Article

Factors Associated with Reading Comprehension of Secondary School Students

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Abstract

Student's individual, family, and teacher factors play a significant role in children's reading development. However, the mechanisms by which these critical factors jointly contribute to children's reading comprehension achievement are poorly understood. The present research aimed at developing a multilevel comprehensive model which shows critical correlates, involving these factors, of reading comprehension of Chinese secondary school students. A random sample of 1,322 students, nested in 27 classes, was taken from five secondary schools. The student-level variables included student's gender, autonomous reading motivation, controlled reading motivation, metacognitive awareness of reading strategies (MARS), and household income. Class-level variables included teacher's qualification and experience. The results indicated student's MARS and autonomous reading motivation were the two most powerful correlates of reading comprehension among the significant variables. Furthermore, teacher's qualification and experience moderated the strength of the relationship between MARS and reading comprehension. Implications for future research, policy making, and improvement of reading instruction are discussed.

Keywords

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Reading comprehension, which is related to students' academic performance, is a good predictor of later school performance (Dias, Montiel, & Seabra, 2015; Vacca, 2005). Further, it is a crucial prerequisite for students to learn all courses successfully. For instance, reading comprehension has pronounced influences on their verbal math reasoning and problem solving (Wu et al., 2017; Zhao, Valcke, Desoete, Verhaeghe, & Xu, 2011). However, in international reading literacy tests, there are a large proportion of low achievers among participants (Mullis, Martin, Foy, & Drucker, 2012; Organisation for Economic Co-operation and Development [OECD], 2010). According to the 2015 report of the Programme for International Students Assessment (PISA), about 20% of students in OECD countries fail to reach the baseline level of reading proficiency (OECD, 2016b). Since 2010, students' mean reading proficiency across most OECD countries has not improved or even declined (OECD, 2016b). In China, students' Chinese reading comprehension tended to deteriorate in poor rural areas in secondary school (Xuan, 2012). Research findings suggest that, because of their poor learning environment and a lack of reading motivation and effective reading strategies, a large number of students struggled with understanding texts at their grade levels (Eurydice, 2011). Multiple factors may influence the achievement of students' reading comprehension. Therefore, it is of great significance to develop a multilevel comprehensive model to reveal the relationship between critical factors and students' reading comprehension.

Correlates of Reading Comprehension

Reading comprehension is "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow, 2002, p. 11). In the development of students' reading skills, many factors are involved (Bellibaş, 2016; Cheung et al., 2017; OECD, 2016a; Snow, 2002). This research has focused on student's critical individual, family, and teacher factors which are related to their reading comprehension.

A large body of studies have corroborated that students' reading motivation is a key factor associated with their reading performance (e.g., Lepper, Corpus, & Iyengar, 2005; Logan, Medford, & Hughes, 2011; OECD, 2016a). Guthrie and Cox (2001) argued that motivating factors can affect reading frequency and engagement, which in turn influence comprehension. According to the self-determination theory, motivation can be categorized as autonomous and controlled motivation (Deci & Ryan, 2008). The two types of motivation lead to different outcomes, with autonomous motivation tending to yield more positive outcomes. Previous research in primary education found that students' autonomous reading motivation is positively and significantly related to their reading comprehension (De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012). However, no comparable studies on secondary school students exist. Besides reading motivation, students' metacognitive awareness of reading strategies (MARS) also appears to be an important individual variable influencing reading comprehension via a mechanism of comprehension monitoring (Kolic-Vehovec & Bajsanski, 2006). In the cyclical phase model of self-regulated learning, monitoring of cognition is an important process interacting with motivation in completing learning tasks (Zimmerman, 2013). MARS, which reflects comprehension monitoring, was found to be related to students' comprehension (Baydik, 2011). However, one limitation of most previous studies of MARS is that researchers only focused on the unique relationship between MARS and comprehension. Further, Logan and Johnston (2009) indicated that students' reading competence and attitudes have a close relationship with gender, with girls having a better reading comprehension and a more positive attitude towards reading. They hypothesized that girls' positive attitudes towards reading lead to a higher frequency of reading and consequently result in higher reading ability. Similarly, the PISA 2015 report confirmed girls perform significantly better than boys in reading (OECD, 2016a).

Researchers indicate that family status can be a key predictor of reading comprehension. Chiu and McBride-Chang (2006, 2010), for example, found that students' family socio-economic status is positively correlated to their reading achievement. Students from socio-economically disadvantaged families tend to be enrolled in schools with poor resources, such as low teacher quality and poor teaching and learning facilities (OECD, 2011; OECD, 2016a).

Researchers emphasize the important role of teacher's qualification and experience in reading instruction. Carlisle, Correnti, Phelps, and Zeng (2009), for instance, argue that teacher's knowledge and experience can positively or negatively influence students' reading performance and achievement in regular classroom situations. Hairrell et al. (2011) further revealed a positive significant correlation between teacher qualification and reading comprehension. Consequently, both teacher qualification and experience can have an impact on students' reading achievement (Chall, Jacobs, & Baldwin, 1990). In addition, since teacher qualification and experience may not only influence students' learning outcomes, but also their learning motivation and awareness (Scheerens, 2010), these factors may act as moderators of the relationships between students' reading motivation and reading comprehension and between their MARS and reading comprehension. Although Scheerens (2010) suggested the possible moderation effects of teacher qualification and experience, no empirical evidence can be found on these effects in previous studies.

As mentioned earlier, previous research has indicated that student's individual, family, and teacher factors play a significant role in children's reading development. Little is known, however, about the strength of the relationship of these critical factors with reading comprehension when studied jointly in a multilevel model. Furthermore, there is a lack of empirical studies on mechanisms underlying the relationship between critical factors and students' reading comprehension in secondary school (Slavin, Cheung, Groff, & Lake, 2008; Guo et al., 2018). Consequently, the present study intends to address the resulting call for this research in Chinese secondary school.

Contextual Background

In China, secondary school teachers attach great significance to students' reading competence. They regard reading as an important basic competence for students to acquire knowledge. However, during the process of rapid urbanization, reading teaching faces several dilemmas although Chinese education witnesses a great success in the past three decades. First, students from poor families may fail to develop their reading competence because of the social economic status of their families (Guo et al., 2018). They are not interested in reading classes. Second, there are not enough qualified teachers in schools in poor rural areas (Chen, Ma, & Qiang, 2017). Finally, a large number of teachers lack experience and fail to teach reading efficiently (Long, 2009). Therefore, all these factors may influence students' reading development.

The Current Study

The present study was performed to test the hypothesized model of the impact of student's individual, family, and teacher factors on reading achievement and of their reading motivation and MARS on reading achievement through teacher qualification and experience (see Figure 1).

A multilevel comprehensive model was built to examine the strength of these correlations and determined the role of each variable in reading performance (Nergis, 2013). Based on the review of existing literature, our hypotheses were as follows: (i) Students' reading comprehension is related to critical student-level variables, including student gender, autonomous reading motivation (ARM), controlled reading motivation (CRM), MARS, and household income; (ii) Students' reading comprehension is related to critical class-level variables, including teacher qualification and experience; (iii) Teacher qualification and

experience moderate the strength of the relationships between ARM, CRM, and MARS on the one hand and reading comprehension on the other hand.
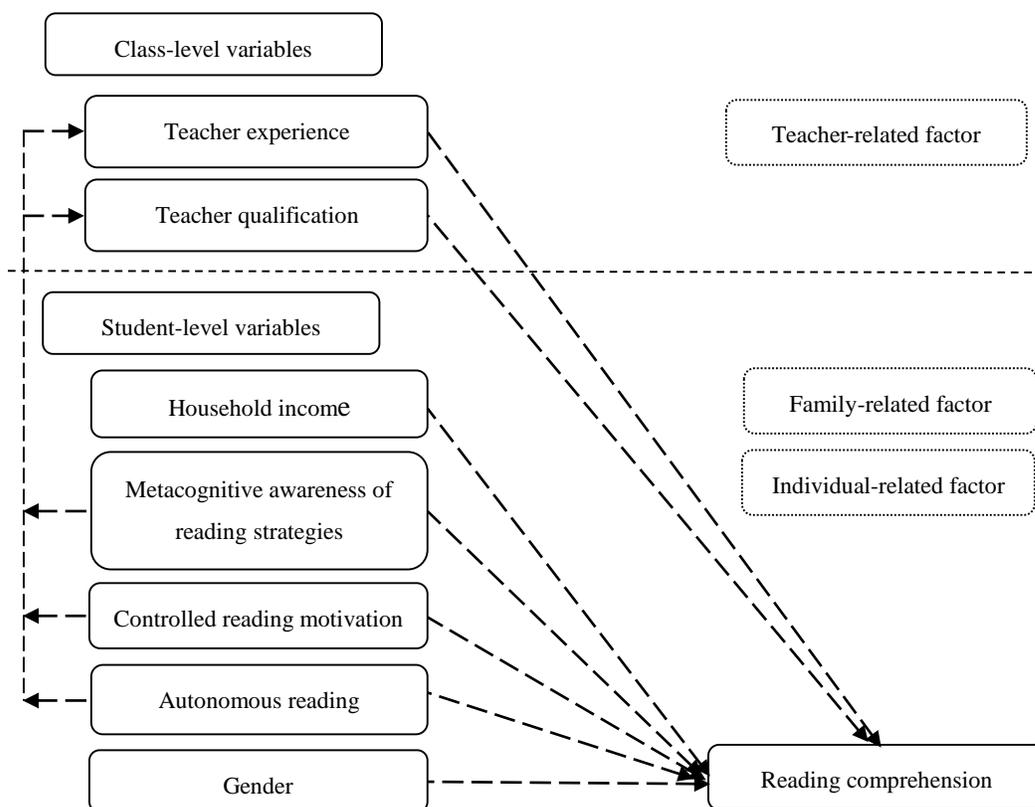
Figure *1. Possible relationship of the variables related to students' reading comprehension*

Method

Participants

A random sample of 1,322 secondary school students aged 13 to 15 (654 boys and 668 girls; M_{age} = 13.86, SD = 1.20) participated in the present study. They were from 27 classes of five secondary schools in south China. All students could speak Mandarin, and they learned to read in Mandarin. The participating teachers were first randomly chosen, and then 60% of the students were randomly selected from their classes to minimize possible bias. The students varied in terms of gender, grade, and household income (see Table 1). There were 15 participating teachers (8 females and 7 males), 12 of whom were teaching two classes. Among them, six had been teaching for 1 to 4 years, four for 5 to 10 years, and five for more than 10 years. With regard to teacher qualification, five of them graduated from colleges without bachelor's degrees, i.e., junior college degree, and ten from universities with at least bachelor's degrees. The former was considered as less-qualified secondary school teachers in China, whereas the latter as well-qualified.

Table 1. *Characteristics of participating students (N = 1,322)*

Characteristics		*n*	*%*
Gender			
	Female	664	50
	Male	658	50
Grade			
	Grade 7	695	53
	Grade 8	627	47
Household income			
	Lower	640	48
	Higher	682	52

Instruments

Data were collected by using three instruments: the *Metacognitive Awareness of Reading Strategies Inventory: Chinese Version* (MARSI–CN; Wu, Valcke, & Van Keer, 2012), the *Self-Regulation Questionnaire–Reading Motivation* (SRQ–Reading Motivation; De Naeghel et al., 2012), and a standardized reading comprehension test developed by Valcke and Mo (2010).

The MARSI–CN (Wu et al., 2012) is based on the *Metacognitive Awareness of Reading Strategies Inventory* (MARSI), originally developed by Mokhtari and Reichard (2002) to measure students' awareness and reading strategies use when reading school-related materials. Metacognitive awareness of reading strategies includes students' metacognitive awareness of global strategies (GLOB), support strategies (SUP), and problem-solving strategies (PROB) during reading, measured on a five-point Likert scale. The MARSI–CN was translated into Chinese and validated among 2,119 students from six secondary schools in China (Wu et al., 2012). The internal consistency coefficients for the three subscales (GLOB, SUP, PROB) in the present study were satisfactory to good with Cronbach's alpha respectively .76 for GLOB, .68 for PROB, and .66 for SUP. Overall internal consistency was .88.

The *SRQ–Reading Motivation*, originally developed by De Naeghel et al. (2012), assesses students' reading motivation in two different contexts (academic and recreational). In both contexts, two subscales can be distinguished: ARM and CRM. The questionnaire was validated using secondary school students (*N* = 476) in China. Internal consistency coefficients for both subscales were good in the academic context in the present research: Cronbach's alpha was .85 for ARM and .82 for CRM. This study focused on the academic context.

The reading comprehension test, which was developed by Ghent University and South China Normal University, was used for the standardized assessment of students' reading comprehension in China (Valcke & Mo, 2010). The test was created based on the national curriculum standards of the students' grade level and comprised 26 reading comprehension questions on one informational text (containing a given table), two narrative texts, and two expository texts. It included questions related to reading strategies such as summarizing (e.g., "What is the main idea of this passage?") and inferring (e.g., "What can you infer from the passages?"). The internal consistency of the test was acceptable (Cronbach's alpha = .83). Students' answer sheets were scored by professional teachers, who served as our research assistants, according to the keys to the standardized test.

Measures of other variables. The information on student gender and household income was collected via a questionnaire. Data on teacher qualification and experience were obtained by interviewing the participating teachers. Household income was defined as the annual per capita disposable income of households, reflecting the economic status of households in China (Zhao, Wang, Zhao, & Su, 2012), and it was

reported by students' parents or legal guardians whether they were from families of lower income (less than the average in the previous year) or of higher income (no less than the average in the previous year) on receiving the questionnaires brought home by their children or wards. Teacher qualification was measured by teacher's educational level in two groups: less-qualified teachers without bachelor's degrees, i.e., junior college degree, and well-qualified teachers with bachelor's degrees or higher, given that junior college degree is the minimum requirement for secondary teacher certification in China. Teacher experience was measured by the years of teaching service

Procedure

First, 15 teachers were randomly selected, and then 1,322 students were randomly selected from these teachers' classes. Next, questionnaires and a reading comprehension test were administered. Students were asked to fill in the questionnaires during their break between classes and to complete the reading comprehension test within one hour in the same week. Finally, information about teacher qualification and teaching experience was attained by interviews with the informed consent of the participating teachers.

Data Analysis

Descriptive statistics were calculated with the Statistical Package for Social Sciences (SPSS) 21.0, and the multilevel model analysis was conducted with Hierarchical Linear and Nonlinear Modeling (HLM) 7.0. First, bivariate correlations were studied among all variables using SPSS 21.0 to examine the occurrence of significant correlations between reading comprehension and student gender, ARM, CRM, MARS, household income, teacher qualification, and teacher experience. More particularly, Pearson correlations were calculated. When the correlation between a variable and students' reading comprehension was significant at the .05 level (2-tailed), the variable was further included in the multilevel model. Second, after examining the correlations, a multilevel analysis was conducted with HLM 7.0 to build an explanatory comprehensive model including the above-mentioned variables. In the present study, individual students were seen as level-1 units and the classes into which the students were nested were level-2 units. In such a sample, the individual observations are generally not completely independent owing to selection processes and the common history and experiences individuals share by belonging to the same group (Hox, 1995). Therefore, the hierarchical nesting is handled by using multilevel modeling, because these models are specifically developed to analyze data with a clustered structure. In our research design, student and family factors were considered to play a role at the same level (student level). The present research treated reading comprehension as the dependent variable and the other variables as independent variables.

In building up the multilevel model, we tested the two-level nested data with five successive models: an intercept-only model (Model 1), a model with only level-1explanatory variables (Model 2), a model also including level-2 fixed-effect variables (Model 3), a model with random slopes (Model 4), and a model with cross-level interactions (Model 5). Model 1 concerned the estimation of a two-level model with only an intercept term and no explanatory variables included. This model served as a baseline with which to compare subsequent more complex models and partitioned the total variance of the reading comprehension scores into between-classes and between-students within-classes variance. Models 2 and 3 of the analysis consisted respectively in the input of the explanatory variables at levels 1 and 2 in order to explain students' reading comprehension scores. Initially, these variables were included in the model as fixed effects, assuming that their impact does not vary from student to student or from class to class. Next, this assumption of a fixed linear trend was verified for the explanatory variables in Model 4 by allowing the coefficients of ARM, CRM and MARS to vary randomly across classes and across students within classes. Finally, in Model 5 of the analysis, cross-level interactions (e.g., between individual students' ARM and teacher qualification)

were included. Estimates of fixed effects, random effects, and model fit were used to assess the fit of the model and the significance of the relationships between reading comprehension and other variables.

Results

Bivariate Correlations Between Variables

The results revealed significant correlations between reading comprehension and the continuous variables ARM, CRM, MARS, and teacher experience (see Table 2). Furthermore, reading comprehension significantly correlated with student gender ($r = .06$, $p < .05$), household income ($r = .27$, $p < .01$), and teacher qualification ($r = .47$, $p < .01$). Consequently, all variables were further included in the multilevel analysis.

Table 2. *Bivariate correlations between the continuous variables (N = 1,322)*

Variables	1	2	3	4	5
1. Reading comprehension	—				
2. ARM	.27**	—			
3. CRM	.38**	.07*	—		
4. MARS	.66**	.44**	.17**	—	
5. Teacher experience	.58**	-.07*	.22**	.18**	—

Note. ARM = autonomous reading motivation, CRM = controlled reading motivation, MARS = metacognitive awareness of reading strategies; *$p < .05$; **$p < .01$

Multilevel Analysis

The intercept-only model. The estimates of the first model, the intercept-only model, are presented in Table 3, Model 1. The intercept of 50.47 in this model is simply the overall mean of students' reading comprehension scores across all students in all classes. The intraclass correlation coefficient (ICC) indicated that 38.2% of the variance in reading comprehension was attributable to level 2, or between class differences, and 61.8% of the variance was at level 1, or within classes between students. In other words, these estimates suggest that the differences in reading comprehension achievement among students within classes outweighed the differences between classes. The Chi-square test for the variance at level 2 indicated that this variance was significantly different from 0, showing significant differences between classes ($\sigma^2_{u0} = 38.35$, $\chi^2 = 834.63$, $df = 26$, $p < .001$). The latter indicated that multi-level analysis was appropriate. The deviance, which is an indication of the goodness of fit of the model and which should drop in subsequent model on condition that the fit is improved, is 9,302.93 for Model 1.

The model with student-level correlates. In Model 2, student-level variables, namely gender, ARM, CRM, MARS, and household income, were entered as fixed effects, assuming that their impact does not vary from student to student or from class to class. These variables appeared to be significantly associated with reading comprehension (see Table 3, Model 2). Using gender, ARM, CRM, MARS, and household income as correlates reduced the within-class variance by 1.3%, 18.5%, 7.7%, 36.2%, and 0.2%, respectively. Compared to the intercept-only model, adding these variables reduced the within-class variance by 63.9%, suggesting that individual differences in reading comprehension can be explained to a large extent by these level-1 correlates. The decrease of the variance in reading comprehension was mainly accounted for by MARS (36.2% of the variance) and ARM (18.5% of the variance) and only weakly by other variables. Correspondingly, the deviance in Model 2 drops to 7,983.67, revealing a better fit to the

data in comparison with Model 1. There is a tendency of decrease in the deviance when student's gender, ARM, CRM, MARS, and household income were entered into the models one by one, suggesting that the model fit improves when these variables enter the model one by one. Forty percent of the total variance on both levels 1 and 2 was explained by these variables as fixed effects in the model.

Table 3. *Model estimates in the multilevel regression analysis with student- and class-level variables*

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5
Fixed effects					
Intercept	50.47*** (1.21)	49.24*** (1.21)	47.82*** (1.01)	48.17*** (0.97)	47.87*** (1.01)
Level 1					
Gender (female)[a]		1.63*** (0.27)	1.61*** (0.26)	1.70*** (0.25)	1.70*** (0.25)
ARM		0.15*** (0.02)	0.15*** (0.02)	0.16*** (0.03)	0.14* (0.07)
CRM		0.18*** (0.02)	0.18*** (0.02)	0.20*** (0.03)	0.13* (0.06)
MARS		0.60*** (0.02)	0.60*** (0.02)	0.64*** (0.04)	0.50*** (0.08)
Household income (high)[b]		0.84** (0.28)	0.80* (0.28)	0.60* (0.26)	0.62* (0.26)
Level 2					
T. QUAL (high)[c]			2.15** (1.34)	1.71** (1.28)	2.15** (1.35)
T. EXP			0.76*** (0.10)	0.79*** (0.10)	0.76*** (0.10)
ARM × T. QUAL[c]					0.04 (0.10)
ARM × T. EXP					0.00 (0.01)
CMR × T. QUAL[c]					0.12 (0.09)
CRM × T. EXP					-0.01 (0.01)
MARS × T. QUAL[c]					0.22* (0.11)
MARS × T. EXP					-0.02*(0.01)
Random parameters					
Level 2					
Intercept (σ^2_{u0})	38.35*** (10.82)	38.10*** (10.51)	4.33*** (1.31)	4.44*** (1.32)	4.42*** (1.32)
ARM slope (σ^2_{u2})				0.01** (0.01)	0.01** (0.01)
CRM slope (σ^2_{u3})				0.01* (0.01)	0.01** (0.01)
MARS slope (σ^2_{u4})				0.03*** (0.01)	0.02*** (0.01)
Level 1					
Intercept (σ^2_{e0})	62.16*** (2.44)	22.46*** (0.88)	22.45*** (0.88)	18.76*** (0.76)	18.74*** (0.76)
Model fit					
Deviance	9,302.93	7,983.67	7,927.27	7,768.95	7,762.42
χ^2	834.63	2,255.63	307.28	368.39	370.02
df	26	26	24	24	24
p	<.001	<.001	<.001	<.001	<.001

Note. Standard errors are in parentheses. ARM = autonomous reading motivation; CRM= controlled reading motivation; MARS = metacognitive awareness of reading strategies; T. QUAL = teacher qualification; T. EXP = teacher experience. [a]Male is the reference category. [b]Lower household income serves as the reference category. [c]Lower T. QUAL acts as the reference category. *p < .05; **p < .01; ***p < .001

The model with class-level correlates. In Model 3, the class-level variables teacher qualification and teacher experience were added, revealing that well-qualified and experienced teachers also led to higher-level reading comprehension and to a decrease of the between-class variance by 88.6% as compared to Model 2. Up to 73.4% of the total variance was explained by student's gender, ARM, CRM, MARS, household income, teacher qualification, and teacher experience as fixed effects. Moreover, adding of these variables resulted in a significant improvement in Model 3 (Deviance = 7,927.27; χ^2 = 307.28, *df* = 24, *p* < .001).

The model with random slopes. In Model 4, the slopes for the level-1 variables ARM, CRM, and MARS were allowed to vary at level 2 to test whether the relationship between these variables and reading comprehension was different across classes. The slope variances of these correlates were significantly different from zero, showing that the relationship between the correlates and reading comprehension varied significantly between classes. Furthermore, the addition of the random slopes improved the model fit as compared with Model 3 (Deviance = 7,768.95; χ^2 = 368.39, df = 24, $p < .001$). Within-class variance was reduced by 16.4%, indicating that allowing the association between the correlates (ARM, CRM, and MARS) and reading comprehension to vary across classes explained a significant amount of reading comprehension.

The model with cross-level interactions. In Model 5, cross-level interactions between the level-1 correlates ARM, CRM, MARS and the level-2 explanatory variables teacher qualification and experience were examined. To test the third hypothesis, teacher qualification and teacher experience were added as level-2 correlates of the slopes of ARM, CRM, and MARS to the model to assess their effects on the slopes. The results indicated that teacher qualification and teacher experience had significant effects on MARS, but not on ARM and CRM. The positive regression coefficient ($\beta_{13} = 0.22$) for the interaction between MARS and teacher qualification indicated that with well-qualified teachers, the possibility for students with a high level of MARS to develop better reading comprehension was higher than expected. However, the negative regression coefficient ($\beta_{14} = -0.02$) for the interaction between MARS and teacher experience suggested that with experienced teachers, the difference in reading comprehension between students with different levels of MARS became smaller than expected. The proportion of explained variance for the slope MARS was 33.3%. The deviance decreased as compared with Model 4, implying that this model had a better fit than the previous model. Therefore, hypothesis 3 was partly confirmed: Teacher qualification and experience moderate the relationship between MARS and reading comprehension. However, no moderation effects were found regarding the relation between ARM and CRM on the one hand and reading comprehension on the other hand.

Discussion

The results of the present study supported the hypothesized relationships as stated in hypothesis 1 and 2. However, they only partially supported hypothesis 3, because teacher qualification and experience only moderated the strength of the relationship between MARS and reading comprehension. This study sheds new light on the relationships of variables associated with reading comprehension.

Student-Level Correlates of Reading Comprehension

The results confirmed that student's gender, reading motivation, MARS, and household income were related to reading comprehension. Furthermore, these student-level variables explained more variance in students' reading comprehension as compared with class-level variables. These results highlight the fundamental role of student- level correlates.

Our finding that student's gender was related to reading comprehension is in line with previous research (e.g., Chiu & McBride-Chang, 2006; OECD, 2010; OECD, 2016a). However, it should be noted that, compared with previous studies, the relationship between these two variables is weaker in the current findings. The present research confirmed that female students perform better in reading comprehension than male students of the same age group. In this respect, Clark and Burke (2012) stated that female students tended to have greater interest and spend more time in reading than male students.

Our findings indicate household income was related to reading comprehension, which supports previous research (e.g., OECD, 2010; OECD, 2016a). However, the relationship between these two

variables is also weaker in the present study than that in previous studies. As expected, students from high-income families performed better than students from low-income families. This accords with previous research findings on the impact of socio-economic status on reading comprehension (Liang, 2001; Cheng & Wu, 2017). A possible explanation is that family income may influence parents' decisions on investment in children's reading, such as buying books and paying for library services (Dahl & Lochner, 2012). Therefore, students from low-income families are more likely to stay behind in reading comprehension. Further, the difference in reading achievement between students from low- and high-income families may be indirectly intensified by the ongoing industrialization and urbanization, which have widened the income gap between families in China (Long, Zou, & Liu, 2009). The current study further found that students' ARM and CRM are significant correlates of reading comprehension. More particularly, ARM is one of the two most powerful correlates of reading comprehension among all student-level variables. The role of reading motivation has been well described in existing literature. Researchers have confirmed that intrinsic motivation for reading, which is related to ARM, has positive effects on reading comprehension (Guthrie & Wigfield, 2005). Similarly, De Naeghel et al. (2012) found that primary students' ARM has a significant relationship with reading comprehension. However, most prior studies have been conducted among primary school children in European, American, and Oceanian countries. Very little is known about how ARM and CRM affect reading among secondary school students in Asian countries, such as China. In this respect, our findings provide additional evidence for the effects of ARM and CRM on reading comprehension and further support the idea that ARM plays a more active role in reading comprehension than CRM (Deci & Ryan, 2008). The findings indicate that when students consider reading as interesting and satisfying in itself and reading meets their innate psychological needs for competence, autonomy, and psychological relatedness, their reading behavior will be most likely to be self-determined (Deci & Ryan, 2008).

An interesting finding regarding student-level correlates was that MARS is the most powerful correlate of reading comprehension. Previous studies have already noted the importance of MARS (Mokhtari & Reichard, 2002); however, it was not clear to what extent it affects reading comprehension as compared with other variables. The current study found that over one third of the variance of students' reading comprehension can be explained by MARS as a student-level correlate. This finding further supports the idea that readers' MARS can facilitate reading comprehension (Sheorey & Mokhtari, 2008). When secondary school students read with MARS, they may activate their metacognitive learning system and select effective reading strategies to construct meaning (Misailidi, 2010).

Class-Level Correlates of Reading Comprehension

The present findings support the second hypothesis that teacher qualification and experience correlate with students' reading comprehension. Similarly, Hairrell et al. (2011) discovered that teacher qualification was significantly related to students' reading comprehension, and Harris and Sass (2011) found that the productivity of teachers in promoting students' reading achievement increases with teacher experience. Teacher qualification and experience are two important factors that reflect teacher quality, which is an essential prerequisite for teacher effectiveness (Hanushek & Rivkin, 2006). The current results demonstrate that well-qualified and high-level-experienced teachers can teach reading more effectively than those with poor qualification and experience. A possible explanation for this might be that teachers' content knowledge and pedagogical content knowledge affect students' progress in reading comprehension (Kleickmann et al., 2013).

The results of the cross-level interactions indicated that teacher qualification and experience moderate the strength of the relationship between MARS and reading comprehension. This relationship is stronger in classes with well-qualified and experienced teachers than in those with less qualified and novice

teachers. These findings were consistent with other research indicating that teacher quality, including teacher qualification and experience, influences students' reading (e.g., Hairrell et al., 2011; Hanushek & Rivkin, 2006; Palacios, 2017). The present research further provided empirical evidence on the moderating effects of teacher quality on the relationship between reading comprehension and MARS. It is possible that the moderating effects are associated with teachers' competence in reading instruction and concepts and experience of reading strategy instruction, which may influence students' MARS as well as reading performance.

Implications for Policy and Practice

The results of the present study have important implications for teachers, parents, school administrators, and policy makers to improve secondary school students' reading comprehension. Teachers can promote students' reading comprehension, MARS, and ARM by explicit instruction of reading strategies. For example, they can use the strategy of goal setting in reading instruction to enhance students' ARM and self-regulated learning. Meanwhile, they can also help students to develop their MARS by setting proper reading goals. In addition, they can promote their qualification and experience by continuing education for the effectiveness of reading instruction. Parents can cultivate their children's interest in reading and motivation for reading and provide a better reading environment for them. In order to help students who are from low-income families, their parents and schools should work together to provide these students with full support in reading learning. For example, they can offer more access to reading materials. Furthermore, education authorities should strive to improve teacher quality and ensure the teaching quality in schools in poor areas. For instance, they can provide special allowance to encourage highly qualified teachers to work in these schools. In teacher training and education, education authorities and universities can set up compulsory courses to develop pre- and in-service teachers' pedagogical content knowledge (Kleickmann et al., 2013). In addition, schools can foster a culture of reading among students by motivating them to read and by supporting them with reading strategy instruction.

Limitations and Further Research

There are some limitations in the present study which should be acknowledged. The sample of participants only contained students in grades 7 and 8. Therefore, the results cannot be generalized to secondary school students in other grades. This study did not include all possible important variables, such as parent's education level, teacher's beliefs about teaching and learning, teaching methods, and school types. In addition, it did not provide further evidence on which aspects of teaching experience could contribute to the enhanced reading achievement. Consequently, future research will benefit not only from the more in-depth investigation of teaching experience (an in-depth interview on teacher experience of reading strategy instruction, for instance), but also from the investigation of the relation between reading comprehension and other critical variables.

Despite its limitations, the present study makes a noteworthy contribution to the development of a multilevel comprehensive model including different explanatory variables, revealing statistically significant relationships between students' reading comprehension and critical individual, family, and teacher factors. It can be concluded that the student-level variables gender, ARM, CRM, MARS, and household income and the class-level variables teacher qualification and teacher experience are significant correlates of reading comprehension. It is important to note that MARS and ARM are the two most powerful correlates among them, and that teacher qualification and teacher experience can act as moderators of the relationship between MARS and reading comprehension. To sum up, the results of this study extend previous research on

correlates of reading comprehension and provide some practical implications for improving reading instruction in secondary school.

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