

# Mediating Role of Motivation on the Effects of Teacher-Student Relationships on Foreign Language Achievement

LIHONG MA

*University of Science & Technology Beijing, China*

XIAOFENG DU

JIAN LIU

*Beijing Normal University, China*

Received: 23 June 2018 / Accepted: 2 November 2019

ISSN paper edition: 1697-7467, ISSN digital edition: 2695-8244

**ABSTRACT:** The present study investigated whether students' motivational beliefs act as a mediator in the association between teacher-student relationships (TSRs) and foreign language performance with a multiple mediation model. Furthermore, this research examined whether mediating roles of intrinsic and extrinsic motivation differ. A total of 1171 eighth graders (583 male, 588 female) were chosen with purposive sampling in China. Student-reported measures of TSRs, intrinsic and extrinsic motivation, and English as a Foreign Language (EFL) test based on national curriculum were administrated in October 2017. Results showed that the positive link between TSRs and foreign language performance is partially mediated by intrinsic and extrinsic motivation, and the mediation effect of intrinsic motivation is significantly greater than that of extrinsic motivation, controlling for gender and socio-economic status. The results indicated that supportive TSRs can help learners to improve their foreign language proficiency by promoting their motivation, especially intrinsic motivation. The present results may have substantive theoretical and practical implications for teacher education and foreign language learning.

**Key words** teacher-student relationships; intrinsic motivation; extrinsic motivation; self-determination theory; multiple mediation model.

**El rol de la motivación en los efectos de las relaciones profesor-estudiante en el rendimiento de la lengua extranjera.**

**RESUMEN:** El presente estudio investigó si las creencias motivacionales de los estudiantes actúan como mediadores en la asociación entre las relaciones profesor-alumno (TSR) y el rendimiento de un idioma extranjero con un modelo de mediación múltiple. Además, esta investigación examinó si los roles mediadores de la motivación intrínseca y extrínseca difieren. Se eligieron 1171 alumnos de octavo grado (583 hombres, 588 mujeres) con muestreo intencional en China. En octubre de 2017, se aplicaron a los estudiantes las pruebas de TSR, la motivación intrínseca y extrínseca y la prueba de inglés como idioma extranjero (EFL) basadas en el plan de estudios nacional. Los resultados mostraron que el vínculo positivo entre TSR y el desempeño de un idioma extranjero está parcialmente mediado por la motivación intrínseca y extrínseca, y el efecto de mediación de la motivación intrínseca es significativamente mayor que el de la motivación extrínseca, controlando el género y el estatus socioeco-

nómico. Los resultados indicaron que los TSR de apoyo pueden ayudar a los alumnos a mejorar su dominio del idioma extranjero ya que promueven su motivación, especialmente la motivación intrínseca. Los resultados actuales pueden tener importantes implicaciones teóricas y prácticas para la formación del profesorado y el aprendizaje de lenguas extranjeras.

**Palabras clave:** relaciones profesor-alumno; motivación intrínseca; motivación extrínseca; teoría de la autodeterminación; modelo de mediación múltiple

## 1. INTRODUCTION

Many studies have confirmed that teacher-student relationships (TSRs) are one of the most important factors affecting students' academic performance (e.g. Roorda, Koomen, Spilt, & Oort, 2011; Hughes, Wu, Kwok, Villarreal, & Johnson, 2012; Ma, Du, Hau, & Liu, 2018). However, the mechanism through which TSRs are associated with student learning is not clear enough, especially in foreign language learning within Confucian Heritage Culture (CHC), where teachers are traditionally considered as omniscient experts and students as obedient learners (e.g. Huan, Quek, Yeo, Ang, & Chong, 2012).

Several theories have been used to explain the link between TSRs and student learning. According to the attachment theory (Bowlby, 1980), supportive TSRs may make students feel safe, which further stimulates positive learning engagement (Verschuere & Koomen, 2012). According to self-determination theory (SDT) (Ryan & Deci, 2017; Deci & Ryan, 2012), positive TSRs are considered as an external source of motivation. The association among TSRs, motivation and student learning is quite complicated. Yildirim (2012) has showed that intrinsic and extrinsic motivation can partially mediate the role of TSRs in students' Maths learning, and the mediation effect of intrinsic and extrinsic motivation is different. However, there are not enough studies that have examined the link among TSRs, motivation and academic performance in foreign language learning.

To address this gap in the literature, this article aims to fully understand the association among TSRs, motivation and English as a Foreign Language (EFL) learning in China, hoping the study from eastern culture may add empirical evidence and provide insight into how TSRs are associated with student learning. The following section will discuss the theoretical and empirical framework for the proposed model of TSRs, motivation and student learning.

## 2. LITERATURE REVIEW

### 2.1. Theoretical framework

SDT focuses on the process of internalizing goals and values, which suggests that a person may manifest a particular behavior for external or internal reasons (Deci & Ryan, 2012). There are different types of motivation according to the level of self-determination, and the main ones are intrinsic and extrinsic motivation. Intrinsic motivation is stimulated by an innate tendency, which is characterized by a perceived locus of a feeling of free choice and internal coherence (Deci & Ryan, 2012). In contrast, extrinsic motivation is stimulated by external forces, which is characterized by a feeling of reward, obligation and

pressure (Ryan & Deci, 2017). Extrinsic motivation can be internalized and integrated into the sense of self when there is a sense of relatedness. Being intrinsically motivated, people are inclined to make learning much deeper and more autonomous than being extrinsically motivated (Deci & Ryan, 2012).

According to SDT, the need for competence, autonomy and relatedness motivates the self to initiate behavior (Deci & Ryan, 2012). In the classroom, teachers play an important role by fulfilling students' basic psychological needs for competence, autonomy and relatedness, given that teachers are the most influential agents in establishing supportive classroom environment. Empirical research has confirmed that constructive classroom context facilitates self-determined motivation (Joe, Hiver, & Al-Hoorie, 2017; Ryan & Deci, 2017), which is helpful for better academic performance. Therefore, SDT offers a framework for linking TSRs, motivation and academic achievement.

## 2.2. TSRs and motivation

The social context where individuals live as well as important persons whom individuals communicate with are of vital importance because proximal social context may affect learners' motivation via satisfying basic psychological needs (Deci & Ryan, 2012; Ryan & Deci, 2017). Similarly, the classroom where students study as well as the teachers with whom students interact are essential for student learning. Jang, Reeve and Deci (2010) found that teachers and their teaching style may influence students' self-determination towards learning. Teachers who support autonomy encourage students to pursue self-determined behavior, which may stimulate students' intrinsic motivation (Jang, Reeve, & Halusic, 2016).

The positive link between TSRs and student motivation has been established, which indicates that positive TSRs help to promote student motivation (e.g. Ma et al., 2018; Opdenakker, Maulana, & den Brok, 2012; Yidirim, 2012). Moreover, TSRs play an important role in stimulating subject-specific motivation as well. For example, Henry and Thorsen (2018) found in a case study that positive relationships with teachers can stimulate second language motivation. In short, TSRs are closely linked with student motivation, but empirical research on the link is far from sufficient, especially in Eastern world.

## 2.3. TSRs and learning outcomes

The positive link between TSRs and learning outcomes has been established (e.g. Hughes, Luo, Kwok, & Loyd, 2008; Hughes, et al., 2012; Katja & Sara, 2016; Lee, Yin & Zhang, 2009; Quin, 2017; Roorda, et al., 2011; Velayutham & Aldridge, 2013). More precisely, warm TSRs can promote positive learning engagement (Brackett, Reyes, Rivers, Elbertson & Salovey, 2011) and further better learning outcomes (Cornelius-White, 2007). Negative TSRs don't nurture students' inner motivational beliefs, and tend to make students less comfortable in the school context (Roorda, et al., 2011; Wubbles & Brekelmans, 2005). A meta-analysis suggested that correlation between both positive and negative TSRs and learning engagement is medium to large ( $0.25 < r < 0.40$ ), whereas correlation between TSRs and academic performance is small to medium ( $0.10 < r < 0.25$ ), and in higher grades the correlation is stronger (Roorda, et al., 2011).

Even though empirical literature has suggested that students who established supportive relationships with teachers are more likely to experience academic success, only a few studies

tested how TSRs are related to students' foreign language learning (e.g. Ma et al., 2018; Wei, Zhou, Barber, & den Brok, 2015). Therefore, there remains a great need to address in what way TSRs are linked with academic performance in the foreign language learning context.

#### **2.4. Motivation and student learning**

Motivation plays an important role in individual behavior and cognition because motivation helps individuals to concentrate attention and energy, especially intrinsic motivation (Deci & Ryan, 2012). Considerable theoretical and empirical studies have established the positive association between motivation and student learning. For example, Cerasoli (2012) with a meta-analysis of 160 studies indicated that intrinsic motivation has medium to strong predictive power on academic performance, and incentive type moderates the predictive validity of intrinsic motivation; Cerasoli, Nicklin and Ford (2014a) discovered that intrinsic motivation predicts more variance in performance quality, while incentives predict more performance quantity. Cerasoli, Nicklin & Ford (2014b) further indicated that intrinsic motivation has medium to strong predictive power for performance ( $\rho = .21-45$ ) and incentive salience affects the predictive validity of intrinsic motivation based on a 40-year meta-analysis. Extrinsic motivation is considered as external regulation (Deci & Ryan, 2012). However, under the influence of surrounding important persons, extrinsic motivation can be internalized as intrinsic motivation (Deci & Ryan, 2012).

Moreover, there is a positive link between subject-specific motivation and learning outcomes. The role of students' motivation in foreign language learning has been considered as a critical issue in foreign language learning over the years. A growing body of research showed the positive link between self-determined motivation and foreign language proficiency (e.g. Klee, 2009; Ma, Du, & Liu, 2018; Malmqvist, 2010; Zhao, 2014). Therefore, it is hypothesized that Chinese students' foreign language learning motivation will be correlated with their foreign language proficiency.

#### **2.5. TSRs, motivation and learning outcomes**

According to SDT, proximal social context and influential persons within the learning context have an important effect on students' motivation, learning behavior and further academic performance (Deci & Ryan, 2012; Ryan & Deci, 2017). As an essential part of classroom context, positive TSRs are assumed to provide a context for students to develop motivational beliefs, which is associated with learning outcomes (Pianta & Stuhlman, 2004).

Despite supportive TSRs benefit learning-related variables (Ma et al., 2018; Yıldırım, 2012), TSRs combined with motivation may be more effective in improving learning outcomes because motivation has been proven to be beneficial for student learning (Cerasoli, 2012; Cerasoli, et al., 2014a; Deci & Ryan, 2012). Moreover, previous studies revealed that student motivation can mediate the association between TSRs and math achievement (Yıldırım, 2012). However, it is not clear whether student motivation can mediate the link between TSRs and student learning in foreign language learning. To address this research gap, the mediation effect of motivation on the link between TSRs and academic performance in foreign language context was tested.

## 2.6. The present study

Even though much research has confirmed that TSRs are closely linked with student motivation and learning outcomes, it is not clear enough how TSRs combined with motivation affect students' foreign language learning, especially in CHC. Therefore, it is significant to extend TSRs research with SDT as a theoretical framework into Chinese EFL context. China inherited traditional Confucian culture, where the authority of teachers is strongly emphasized.

A multiple mediation model was proposed (see Figure 1) in the present study, where students' intrinsic and extrinsic motivation serve as mediation variables in explaining the link between TSRs and learning outcomes. On the one hand, the present model is based on empirical evidence, as TSRs are associated with motivation (e.g. Hughes, 2011; Yildirim, 2012) and motivation is closely associated with learning outcomes (e.g. Cerasoli, 2012; Deci & Ryan, 2012). On the other hand, according to SDT, the social context affects individual motivation, which further influences learning results. The classroom can be regarded as a miniature but a complete society (Hughes, 2011). What teachers do and how they interact with students in the classroom may directly affect student motivation. Therefore, the present conceptual model is in accord with SDT theoretically and gains strong empirical support as well (e.g. Ma et al., 2018; Hughes et al., 2012; Velayutham & Aldridge, 2013; Yıldırım, 2012). Furthermore, SDT considers motivation as a complex construct, ranging from intrinsic to extrinsic (Deci & Ryan, 2012; Ryan & Deci, 2017), which might indicate that mediation effect of intrinsic and extrinsic motivation is different. Thus, our detailed research hypotheses are as follows:

H1: TSRs, motivation and foreign language performance positively correlate with each other.

H2: Motivation mediates the link between TSRs and foreign language performance.

H3: Intrinsic motivation has a significantly greater mediation effect than extrinsic motivation on the link between TSRs and foreign language performance.

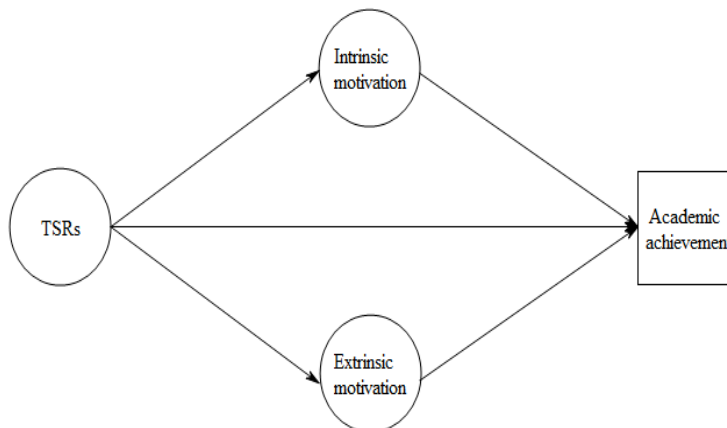


Figure 1. Hypothesized multiple mediation model depicting the association among TSRs, motivational beliefs and academic performance.

### 3. METHODOLOGY

#### 3.1. Participants and procedure

The present data were from a large-scale research named the Regional Education Monitoring Project (REMP) in China, which focused on academic achievement and psychological development of secondary students. A total of 1171 eighth graders were chosen in 2017 with purposive sampling, 583 (49.8%) boys and 588 (50.2%) girls. Before data collection, informed consent was received from headmasters, teachers, parents and students respectively. First, we informed participants of the research purpose and promised that all the data collected would be used only for research and would be kept confidential. Then the participants answered the questionnaire related to English learning and demographic information under the guidance of the researchers. It took them 30 minutes to finish all the scales. Finally, participants were required to complete the English achievement test within one hour.

#### 3.2. Measures

##### 3.2.1. TSRs

TSRs can be measured through teacher and student reports, both of which have been proven to have high construct validity and reliability (e.g. Li, Hughes, Kwok & Hsu, 2011). However, many studies in preschool and junior grades in elementary school used teacher-perceived TSRs because young students may not accurately view TSRs quality (Saft & Pianta, 2001). However, Murray and Greenberg (2006) indicated that TSRs after grade 3 is highly reliable and valid. Besides, large-scale surveys like PISA use student-perceived TSRs. Thus we chose student-perceived TSRs in the present research.

Items from PISA 2012 were adapted to test Chinese eighth graders' interpersonal relationships with their English teachers. First, the current TRRs items were previously validated for Chinese eighth graders (e.g. Ma, et al., 2018). Second, a pilot research study was performed initially in order to test its construct validity. Five items were used to measure TSRs in eighth graders' English class, e.g. "English teacher offers extra help when I need it". Participants were required to record the degree of TSRs on a 5-point Likert-type scale with 1 (*does not match at all*) to 5 (*matches very strongly*). The higher score meant the more supportive TSRs. The reliability (Cronbach's alpha) of the present TSRs scale was .917.

##### 3.2.2. Intrinsic/extrinsic motivation

In order to examine Chinese eighth graders' English learning motivation, items from PISA 2012 were adapted for the EFL context in China. Even though the original PISA items of motivation were related to science, reading, and mathematics, we only changed the context to EFL and no more changes were made. Moreover, a pilot research was carried out in China. Both the intrinsic and extrinsic motivation scales used in the current study were measured on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. There were four items regarding intrinsic motivation in English learning (e.g. "I like reading English materials"), three items regarding extrinsic motivation in English learning

(e.g. "I learn English in order to find a good job in the future"). The higher score indicated the higher motivation. The reliability of intrinsic and extrinsic motivation was .926 and .930 respectively.

### 3.2.3. *English Achievement Test*

English achievement test in the present research was compiled in accord with National English Curriculum Standards in China. It consisted of 56 items, with 100 as a total original score. It was a paper-and-pencil test, which was administrated by teachers of local schools. The reliability (Cronbach's alpha) of the present English achievement test was .956.

### 3.3. **Data analysis**

Considerable research indicated that students' family SES (e.g. Fernald, Marchman & Weisleder, 2013) and gender (e.g. Voyer & Voyer, 2014) influence their learning motivation and academic achievement. Therefore, we estimated the hypothesized model controlling for gender and SES.

In accordance with our research hypotheses, a two-step modeling approach was performed with Mplus7 (Muthén & Muthén, 2012), including measurement model and structural model. The measurement model was calculated to provide evidence for psychometric properties of items within each construct. And the structural model was established to decide whether the relationship between TSRs and EFL performance is mediated by students' motivation. The significance of mediation effect was examined through bootstrap method because it has greater statistical power (Preacher & Hayes, 2008; Williams & MacKinnon, 2008). In the present study, the bootstrap method with 1000 copies of bootstrapped samples was utilized to examine the significance of mediation effects; the indirect effects are statistically significant if empirical 95% confidence intervals didn't have zero (Preacher & Hayes, 2008). Then the magnitude of the two mediators was compared through a contrast test. We applied Multiple Imputation (ML) as the procedure for handling missing data here. In order to evaluate goodness of fit, a range of indicators were referred to, including CFI (Comparative Fit Index), TLI (Tucker Lewis Index) and RMSEA (Root Mean Square Error of Approximation), which were considered as standard reference points (Sun, 2005; Morten, 2012).

## 4. **RESULTS**

### 4.1. **Descriptive results**

Skewness and kurtosis tests indicated that the present data are normally distributed. Tolerance motivation of intrinsic motivation, extrinsic motivation and TSRs (.500, .765, .674) was more than .10, VIF motivation (2.001, 1.308, 1.483) was less than 10, both of which revealed that there is no serious collinearity.

In order to determine to what extent TSRs, intrinsic and extrinsic motivation, and EFL performance are correlated, zero-order latent correlations were performed. Results showed that TSRs, motivation and EFL performance significantly and positively correlate with each other (see Table 1), which confirmed H1.

Table 1. Correlation between variables.

Variables	1	2	3	4	5	6
1.academic achievement	1					
2.intrinsic motivation	0.464**	1				
3.extrinsic motivation	0.326**	0.541**	1			
4. TSRs	0.392**	0.618**	0.452**	1		
5.Gender	0.437**	0.349**	0.206**	0.189**	1	
6. SES	0.023	0.083**	0.059**	0.119**	-0.03	1
M	57.44	2.31	1.88	3.23	1.50	-0.51
SD	25.552	0.817	0.586	0.982	0.500	0.530

Note.  $N = 1171$ ; \*\* $p < .01$ .

#### 4.2. Psychometric properties of items within each construct

First, EFA (Exploratory Factor Analysis) with random half of the samples was performed with Mplus7, which revealed that TSRs, intrinsic and extrinsic motivation measures formed three separate interpretable factors. The loadings on TSRs ranged from .750 to .856, the loadings on intrinsic motivation ranged from .817 to .827, the loadings on extrinsic motivation ranged from .692 to .906. Second, CFA (Confirmatory Factor Analysis) with the rest half of the samples was implemented with Mplus7 to prove the structure of the constructs. According to goodness of fit in CFA (Sun, 2005), the three-factor structure provided a good fit with CFI = .998, TLI = .997, RMSEA = .041 (90% CI: .029- .052),  $\chi^2(51) = 101.013$ . The factor loadings from CFA are presented in Table 2, which shows that factor loadings for the latent variables are significant ( $p < .001$ ), being above 0.86 for TSRs, above 0.96 for intrinsic motivation, and above 0.72 for extrinsic motivation indicators. Therefore, it could be concluded that the present instruments have good construct validity.



Table 2. Exploratory Factor Analysis and Confirmatory Factor Analysis Factor Solutions.

	EXPLORATORY FACTOR ANALYSIS		CONFIRMATORY FACTOR ANALYSIS
	<i>TSRs</i>	<i>Intrinsic motivation</i>	<i>parameter estimates</i>
F1	0.75		0.99(1.00)
F2	0.84		0.99(1.00)
F3	0.85		0.86(0.99)
F4	0.85		0.99(0.99)
F5	0.80		0.86(0.99)
F6		0.82	0.99(1.00)
F7		0.81	0.99(0.99)
F8		0.82	0.99(1.00)
F9		0.82	0.99(0.99)
F10			0.72(1.00)
F11			0.99(1.02)
F12			0.86(1.02)

*Note.* Exploratory factor analysis is based on random 50% of the data. Confirmatory factor analysis is based on remaining half of the random data.

\* Standardized and unstandardized (in parentheses) confirmatory factor analysis estimates. All parameter estimates are significant at  $p < .01$ .

### 4.3. Mediation analysis

As for H2, multiple mediation analysis was performed using SEM (structural equation modelling) in Mplus7 with TSRs as the independent variable, intrinsic and extrinsic motivation as mediators, EFL performance as dependent variable, and SES and gender as controlling variables. Bootstrapping procedures were used to examine whether mediation effect of intrinsic and extrinsic motivation is significant (Preacher & Hayes, 2008). The results are presented in Figure 2.

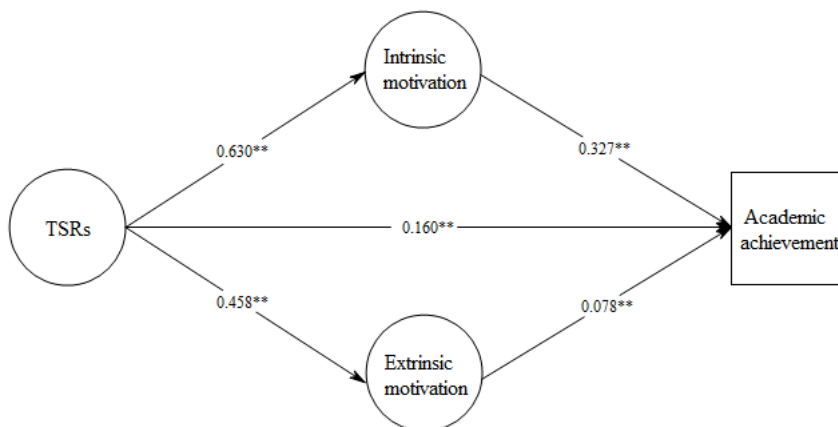


Figure 2. Results of SEM analysis on the multiple mediation model.

The mediation model fitted the data well with CFI = .941, TLI = .924, RMSEA = .064, 90% CI [.091, .095],  $\chi^2(88) = 3847.521, p < .001$ . As shown in Figure 2, the total effect of TSRs on EFL performance was significantly positive with  $c = 0.392, p < 0.01$ . However, after controlling for mediators, the direct effect of TSRs on EFL performance was still significant with  $c' = 0.078, p < 0.01$ . Therefore, there are partial mediation effects between TSRs and EFL performance (Morten, 2012).

In accordance with H2, the mediation effect of intrinsic motivation on the relationship between TSRs and EFL performance was significant after controlling for gender and SES as evidenced by confidence interval 95% CI [5.078, 6.049] without zero (Preacher & Hayes, 2008). Hence, intrinsic motivation was a significant mediator and the indirect effect of intrinsic motivation is 0.206 ( $a_1 * b_1 = 0.206$ ) (see Table 3). As illustrated in Figure 2, TSRs was positively associated with students' intrinsic motivation, which in turn significantly enhanced their EFL performance. The mediating role of extrinsic motivation on the effect of TSRs on EFL performance was also significant after controlling for gender and SES with 95% CI [0.756, 1.299]. Therefore, extrinsic motivation was a significant mediator as well and the indirect effect of extrinsic motivation was 0.036 ( $a_2 * b_2 = 0.036$ ) (see Table 3). As illustrated in Figure 2, TSRs was positively related to extrinsic motivation, which in turn significantly enhanced students' EFL performance.

Table 3. Standardized mediating effects of hypothesized model using bootstrapping method.

PATH	DIRECT EFFECT	INDIRECT EFFECT	TOTAL EFFECT
TSRs→achievement	0.392**	0.242	0.634
TSRs→intrinsic motivation→achievement		0.206**	
TSRs→extrinsic motivation→achievement		0.036**	

Note.  $N = 1171$ . \*\* $p < .01$ .

In accordance with H3, a contrast test of the two specific mediation effects was conducted in Mplus7. Results revealed that there is a significant contrast between the two mediation factors, which suggests that the mediation effect of intrinsic motivation is significantly greater than that of extrinsic motivation on EFL performance with 95% CI (3.936, 5.109).

## 5. DISCUSSION

This study aimed to examine a proposed model of TSRs and academic performance in foreign language learning grounded on SDT. More precisely, this study analyzed how complex relationship between TSRs and learning outcomes is understood in foreign language learning. The multiple mediation model that hypothesized the link between TSRs and foreign language achievement with motivation as a mediation variable was confirmed, which might provide new empirical support for the link between TSRs and academic performance. The major findings include: (1) TSRs, motivation and foreign language performance positively correlate with each other. (2) Motivation mediates the link between TSRs and foreign language performance. (3) Intrinsic motivation has a significantly greater mediation effect than extrinsic motivation on the link between TSRs and foreign language performance.

### 5.1. The effects of TSRs

The present findings suggested that foreign language learners with more supportive relationships with teachers perform better, which confirmed the importance of TSRs for student learning in other subjects (e.g. Hughes, et al., 2008; Telli, den Brok & Cakiroglu, 2010; Yıldırım, 2012; Fadlelmula, Cakiroglu & Sungur, 2015).

The most valuable finding of the current research was the mediation effect of motivation on the association between TSRs and foreign language performance, which might provide empirical evidence from foreign language learning and shed new light concerning the association between TSRs and learning outcomes. The present findings were in line with the mediation effect of motivation on the association between TSRs and learning outcomes in other subjects, such as math (e.g. Yıldırım, 2012) and science (Velayutham & Aldridge, 2013; Wang & Liou, 2017). However, the present findings were not in line with Barile et al. (2012), who discovered that after controlling for related variables, the association between TSRs and academic performance is not statistically significant.

### 5.2. The mediation of motivation between TSRs and academic performance

The mediation analysis indicated that the positive link between TSRs and learning outcomes is partially mediated by motivation in foreign language learning, controlling for SES and gender. On the one hand, the present findings were in line with SDT (Deci & Ryan, 2012; Ryan & Deci, 2017), which suggested that proximal social context and key figures within the context have great influence on individuals' motivation and further learning outcomes. From this point of view, the present research provided additional empirical evidence on the application of SDT in foreign language learning. On the other hand, the

present findings from CHC echoed prior research in western context as well, which indicated that the association between TSRs and academic achievement is partially mediated by students' motivation (e.g. Hughes, et al., 2008; Telli, et al., 2010; Yıldırım, 2012). Moreover, the mediation effect of motivation in the present research was consistent with a case study (Henry & Thorsen, 2018), which showed that positive relationships with teachers can stimulate second language motivation.

SDT explained how motivation can be nurtured by creating a conducive learning environment. More precisely, needs for relatedness can function as a powerful motivational force that favors interpersonal relationships (e.g. Walton, Cohen, Cwir, & Spencer, 2012). With warm relationships with teachers, students are more generally motivated to learn (Wentzel, Battle, Russell, & Looney, 2010) and show greater engagement (Claessens et al., 2017; White, 2013). Importantly, longitudinal research showed that students who experienced a sense of connectedness with teachers could maintain motivation over time (Hamre & Pianta, 2005). The present findings combined intrinsic and extrinsic motivation into TSRs in foreign language learning for the first time, which is expected to provide new proof for the association between TSRs and student learning.

It is noteworthy that intrinsic motivation has a significantly greater mediation effect than extrinsic motivation in the link between TSRs and foreign language performance. On the one hand, the present findings were consistent with previous research in other subjects, such as math (e.g. Yıldırım, 2012). On the other hand, the present findings revealed that TSRs promote more intrinsic motivation instead of extrinsic motivation, which indicated the great change of TSRs in modern China. With the promotion of curriculum reform in China since 2001, great changes took place in modern TSRs in China (Liu & Fang, 2009; Law, 2014; Wei, et al., 2015). Specifically, the people-oriented curriculum reform advocated establishing democratic and equal relationships between teachers and students, which further stimulates more intrinsic motivation (Law, 2014; Liu & Fang, 2009).

### 5.3. Theoretical and educational implications

In the present research, the link between TSRs and foreign language learning is mediated by students' motivation, which further expands SDT (Deci & Ryan, 2012; Ryan & Deci, 2017). Meanwhile, the present findings are consistent with the attachment theory, which suggested that teachers are important in students' mental development (Bowlby, 1980).

The present research generated more specific implications for teacher education. Based on the above findings, TSRs are directly and indirectly linked with students' academic performance. Thus, in order to improve learning outcomes, it is quite necessary to establish supportive interpersonal relationships with teachers. Intervention to improve teachers' supportive behavior has been proven to be effective in promoting students' motivation and engagement (Haakma, Janssen & Minnaert, 2017). Therefore, teacher education with the focus on how to build healthy TSRs is recommended.

Moreover, motivation, especially intrinsic motivation has been proven to function as a promoter of academic performance. Therefore, promoting students' motivational beliefs, especially intrinsic motivation, helps to improve the effects of TSRs on academic performance. According to SDT, autonomy-supportive behaviors help to increase student motivation (Ryan & Deci, 2017), which may offer a reference for teacher behavior.

#### 5.4. Limitations and suggestions

It should be reiterated that there are several limitations in the present study. First, self-report questionnaires with potential response bias might influence the findings even though the foreign language performance was not self-report. Second, even though our hypothesized model was based on a sound theoretical framework and previous empirical results, there are limitations in inferring the direction of the mediation model with cross-sectional data. Further work is needed on the longitudinal association between TSRs and academic performance. Third, the measures of TSRs were limited with only positively worded items, and negatively worded items may be added in future research.

### 6. CONCLUSION

Considerable research on TSRs has focused on identifying reliable indicators of relationship quality. This research examined the link between TSRs and academic performance with motivation as a mediation variable. Even though TSRs have received much attention, this study is one of the first to explore the link between TSRs and academic performance in foreign language learning in CHC, which might provide empirical evidence from Eastern world for the complex relationship between TSRs and learning outcomes.

To our knowledge, the present research is among the first to examine the association between TSRs, motivational beliefs and learning outcomes in foreign language learning with a multiple mediation model. It was found that positive TSRs might stimulate students' motivation and further enhance foreign language performance, and intrinsic motivation has significantly more mediating power than extrinsic motivation. Thus, the present study may make great contribution to the value of TSRs for student learning. However, evidence for the link between TSRs and foreign language performance with motivation as a mediation variable needs more longitudinal studies.

### 7. ACKNOWLEDGEMENT

This work is part of the research funded by humanities and social science research project of Ministry of Education in China (19YJA740038). We also acknowledge the assistance provided by Professor Dennis M. McInerney and Professor Kit-Tai Hau in commenting on earlier drafts of this paper and data analysis.

### 8. REFERENCES

- Barile, J. P., Donohue, D. K., Anthony, E. R., Baker, A. M., Weaver, S. R., & Henrich, C. C. (2012). Teacher-student relationship climate and school outcomes: Implications for educational policy initiatives. *Journal of Youth and Adolescence*, 41(3), 256-267.
- Bowlby, J. (1980). *Attachment and loss: Vol. 3. Loss, sadness, and depression*. New York: Basic Books.

- Brackett, M. A., Reyes, M. R., Rivers, S. E., Elbertson, N. A., & Salovey, P. (2011). Classroom emotional climate, teacher affiliation, and student conduct. *Journal of Classroom Interaction*, 46(1), 27-36.
- Cerasoli, C. P. (2012). Incentives, intrinsic motivation, and performance: A meta-analysis and theoretical reconciliation. *Academy of Management Meeting*, 1, 1-1.
- Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014a). Intrinsic motivation, performance, and the mediating role of mastery goal orientation: A test of self-determination theory. *The Journal of Psychology*, 148(3), 267-286.
- Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014b). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin*, 140(4), 980-1008.
- Claessens, L. C. A., van Tartwijk, J., van der Want, A. C., Pennings, H. J. M., Verloop, N., den Brok, P. J., & Wubbels, T. (2017). Positive teacher-student relationships go beyond the classroom, problematic ones stay inside. *The Journal of Educational Research*, 110(5), 478-493.
- Cornelius-White, J. (2007). Learner-centered teacher-student relationships are effective: A meta-analysis. *Review of Educational Research*, 77(1), 113-143.
- Deci, E. L., & Ryan, R. M. (2012). Motivation, personality, and development within embedded social contexts: An overview of self-determination theory. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 85-107). Oxford, UK: Oxford University Press, Inc.
- Fadlilmula, F. K., Cakiroglu, E., & Sungur, S. (2015). Developing a structural model on the relationship among motivational belief, self-regulated learning strategies, and achievement in mathematics. *International Journal of Science and Math Education*, 13, 1355-1374.
- Fernald, A., Marchman, V. A., & Weisleder, A. (2013). SES differences in language processing skill and vocabulary are evident at 18 months. *Developmental Science*, 16(2), 234-248.
- Haakma, I., Janssen, M., & Minnaert, A. (2017) Intervening to improve teachers' need-supportive behavior using self-determination theory: Its effects on teachers and on the motivation of students with deaf blindness. *International Journal of Disability, Development and Education*, 64(3), 310-327.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development*, 76(5), 949-967.
- Henry, A., & Thorsen, C. (2018). Teacher-student relationships and L2 motivation. *The Modern Language Journal*, 102(1), 218-241.
- Huan, V. S., Quek, G. C. L., Yeo, L. S., Ang, R. P., & Chong, W. H. (2012). How teacher-student relationship influenced student attitude towards teachers and school. *Asia-Pacific Education Researcher*, 21(1), 151-159.
- Hughes, J. N. (2011). Longitudinal effects of teacher and student perceptions of TSR qualities on academic adjustment. *The Elementary School Journal*, 112(1), 38-60.
- Hughes, J. N., Luo, W., Kwok, O., & Loyd, L. (2008). Teacher-student support, effortful engagement, and achievement: A three year longitudinal study. *Journal of Educational Psychology*, 100(1), 1-14.
- Hughes, J. N., Wu, J.Y., Kwok, O. M., Villarreal, V., & Johnson, A. Y. (2012). Indirect effects of child reports of teacher-student relationship on achievement. *Journal of Educational Psychology*, 104(2), 350-365.

- Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588-600.
- Jang, H., Reeve, J., & Halusic, M. (2016). A new autonomy supportive way of teaching that increases conceptual learning: Teaching in students' preferred ways. *The Journal of Experimental Education, 84*(4), 686-701.
- Joe, H. K., Hiver, P., & Al-Hoorie, A. H. (2017). Classroom social climate, self-determined motivation, willingness to communicate, and achievement: A study of structural relationships in instructed second language settings. *Learning and Individual Differences, 53*, 133-144.
- Katja, K., & Sara, T. (2016). Teacher-student relationship and academic achievement: A cross-lagged longitudinal study on three different age groups. *European Journal of Psychology of Education, 29*(3), 409-428.
- Klee, C. A. (2009). Internationalization and foreign languages: The resurgence of interest in language across the curriculum. *Modern Language Journal, 93*(4), 618-621.
- Law, W. W. (2014). Understanding China's curriculum reform for the 21st century. *Journal of Curriculum Studies, 46*(3), 332-360.
- Lee, J. C., Yin, H., & Zhang, Z. (2009). Exploring the influence of the classroom environment on students' motivation and self-regulated learning in Hong Kong. *Asia-Pacific Education Researcher, 18*(2), 219-232.
- Li, Y., Hughes, J. N., Kwok, O., & Hsu, H. (2011). Evidence of convergent and divergent validity of child, teacher, and peer reports of teacher-student support. *Psychological Assessment, 23*(23), 44-63.
- Liu, Y. B., & Fang, Y. P. (2009). Basic education reform in China: Globalization with Chinese characteristics. *Asia Pacific Journal of Education, 29*(4), 407-412.
- Ma, L. H., Du, X. F., Hau, K. T., & Liu, J. (2018). The association between teacher-student relationship and academic achievement in Chinese EFL context: a serial multiple mediation model. *Educational Psychology, 38*(5), 687-707.
- Ma, L. H., Du, X. F., & Liu, J. (2018). Intrinsic and extrinsic value for English learning: Mediating effects of self-efficacy in Chinese EFL context. *Chinese Journal of Applied Linguistics, 41*(2), 150-168.
- Malmqvist, A. (2010). Interests and strategies in foreign language reading: As reading students and students of English texts reading and understanding. *Language Awareness, 19*(1), 69-72.
- Morten, M. (2012). The model size effect in SEM: Inflated goodness-of-fit statistics are due to the size of the covariance matrix. *Structural Equation Model-A Multidisciplinary Journal, 19*(1), 86-89.
- Murray, C., & Greenberg, M. T. (2006). Examining the importance of social relationships and social contexts in the lives of children with high-incidence disabilities. *The Journal of Special Education, 39*, 220-233.
- Muthén, L. K., & Muthén, B. O. (2012). *Mplus user's guide* (7ed). CA: Los Angeles.
- Opdenakker, M. C., Maulana, R., & den Brok, P. (2012). Teacher-student interpersonal relationships and academic motivation within one school year: Developmental changes and linkage. *School Effectiveness and School Improvement, 23*(1), 95-119.
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School Psychology Review, 33*(3), 444-458.
- Preacher, K., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891.

- Quin, D. (2017). Longitudinal and contextual associations between teacher-student relationships and student engagement: A systematic review. *Review of Educational Research, 87*(2), 345-387.
- Roorda, D., Koomen, H., Spilt, J., & Oort, F. (2011). The influence of affective TSRs on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*(4), 493-529.
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publishing.
- Saft, E. W., & Pianta, R. C. (2001). Teachers' perceptions of their relationships with student: Effects of child age, gender, and ethnicity of teachers and children. *School Psychology Quarterly, 16*(2), 125-141.
- Sun, J. (2005). Assessing goodness of fit in confirmatory factor analysis. *Measurement and Evaluation in Counseling and Development, 37*(4), 240-256.
- Telli, S., den Brok, P., & Cakiroglu, J. (2010). The importance of teacher-student interpersonal relationships for Turkish students' attitudes towards science. *Research in Science & Technological Education, 28*(3), 261-276.
- Velayutham, S., & Aldridge, J. M. (2013). Influence of psychosocial classroom environment on students' motivation and self-regulation in science learning: A structural equation modeling approach. *Research in Science Education, 43*(2), 507-527.
- Verschueren, K., & Koomen, H. M. (2012). Teacher-child relationships from an attachment perspective. *Attachment & Human Development, 14*(3), 205-211.
- Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic performance: A meta-analysis. *Psychological Bulletin, 140*(4), 1174-1204.
- Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology, 102*(3), 513-532.
- Wang, C. L., & Liou, P. Y. (2017). Students' motivational beliefs in science learning, school motivational contexts, and science achievement in Taiwan. *International Journal of Science Education, 39*(7), 898-917.
- Wei, M., Zhou, Y., Barber, C., & den Brok, P. (2015). Chinese students' perceptions of teacher-student interpersonal behavior and implications. *System, 55*, 134-144.
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology, 35*(3), 193-202.
- White, K. M. (2013). Associations between teacher-child relationships and children's writing in kindergarten and first grade. *Early Childhood Research Quarterly, 28*(1), 166-176.
- Williams, J., & MacKinnon, D. (2008). Resampling and distribution of the product methods for testing indirect effects in complex models. *Structural Equation Modeling, 15*(1), 23-51.
- Wubbels, T., & Brekelmans, M. (2005). Two decades of research on TSRs in class. *International Journal of Education Research, 43*, 6-24.
- Yıldırım, S. (2012). Teacher support, motivation, learning strategy use and achievement: A multilevel mediation model. *The Journal of Experimental Education, 80*(2), 150-172.
- Zhao, Y. (2014). On how to arouse the students' learning interest in foreign language teaching. *Advances in Intelligent Systems Research, 100*, 308-312.