finland	0.71	0.84	0.55
Croatia	0.70	0.82	0.54
Israel	0.70	0.81	0.55
United States	0.69	0.79	0.56
England	0.68	0.79	0.56
Ireland	0.68	0.80	0.54
Lithuania	0.67	0.81	0.50
Germany	0.67	0.82	0.48
Hungary	0.66	0.81	0.49
Italy	0.66	0.81	0.49
Canada	0.66	0.79	0.51
Chinese Taipei	0.66	0.83	0.45
Czech Republic	0.66	0.82	0.46
Portugal	0.65	0.76	0.52
Denmark	0.65	0.81	0.46
Sweden	0.65	0.76	0.51
Slovak Republic	0.64	0.78	0.49
Netherlands	0.64	0.79	0.46
Bulgaria	0.64	0.77	0.48
Slovenia	0.63	0.76	0.47
Austria	0.63	0.79	0.43
New Zealand	0.63	0.73	0.50
Poland	0.62	0.76	0.46
Australia	0.61	0.74	0.47
France	0.61	0.76	0.43
Georgia	0.60	0.70	0.47
Spain	0.58	0.72	0.40
Romania	0.58	0.69	0.43
Malta	0.54	0.68	0.38
Belgium (French)	0.54	0.72	0.32
Norway	0.52	0.70	0.30
Azerbaijan	0.50	0.65	0.32
Iran, Islamic Rep. of	0.48	0.63	0.30
United Arab Emirates	0.46	0.60	0.29
Colombia	0.45	0.63	0.24
Qatar	0.41	0.54	0.26
Saudi Arabia	0.41	0.55	0.24
Indonesia	0.37	0.51	0.20
Oman	0.36	0.48	0.21
Morocco	0.26	0.38	0.11
Rural China	**0.23**	**0.33**	**0.10**

Source: PIRLS and authors' own data
Note: There is no data available for Trinidad and Tobago.

in terms of reading achievement. Hence, it is clear that the hypothesis that confidence is a significant factor in determining reading achievement is supported by the case of our rural Chinese schools. When we look at different types of reading skills, we find that rural Chinese students also got the lowest percentage correct.

The importance of confidence in explaining reading achievement levels is somewhat undermined by the reading achievement scores of students from HK and Taiwan. HK and Taiwan, in contrast to their rankings of confidence, performed well in reading

achievement. In fact, the students from HK are the top performers, and students from Taiwan rank 16th in reading achievement (Table 2).

So what is driving the higher reading achievement test scores of HK and Taiwan? It is possible that in the case of these two Asian economies, there is an income effect that overcomes the absence of student confidence. Interestingly, when looking at the correlation between student reading achievement and GNI per capita in all of these countries/regions, there is clearly a positive relationship between reading achievement and levels of national income (Figure 1). Compared to the other countries/regions, HK ranks 15th in GNI per capita and 1st in reading achievement while Taiwan ranks 25th in GNI per capita and 16th in reading achievement. Considering that nations with higher income are more likely to provide more educational resources, our findings suggest that while confidence in reading may be important, access to adequate reading resources may also be an important role in student reading development (Cheung et al. 2009; Elley 2000).

Correlation between reading confidence and reading achievement in rural China

Despite the differences in the relationship between confidence in reading and reading achievement among HK/Taiwan and rural China, when applied to the entire sample of all countries/regions that took the PIRLS test (including our sample in rural China), the correlation test demonstrates that confidence in reading is highly correlated with reading achievement, with a correlation coefficient of around 0.11 (significant at 5% level). The graph showing the relationship of each country or region is in Figure 2. Note that in this figure, HK and Taiwan appear to be outliers (low levels of student confidence in reading and high levels of reading achievement).

Using individual data from our rural China sample, we also examine the correlation between student confidence in reading and reading achievement (Table 3, Row 1).

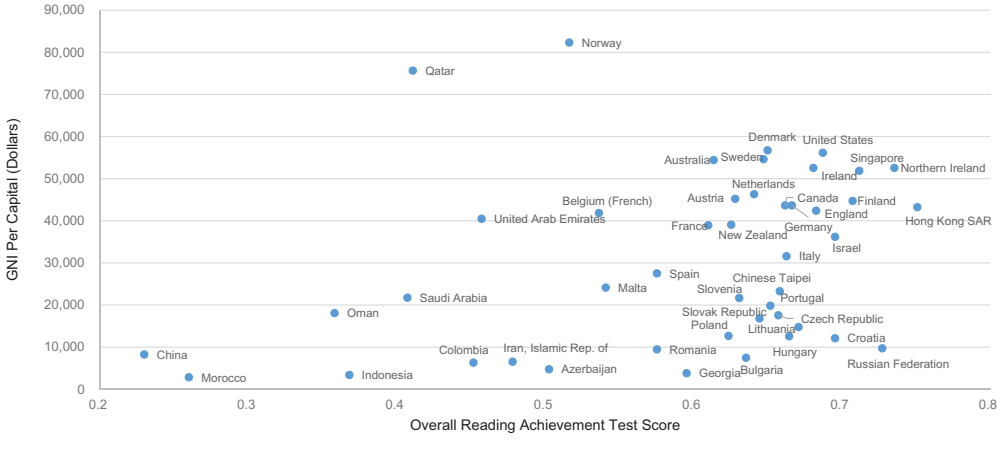

Figure 1. Correlation between student reading achievement and GNI per capital in all countries/regions.

Source: PIRLS and authors' own data. There are 46 sample countries/regions that took part in the PIRLS reading test (including our sample in rural China). The reading achievement is measured by the overall average student reading test score in each sample country/region. For the GNI per capita of each sample country/region we used the GNI per capita that was reported by the World Bank in 2016.

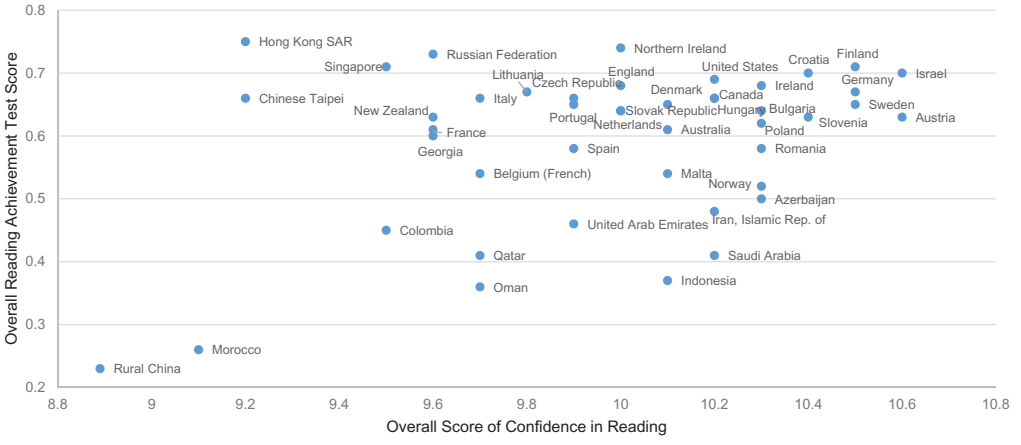

Figure 2. Correlation between student confidence in reading and reading achievement in all countries/regions.

Source: PIRLS and authors' own data. There are 46 sample countries/regions that took part in the PIRLS reading test (including our sample in rural China). The confidence in reading is measured by the average scale score of student confidence in reading while the reading achievement is measured by the overall average student reading test score in each sample country/region.

Overall, our analysis shows that, when holding constant student access to books, teacher characteristics, teaching practices, and other student and school characteristics, reading achievement is highly correlated with confidence among rural Chinese students (Row 1, Column 1).

When dividing the full sample by different levels of student reading skills, the correlation is stronger among the weaker performers in reading skills than the stronger performers in rural China. Specifically, the correlation is stronger for the students who scored in the bottom tercile than the top tercile or the middle tercile (Row 1, Columns 2 to 4). In other words, it appears as if building confidence in reading is particularly important for improving the reading achievement of wearker readers in rural China. When families/students are better off, weaker readers (perhaps) may have access to additional resources (e.g. lots of resources spent on reading classes or reading programmes) that can offset the low confidence in reading and ultimately improve reading achievement (Kim and Quinn 2013; Rashotte, MacPhee, and Torgesen 2001). While we cannot say for sure, the same dynamic may be at work here as in the cases of HK and Taiwan (places where better-off students had low confidence but higher reading achievement levels).

Correlation between reading confidence and school environment/teaching practices in rural China

So what factors are associated with student confidence in reading? Using our data from the sample of rural China students, we first find that having access to books seems to have an impact on student confidence in reading (Table 4, Rows 2 & 3). Specifically, our results show that access to books at school affects student confidence in reading only if there is a classroom library, especially among weak readers. In rural China, books in school

Table 3. The correlation between school environment, student reading achievement, and student confidence in reading in rural China.

	Student Confidence in Reading [a]			
	Total Sample	Top Tercile [b]	Middle Tercile [b]	Bottom Tercile [b]
Dependent variable	(1)	(2)	(3)	(4)
Reading achievement				
1. Standardised reading test score (SD)	0.23***	0.21***	0.27*	0.43***
	(0.02)	(0.05)	(0.13)	(0.09)
Access to books				
2. School library has 5,000 or more book titles (1 = yes)	−0.11	−0.11	−0.07	−0.15
	(0.07)	(0.06)	(0.09)	(0.10)
3. Classroom library (1 = yes)	0.22*	0.12	0.13	0.43***
	(0.09)	(0.09)	(0.10)	(0.13)
Teacher characteristics and teaching practices				
4. Teacher gender (1 = female)	0.05	0.12	0.16	−0.12
	(0.08)	(0.09)	(0.09)	(0.13)
5. Teacher has postsecondary education (1 = yes)	−0.01	−0.06	−0.02	−0.03
	(0.09)	(0.08)	(0.11)	(0.12)
6. Teacher teaching experience (years)	0.01	0.01*	0.01	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)
7. Teacher received professional training in reading for 16	−0.10	−0.03	−0.25*	−0.03
hours or more in past two years (1 = yes)	(0.15)	(0.15)	(0.12)	(0.23)
8. Students are taught key reading skills at grade 4 or higher	−0.05	−0.14*	−0.04	0.01
(1 = yes)	(0.07)	(0.07)	(0.09)	(0.11)
9. Teacher uses children's books in reading instruction (1 = yes)	0.03	0.13*	0.01	−0.09
	(0.07)	(0.06)	(0.09)	(0.13)
Control variables				
10. Student gender (1 = girl)	0.29***	0.22***	0.36***	0.31***
	(0.04)	(0.05)	(0.07)	(0.07)
11. Standardised maths or Chinese test score (SD)	0.17***	0.09*	0.22***	0.21***
	(0.02)	(0.04)	(0.04)	(0.05)
12. Teacher-student ratio	−0.70	−0.54	−0.45	−1.28
	(1.73)	(2.12)	(2.36)	(2.36)
13. Student has fewer than 10 books at home (1 = yes)	−0.28***	−0.04	−0.36***	−0.42***
	(0.04)	(0.06)	(0.07)	(0.08)
14. Student has own room for study at home (1 = yes)	0.18***	0.19***	0.20***	0.15*
	(0.03)	(0.06)	(0.06)	(0.07)
15. Mother graduated from middle school (1 = yes)	−0.02	0.03	−0.07	−0.01
	(0.04)	(0.06)	(0.07)	(0.06)
16. Father graduated from middle school (1 = yes)	0.08	0.01	0.16*	0.07
	(0.04)	(0.08)	(0.08)	(0.08)
17. Constant	8.72***	8.38***	8.60***	8.82***
	(0.15)	(0.18)	(0.20)	(0.27)
Observations	4,616	1,524	1,573	1,519
R-squared	0.123	0.060	0.084	0.098

Source: PIRLS and authors' own data

Note: Robust standard errors in parentheses, *** p < 0.001, ** p < 0.01, * p < 0.05

[a]Student confidence in reading is measured by their score in the scale of confidence in PIRLS questionnaire.

[b]Students are divided into terciles based on their reading achievement scores. Columns 2 to 4 present results of running Equation (1) among the top, middle and bottom terciles of students.

libraries do not appear to correlate with confidence in reading (Row 2). However, having a classroom library does positively correlate with confidence (Row 3, Column 1). Again, the correlation is stronger for the students who performed poorly in the reading test (Row 3, Column 4).

Besides access to reading books, teacher characteristics and teaching practices are also shown to be associated with confidence in reading, especially among students with higher reading achievement (Table 4, Rows 4 to 9). Specifically, teaching experience positively correlates with reading confidence of the better performers (Row 6, Column 2). If schools delay teaching key reading skills until grade 4, the better performers are less likely to do well (Row 8, Column 2). In addition, the better performers seem to benefit from the use of children's books at school (Row 9, Column 2). However, none of these teacher characteristics or teaching practices correlates with the confidence levels of worse performers (Rows 4 to 9, Column 4).

Discussion and conclusion

This study provides a deeper understanding of primary school student confidence in reading in rural China. Our results indicate that rural Chinese students exhibit low levels of confidence in reading. The analysis finds that rural China ranks the lowest among all the countries/regions that participated in the PIRLS tests in this aspect. It may be partly related to the fact that the student participants have weak reading skills. According to our data, the reading achievement of rural Chinese students is also the worst among all the PIRLS participant countries/regions. Our analysis also shows that there is indeed a positive correlation between confidence in reading and reading achievement in rural China (as well as among all sample countries/regions). These results are consistent with studies that found a positive relationship between confidence in reading and reading achievement (Bouffard et al. 2003; Katzir, Lesaux, and Kim 2009; McGeown et al. 2015; Pajares and Valiante 1999). Our results also support those of Morony, Kleitman, Lee, & Stankov (2013) and Salili, Chiu, & Lai (2001), which showed that Asian students tend to have lower confidence than American students in school subjects. Although we cannot disregard the potential impacts of cultural differences on reading achievement, many studies have demonstrated that it may be learning context (e.g. school environment, teaching) that has an influence on differences in student confidence in learning across countries (Salili, Chiu, and Lai 2001; Yates, Lee, and Shinotsuka 1996).

In rural China, having access to books is related with higher confidence in reading among those students with weaker reading skills. Our data show that having classroom libraries is highly correlated with confidence in reading as well. The literature suggests that classroom libraries provide ready access to books and magazines to students that can be part of their reading lessons and activities (Department for Education 2012; Fractor et al. 1993; Worthy 1996). One of the possible reasons for the low confidence in rural China could be the absence of classroom libraries. Compared with other countries/regions, rural China ranks the lowest in the prevalence of classroom libraries (Table A2). This suggests that one of the main barriers for improving reading confidence in rural China may be the absence of books in the immediate learning environment of students.

Interestingly, having a school library does not seem to be related to student confidence in reading in rural China. In China, it is a national policy that every elementary school has to be equipped with a school library (Ministry of Education of the People Republic of China 2003). In fact, our data also demonstrate that 78% of rural students are in schools with school libraries. Interestingly, in this metric, rural China ranks 22th among all

countries/regions (Table A3). Media and research, however, have reported that the school libraries in rural schools are rarely used (Sohu News 2016; Wang et al. 2015). School libraries often are only open when there are inspections from the government and are locked up the rest of the time. The rare usage of school libraries is likely to be the reason why having a school library is not correlated with confidence in reading in rural China. Therefore, making better use of existing school libraries may be a cost-effective way to improve student confidence in reading.

For students with stronger abilities in reading, reading instruction seems to be paramount in improving their confidence in reading. Particularly, if teachers incorporate key reading skills into instruction at an early stage, the better performers are likely to have higher confidence. Many studies have stressed the importance of introducing students to increasingly complex reading skills and strategies as they advance through elementary school (Spears et al. 1992; Slavin et al. 2009). The literature also show that if students are to be able to learn to read by the third grade, then the introduction to reading skills and strategies should begin when students enter the first grade, if not before (Martin and Mullis 2013). The majority of countries/regions emphasised these skills at third grade or earlier, while 38% of rural Chinese students attend schools where these skills are emphasised only at the fourth grade or even later (Table A4). In addition, the use of children's books in instruction seems to be effective at increasing the levels of confidence of these students, perhaps because it can make students more interested in reading (Gunning 2000). However, these teaching practices in reading instruction do not seem to matter for weak students in rural China. One of the possible reasons may be that the reading skills of the weaker performers in rural areas of China are so low that they cannot benefit from reading instruction that incorporates the key reading skills at early grades.

Our study not only reveals that there are low levels of student confidence in reading in rural China, but it also suggests that the low confidence in reading could hinder the reading achievement of these students. For these reasons, decision makers in China's education system must pay more attention to how to improve student confidence in reading and reading skills in rural China. Providing adequate access to books and improving teacher instruction appear to be important for improving student confidence in reading. Therefore, we suggest that the Chinese government should both make better use of existing school libraries as well as develop teacher training on methods of reading instruction, which could ultimately improve student confidence in reading and reading skills.

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Table A1. Items in the PIRLS 2011 emphasis in early grades on reading skills and strategies scale.

Question: At which grade do the following reading skills and strategies first receive a major emphasis in instruction in your school?
Reading isolated sentences
Reading connected text
Locating information within the text
Identifying the main idea of a text
Explaining or supporting understanding of a text
Comparing a text with personal experience
Comparing different texts
Making predictions about what will happen next in a text
Making generalisations and drawing inferences based on a text
Describing the style or structure of a text
Determining the author's perspective or intention

Table A2. Classroom library resources.

Country/Region	Have a Classroom Library (%)
United States	99
New Zealand	99
Ireland	98
Northern Ireland	97
Canada	95
Hong Kong SAR	95
Chinese Taipei	92
Singapore	92
Spain	91
Australia	91
Malta	90
Israel	89
Belgium (French)	89
Lithuania	87
England	87
France	87
Netherlands	86
Germany	82
Hungary	80
Austria	78
Russian Federation	77
Italy	73
Qatar	73
Azerbaijan	71
Romania	69
Slovak Republic	69
Trinidad and Tobago	69
Portugal	67
Poland	65
Norway	60
United Arab Emirates	59
Slovenia	59
Indonesia	58
Czech Republic	55
Georgia	54
Iran, Islamic Rep. of	53
Sweden	52
Croatia	51
Finland	51
Bulgaria	49
Oman	41
Saudi Arabia	39
Denmark	38
Colombia	37
Morocco	30
Rural China	**26**

Source: PIRLS and authors' own data

Table A3. Size of school library.

Country/Region	More than 5,000 Book Titles (%)	501–5,000 Book Titles (%)	500 Book Titles or Fewer (%)
Chinese Taipei	90	9	0
Hong Kong SAR	82	18	0
Singapore	77	22	1
Denmark	73	22	1
Slovenia	66	27	6
Poland	65	32	2
Russian Federation	65	31	3
United States	63	34	2
Australia	56	42	1
Canada	53	42	3
Hungary	52	41	3
Qatar	52	34	13
New Zealand	47	52	1
Lithuania	46	45	6
Romania	45	45	6
Croatia	39	53	8
Georgia	35	49	13
Azerbaijan	29	44	28
United Arab Emirates	27	47	23
Bulgaria	25	44	14
Spain	21	65	10
Rural China	**21**	**40**	**17**
Norway	18	73	4
Sweden	18	52	12
Israel	13	47	24
England	11	67	14
Slovak Republic	11	58	20
Malta	11	58	17
Oman	11	58	10
Colombia	11	26	27
Ireland	7	30	14
Czech Republic	6	55	23
Indonesia	6	39	33
Portugal	5	47	24
Italy	5	41	42
Finland	4	47	28
Belgium (French)	4	26	40
Northern Ireland	3	51	15
Iran, Islamic Rep. of	3	40	37
Saudi Arabia	3	17	55
France	2	43	28
Germany	2	39	33
Trinidad and Tobago	2	23	56
Austria	1	45	27
Netherlands	0	37	46
Morocco	0	6	23

Source: PIRLS and authors' own data

Table A4. School Emphasis on Reading Skills and Strategies in the Early Grades.

Country/Region	At or Before Second Grade (%)	At Third Grade (%)	Average Scale Score
England	84	15	12.60
United States	75	24	12.20
Australia	73	27	12.60
New Zealand	73	27	12.20
Israel	59	41	11.50
Northern Ireland	55	45	11.60
Canada	55	44	11.40
Russian Federation	50	50	11.10
Singapore	46	54	10.90
Ireland	40	60	10.60
Sweden	37	63	10.50
Trinidad and Tobago	32	66	10.30
Croatia	31	68	10.30
Germany	30	69	10.40
Spain	29	71	10.20
Austria	29	71	10.30
Belgium (French)	29	70	10.20
Hungary	28	71	10.20
Portugal	25	75	10.30
Bulgaria	25	74	10.40
Slovak Republic	24	76	10.10
Czech Republic	24	74	10.00
Qatar	24	66	9.40
Lithuania	23	76	10.10
Netherlands	22	78	9.90
Denmark	21	79	9.70
Georgia	20	79	9.90
Azerbaijan	19	79	9.70
France	18	81	9.60
Chinese Taipei	17	80	9.40
Hong Kong SAR	16	81	9.50
Italy	15	84	9.40
United Arab Emirates	15	68	8.70
Romania	14	85	9.80
Norway	14	83	9.30
Malta	13	87	9.40
Colombia	13	81	9.10
Finland	10	87	9.20
Slovenia	8	87	8.90
Iran, Islamic Rep. of	7	85	8.70
Saudi Arabia	7	78	8.30
Poland	6	94	9.30
Indonesia	4	88	8.50
Oman	4	86	8.40
Rural China	**3**	**59**	**7.46**
Morocco	1	48	6.80

Source: PIRLS and authors' own data