

The association between teacher-student relationship and academic achievement: The moderating effect of parental involvement

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Abstract

As an important part of adolescents' social capital, teacher-student relationship (TSR) and parental involvement (PI) are important for student learning. However, we know little about how PI works with TSR in relation to adolescents' learning outcomes. The present study aimed to examine the association between TSR and adolescents' learning outcomes in China, as well as testing the potential moderating role of PI. Participants were 332 fourth graders and 321 eleventh graders from Shandong province, China. Student-perceived TSR and home-based PI, and curriculum-based measures of academic achievement were collected in October 2019. The major findings of the study included: (1) TSR and students' academic performance positively correlate with each other; (2) PI moderates the relationship between TSR and students' academic performance; (3) High PI in primary school reduces the impacts of lower TSR on student performance; (4) High PI in secondary school has no compensating effect on low TSR, but it still reduces the influence of TSR on academic performance. The present research verifies and extends the association between TSR and academic achievement to parental factors, and holds substantive theoretical and practical implications for teacher education and family education research.

KEYWORDS

academic achievement, moderation model, parental involvement, teacher-student relationship

1 | INTRODUCTION

As an important part of school social capital, teacher-student relationship (TSR) is important for student learning (Henson, 2010; Krane & Klevan, 2019). According to the attachment theory (Bowlby, 1980), supportive TSR can provide security and belonging for students, and further promote their active learning behavior. A number of empirical studies have shown that positive TSR improves students' academic performance (e.g., Hughes et al., 2008, 2012; L. H. Ma et al., 2018; Roorda et al., 2011). As important sources of social capital for adolescents, both home and school are pivotal learning contexts (Krane & Klevan, 2019; Lee & Bowen, 2006). Parents may promote children's academic performance by providing direct, tangible and intangible support (Lee & Bowen, 2006). Recent research has shown that parental involvement (PI) may lead to effective school-based interventions (e.g., Boonk et al., 2018; Borgonovi & Montt, 2012; Gao, 2016; Hemmerechts et al., 2017; Jhang & Lee, 2018). However, we know little about how PI works with teachers in relation to adolescents' learning performance, especially in Confucian Heritage Culture (CHC) where PI and TSR may be different from that in western culture (F. Zhang et al., 2020). Thus, this study aimed to explore the link between TSR, PI and student learning in CHC context, which may deepen our understanding of the role that teachers and parents play in student learning from eastern culture.

2 | LITERATURE REVIEW

2.1 | Theoretical framework

Coleman's concept of social capital was adopted in this study. According to Coleman (1988), social capital is the resources in the structure of social relations that individuals can use to prevent or solve common problems. Social capital is not about people, but the relationship between people (McGraw, 1992). Coleman (1988) put forward two dimensions of social capital, namely social capital within and outside family, and further emphasized the role of social capital in student learning. Moreover, longitudinal research has revealed the effects of social capital on reading and math achievement (e.g., Fan, 2001; Hong & Ho, 2005).

There are two main types of social capital for adolescents: school and family. School social capital refers to the relationship and network that students have to succeed in school, including the relationship between students and teachers, counselors and peers (Croninger & Lee, 2001). Teachers can establish social capital with students through counseling, consultation, emotional support, and encouragement (Croninger & Lee, 2001). When adolescents trust their teachers and accept their guidance, they are more likely to achieve better learning outcomes. Hence, the relationship between teachers and students can provide students with a kind of connection with school and resources for academic success. Without support from teachers, it is difficult for students to obtain resources necessary for their academic success. Thus, teacher-based social capital is beneficial to all students, especially those with academic difficulties. Family social capital refers to the relationship network that adolescents have at home (Dufur et al., 2013). Thus, PI is seen as a form of social capital through which children's educational outcomes are influenced (Dufur et al., 2013; Jeong & Acock, 2014; Lee & Bowen, 2006). Therefore, social capital theory can offer a framework for linking TSR and PI in promoting student learning.

2.2 | TSR and academic achievement

TSR is defined as human interplay that develops in the interaction and communication between teachers and students (Hughes et al., 2008, 2012). As an important part of school social capital, student-perceived TSR is closely associated with students' motivational beliefs and academic performance (Henson, 2010; L. H. Ma et al., 2018,

L. Ma et al., 2020). Numerous studies have shown a positive link between TSR and student learning (e.g., Hughes et al., 2008, 2012; Roorda et al., 2011). More precisely, warm TSR promotes active learning engagement and excellent academic performance (Brackett et al., 2011). Negative TSR makes students feel uncomfortable, which is harmful for student learning (Roorda et al., 2011; Wubbels & Brekelmans, 2005). Although empirical studies have indicated that students are more likely to experience academic success by establishing supportive relationship with teachers (e.g., Wei et al., 2015), the mechanism of TSR on student learning may be complex.

To sum up, even though there was a growing interest in the association between TSR and student learning, previous research has insufficiently explored possible moderators between them, especially in CHC context. Therefore, this study aimed to explore possible moderators in the link between TSR and students' learning performance in the context of Confucian culture.

2.3 | PI and academic achievement

Generally speaking, PI in education refers to parents' efforts to promote their children's academic success by communicating with school staff, discussing school-related topics with their children, and participating in school activities (Boonk et al., 2018; Fantuzzo et al., 2000; Hemmerechts et al., 2017; Hill & Tyson, 2009; Hoover-Dempsey et al., 2005). It includes home-based involvement, school-based involvement, and home-school communication. Home-based PI refers to parent-child interactions that occur at home in relation to children's learning process (e.g., helping children with homework, reading together, talking about school experience, family supervision, and parent-child communication; Boonk et al., 2018). School-based PI refers to all parental activities that require contact with school, including communicating with teachers, taking part in school activities, and parental volunteering (Fantuzzo et al., 2000). In addition to home- and school-based behaviors, PI in education also includes parents' beliefs about their children's education, such as parents' expectations (Englund et al., 2004). It is widely believed that home-based PI is particularly important for children's learning and growth (Borgonovi & Montt, 2012).

The role of parents in their children's learning is unique and necessary (Barger et al., 2019; Boonk et al., 2018; Hemmerechts et al., 2017; Hoover-Dempsey et al., 2005). Without active support from parents, even the best school can hardly educate the children well. However, the influence of PI on children's academic performance varies with different forms of PI (Fan & Chen, 2001; Hill & Tyson, 2009; Jeong & Acock, 2014; Jeynes, 2007; Li, 2018; Yan & Lin, 2005). A meta-analysis with 37 studies in kindergartens, primary and secondary schools found the strongest link between PI and academic achievement when families have higher academic expectation towards children, discuss school-related issues with children, and help children develop reading habits (Castro et al., 2015). Another meta-analysis found that there is a positive correlation between homework checking and student performance, but its effect is the weakest compared with other types of PI (Jeynes, 2012). However, according to Hill and Tyson (2009) and Barger et al. (2019), parents' help with homework is negatively correlated with student performance as they grow older. In short, research on the effect of PI on children's academic achievement is mixed.

In this paper, we focused on home-based PI. On the one hand, home-based PI is considered to be more important to adolescents' learning than school-based PI (Li et al., 2019). On the other hand, due to time and energy constraints or lack of scientific guidance, most CHC parents are absent from school activities (Lau et al., 2011; Li et al., 2019).

2.4 | Moderating role of PI

Previous research have confirmed the important role of teachers and parents as social capital in adolescents' learning performance (Krane & Klevan, 2019). As an important part of school social capital, TSR is closely

related to student performance (e.g., Brackett et al., 2011; Hughes et al., 2008, 2012; L. H. Ma et al., 2018; Roorda et al., 2011; Wei et al., 2015). As an important part of family social capital, PI is of great significance to adolescents' learning motivation and academic achievement (e.g., Castro et al., 2015; Hemmerechts et al., 2017; Jeynes, 2007; Jhang & Lee, 2018; Krane & Klevan, 2019). Specifically, PI in literacy, numeracy and other learning activities positively links with adolescents' cognitive development (Sonnenschein & Sun, 2017; M. Wang & Sheikh-Khalil, 2014) and even long-term learning outcome (Jhang & Lee, 2018). Therefore, PI is likely to interact with TSR to promote student learning. In other words, a high level of PI may mitigate the negative impact of low TSR on students' academic performance. However, the interaction of these factors has not been sufficiently examined, especially in CHC context.

CHC is a popular cultural tradition in Asia, especially in East Asia, which has important influence on education (Tan, 2016). China, Vietnam, Singapore, Korea, Japan, and other countries in East Asia are considered as Confucian cultural heritage countries (Phuong-Mai et al., 2005). In the context of CHC, high academic achievement is a key way to obtain high social status (F. Zhang et al., 2020). One's academic achievement often transcends individual values and is further regarded as collective efforts and family honor (Ng et al., 2014). Therefore, compared with Western parents, CHC parents are more widely involved in their children's education (F. Zhang et al., 2020). Moreover, children are taught to respect people of older age and higher status in CHC, such as parents and teachers (Ramburuth & McCormick, 2001). As a result, teachers' wisdom is often taken for granted and not questioned, and CHC students often prefer to absorb knowledge from their teachers without critical thinking (Ramburuth & McCormick, 2001). Thus, they are often criticized as passive learners, and their relationship with teachers may be different from TSR in other cultures (L. H. Ma et al., 2018; Zhou et al., 2020).

Based on the social capital theory (Coleman, 1988) and the above literature review, it is reasonable to assume that PI may moderate the association between TSR and student learning. Due to the situational dependence of social capital (Fasang et al., 2014), TSR and PI in CHC may have different impacts on student learning, and the influencing path may be varied in different schooling stages. Therefore, this study aimed to address the limitations of previous studies by using the moderation model to evaluate the interaction of PI and TSR on student learning in primary and secondary school in China. The following research hypotheses was tested.

TSR is positively associated with student learning.

PI moderates the association between TSR and student learning.

The moderating effect of PI in the association between TSR and student learning is different in primary and secondary school.

3 | METHOD

3.1 | Participants and procedures

There were 337 fourth graders and 323 eleventh graders in Shandong Province participating in this study with convenience sampling in October 2019. Before data collection, informed consent was gained from headmasters, teachers, parents, and students respectively. At the beginning of data collection, we informed participants of the research purpose and promised that all the data collected was used only for research. Then the participants answered the questionnaire and achievement test under the guidance of researchers. After canceling the participants with missing data, we got 332 fourth graders from three primary schools and 321 eleventh graders from three secondary schools. The detailed information of the participants was presented in Table 1.

TABLE 1 Sample characteristics

Sample	Primary school	Secondary school
Number	332	321
Gender (% of girls)	45.8%	54.2%
SES (mean)	0.4747 (SD = 0.613)	0.5047 (SD = 0.693)
Grade level	Grade 4	Grade 11
Only child (%)	53.7%	65.4%

3.2 | Measures

3.2.1 | TSR scale

Student-reported TSR was used in this study in that students after Grade 3 can accurately report TSR quality (Murray & Greenberg, 2006). Items from PISA 2012 that had been shown good reliability and validity (e.g., OECD, 2014) were adapted to measure Chinese adolescents' interpersonal relationship with their teachers. The original PISA items related to science, reading, and mathematics. Based on educational reality in China, we changed the context to science, mathematics, and Chinese for primary school students and English, science, mathematics, Chinese, and arts for secondary school students. Then, a pilot research and focus group interview with 30 students were carried out initially to make sure its construct validity. In addition, the scale has been proven as a valid TSR measurement for Chinese primary (e.g., Zhou et al., 2020) and secondary (e.g., L. H. Ma et al., 2018) school students. At last, there were fifteen items used to measure primary school students' perception of TSR with three subscales: (1) the relationship with Chinese teacher (5 items, such as "Chinese teacher offers extra help when I need it."); (2) the relationship with science teacher (5 items, such as "science teacher offers extra help when I need it."); (3) the relationship with mathematics teacher (5 items, such as "math teacher offers extra help when I need it.") (see item 1-15 of Appendix A). And there were 25 items used to measure secondary school students' perception of TSR with five subscales: (1) the relationship with English teacher (5 items, such as "English teacher offers extra help when I need it."); (2) the relationship with mathematics teacher (5 items, such as "mathematics teacher offers extra help when I need it."); (3) the relationship with Chinese teacher (5 items, such as "Chinese teacher offers extra help when I need it."); (4) the relationship with science teacher (5 items, such as "science teacher offers extra help when I need it."); (5) the relationship with arts teacher (5 items, such as "arts teacher offers extra help when I need it.") (see item 1-25 of Appendix A). Participants were required to record the degree of perceived TSR on a 5-point Likert-type scale with 1 (*does not match at all*) to 5 (*matches very strongly*). Higher score indicates more supportive TSR. The mean value of the subscales was used as indicators of TSR.

For Grade 4, while the Cronbach's alphas for the scales on Science, Math, and Chinese teachers were .870, .848, .873, respectively, and for all the items for three subjects combined was .904. The correlations among the three subject teachers were consistently high (.424–.593). If we use the mean of each subject as an indicator for each subject, the alpha for the three indicators (one for each subject) was .759, still reasonably high. For Grade 11, similar analyses showed the alphas for English, science, Math, Chinese, and arts teachers were .964, .965, .976, .967, .978, respectively. It became .909 when all subjects were combined. The correlations among all subjects were positive (.284–.720). For the scale involving 5 indicators, one for each subject, the α was .845, still reasonably high. Thus, the results supported the use of all subjects as an overall score indicating a general relationship with the teachers.

3.2.2 | PI scale

PI items from PISA 2018 were adapted in this study. A pilot research and focus group interviews with 30 students were carried out to make sure its construct validity. At last, there were seven items to measure secondary school students' perception of the current PI, for example, "how often do your parents discuss with you how well you are doing at school?" "how often do your parents go to a bookstore or library with you?" (see item 1-7 of Appendix B). Besides the above seven items, there are another two items added to measure primary students' perception of PI, for example, "how often do your parents accompany you to extracurricular classes?" "how often do your parents accompany you to exercise (such as running, swimming, climbing mountain)?" (see item 1-9 of Appendix B). Participants were required to record the degree of perceived PI on a 5-point Likert-type scale with 1 (*never*) to 5 (*always*). Higher score indicates more home-based PI. The reliability (Cronbach's alpha) of the current PI scale for primary and secondary school students was .873 and .845, respectively.

3.2.3 | Achievement test

In the elementary education system of mainland China, all courses are based on curriculum standards (Lv et al., 2019). Thus, we compiled performance tests according to the curriculum standards of primary and secondary schools in mainland China, including Chinese, mathematics, and science for primary school students and Chinese, mathematics, English, science, and arts for secondary students. These are standardized paper-and-pencil tests with a total original score of 100 for each subject. The students were required to complete the achievement test, which takes primary school students a total of 3 h and secondary school students a total of 5.5 h. By referring to the algorithms of international organizations such as PISA and TIMSS, the researchers used the item response theory (IRT) to convert the student performance into a standard score with an average score of 500 and a standard deviation of 100 based on the students' IRT value. The mean value of these subjects was used as indicators of their academic achievement. The reliability (Cronbach's alpha) of the present achievement test for primary and secondary school students was .967 and .978, respectively.

3.2.4 | Demographic variables

Considerable research indicated that adolescents' family SES (e.g., Erika, 2013) and gender (e.g., Voyer & Voyer, 2014) influence their academic achievement. Therefore, we estimated the hypothesized model controlling for gender and SES. In this study, gender was used as a dummy variable, taking 1 for girls and 0 for boys. The items measuring students' SES in our research was adapted from PISA, so we adopted the SES calculation method in PISA. In other words, SES is indicated by parents' occupation, parents' education level, and family possessions with mean of 0, standard deviation of 1, and most values ranged from -3 and 3 (OECD, 2017).

3.3 | Data analyses

All data were analyzed using SPSS version 20. To control the known factors related to children's learning performance, we used gender and SES as covariates in our analysis. In this study, the moderating effect of PI in the association between TSR and academic performance was estimated by linear regression analysis (Hayes, 2013). All independent variables (covariates, PI and TSR) and interaction items (TSR \times PI) were included at the same time. It indicates moderating effect if interaction terms add significant explanatory variance to the regression model (Helm & Mark, 2012).

4 | RESULTS

4.1 | Preliminary analysis

Skewness and kurtosis test indicated that the data in primary and secondary school are normally distributed. The tolerance motivation of TSR and PI (primary school: 0.905, 0.911; secondary school: 0.966, 0.897) is greater than 0.10, VIF motivation (primary school: 1.105, 1.097; secondary school: 1.035, 1.115) is less than 10, both of which indicated that there is no serious collinearity (O'Brien, 2007).

4.2 | Descriptive results

To determine to what extent TSR, PI and academic achievement correlate with each other, zero-order latent correlation was performed. Results showed that TSR and academic performance significantly and positively correlate with each other in both primary and secondary school (see Tables 2 and 3), which confirmed H1. Moreover, PI positively correlates with student performance in both primary and secondary school. However, PI positively correlates with TSR in primary school and negatively correlates with TSR in secondary school (see Tables 2 and 3).

4.3 | Moderation analysis

To test the hypothetical moderation effect of PI in the link between TSR and academic achievement, we performed two moderated regressions on academic achievement in primary and secondary school respectively. Following Aikens and West (1991), we made the continuous independent variable (TSR) and moderating variable (PI) mean-centered, which can reduce the effects of multi-collinearity and facilitate the interpretation of results. Then we calculated the interaction term by multiplying TSR with PI. The result for the moderation effect of PI in primary school was shown in Table 4. Significant regression equation is found for students' academic achievement ($F = 5.45$, $p < .001$). We found that PI is positively related to students' academic achievement ($B = 7.207$, $p < .05$). The direct

TABLE 2 Descriptive statistics and correlation among variables (primary school)

	1	2	3	4	5
1. TSR	1				
2. PI	0.282**	1			
3. Achievement	0.146**	0.164**	1		
4. Gender	0.06	0.021	0.068	1	
5. SES	0.015	0.096	0.113*	0.000	1
Mean	3.849	3.822	573.267	0.459	0.475
SD	0.784	0.924	70.013	0.499	0.613
Min	1.47	1	306.44	1	-1.34
Max	5	5	730.22	2	1.84

Note: $N = 332$.

Abbreviations: PI, parental involvement; TSR, teacher-student relationship.

* $p < .05$; ** $p < .01$.

TABLE 3 Descriptive statistics and correlation among variables (secondary school)

	1	2	3	4	5
1. TSR	1				
2. PI	-0.803	1			
3. Achievement	0.294**	0.181*	1		
4. Gender	-0.085	0.07	0.061	1	
5. SES	0.133	-0.165	0.005	0.030	1
Mean	3.756	3.556	567.287	1.54	0.505
SD	0.852	0.809	67.521	0.501	0.695
Min	1.33	1	302.52	1	-1.40
Max	5	5	716.06	2	1.87

Note: $N = 321$.

* $p < .05$; ** $p < .01$.

TABLE 4 Predictors of academic achievement (primary school)

	Academic achievement			
	<i>B</i>	SE	β	Sig.
Intercept	570.276	5.658		0.000
SES	9.928	5.791	.092	0.202
Gender	9.092	7.107	.068	0.087
TSR	11.091	4.092	.152	0.007
PI	7.207	3.967	.101	0.030
TSR \times PI	-10.567	3.879	-.146	0.007
Explained variance	$\Delta R^2 = 0.021$ /Adjusted $R^2 = 0.063$			
ANOVA	$F_{(5, 326)} = 5.45^{***}$			

Note: $N = 332$.

Abbreviations: ANOVA, analysis of variance; PI, parental involvement; TSR, teacher-student relationship.

effect of TSR on academic achievement in regression analyses is positive as well ($B = 11.091$, $p < .01$). More importantly, significant interaction effect of TSR and PI is found for primary school students' academic achievement ($B = -10.567$, $p < .01$), which explained 6.3% of the variance (see Table 4).

The result for the moderation effect of PI in secondary school was shown in Table 5. Significant regression equation is found for students' academic achievement ($F = 13.285$, $p < .001$). It can be seen that PI in secondary school is positively related to students' academic achievement ($B = 14.124$, $p < .001$). The direct effect of TSR on academic achievement in regression analyses is positive as well ($B = 21.607$, $p < .001$). However, the significant interaction effect of TSR and PI is found for secondary school students' academic achievement as well with different direction ($B = 14.928$, $p < .001$), which explained 17.9% of the variance (see Table 5).

Further, the regression lines between independent variable (TSR) and dependent variable (academic achievement) were drawn according to high level ($M + 1$ SD) and low level ($M - 1$ SD) PI. It can be seen from Figure 1 that PI in primary school has a compensating effect on TSR. That is to say, a high level of PI may mitigate the impact of low TSR on students' academic performance. From Figure 2, the compensating effect of PI in secondary school

TABLE 5 Predictors of academic achievement (secondary school)

	Academic achievement			
	B	SE	β	Sig.
Intercept	568.678	10.093		0.000
SES	-3.349	9.113	-.036	0.045
Gender	14.008	12.322	.110	0.516
TSR	21.607	6.280	.335	0.000
PI	14.124	6.511	.219	0.000
TSR \times PI	14.928	5.920	.248	0.000
Explained variance	$\Delta R^2 = 0.058$ /Adjusted $R^2 = 0.179$			
ANOVA	$F_{(5, 276)} = 13.285^{***}$			

Note: N = 321.

Abbreviations: ANOVA, analysis of variance; PI, parental involvement; TSR, teacher-student relationship.

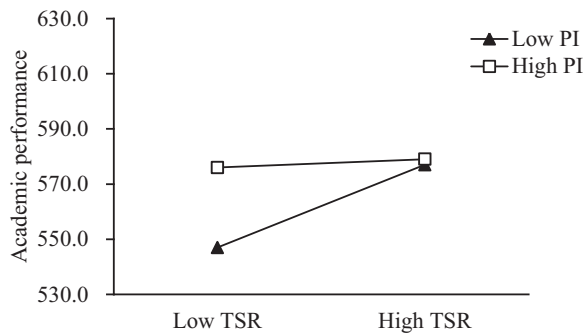


FIGURE 1 The interaction between TSR and PI in primary school (gender and SES controlled). PI, parental involvement; TSR, teacher-student relationship

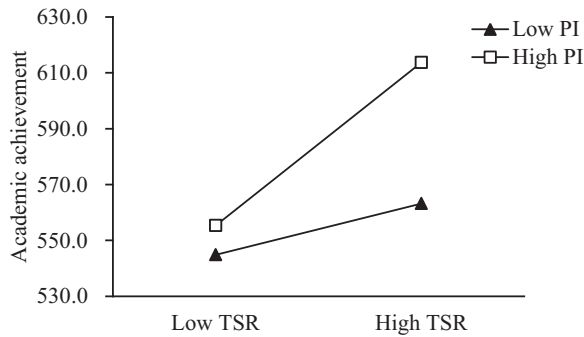


FIGURE 2 The interaction between TSR and PI in secondary school (gender and SES controlled). PI, parental involvement; TSR, teacher-student relationship

decreases for students with low TSR, but PI can still reduce the effect of low TSR on students' academic performance and the predictive effect of TSR on academic achievement is also stronger among students with high PI.

5 | DISCUSSION

The current study contributes a lot to the literature by verifying a conceptual model about the moderation of PI in the association between TSR and student learning. The major findings of this study include: (1) TSR and student learning positively correlate with each other; (2) PI moderates the relationship between TSR and student learning; (3) high PI in primary school mitigates the negative impact of low TSR on student learning; (4) high PI in secondary school has no compensating effect on low TSR, but it still reduces the effect of TSR on student learning. Our research complements the previous research by exploring the moderating role of home-based PI in the linkage between TSR and student learning in CHC. Overall, the current results confirmed the importance of social capital from school and family in student learning.

5.1 | Discussion of the results

This study indicated that students with positive TSR get higher academic performance, which is in line with previous research (e.g., Hughes et al., 2008, 2012; L. H. Ma et al., 2018; L. Ma et al., 2020; Roorda et al., 2011; Wubbels & Brekelmans, 2005; Zhou et al., 2020). As an important element of school social capital, TSR is particularly essential to adolescents' developmental, emotional and psychological progress (Pianta & Allen, 2008). Thus, this study adds empirical evidence to TSR research from eastern culture, and further provides extra empirical support to the link between school social capital and student learning.

The most important finding in this study is that the unique link between TSR and student learning is positively moderated by home-based PI in secondary school, but negatively moderated in primary school. That is to say, home-based PI in primary school can compensate for the impact of negative TSR on student learning. In China, most parents are capable of providing academic support and assistance to their primary school children due to their immature mental development, narrow social circle, high degree of attachment to parents, and simple subject knowledge (Y. Y. Zhang et al., 2015). Therefore, home-based PI can make up for the effect of low TSR on student learning in primary school. However, Chinese secondary school students are eager to get rid of their parents' shackles and gradually lose attachment to their parents as their mental development matures and social networks expand (Gao, 2016). In addition, many parents are not able to help their children with learning with the increased difficulty of subject knowledge in secondary school (Gao, 2016). Therefore, if secondary school students received insufficient support from teachers, it would be difficult for their parents to make up for it. However, for secondary school students with high TSR, active home-based PI can still improve their academic performance, which also highlights the importance of home-school cooperation.

On the other hand, this study found that home-based PI has an important impact on children's academic performance, which is consistent with previous findings (e.g., Avvisati et al., 2014; Jiang & Dong, 2020; H. Wang & Cai, 2017; F. Zhang et al., 2020, 2021). However, due to differences in parents' educational background (cultural capital), not all parents are able to participate in their children's learning (Antony-Newman, 2019). This study further showed that for pupils with low PI, TSR is particularly important. In other words, if teachers give enough support to children with low PI, their academic performance will be much higher than that of children with insufficient teacher support. Similarly, for secondary school students with low PI, TSR is still very important. These results suggest that when home-based PI is low, TSR can help to increase children's social capital, thus buffering the negative impact of low PI on children's learning. Therefore, the social capital of children with low PI can be increased by improving TSR. On the contrary, for pupils with high PI, the importance of TSR seems to be less prominent, which indicates the

special importance of PI for pupils. This finding is consistent with Gahramanov et al. (2020) and Sun and Ng (2021) who indicated that PI has a significant impact on early childhood development. For secondary school students with high PI, TSR is still very important, which indicates that for secondary school students, the importance of PI is increasingly weakened, and the importance of TSR is more prominent. In particular, the interaction between high PI and high TSR seems to have an incredible impact on the academic performance of elementary or secondary school students in this study. This suggests that as important others in adolescents' lives, support from teachers and parents play a decisive role in their cognitive development and jointly predict their academic success (Dufur et al., 2013). Thus, both TSR and PI can increase adolescents' social capital and further promote their learning.

Although the association between TSR and student learning has been widely studied, there are insufficient research on the interaction between PI and TSR on student learning. This study overlaps with previous studies, but there are innovations. First, the current results echoed prior studies that documented the effect of home-based PI (e.g., Boonk et al., 2018; Englund et al., 2004; Sonnenschein & Sun, 2017) and TSR (e.g., L. H. Ma et al., 2018; L. Ma et al., 2020; Roorda et al., 2011; Zhou et al., 2020) on student learning. Second, this study confirmed that home-based PI moderates the link between TSR and student learning in CHC context. Based on social capital theory, both PI and TSR are crucial for children's academic growth (Coleman, 1988). Thus, this study provide empirical evidence from CHC context for the application of social capital theory.

However, the association between PI, TSR and academic performance varies with educational systems and cultural backgrounds. In Asian-American families, children perform best in learning when their parents read to them instead of participating in school activities (Jeynes, 2003). However, some research have found that parent-child discussion has a positive and direct effect on the initial academic achievement of white students, but no effect on the academic achievement of Asian American students (Hong & Ho, 2005; Yan & Lin, 2005). Moreover, Korean parents believed that home-based participation is more important than school-based (Kim et al., 2018). This study showed that home-based PI is crucial to student learning, especially for primary school students. Thus, the present research confirmed the positive effect of home-based PI on academic achievement both in primary and secondary school from eastern culture. Therefore, it is necessary to encourage schools and families to enrich social capital to increase resources for young students to realize their maximum potential. However, it is worth noting that Jeong and Acock (2014) found that PI in Mexican and East Asia immigrant families is not linked with the growth rate of reading and math performance.

5.2 | Implications

The present results raise important implications for teacher education and school intervention policies. First, this study showed that TSR positively links with students' academic performance. Therefore, professional training on how to improve TSR in teacher education program is strongly recommended. For example, teachers may critically think about classroom interaction and teaching skills (Hughes et al., 2012) and show mutual respect and care for students (Wei et al., 2015), which help to build warm and supportive interpersonal relationships with students. Besides, TSR develops through interaction between multilevel systems, such as classroom environment, school atmosphere, collaboration between parents and teachers. Second, this study indicated that home-based PI significantly moderates the linkage between TSR and academic achievement. Specifically, high home-based PI helps to enhance low-TSR children's academic achievement, especially primary school children. Thus, home-based PI is strongly recommended to improve adolescents' academic achievement. Especially parents of primary school students should be more involved in their children's learning. To encourage parents to deeply participate in their children's learning, school can provide parents with resources, guidance and help.

5.3 | Limitations

Nevertheless, there are several limitations in this study. First, the questionnaire used in this study adopted students' self-report measures, and the measures of TSR were limited with only positively worded items. Thus, the relationship among variables may be inflated due to response bias and method effects. Nevertheless, previous research showed that teenagers' self-report social behavior is reliable and effective under confidentiality (L. H. Ma et al., 2018). Moreover, the measurement of achievement results was not self-reporting, which may improve the effectiveness of the research. Second, this study was a cross-sectional design that limits the directional assumptions, since any changes in students' perceptions and academic performance can affect the results. However, the positioning of variables in this study was based on previous theoretical and empirical research. Therefore, a longitudinal and experimental research design may strengthen the relationships tested in this study. Third, this study excluded other dimensions of PI, such as parental expectation. Research showed that parental expectation has a positive impact on students' academic performance (Castro et al., 2015; Englund et al., 2004). Thus, future research should include other aspects of PI to understand whether PI has a moderating effect on the association between TSR and academic achievement. Fourth, this study was conducted in CHC context where TSR and PI have different impacts on student learning (L. H. Ma et al., 2018; F. Zhang et al., 2020), which may limit its generalizability to other populations. Thus, future research with samples from other cultural context is strongly needed.

6 | CONCLUSION

The present study not only showed the positive link between TSR and academic achievement in Chinese context, but also confirmed that PI moderates this link. Specifically, high PI in primary school reduces the impacts of lower TSR on student learning, and high PI in secondary school does not have compensating effect on low TSR, but it still reduces the influence of TSR on student learning. To our knowledge, this is one of the first studies in CHC to explore the moderation effect of PI in the association between TSR and student learning. This study contributes to both theoretical and empirical literature on how social capital relates to student learning. It should be noted that this study was only performed on a small sample with a cross-sectional design. Therefore, further studies on large samples are needed to determine the long-term impact of TSR and PI on student learning.

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APPENDIX A

- (1) I get on well with English teacher.
- (2) English teacher cares about my health, whether physically or mentally.
- (3) English teacher listens to my innermost thoughts willingly.
- (4) English teacher offers extra help when I need it.
- (5) English teacher treats me fairly.
- (6) I get on well with Chinese teacher.
- (7) Chinese teacher cares about my health, whether physically or mentally.
- (8) Chinese teacher listens to my innermost thoughts willingly.
- (9) Chinese teacher offers extra help when I need it.
- (10) Chinese teacher treats me fairly.
- (11) I get on well with math teacher.
- (12) Math teacher cares about my health, whether physically or mentally.

- (13) Math teacher listens to my innermost thoughts willingly.
- (14) Math teacher offers extra help when I need it.
- (15) Math teacher treats me fairly.
- (16) I get on well with science teacher.
- (17) Science teacher cares about my health, whether physically or mentally.
- (18) Science teacher listens to my innermost thoughts willingly.
- (19) Science teacher offers extra help when I need it.
- (20) Science teacher treats me fairly.
- (21) I get on well with arts teacher.
- (22) Arts teacher cares about my health, whether physically or mentally.
- (23) Arts teacher listens to my innermost thoughts willingly.
- (24) Arts teacher offers extra help when I need it.
- (25) Arts teacher treats me fairly.

APPENDIX B

- (1) How often do your parents discuss with you how well you are doing at school?
- (2) How often do your parents eat (the main meal) with you around a table?
- (3) How often do your parents spend time just talking to you?
- (4) How often do your parents help you with your reading and writing homework?
- (5) How often do your parents discuss political or social issues with you?
- (6) How often do your parents go to a bookstore or library with you?
- (7) How often do your parents talk with you about what you are reading on your own ?
- (8) How often do your parents accompany you to extracurricular classes?
- (9) How often do your parents accompany you to exercise (such as running, swimming, climbing mountain)?