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Teachers' motivation to participate in continuous professional development: relationship with factors at the personal and school level

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ABSTRACT

Teachers' motivation to participate in professional learning is a significant factor in explaining the effectiveness of continuous professional development programmes. The present study investigated how factors at teachers' personal and school levels are related to their motivation to participate in professional learning activities. A questionnaire was completed by 472 Chinese teachers. Multivariate analysis revealed that several factors at the teacher level (teachers' prior experience with learning activities, teaching experience, self-efficacy and conceptions of learning) and the school level (work and emotional pressure, colleague support and principal leadership) were related to their motivation to participate in professional learning. These findings are discussed in the context of the professional development of Chinese teachers. Implications are generated for teacher education and continuous professional development.

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KEYWORDS
Teacher motivation; professional learning; teacher professional development; individual factors; school factors

1. Introduction

A growing body of literature confirms that teachers' teaching quality is one of the most important predictors of students' learning outcomes (e.g. Gaertner and Brunner 2018; Scherer, Nilsen, and Jansen 2016; Yang et al. 2014). Therefore, organising professional learning activities for in-service teachers might be an appropriate way to improve teaching quality and consequently students' learning outcomes. However, teachers' continuous learning is not self-evident. Teachers' motivation to learn is a basic condition for teacher learning and successful professional development (Shulman and Shulman 2009). Previous studies have demonstrated that teachers' personal experiences and institutional and socio-cultural context can both influence motivation to learn in professional learning activities (Gan, Nang, and Mu 2018; Kwakman 2003; Liu, Yuan, and Zhang 2018). For example, teachers' perceptions of freedom and autonomy of work have been found to be important predictors of teachers' motivation to learn (Gagné and Deci 2005; Gorozidis and Papaioannou 2014). Yet these findings might be different for teachers from a collective society like China, in which people tend to internalise the demands of people they feel attached to (Bao and Lam 2008). Because of the cultural differences between China and

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Western societies (in which most studies on teachers' motivation for professional learning have been carried out), the current study aims to provide to insights into the factors that explain differences in teachers' motivation to participate in professional learning activities in China.

2. Literature review

2.1. Teacher professional development in China

The quality of education depends on the quality of teachers (Hanushek and Rivkin 2006). Various professional development (PD) programmes for teachers' development have therefore been set up to improve and maintain a high standard of teaching. In China, PD programmes are generally offered by the Ministry of Education of the People's Republic of China (Ping et al. 2020). However, many educational professionals have acknowledged that the current PD programmes do not fit teachers' learning preferences or their specific concerns, and are therefore misaligned with teachers' problems in practice, their learning preferences or their specific concerns (Yan 2015; Yuhua and Jiacheng 2013; Zhang and Wong 2018). As a result, teachers may feel less motivated to participate in such programmes. To better stimulate teachers' motivation for learning and to improve their learning performance, new PD programmes need to be designed. In this study, we focus on a specific educational programme, the New Basic Education (NBE), which is designed as a long-term school-based training programme to continuously help teachers learn and refine pedagogical strategies. Academic supervisors from three types of universities (Normal universities under the Ministry of Education of the People's Republic of China, Comprehensive research universities, and Provincial normal universities) go to schools weekly to organise seminars for teachers to disseminate their own professional experiences and beliefs. They also visit class each week to observe teachers' teaching and provide feedback. In addition, they organise monthly workshops to help teachers to implement theories in practices. In Table 1, we provide a summary of the general setup of the NBE programme.

Although NBE is regarded as an effective educational innovation, it is not readily accepted by all teachers in China (Bu and Han 2019), because the new practices addressed in the programme bear little resemblance to either their current teaching approaches or the way they have learned from programmes offered by the government. Consequently, some teachers may be reluctant to participate in professional learning activities.

Table 1. Learning activities organised by NBE.

Activities	Content	Length	Frequency
Lectures	General knowledge of curriculum and pedagogy	3 hours	Weekly
Workshops	Specific skills including: 1: Curriculum and materials design, 2: Teaching and management skills, 3: Stimulating students' interest	3 hours	Weekly
Classroom observations	Observation and evaluation of teachers' teaching, and providing professional recommendations	6 hours	Monthly
Reflective activities	Reflection on a wide range of practical teaching and learning experiences	3 hours	Weekly

2.2. Teacher motivation and learning

Motivation to participate in professional learning can be approached as a multidimensional construct, implying that individuals may have multiple reasons for engaging in a certain behaviour (Deci and Ryan 2002). In the case of participating in learning activities, a teacher may work with teaching experts to improve their teaching quality with pleasure and enjoyment derived from the partnership. This represents an example of intrinsic motivation, which is deemed the most self-determined type of motivation. In contrast, extrinsic motivation refers to behaviours that are exhibited in order to attain material incentives, recognition or rewards, or to avoid punishment. It can be divided into: a) external regulation, where the reasons for participating in professional learning are entirely external from the self; b) introjected regulation, where the reasons for getting involved in professional learning are not fully internalised and teachers merely want to avoid feelings of guilt or shame; and c) identified regulation, where the reason for doing an activity is to pursue fully internalised goals, which is considered a highly self-determined form of extrinsic motivation (Gorozidis and Papaioannou 2014). According to the Self-Determination Theory (SDT) of Deci and Ryan (2000), intrinsic motivation and identified regulation can be understood as autonomous motivation. External regulation and introjected regulation are conceptualised as controlled motivation. Research on teachers' motivation to participate in professional learning activities has systematically revealed that autonomous motivation is strongly related to positive teacher learning outcomes, whereas controlled motivation has been closely associated with negative outcomes (Blais et al. 1993; Deci et al. 2001; Gagné et al. 2010).

2.3. Factors related to teachers' motivation to participate in professional learning activities

Many studies have indicated that teachers' personal and psychological factors and their perceptions of workplace conditions in schools can potentially affect their motivation to participate in professional learning activities (Geijsel et al. 2009; Thoonen et al. 2011). A motivation model to describe the impact of factors on teachers' motivation to participate in learning activities has been developed by McMillan, McConnell, and O'Sullivan (2016). This model provides a comprehensive view of stimulating and inhibiting factors of teachers' motivation for continuous professional development at three levels: personal, school-related and system-wide. In principle, factors at these three levels can either enhance or inhibit both autonomous and controlled forms of teachers' motivation to participate in learning activities.

At the personal level, *intrinsic factors* are included, which mean that teachers would attend a PD programme because of their personal factors. Teachers would express a preference to pursue professional learning activities that they valued for their own personal reasons, and in response to their own personal and/or professional needs. Factors at the personal level are generally considered to be the chief catalysts of intrinsically motivating teachers to participate in PD programmes.

At the school level, *contingent factors* are included, which refer to the workplace conditions that can either support or inhibit teachers' motivation for learning. They include interpersonal relations and school policy. Interpersonal relations refer to the

relationship between teachers and their colleagues and school leaders. School policy refers to general support in school. It is assumed that teachers are more likely to engage in learning activities when they perceive a supportive school culture. Factors at the school level can be positively linked to both autonomous and controlled forms of teacher motivation to participate in learning activities.

At the system level, *tangential factors* are included when the professional learning activities are mandatory, and teachers have no choice whether or not to be involved in the PD programmes. Tangential factors refer to a compulsory effort to force teachers to engage in the professional learning activity, including threats of being punished, scrutinised and evaluated. The difference between tangential factors and contingent factors is that tangential factors are more focused on the system of PD, whereas contingent factors pay more attention to aspects related to the school environment. Generally, tangential factors relate positively to controlled forms of teacher motivation to participate in learning activities.

In this study, we have included factors at the personal and the school level, but not at the system level, as our study is within one particular system, which is described as the professional development programme. Moreover, teachers' participation in professional learning activities is voluntary rather than mandatory, which means that there is no effort to force teachers to participate in professional learning activities.

2.3.1. Factors at the personal level

Based on the model of McMillan, McConnell, and O'Sullivan (2016), four variables were labelled as factors at the personal level: teachers' self-efficacy, conceptions of learning, prior learning experience and teaching experience. Teachers' self-efficacy refers to their beliefs in their ability to make a difference in student learning and to get through even to students who are difficult or unmotivated (Tschannen-Moran, Hoy, and Hoy 1998). Prior learning experience refers to teachers' prior successful experience in professional learning activities.

It has been shown that these four variables exercise a significant influence on teachers' motivation to participate in learning activities. In a study on teachers' participation in professional learning, Geijsel et al. (2009) show that teachers with a strong belief in their own capabilities were more involved in learning activities and showed more enthusiasm and passion for learning, compared to teachers with low self-efficacy. With regard to teachers' conceptions of learning, Bolhuis and Voeten (2004) report that teachers with a belief in intelligence as a fixed quality were more likely to give up when confronted with difficulties when implementing new teaching strategies. Conversely, teachers with a belief in intelligence as a malleable quality were more concerned with developing their teaching competence and persistence, despite difficulties, and were more motivated to participate in PD programmes. Finally, Hildebrandt and Eom (2011) find that inexperienced teachers showed higher needs for achievement and growth compared to experienced teachers. To pursue greater achievements, inexperienced teachers were more motivated to participate in PD programmes.

2.3.2. Factors at the school level

In the model of McMillan, McConnell, and O'Sullivan (2016), two categories of contingent factors were distinguished: interpersonal relations and school policy. In the current study, five variables were labelled as factors at the school level: collegial support, principal leadership, work pressure, emotional pressure and task autonomy. Collegial support refers to helpful social interactions with colleagues in school (Kwakman 2003). Principal leadership refers to vision building through initiating and identifying a vision for the school's future, providing individual support and providing intellectual stimulation (Silins 1994). Collegial support and principal leadership are understood to be part of interpersonal relations.

Work pressure refers to challenging aspects of the job such as workload and the pace of work (Veldhoven and Meijman 1994). Emotional pressure concerns the extent to which teachers perceive their jobs as requiring emotional investment (Veldhoven and Meijman 1994). We also distinguish task autonomy, which refers to joint decision-making or shared influence in decision-making processes by teachers in school (Veldhoven and Meijman 1994). It is assumed that how teachers perceive pressure and autonomy depends on the school policy for building an autonomy-supportive work environment, so we label work pressure, emotional pressure, and task autonomy as the school policy variables.

Ishler, Johnson, and Johnson (1998) demonstrate that teachers' motivation for professional learning was closely related to both the support they received from their colleagues and the leadership they received from their principal. Thoonen et al. (2011) show that task autonomy reinforced the extent to which teachers internalised school values as their personal goals, and subsequently affected their motivation to engage in continuous professional development. In a study on teachers' workplaces, Rosenholtz (1989) indicates that work pressure is generally regarded as a job challenge. He measures teachers' work pressure, and reports that the more challenges teachers reported in their workplace conditions, the more prone they are to maintain their present methods of instructions and to avoid mistakes, and the more reluctant they were to participate in continuous professional development.

2.3.3. This study

The present study provides a comprehensive overview of factors at the personal level (i.e. prior learning experience, teaching experience, self-efficacy and conceptions of learning) and factors at the school level (i.e. principal leadership, task autonomy, collegial support, work pressure and emotional pressure) that are related to teachers' motivation for professional learning in the Chinese context (see Figure 1). The following research question is addressed:

'How are factors at the personal and school levels related to teachers' motivation to participate in professional learning?'

3. Method

3.1. Procedure and participants

In this study, 514 teachers from 13 primary and middle schools in Shanghai (China) were randomly selected. The first author visited each school and sent the questionnaire directly

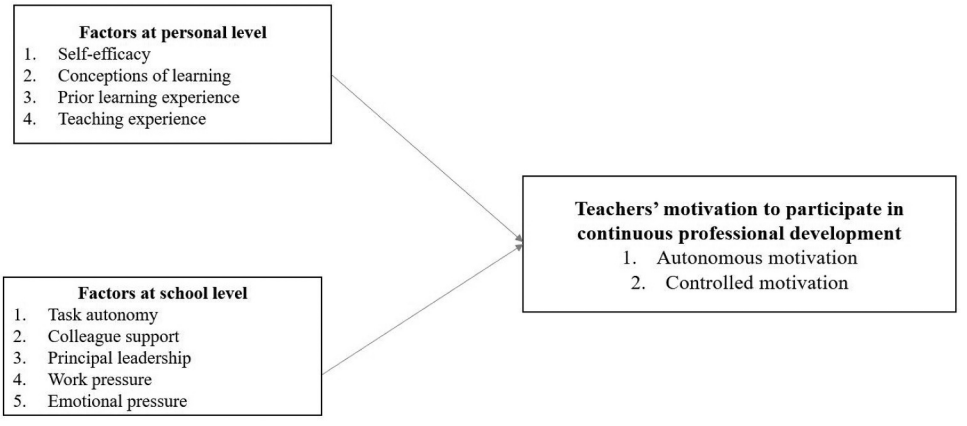

Figure 1. Research model of teachers' motivation to participate in continuous professional development.

to teachers. They were given enough time (30 minutes) to complete the questionnaire individually at their offices. In total, 42 teachers did not fully complete the questionnaire. The questionnaires of these teachers were removed, resulting in a sample of 472 teachers who were included in the analysis. For a few missing items, imputation of the sample mean was used to reduce the number of missing values.

Participation in the study is strictly voluntary, and teachers completed the questionnaire anonymously. Ethics approval for this study was granted by the authors' institution. Upon recruitment, school leaders authorised the study within schools, and teachers were asked to sign an informed consent regarding their participation in the study. Teachers' ages ranged from 22 to 64 years, and they taught a wide array of subjects. Participants' information is displayed in Table 2. These demographic variables were also included in the model to explore how they influence teachers' motivation to learn.

3.2. Measures

The questionnaire comprised different components from questionnaires used in studies conducted in Western countries. The questionnaire was translated into Chinese, with translation and back-translation of the instrument. Upon completion of the translation and back-translation procedure, minor discrepancies were discussed thoroughly, and subsequently revised. Next, the questionnaire was tested in a pilot study with 30 teachers from primary schools in Shanghai. This pilot study resulted in minor changes designed to provide more suitable wording.

3.2.1. Teacher motivation

Teachers' motivation to participate in professional training was assessed using the Teacher Motivation Inventory (Lam, Cheng, and Choy 2010). The instrument consisted of four subscales (external regulation, introjected regulation, identified regulation and intrinsic motivation) with five items per scale, constituting a total of 20 items. The items were presented randomly. Teachers were asked to indicate their feelings of motivation on

Table 2. Participant information (N = 472).

	Participants	N
Gender	Female	425
	Male	47
Subject	Chinese	162
	English	113
	Mathematics	102
	Art	23
	Music	20
	Others	52
Teaching experience	0–3 years	55
	4–6 years	70
	7–18 years	148
	19–30 years	169
	31-plus years	29
Educational background	Secondary vocational shool diploma	2
	Senior college degree	34
	Bachelor's degree	359
	Master's degree	74
Prior educational reform experience	Yes	229
	No	242
Time involved in NBE	0	9
	1–3 months	22
	4–6 months	14
	7–11 months	14
	12–23 months	39
	24–35 months	44
	36–47 months	65
	48–59 months	33
	60–71 months	34
	72 -plus months	197

a five-point scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree). The 20 motivation items were subjected to an exploratory principal component factor analysis to determine the underlying factors. Three components out of 16 items were extracted, explaining 44%, 15% and 7.7% of the variance in motivation scores, respectively. The first component included intrinsic motivation and identified regulation. According to the perspective of self-determination theory (Deci and Ryan 2002), the combination of intrinsic motivation and identified regulation is designated as autonomous motivation, hence the first component was labelled 'autonomous motivation'. This means that teachers engage in a learning activity for its inherent enjoyment and pleasure, or they pursue a meaningful outcome from the activity. The second component was labelled 'external regulation', which implies that the reason why the teacher engages in activities is to attain material incentives, recognition or rewards, or to avoid punishment. The third component was labelled 'introjected regulation', with items indicating the introjected regulation of teachers' motivation. This means that the reasons why teachers participate in activities are not well-internalised, and their involvement is to avoid feelings of guilt or shame. The Cronbach's alphas of autonomous motivation, external regulation and introjected regulation were 0.94, 0.83 and 0.62, respectively, showing satisfactory reliabilities.

3.2.2. Teachers' teaching experience

We divided teaching experience into five broad categories (Huberman 1989), namely Career Entry Stage (0–3 years of teaching experience), Stabilisation Stage (4–6 years of

teaching experience), Experimentation-Diversification Stage (7–18 years of teaching experience), Serenity Stage (19–30 years of teaching experience) and Disengagement Stage (31 or more years of teaching experience).

3.2.3. Self-efficacy

Teachers' self-efficacy was assessed using the Teachers' Sense of Efficacy Scale (TSES, 12 items) developed by Tschannen-Moran and Hoy (2001), which included three subscales: 1) instructional strategies, 2) classroom management and 3) student engagement. The 12 items were subjected to an exploratory principal component factor analysis with oblimin rotation to determine the underlying factors. The final factor analysis consisted of two components of 11 items, which explained 55.3% and 9.6% of the variance in self-efficacy scores, respectively. The first component was labelled 'efficacy in teaching' (7 items) and comprised items from the original scale of instructional strategies and student engagement. The second component was labelled 'efficacy in classroom management' (4 items) and comprised items from the original scale of classroom management. The Cronbach's alphas of the two factors were 0 .88 and 0.88, respectively, showing satisfying reliabilities for both scales.

3.2.4. Teacher conceptions of learning

In order to capture teacher conceptions' of student learning as well as of their own learning, 46 items were derived from the teacher conception questionnaire, including five subscales: External versus Internal Regulation, Reproductive versus Constructive Knowledge, Individual versus Social Learning, Fixed versus Dynamic Ability and Intolerance of Uncertainty versus Tolerance of Uncertainty (Bolhuis and Voeten 2004). Teachers stated the extent to which they agreed with each learning conception to themselves and to their students. A four-point scale was used. Reliability analysis of teacher conception of student learning revealed that only Reproductive versus Constructive Knowledge ($\alpha = 0.64$), Individual versus Social Learning ($\alpha = 0.59$) and Fixed versus Dynamic Ability ($\alpha = 0.67$) were acceptable. For teachers' conceptions of their own learning, only Fixed versus Dynamic Ability ($\alpha = 0.67$) showed reliabilities for both scales. These four scales were labelled 'conception of student knowledge', 'conception of student teamwork', 'conception of student ability' and 'conception of their own ability', and are included in subsequent analyses.

3.2.5. Principal leadership

In this study, principal leadership was measured by six items from a questionnaire on transformational leadership (Geijsel et al. 2009). The Cronbach's alpha for principal leadership was 0.91, indicating satisfactory reliability.

3.2.6. Task autonomy and colleague support

Task autonomy and colleague support were measured by the Dutch Social Psychological Work Demands questionnaire (Veldhoven and Meijman 1994). This comprises 10 items, answered on a 4-point Likert-type scale, from 1 = 'almost never' to 4 = 'almost always'. Cronbach's alphas for task autonomy and social support from colleagues were 0.62 and 0.68 respectively, indicating satisfactory reliability.

Table 3. Descriptive statistics for the dependent and independent variables.

	Number of items	Mean	SD	α	N
Teacher motivation					
Autonomous motivation	10	3.88	0.63	0.94	472
External regulation	3	3.52	0.89	0.84	472
Introjected regulation	3	2.94	0.76	0.62	472
Factors at personal level					
Efficacy in teaching	7	6.35	1.08	0.88	472
Efficacy in classroom management	4	6.91	1.29	0.88	472
Conception of student knowledge	4	3.48	0.54	0.64	472
Conception of student teamwork learning	4	3.26	0.54	0.59	472
Conception of student ability	5	3.07	0.55	0.67	472
Conception of their own ability	4	3.32	0.55	0.67	472
Factors at school level					
Principal leadership	6	3.07	0.65	0.91	472
Emotional pressure	4	2.26	0.64	0.81	472
Work pressure	3	3.24	0.62	0.73	472
Colleague support	4	2.80	0.52	0.68	472
Task autonomy	4	2.21	0.58	0.62	472

3.2.7. Work and emotional pressure

For this study, work and emotional pressure were assessed using the Dutch Social Psychological Work Demands questionnaire (Veldhoven and Meijman 1994). This comprises 9 items, answered on a 4-point Likert-type scale, from 1 = 'almost never' to 4 = 'almost always'. The Cronbach's alphas for emotional pressure and work pressure were 0.81 and 0.73, respectively, indicating a moderate to high reliability score. Table 3 provides descriptive statistics for the dependent and independent variables. We also provide the correlations of dependent variables and independent variables in the Appendix A.

3.3. Analysis

As data are nested (teachers within the school), multilevel variance components analyses were carried out for each motivation scale. For both scales, we found no significant variance at the school level (with α = 0.05). This means that the analyses were performed at the teacher level only. Multivariate analyses of variance (MANOVA) were carried out using SPSS (version 22), with factors at the personal and school levels as independent variables and the three motivation scales as dependent variables. These analyses were first performed for each cluster of teacher personal level and school level separately. In the final analysis, only variables with significant effects on the previous steps were included. The results of the final analyses are presented in the results section.

4. Results

In Table 4, the variables are included that appear to be significantly related to at least one of the motivational variables. In this study, we reported the *F* value, *p* value and proportion explained variance (η^2) of the model, which are the most commonly reported for MANOVA (Keselman et al. 1998)

Table 4. The results of the multivariate analyses of significant teacher characteristics, personal and perceived working conditions, and motivation.

	Total motivation	Autonomous motivation	External regulation	Introjected regulation
Factors at personal level				
Prior experience	Wilks'λ(3,458) = 0.982; P = 0.040; η^2 = 0.018	F(1,460) = 4.039; P = 0.045; η^2 = 0.009		
Teaching experience	Wilks'λ(3,458) = 0.972; P = 0.005; η^2 = 0.028	F(1,460) = 7.280; P = 0.007; η^2 = 0.016		
Efficacy in teaching	Wilks'λ(3,458) = 0.964; P = 0.001; η^2 = 0.036	F(1,460) = 11.367; P = 0.001; η^2 = 0.024		F(1,460) = 7.387; P = 0.007; η^2 = 0.016
Conception of students' ability	Wilks'λ(3,458) = 0.965; P = 0.001; η^2 = 0.035	F(1,460) = 11.192; P = 0.001; η^2 = 0.024	F(1,460) = 8.540; P = 0.004; η^2 = 0.018	
Conception of their own ability	Wilks'λ(3,458) = 0.979; P = 0.020; η^2 = 0.021	F(1,460) = 9.707; P = 0.002; η^2 = 0.021		
Factors at school level				
Emotional pressure	Wilks'λ(3,458) = 0.969; P = 0.002; η^2 = 0.031	F(1,460) = 4.917; P = 0.027; η^2 = 0.011	F(1,460) = 9.658; P = 0.002; η^2 = 0.021	
Principal leadership	Wilks'λ(3,458) = 0.878; P < 0.001; η^2 = 0.122	F(1,460) = 58.493; P < 0.001; η^2 = 0.113	F(1,460) = 12.384; P < 0.001; η^2 = 0.026	

4.1. Factors at the personal level

A significant relationship is found between prior experience and autonomous motivation (F(1,460) = 4.039; p = 0.045; η^2 = 0.009). Teachers with prior experience (M = 3.95, SD = 0.625) are more autonomously motivated to participate in a university-school partnership than teachers with no prior experience (M = 3.81, SD = 0.642). We also find that teaching experience is significantly associated with teachers' autonomous motivation (F(1,460) = 7.280; p = 0.007; η^2 = 0.016), implying that the more teaching experience teachers have, the less autonomously motivated they are to participate in professional learning activities.

We also find a significant positive relationship between teacher efficacy in teaching and teacher autonomous motivation (F(1,460) = 11.367; p = 0.001; η2 = 0.024). This indicates that the greater teachers' self-efficacy in teaching, the more autonomously motivated they are to participate in professional learning activities. We also find a weak positive relationship with introjected regulation (F(1,460) = 7.387; p = 0.007; η^2 = 0.016), indicating that the more self-efficacy teachers reported, the higher the introjected regulation for professional learning they reported. Another significant relationship is found between teachers' conceptions of learning and teacher motivation. In particular, conception of students' ability demonstrates a significant positive relationship with teacher autonomous motivation (F(1,460) = 11.192; p = 0.001; η^2 = 0.024) and a negative relationship with external regulation (F(1,460) = 8.540; p = 0.004; η^2 = 0.018). These results mean that teachers who conceived of learning as dynamic are more autonomously motivated and perceived less external regulation in their motivation to participate in professional learning.

4.2. Factors at the school level

Emotional pressure appears to have a significant negative relationship with autonomous motivation ($F(1,460) = 4.917$; $p = 0.027$; $\eta^2 = 0.011$) and a significant positive relationship with external regulation ($F(1,460) = 9.658$; $p = 0.002$; $\eta^2 = 0.021$). This means that the more emotional pressure teachers reported, the less autonomously and the more externally motivated they are to participate in professional learning. Principal leadership also appears to demonstrate a significant positive relationship with autonomous motivation ($F(1,460) = 58.493$; $p < .001$; $\eta^2 = 0.113$) and a negative relationship with external regulation ($F(1,460) = 12.384$; $p < 0.001$; $\eta^2 = 0.026$), indicating a significant impact of principal leadership on teachers' motivation to participate in the university-school partnership. Therefore, the more leadership the principal demonstrated, the more teachers are autonomously motivated to participate in professional learning.

5. Discussion

5.1. Factors at the personal level and motivation

As regards teachers' experience, we find that the effects of teachers' teaching experience and of prior learning experience on teachers' motivation are opposed. Teachers with more teaching experience are less in favour of interaction and of learning with supervisors from universities about their subject domain. However, if a teacher has a prior successful learning experience, he or she may still maintain a high level of autonomous motivation to learn. Richter (2013) finds early-career teachers to be more 'eager' for PD, and that as teaching experience increases, the levels of participation decreases. However, based on our results, if experienced teachers are provided with a successful learning experience when they first participate in a PD programme, they still have the potential to be stimulated to learn. Considering that increase of teaching experience is inevitable, our result emphasises the importance of the teachers' learning experience for their motivation to participate in follow-up activities.

Teachers' self-efficacy in teaching is positively related to their autonomous motivation for learning. This means that the higher teachers' confidence in teaching, the more motivated they are to participate in professional learning; however, a positive relationship between teachers' self-efficacy and introjected regulation is also found. This means that teachers with more self-efficacy participate in PD more to avoid feelings of guilt or maintain self-worth. Apparently, self-efficacious teachers are more motivated for professional learning than other teachers, no matter the source of their motivation. However, our results further reveal that the reasons why high efficacy teachers participate in activities may not have been well internalised. This indicates that they may implement these educational innovations and actions without fully accepting them as their own. According to SDT theory (Deci and Ryan 1985), such behaviour is perceived as external and has been closely associated with negative learning outcomes, such as less enthusiasm and persistence for learning. Our results show the crucial role of teachers' introjected regulation in teacher learning, which is less firmly established in previous studies (Guo et al. 2011; Suchodoletz et al. 2018)

In line with previous research (Bolhuis and Voeten 2004), our study confirmes the important influence that teachers' conceptions about learning ability exert on their

motivation for professional learning. Our findings indicate that teachers' conceptions of students' learning ability have a positive relationship with teachers' autonomous motivation and a negative relationship with external regulation. However, teachers' conception of their own ability is only found to be positively related to autonomous motivation. Given that beliefs will directly affect how teachers utilise their pedagogical knowledge in the classroom and shape their reactions to professional learning (Roehrig and Kruse 2005), these findings may prove valuable to policymakers seeking to motivate teachers to participate in professional learning.

5.2. Factors at the school level and motivation

First, principal leadership appears to be related not only to teachers' autonomous motivation (positively), but also to external regulation (negatively). This means that principals with more leadership are more likely to encourage teachers to learn autonomously, and to avoid inducing teachers to participate in this activity because of material incentives or rewards or to avoid punishment. Research on SDT (Deci and Ryan 1985) has indicated that autonomous motivation could significantly enhance the effectiveness of teachers' learning experiences in PD programmes. This finding therefore confirms the important role of principal leadership in teachers' motivation for professional learning. Actually, compared with principals in Western schools, Chinese principals might have more influence on schoolteachers. Dou, Devos, and Valcke (2017), in their study on Chinese principal leadership, indicate that Chinese principals' leadership tremendously influences every aspect of school teaching through the school climate. The positive relationship with teachers' autonomous motivation for learning found in the current study suggests a supportive role of the school principal instead of a coercive one, as suggested by the negative relationship with controlled motivation.

Second, emotional pressure appears to have a negative relationship with teachers' autonomous motivation for learning and a positive one with external regulation. This means that the more teachers perceived emotional pressure, the less autonomously motivated they are to participate in professional learning and the more their motivation is felt as externally regulated. Previous studies on teacher stress indicate that teachers under great pressure are more vulnerable to burnout (Herman et al. 2020). Our study indicates that stressed teachers may continue to participate in PD, but that their motivation may become more external, and the influence of PD on teachers' teaching also become less effective. Although work pressure and emotional pressure are closely related, we do not find any significant and negative relationship between work pressure and teacher motivation. This contradicts previous research that finds a significant relationship between work pressure and teachers' motivation to participate in professional learning (Kwakman 2003). Apparently, for Chinese school teachers, emotional pressure might be a more salient factor than work pressure in determining the motivation for professional learning. This finding of the salience of emotional pressure on teachers' motivation for learning complements previous studies, since most studies focus on teachers' work pressure and professional learning rather than on emotional pressure (Jansen in de Wal et al. 2020).

5.3. Insignificant factors for Chinese teachers' motivation

Our results also indicate that colleague support and task autonomy were unrelated to Chinese teachers' motivation to participate in professional learning. This finding contradicts the findings of some studies in the Western context claiming that help from colleagues and task autonomy have a significant positive influence on teachers' motivation to participate in professional learning (Kwakman 2003; Thoonen et al. 2011). Supovitz, Sirinides, and May (2010) also identify a considerable positive effect of support from colleagues on teachers' motivation to participate in professional learning. This discrepancy may be attributed to a cultural difference, as compared to their counterparts from Western countries, teachers from China are more deeply influenced by Eastern culture. Indeed, Kennedy (2002) has indicated that Chinese teachers' apparent reluctance to ask for help when they encounter problems with teaching is due to a fear of 'losing face' (mien-tzu – having status in front of others). People's awareness of 'face' is extremely important, as Chinese teachers are high-context collectivists, and it is considered selfish and shameful to cause someone to 'lose face' in Chinese culture, in Western culture, on the other hand, loss of face is not as crucial to one's self-achievement, as people are inclined to fight for their own needs rather than feel concerned about social acceptance (Nhung 2014).

Differences between Chinese and Western culture might also explain the lack of a significant relationship between task autonomy and teachers' motivation for learning. According to Bochner (1994), in collective societies such as China, the individual is more absorbed into and attached to the group, and people are encouraged to do what is best for the community rather than for the individual. A collectivistic culture is not only related to teachers' behaviour, but also forms the cornerstone of school policies. This might mean that schools do not encourage task autonomy among teachers, and Chinese teachers may be obligated to sacrifice their freedom in performing a task for the greater performance of the school.

5.4. Limitations of the study

Three limitations should be carefully considered. Only schools from Shanghai have been invited to participate in our study. Shanghai is one of the largest cities and the economical centre of China, and teachers from Shanghai are generally well-trained and have many opportunities to participate in professional learning activities. Teachers from rural areas are generally less well-trained and often lack sufficient opportunities to learn new teaching strategies. This gap in learning opportunities between teachers from rural areas and those from large cities may prevent us from generalising our findings to other regions in China.

Second, because of the Chinese context, we should be careful about generalising to the teacher development situation in Western countries. Yet we assume that our conclusions could be generalised to other Asian countries with similar cultures of teaching and learning, such as Japan and Korea. In addition, the findings of the current study also generate hypotheses about factors related to teachers' motivation to participate in professional learning activities that can be tested in contexts outside of East Asia.

Third, the current study is based on quantitative questionnaire data only. Given that the school is a complex environment and various psychological and organisational factors

affect teachers' motivation to participate in professional learning, future studies could use qualitative methodologies (e.g. in-depth face-to-face interviews) as well to develop a better understanding of these factors' influence on teachers' motivation for professional learning. In addition, moderator analyses could also be applied to examine how various groups of teachers (clustered on the basis of their characteristics, such as self-efficacy and teaching experience) differ in the relationship between school level factors and motivation to participate in learning activities.

6. Conclusion

The current study has presented a comprehensive account of factors at the personal and school levels that are significantly related to teachers' motivation to participate in professional learning activities. Teachers' prior experience, teaching experience, self-efficacy, beliefs about learning, emotional pressure and principal leadership were all related to teachers' motivation for professional learning. Two non-significant relationships with colleague support and task autonomy were attributed to the characteristics of the Chinese educational context. Based on the findings several implications can be formulated to help stimulate teachers' motivation to learn.

First, our results indicate that, compared to inexperienced teachers, experienced teachers are less motivated to participate in learning activities. This might mean that PD activities should be designed to be more challenging for experienced teachers. For example, professional learning activities for more experienced teachers could be focused on using innovative pedagogies in the classroom, and providing guidance and workshops for beginning teachers. In addition, to stimulate teachers' motivation to learn, more attention should probably be paid to teachers' prior learning experiences. Professional learning activities could be carefully designed on the basis of teachers' needs in order to create individual learning pathways, which might be more motivating and more effective than the one-size-fits-all approach.

The second implication of our findings relates to the importance of the level of self-efficacy for teachers' motivation to learn. In order to be effective for teachers with low levels of self-efficacy, PD programmes could be designed with scaffolds that are reduced over time. This could reduce feelings of pressure and enhance all teachers' confidence in their ability to change their teaching and adapt to educational innovations.

A third implication of our findings relates to the important role played by principal leadership in teachers' motivation to participate in professional learning. School principals can reinforce teachers' commitment to the school and the teaching profession in general by identifying a school vision of teaching and learning, which also strengthens teachers' attitudes towards their own learning. As a result, teachers may feel more willing to internalise organisational goals as their personal goals, which in turn might increase their autonomous motivation to participate in professional learning activities.

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Appendix

The correlations of dependent variables and independent variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Autonomous motivation	-														
2. External regulation	−.341**	-													
3. Introjected regulation	.094*	.276**	-												
4. Efficacy in teaching	.325**	−.089	.096*	-											
5. Efficacy in classroom management	.185**	−.036	.034	.706**	-										
6. Conception of student knowledge	.212**	−.066	−.054	.135**	.099*	-									
7. Conception of student teamwork	.342**	−.213**	.000	.286**	.207**	.490**	-								
8. Conception of student ability	.415**	−.271**	−.045	.304**	.189**	.404**	.515**	-							
9. Conception of their own ability	.378**	−.195**	−.008	.279**	.202**	.467**	.526**	.565**	-						
10. Principal leadership	.457**	−.231**	−.010	.333**	.229**	.194**	.250**	.302**	.239**	-					
11. Emotional pressure	−.258**	.273**	.105*	.082	.043	.135**	.236**	.322**	.237**	.131**	-				
12. Task autonomy	.141**	−.023	.094*	.239**	.196**	−.053	−.023	.104*	.036	.143**	.127**	-			
13. Colleague support	.107*	−.011	.100*	.362**	.362**	.077	.059	.118*	.145**	.180**	−.240**	.214**	-		
14. Work pressure	−.109*	.187**	.028	.706**	−.092*	.007	.081	.111*	.051	−.011	.461**	.058	−.352**	-	
15. Teaching experience	−.005	.032	−.057	.198**	.204**	.077	.094*	.090	.030	.096*	.031	.094*	−.082	−.054	-

*$p < 0.05$, **$p < 0.01$.