

Student, Parent, Home, and Reading Achievement

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Abstract

This study aimed to look into the reason for the remarkable improvement in reading achievement of the Hong Kong primary school students in the Progress in International Reading Literacy Study (PIRLS) survey between 2001 and 2011. The reading achievement data from the PIRLS 2001 and 2011 samples were analysed. It was found that the relationship between the parent factor (measured with parents' reading attitudes) and reading achievement was mediated either by the student factor (measured with students' reading attitudes and reading practices) or by the home (measured with home educational resources and early home literacy activities) and student factors together. The relationship between the parent factor and reading achievement mediated by the home and student factors was stronger among Hong Kong students in the PIRLS 2001 survey than in the PIRLS 2011 survey. These findings suggest that the changed strength of the relationship between the parent, home, and student factors may be a key point to explain the outstanding progress achieved by the Hong Kong primary school students achieved in the PIRLS 2011 survey.

Keywords

Reading Achievement, Reading Attitudes, Reading Practices, Home Literacy Environment, Home Educational Resources, Early Home Literacy Activities, PIRLS

1. Introduction

The reading achievement of Hong Kong Grade 4 students has risen steadily since 2001 when the International Association for the Evaluation of Educational Achievement (IEA) initiated the PIRLS survey, a five-yearly, and assessment survey of the reading achievement of primary Grade 4 students worldwide. In the 2001 PIRLS survey, Hong Kong students ranked fourteenth out of the 35

participating regions and countries and they topped the list in 2011 out of the 48 participating regions and countries. Teachers of reading internationally have looked with curiosity at the performance of the Hong Kong students and asked about the sources of such outstanding achievement. In order to probe the reasons why the performance of Hong Kong students in 2011 was superior to that in 2001, the present study was conducted to compare the Hong Kong data in the PIRLS survey between 2001 and 2011 to search for possible factors that explain why Hong Kong students made such a great leap in PIRLS 2011 as compared to that in PIRLS 2001.

2. Literature Review

2.1. The Framework for Reading Development Underpinning PIRLS Research

The IEA reading literacy framework was developed with reference to various scenarios, including national, community, school, classroom, and home contexts (Campbell, Kelly, Mullis, Martin, & Sainsbury, 2001; Mullis, Kennedy, Martin, & Sainsbury, 2006; Mullis, Martin, Kennedy, Trong, & Sainsbury, 2009). Individual students receive instruction or accumulate literacy experiences and eventually acquire reading skills, and they also acquire reading attitudes and habits. Students' reading achievement is greatly influenced and shaped by a number of social, cultural, and contextual factors. These include the quality of the teaching the children receive, the quality of literacy training and opportunities in school, the resources utilized, the reading syllabus, and the school's overall curriculum. Also, of relevance are the importance of literacy-enhancing variables outside of school, including parental and social expectations, the cultural and social environment, and a range of factors that might influence the reading development of children. Based on this theoretical framework, the IEA has assessed the reading achievement of primary Grade 4 students worldwide every five years since 2001. The IEA also collected extensive information about the home, school, and national contexts which are important for literacy development.

In order to account for the superior progress achieved by the Hong Kong students in the PIRLS 2011 assessment, a preliminary analysis was performed to identify predictors of both the reading achievement scores of the students in the PIRLS 2001 and 2011 surveys. Results showed that significant predictors of the students' reading achievement scores were parents' reading attitudes, students' reading attitudes, reading practices, home educational resources, and early home literacy activities. Hence these factors were selected as the focus of the present study. In order to fit our work into the context of the larger literature, a brief review of the relationship between the selected variables and reading achievement follows.

2.2. Relations of Students' Reading Attitudes and Reading Practices to Reading Achievement

The attitude toward reading has been defined as "a state of mind, accompanied

by feelings and emotions that make reading more or less probable” (Smith, 1990: p. 215). This reading-related definition of attitude has directed researchers to assume that reading attitude is causally related to reading achievement (Schofield, 1980) and to conceptualize reading attitude as an affective factor associated with reading development (McKenna, Kear, & Ellsworth, 1995). Indeed, students’ reading attitudes at early primary grades have been found to be a significant predictor of their subsequent reading achievement (Kush, Watkins, & Brookhart, 2005; Martinez, Aricak, & Jewell, 2008; Naeghel, Keer, Vansteenkiste, & Rosseel, 2012). The link of reading attitude and reading achievement has been found in different populations in the PIRLS survey (Mullis, Martin, Foy, & Drucker, 2012; Mullis, Martin, Gonzalez, & Kennedy, 2003; Mullis, Martin, Kennedy, & Foy, 2007; Park, 2011). The close association of students’ reading attitudes and reading development has been demonstrated in many studies. For example, McKenna, Kear, and Ellsworth (1995) highlight the significant role of reading attitudes in learning to read and delineate how reading attitudes interact with other factors (e.g. emotion and motivators) to influence reading outcomes. Swalander and Taube (2007) modelled the relationship among home, affective factors, and reading ability and they found that reading attitude was a significant predictor of reading ability. Kush, Watkins, and Brookhart (2005) conducted a longitudinal study and found that although reading attitudes measured in Grades 2 and 3 did not predict reading attainment in Grades 2 and 3, they did predict reading attainment Grade 7. These findings suggest that the link between reading attitudes and reading attainment changes developmentally, with reading attitudes playing a more important role in later reading development.

Apart from reading attitudes, students’ reading practices have also been found to be related to reading development. Reading aloud to children in the classroom is a common practice that has been recommended for decades (Jacobs, Morrison, & Swinyard, 2000; Wells, 1990). Children benefit from being reading aloud to in many areas of literacy growth, such as increasing linguistic development and positive reading attitudes (Routman, 1991). In addition, a strong relationship between independent reading and academic achievement has been well documented in literature (Cullinan, 2000; Tunnell & Jacobs, 1989). For example, Taylor, Frye, and Maruyama (1990) found that time spent on independent reading in school significantly contributed to Grade 5 students’ gains in reading achievement, whereas home reading did not, suggesting that in-school independent reading practice may be much more beneficial to intermediate grade students. Likewise, the amount of time Independent reading in school often takes the form of sustained silent reading which encourages students’ self-independence and involves less teacher guidance in reading. The amount of time devoted to independent reading outside school has been found to be related to reading achievement, verbal ability, reading attitudes, and family influence (Greaney & Hegarty, 1987). It has also been found to be the most significant predictor of reading comprehension, vocabulary, and reading speed among elementary students (Anderson, Wilson, & Fielding, 1988). The reason that independent reading practice is important for reading development

may be that such reading practice allows reading autonomy that functions as an internal motivator of reading (Yoon, 2002). Learners have an innate need for self-determination and are more likely to be interested in and committed to activities decided by themselves (Arens & Morin, 2016; Deci, Vallerand, Pelletier, & Ryan, 1991).

Given the important role of students' reading attitudes and reading practices in reading development, they were conceptualized as the student factor to contribute directly to reading achievement in this study.

2.3. Relations of Parents' Reading Attitudes and Home Literacy Environment to Reading Achievement

Regarding the role of parent in reading development, there is empirical evidence showing that parents' attitudes towards reading in a family have a great influence on children's reading performance (DeBaryshe, 1995; Krashen & Loh, 2015; Swalander & Taube, 2007) and their attitudes towards reading (Baker, Scher, & Mackler 1997; Purcell-Gates, 1996). Parents who enjoy reading are more likely to pass on the positive attitudes to their children and to develop regular reading practices for their children as they are good models in home literacy activities.

Home literacy environment has also been found to play an important role in the development of literacy and language skills (Burgess, 1999; DeBaryshe, Binder, & Buell, 2000; Strickland & Taylor, 1989). For example, home educational resources were found to be positively related to kindergarteners' emerging literacy and language skills (Christian, Morrison, & Bryant, 1998; Evans, 1998; Griffin & Morrison, 1997; Leseman & De Jong, 1998). Parents' engagement in literacy activities was also found to contribute to language and reading development (Burgess, Hecht, & Lonigan, 2002). Parents who ascribe great value to reading are more willing to create a rich home literacy environment. They provide fruitful educational resources at home (e.g. a variety of reading materials) and spend a lot of time on home literacy activities with their children (e.g. routine and frequent bedtime stories and library visits), both of which were found to be significant predictors of emergent literacy skills (Purcell-Gates, 1996) and later reading ability (Jacobson & Lundberg, 2000; Rowe, 1991).

In this study, the parent factor (i.e. parents' reading attitudes) was postulated to contribute to reading achievement via the contribution of the student factor or via the contributions of the home (i.e. home educational resources and early home literacy activities) and student factors.

3. Aims of the Present Study

The primary goal of the current study was to examine the interrelationship among student-related (i.e. students' reading attitudes and reading practices), parent-related (i.e. parents' reading attitudes), and home-related factors related (i.e. home educational resources and early home literacy activities), and reading achievement among Hong Kong primary school students in two subsamples of the large-scale

data set gathered during the PIRLS 2001 and 2011 survey. In order to explain the remarkable improvement in the reading achievement of Hong Kong primary school students in PIRLS between 2001 and 2011, a special interest was also given to compare the strength of this interrelationship between the two subsamples directly by testing the extent to which the student, parent, and home factors predicted reading achievement.

4. Methods

4.1. Samples

In order to ensure the representativeness of the participants in the different countries surveyed in PIRLS, the IEA used a rigorous two-stage stratified sampling procedure. Specifically, in each country, around 150 schools representing a broad spectrum were selected, and then one or two full classes of students (around 30 students) were sampled from each school. In line with the standard sampling procedure, 5050 primary Grade 4 students (mean age = 10 years) were selected from 147 schools in Hong Kong to comprise the 2001 sample and 3875 Grade 4 students (mean age = 10 years) were selected from 132 schools in Hong Kong to comprise the 2011 sample.

4.2. Design

The IEA required the sampled primary Grade 4 students in each country to complete a reading achievement test and a questionnaire about their learning experiences in school and home. Parents of the participating students were invited to fill out a home questionnaire about learning to read. Teachers and school principals of the participating students were also invited to complete questionnaires to collect information about school context for learning and teaching literacy. Each student completed an 80-minute test booklet and an additional 15- to 30-minute questionnaire (i.e. the student questionnaire).

4.2.1. Reading Achievement Test

The reading achievement test for the PIRLS 2001 and 2011 assessment was designed to measure Grade 4 students' reading literacy. The test contained 10 passages and questions covering a wide range of text types and topics encountered by Grade 4 students in their regular classroom experiences. Five passages were chosen to permit assessment of literary reading materials (e.g. short stories, narrative extracts, and traditional tales). The other five passages were designed to assess comprehension of informational text (e.g. expository passages, instructions, and manuals).

To maximize the evaluative precision of the test, an Item Response Theory (IRT) approach was also used to combine and scale students' responses in the test (i.e. to estimate reading achievement scores of students based on their responses to their respective subtests of questions from the overall test). Accordingly, reading scores were IRT scale scores with an international mean of 500 and a standard deviation of 100. The Cronbach's alpha value for the mul-

multiple-choice items was .85 and the average of inter-scoring reliabilities (i.e. the agreement between independent scorers) for the constructed-responses was 88% for the 2001 sample (Mullis, Martin, Gonzalez, & Kennedy, 2003). The Cronbach's alpha value for the multiple-choice items was .88 and the average of inter-scoring reliabilities (i.e. the agreement between independent scorers) for the constructed-responses was 86 % for the 2011 sample (Foy & Drucker, 2013) for the 2011 sample.

4.2.2. Questionnaires

The IEA also designed multiple items to measure a theoretical construct in the student, home, teacher, school, and curriculum questionnaires. Most items were designed to measure response frequencies (e.g. every day or almost every day, once or twice a week, once or twice a month, and never or almost never). For the purpose of this study, we used in our analyses the derived variables that were computed from responses on the student and home questionnaires. Mode substitution was used to handle the problem of missing values (missing data fewer than 5%).

4.3. Procedures

IEA required the sampled primary Grade 4 students in each country to complete a reading attainment test and a questionnaire. The association also asked students' teachers and school principals to fill out questionnaires. Parents of the participating students were invited to fill out a home questionnaire. IEA worked with experts from the participating countries to create and verify translated test items in the reading attainment test and to test the validity and reliability of these items (Mullis, Martin, Kennedy, & Foy, 2007). The experts also conceptualized and created derived variables and indexes in the questionnaires and tested their validity and reliability (Trong & Kennedy, 2007). Each student completed an 80-minute test booklet and an additional 15- to 30-minute questionnaire.

4.4. Variables

Reading achievement scores for the 2001 and 2011 samples were used as the outcome measures and five variables derived from the questionnaires as the predictors in later multigroup path analyses. The derived variables were reverse-coded for the analyses.

4.4.1. Reading Achievement

Students' standardized overall reading scores in the reading achievement test for the PIRLS 2001 and 2011 samples (Foy, Galia, & Li, 2007; Gonzalez, 2003) were used as the outcome measures in path analyses.

4.4.2. Students' Reading Attitudes

This variable was derived from students' level of agreement on four statements, each with a four-point Likert response scale. It was created by summing students' responses to the component items. The Cronbach's alpha coefficients of

the variable were .6 for the 2001 sample and .61 for the 2011 sample.

4.4.3. Students' Reading Practices

This variable was derived from students' responses to five questions about in-class and outside-school reading practices. It was created by summing students' responses to the component items. The Cronbach's alpha coefficients of the variable were .57 for the 2001 sample and .72 for the 2011 sample.

4.4.4. Parents' Reading Attitudes

This variable was derived from parents' agreement on four statements, each with a four-point Likert response scale. It was created by summing parents' responses to the component items. The Cronbach's alpha coefficients of the variable were .5 for the 2001 sample and .57 for the 2011 sample.

4.4.5. Home Educational Resources

This variable was derived from students' responses to two questions about home educational resources. It was created by averaging z scores for the number of books in the home and the availability of home educational aids. The Cronbach's alpha coefficients of the variable were .41 for the 2001 sample and .4 for the 2011 sample.

4.4.6. Early Home Literacy Activities

This variable was derived from parents' responses to five questions about their engagement in home early literacy activities with their children. It was created by summing parents' responses to the component items. The Cronbach's alpha coefficients of the variable were .66 for the 2001 sample and .72 for the 2011 sample.

4.4.7. Student

This variable was created for path analyses by computing the mean of z scores for students' reading attitudes and students' reading practices.

4.4.8. Parent

This variable was measured with parents' reading attitudes and was used for path analyses.

4.4.9. Home

This variable was created for path analyses by computing the mean of z scores for home educational resources and early home literacy activities.

5. Results

5.1. Descriptive Statistics

Descriptive statistics and correlational analyses were performed with the IEA IDB Analyzer (Foy & Drucker, 2013). The IEA IDB Analyzer was developed to perform preliminary analyses (e.g. mean, percentage, percentile, and correlation) in large-scale survey research. It considers the sampling information and the

multiple imputed reading achievement scores (i.e. plausible values of reading achievement scores) in the calculation of statistics and the estimation of their standard errors. **Table 1** presents means and standard deviations of all variables for the 2001 and 2011 samples. The results show that the students in the 2011 sample scored 42.67 marks higher than the students in the 2001 sample in the reading achievement test, but they performed similarly on other measures.

5.2. Correlational Analyses

Correlational analyses were also performed with the IEA IDB Analyzer. The five sets of plausible values of the reading achievement scores were used to perform the analyses five times (one set for each time) and aggregated results were reported here. **Table 2** and **Table 3** present the matrixes of correlation coefficients

Table 1. Means and standard deviations of all variables, and standard errors (S.E.) for all estimates for the PIRLS 2001 and 2011 samples.

Variable (maximum score)	2001 sample (n = 5050)		2011 sample (n = 3875)	
	Mean (S.E.)	Standard Deviation (S.E.)	Mean (S.E.)	Standard Deviation (S.E.)
Reading achievement	527.87 (3.06)	62.80 (1.66)	570.54 (2.26)	60.58 (1.20)
Students' reading attitudes (16)	12.26 (.06)	2.58 (.03)	12.34 (.07)	2.65 (.03)
Students' reading practices (20)	13.43 (.06)	2.78 (.03)	13.76 (.09)	3.25 (.04)
Parents' reading attitudes (16)	11.14 (.05)	2.40 (.03)	11.04 (.05)	2.33 (.03)
Home educational resources	-.02 (.03)	.80 (.01)	.01 (.02)	.77 (.01)
Early home literacy activities (15)	9.57 (.05)	1.95 (.03)	10.24 (.04)	2.05 (.03)

Note: Composite score for home educational resources was the mean of z scores for the number of books and educational aids at home.

Table 2. Matrix of correlation coefficients among various variables and standard errors for all estimates for the PIRLS 2001 sample (n = 5050).

	1	2	3	4	5	6
1. Reading achievement	-					
2. Students' reading attitudes	.28*** (.02)	-				
3. Students' reading practices	.13*** (.02)	.35*** (.01)	-			
4. Parents' reading attitudes	.10*** (.02)	.13*** (.02)	.09*** (.02)	-		
5. Home educational resources	.11*** (.02)	.15*** (.02)	.28*** (.02)	.12*** (.02)	-	
6. Early home literacy activities	.05*** (.02)	.12*** (.01)	.18*** (.02)	.23*** (.01)	.27*** (.01)	-

Note: Standard errors are in parentheses. *** $p < .001$.

Table 3. Matrix of correlation coefficients among various variables and standard errors for all estimates for the PIRLS 2011 sample (n = 3875).

	1	2	3	4	5	6
1. Reading achievement	-					
2. Students' reading attitudes	.31*** (.02)	-				
3. Students' reading practices	.10*** (.02)	.43*** (.02)	-			
4. Parents' reading attitudes	.11*** (.02)	.13*** (.02)	.12*** (.02)	-		
5. Home educational resources	.09*** (.02)	.20*** (.02)	.32*** (.02)	.16*** (.02)	-	
6. Early home literacy activities	.15*** (.02)	.17*** (.02)	.18*** (.02)	.28*** (.02)	.25*** (.02)	-

Note: Standard errors are in parentheses. *** $p < .001$.

among various variables for the 2001 and 2011 samples, respectively. The results for the 2001 sample show that reading achievement was significantly correlated with students' reading attitudes and reading practices, parents' reading attitudes, home educational resources, and early home literacy activities (all $rs^3 \geq .05$, $ps < .001$) and all other correlation coefficients were significant (all $rs^3 \geq .09$, $ps < .001$). Similar results were obtained for the 2011 sample (all $rs^3 \geq .09$, $ps < .001$). The close associations among various variables provided evidence to model their interrelationship using path analyses.

5.3. Path Analyses

In path analysis, relationships among variables are depicted in a path diagram (each relationship represented as a path) and the strength of each relationship is estimated with a path coefficient (Garson, 2015; Hair Jr., Black, Babin, & Anderson, 2010). Given the advantage of modeling complex interrelationships among variables, path analyses were performed using LISREL 8.80 (Jöreskog & Sörbom, 2006) to address the research questions. The following analyses were conducted five times (one set of plausible values for the reading achievement scores at each time) (Foy, Galia, & Li, 2007; Gonzalez, 2003). Since no aggregated results are available in LISREL 8.80 and results from the five sets of plausible values were similar, only results from the first set of plausible values were reported here (Akiba, 2008; Wang, Wang, & Osterlind, 2011; Wu, 2005). Replication results using the other four sets of plausible values are available from the authors on request.

A model was proposed to determine predictors of reading achievement among Hong Kong Grade 4 students for the 2001 and 2011 samples. In this model, the parent variable was postulated to have direct effect on the student variable which in turn contributed to reading achievement; the parent variable was also postulated to have direct effect on the home variable which in turn had direct effect on the student variable; and an error covariance was added between the student variable and reading achievement (Figure 1 and Figure 2).

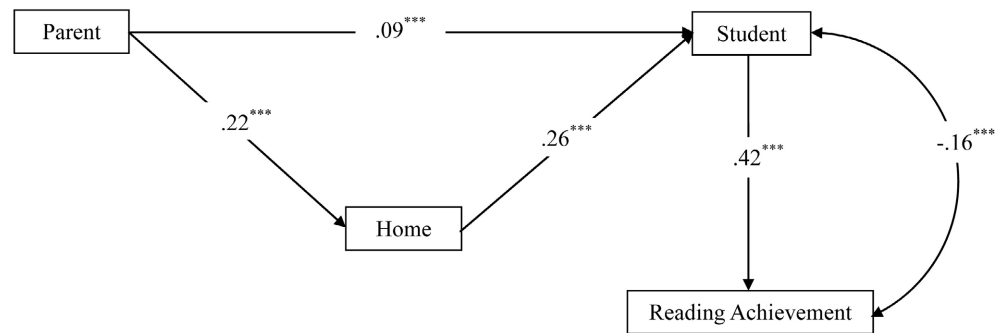


Figure 1. Model of parent, student, home, and reading achievement for the 2001 sample. *Note:* Student was measured with students' reading attitudes and reading practices; parent was measured with parents' reading attitudes; and home was measured with home educational resources and early home literacy activities. *** $p < .001$.

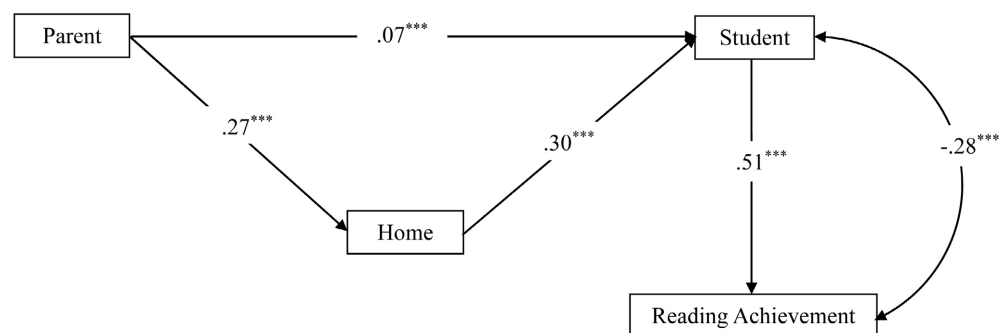


Figure 2. Model of parent, student, home, and reading achievement for the 2011 sample. *Note:* Student was measured with students' reading attitudes and reading practices; parent was measured with parents' reading attitudes; and home was measured with home educational resources and early home literacy activities. *** $p < .001$.

Results show that the overall fit of the model for the 2001 sample was good, χ^2 (1, $N = 5050$) = 22.12, $p < .001$, Non-Normed Fit Index (NNFI) = .89, Comparative Fit Index (CFI) = .98, and Root Mean Square Error of Approximation (RMSEA) = .07. All standardized path coefficients (a path coefficient representing the direct effect from one variable to the other variable) were significant. Indirect effects tested in this model were also significant, including significant indirect effects of parent on reading achievement (standardized coefficient for the indirect effects = .06) via student (standardized coefficient for the indirect effect = $.09 \times .42 = .04$) and via home and student (standardized coefficient for the indirect effect = $.22 \times .26 \times .42 = .02$). Similarly, the overall fit of the model for the 2011 sample was also good, χ^2 (1, $N = 3875$) = 8.37, $p = .004$, Non-Normed Fit Index (NNFI) = .96, Comparative Fit Index (CFI) = .99, and Root Mean Square Error of Approximation (RMSEA) = .04. All standardized path coefficients were significant. Significant indirect effects of parent on reading achievement (standardized coefficient for the indirect effects = .08) were also found via student (standardized coefficient for the indirect effect = $.07 \times .51 = .04$) and via home and student (standardized coefficient for the indirect effect = $.27 \times .30 \times .51 = .04$). The results suggest that the proposed model is appropri-

ate to describe the interrelationship among student, parent, home, and reading achievement.

In order to account for the outstanding improvement in the reading achievement of Hong Kong Grade 4 students between 2001 and 2011 in the PIRLS survey, a multigroup path analysis was conducted to compare the strength of the interrelationship among the variables between the 2001 and 2011 samples. The multigroup comparison procedures proposed by Jaccard and Wan (1996) was used here. A baseline model was first established in which the two groups were combined. In this model, no equality constraints were imposed on the two groups, namely, leaving all path coefficients free to be estimated. The baseline model resulted in a good model fit ($\chi^2(5, N = 8925) = 33.46, p < .001, NNFI = .97, CFI = .99, \text{ and } RMSEA = .04$). Then we constrained each parameter to be equal across the two groups, one at a time, as suggested by Mann, Rutstein, and Hancock (2009). The constrained model was compared with the base model each time through comparing their chi-square difference. A chi-square difference equal to or greater than 3.84 was taken as significant difference between the base and constrained models ($p \leq .05$), indicating that the corresponding parameter was not equal across the groups and therefore was set free for estimation in the final model. Results show that the final model had a very good model fit ($\chi^2(7, N = 8925) = 37.1, p < .001, NNFI = .98, CFI = .99, \text{ and } RMSEA = .03$) (Figure 3).

Results from the multigroup comparison show that the relationships between parent and home, and between home and student were stronger in the 2011 sample than that in the 2001 sample (the path coefficients between parent and home and between home and student became larger). Other relationships between parent and student and between student and reading achievement were same between the two samples. The results suggest that the changed relationships between parent and home and between home and student may be a key point to explain the outstanding progress achieved by the Hong Kong primary school students in the PIRLS survey between 2001 and 2011.

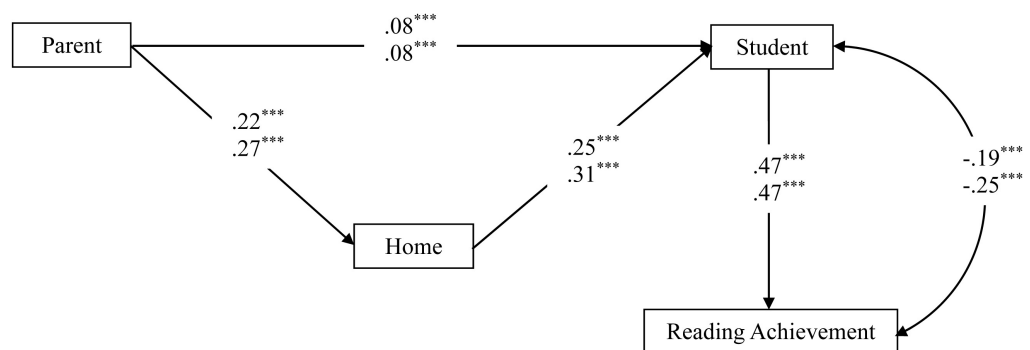


Figure 3. Comparison of the model of parent, student, home, and reading achievement between the 2001 and 2011 samples. *Note.* (1) Student was measured with students' reading attitudes and reading practices; parent was measured with parents' reading attitudes; and home was measured with home educational resources and early home literacy activities. (2) Coefficients for the 2001 sample are always listed above those for the PIRLS 2011 sample. *** $p < .001$.

6. Discussion

6.1. Interrelationship among Student, Parent, Home, and Reading Achievement

The finding in this study that the parent factor (measured with parents' reading attitudes) had an indirect effect on reading achievement via the student factor (measured with students' reading attitudes and reading practices) suggests that parents play an important role in conveying their attitudes about learning and reading to their children and in shaping their children's reading behaviours, which in turn contribute to reading achievement. Parents play a major role in children's intellectual growth (Epstein, 1990). Their beliefs and perceptions about education are conveyed to their children (Lynch, 2002) and their behaviors are observed and imitated by their children too (Bandura, 1986). The strong relationship found in this study between parents' reading attitudes and reading achievement via the effects of students' reading attitudes and reading practices lends support to these ideas. This finding also adds some support to the significant role of culture in explaining Asian students' better academic achievement compared to that of their Western peers, especially in reading and mathematics (Harmon, Smith, Martin, Kelly, Beaton, & Mullis, 1997; Mullis, Martin, Kennedy, & Foy, 2007). The strong relationship found in this study between Chinese parents' thoughts and beliefs about reading and their children's attitudes toward reading also adds some supports to the significant role of cultures in explaining Asian students' better academic achievement than their Western peers, especially in reading and math (Harmon, Smith, Martin, Kelly, Beaton, & Mullis, 1997; Mullis, Martin, Kennedy, & Foy, 2007; Peng, 1994). Chinese cultures that are deeply rooted in Confucian perspectives (Confucius, 1979) advocate docility, respect for authority, and a strong emphasis on learning (Gibson, 1988; Ogbu, 1987). It is not surprising in this study and our previous studies that Chinese parents with reading attitudes influenced by these cultural characteristics tended to have higher expectations for learning success and supported their children in learning to read. Such parents tended to pass on their favorable reading attitudes to their children and were more likely to involve their children in reading practices (e.g. allow them to read books that they chose themselves and encourage them to read both for fun and for information), resulting in their children obtaining outstanding reading achievement scores.

Another important finding in this study was that the relationship between the parent factor and reading achievement was mediated by the home and student factors. The evidence here and elsewhere (Tse, Xiao, & Lam, 2013) suggests that Chinese parents' achievement-related beliefs and expectations are essential for children's successful academic outcomes. These beliefs and expectations seem to influence parents' behavior and readiness to provide a cognitively stimulating and emotionally supportive home literacy environment for children's development (Alexander, Entwisle, & Bedinger, 1994). Such parents may be more aware

of the important association between reading and achievement outcomes. They hence are more likely to provide their children with fruitful home educational resources (e.g. a variety of reading materials) and to engage in home literacy activities with their children (e.g. routine and frequent bedtime stories and library visits), both of which have been found to be significant predictors of emergent literacy skills and later reading performance (Jacobson & Lundberg, 2000; Purcell-Gates, 1996; Rowe, 1991). Students in such a structuring home literacy environment are more likely to develop favorable attitudes toward learning and reading and to engage in various reading activities, which may eventually promote their academic achievement.

6.2. Explaining the Remarkable Improvement in Reading Achievement of the Hong Kong Primary School Students in PIRLS Survey between 2001 and 2011

The core research aim for this study was to examine factor(s) to explain the superior performance of Hong Kong Grade 4 students achieved in PIRLS 2011 as compared to that in PIRLS 2001. The findings from the multigroup path analyses that the relationships between the parent and home factors and between the home and student factors were significantly stronger in the 2011 sample than that in the 2001 sample shed some lights on this issue. These findings suggest that parents were more aware to promote their children's reading development by constructing a cognitively stimulating home literacy environment to shape their children's reading attitudes and reading practices. This hence is a key factor for the advancement of the Hong Kong Grade 4 students made in PIRLS 2011. In this study, Hong Kong parents with high expectations of academic success in the 2011 sample may be more supportive of learning to read and provide their children with a great deal of assistance and pressure, resulting in their children working much harder (e.g. in-class and out-of-school reading practices) to obtain better reading achievement scores. They provided more fruitful educational recourses in the home and spent more time in early literacy interactions with their children during the ten years, both of which were found to be significant predictors of reading attitudes and reading achievement among Chinese children in our previous studies (Tse & Xiao, 2014; Tse, Xiao, Ko, Lam, Hui, & Ng, 2014; Tse, Xiao, & Lam, 2013).

During the ten years between 2001 and 2011, the Education Bureau in HK organised four large-scale workshops, which were conducted by the HK PIRLS research team, to provide strategies for parents to set up a good home literacy environment to instill positive reading attitudes in their children, to promote good reading habits, and to help their children develop reading skills (Tse, Ip, Tan, & Ko, 2012). In addition, the Education Bureau also published a leaflet and a series of booklets to help parents foster good reading attitudes and habits in their children (Education Bureau, 2009). These actions may further explain the remarkable progress of the Hong Kong students achieved in the PIRLS 2011 survey.

6.3. Educational Implications of the Present Study

Important implications for educational practices stem from the present findings. Findings in this study have implications for assessment and instruction. Firstly, it is important to note that our data may suggest the sensitivity of reading comprehension tests in the assessment of comprehension skills in elementary grades which have been focusing on children's text-level reading skills. Secondly, the main educational implication of the findings is to inspire teachers to reflect on how they need to motivate students to read within a broad curriculum at the early stage of learning to read Chinese. Students' attitudes towards reading examined here could be developed to foster their development of comprehension skills. Moreover, in order to help their children to acquire reading skills, parents are suggested to invest time and money in literacy-related activities at home.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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