Moderating effect of work stress on the relationship between workload and professional identity among in-service teachers

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Abstract

This study examined the moderating effect of work stress on the association between teachers' workload and professional identity. We hypothesized that teachers who report low workload with low work stress would present high professional identity, teachers who report high workload with high work stress would present low professional identity, and teachers with high work stress would present low professional identity. The model was tested using PROCESS macro in SPSS based on a large sample of 18,227 teachers from rural areas in five provinces of China. Results indicated that teachers' work stress negatively affected the relationship between workload and professional identity. Contributions and implications for practice are discussed.

Keywords Workload · Work stress · Teachers' professional identity · In-service teacher

Introduction

Teacher shortages in K-12 schools have been a significant concern around the world (Garcia & Weiss, 2019; Ingersoll et al., 2018; UNESCO, 2016), which are usually associated with economic and educational costs (Carver-Thomas & Darling-Hammond, 2017; Sutcher et al., 2016) as well as negative effects on student achievement (Kraft & Papay, 2014; Ladd & Sorensen, 2017; Sutcher et al., 2016) estimated that, in the U.S., the demand for new teachers exceeded the teacher supply in 2013, and this gap will become larger and larger. Indeed, researchers showed that during the 2018–2019 school year, the U.S. national teacher shortage exceeded 120,000 (Wiggan et al., 2020). Similar situations exist in the U.K. (White et al., 2006), Australia (Buchanan et al., 2013), and China (Li et al., 2019). Teacher shortage was caused by fewer high school graduates choosing to pursue related majors and fewer college students enrolling in teacher preparation programs (Aragon, 2016). Meanwhile, teacher shortage is often characterized by attrition, retention, and turnover (Garcia & Weiss, 2019; Ingersoll, 2002), which were found to be significantly related to teachers' professional identity (Hong, 2010; Kremer & Hofman, 1981; Shuhua & Guangwen, 2012). Moreover, researchers further indicated that such phenomena were especially remarkable in high-poverty and rural areas (Ingersoll, 2002; Wiggan et al., 2020), which usually are the areas that needed the education most to increase social mobility to diminish the effect of origin status on destination status (Hout, 1988).

For the past two decades, teachers' professional identity (P.I.) has been viewed as an independent research area, and more researchers have joined this area (Beauchamp & Thomas, 2009; Beijaard et al., 2004; Meo & Tarabini, 2020), which might be because of its positive influence on the development of the school, student, and themselves. Teachers' P.I. was found to be related to the positive development of the school through the decrease in teachers' burnout (Fisherman, 2015; Gaziel, 1995) and job turnover (Hong, 2010; Moore & Hofman, 1988). In a longitudinal mixed-methods study, the important role of teachers' P.I.

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in positive student outcomes (i.e., educational attainments) was emphasized (Sammons et al., 2007). Moreover, it was found that teachers' P.I. has a significant role in improving teaching quality by increasing education innovation (Nixon, 1996), helping teachers deal with educational changes (Beijaard et al., 2004), and providing opportunities to cooperate with their colleagues (Mitchell, 1997). Furthermore, it is also significantly related to teachers' personal and professional development (Freese, 2006; Olsen, 2008).

Teachers' P.I. refers to teachers' perceptions of the things that are important to their professional and daily lives, which were based on their own experiences and backgrounds and the opinions of others regarding what teachers should know and do (Tickle, 2000). Therefore, the process of forming teachers' P.I. can be affected by various factors, such as types of teacher education (Schepens et al., 2009), self-image (Sugrue, 1997; Volkmann & Anderson, 1998), self-reflection (Antonek et al., 1997), and self-concept (Deng et al., 2018; Lim, 2011). However, Beijaard et al. (2004) indicated that most studies on teachers' P.I. were "emphasized on the personal side" (p.125), thus suggesting future studies should pay more attention to the aspect of teachers' contexts in the process of P.I. formation. Similarly, Sammons et al. (2007) indicated that teachers' P.I. could be affected by "the management of the school, its ethos/culture, staff morale, and opportunities for continuing professional development" (p.691). Furthermore, as Scherr & Johnson (2019) reviewed, teachers' P.I. is a situated identity influenced by the intersection of many factors, such as personal history, self-perception, professional knowledge, and experiences in the school. Therefore, school and work-related factors played a significant role in how teachers (re)shaped their P.I. and how teachers, as a group, formed their identities toward their careers.

Interestingly, few studies explored how school- or work-related factors influence teachers' P.I. Despite the complicated and diverse contexts in school, several work-related factors were found to be significantly related to teachers' P.I., such as workload (Sammons et al., 2007) and work stress (Dugas et al., 2020). Even though studies gradually recognized the magnitude of work-related factors in forming teachers' P.I. (Dugas et al., 2020; Sammons et al., 2007), existing studies mainly concentrated on teachers' self-perceptions or reflections. For example, in a longitudinal research project in England, Sammons et al. (2007) indicated that primary and secondary teachers reported their workload was negatively related to their perceived professional lives. Similarly, in a U.S. university tenure-track faculties study, Dugas et al. (2020) found that professors reported that the substantial and pervasive levels of workload and stress negatively influenced their academic identity. Location of the school also matters when dealing

with teachers' P.I. Teachers in rural areas were often surrounded by high poverty, limited teaching resources, severe working conditions, and the most deprived students, which might be associated with a heavy workload and disproportionate compensation (Tang, 2019). Therefore, teachers in such conditions need stronger P.I. to help them overcome the obstacles in daily working activities than those in more economically developed areas.

Considering the vital role of teachers' P.I. and its relationship with their workload and work-related stress as well as the inequality distribution of educational resources in rural areas, in the current study, we explored the moderating role of work stress in the relationship between teachers' workload and P.I. in a large sample of rural in-service teachers in China.

Workload and Professional Identity

Individuals' experience within the organization is important for their professional identity. Social identity theory emphasized that organizations (i.e., schools) contribute to individuals' sense of self (Haslam, 2004). Working time as one of the most common and direct experiences individuals got in the organization is correlated with their identity. Individuals tend to devote more time to their role when they have a strong identity (Burke & Reitzes, 1991), which is especially true for teachers (Stryker & Burke. 2000). Just as strong P.I. can lead to longer working hours, longer working hours might also influence the teachers' P.I. because "individuals are likely to spend more time on those activities that validate and reinforce their salient social identities the most" (Ng & Feldman, 2008, p.856). Thus, individuals' workload might have a significant role in their professional identity. Different professions have different job duties and activities. Fiksenbaum et al. (2010) proposed that time was one of the two ways to clarify individuals' workload. Even though teachers' workload usually involves various activities, such as general teaching, pastoral, and administrative duties, working time is more frequently used in empirical studies because of its conventional principles and clear measures (Angrave & Charlwood, 2015).

Teachers' workload and professional identity change with social movements, demonstrating their unique professional characteristics. On the one hand, teachers' workload tends to be a symbol to represent their competitiveness. "The Global Education Reform Movement (GERM)" advocated by the OECD, the World Bank, and many countries across the globe emphasizes and imposes a business model on education (Sahlberg, 2011), which implied that teachers need to work harder and work longer to be more competitive. Such social movement dramatically influences teachers' daily

activities and workload. Indeed, such a new way of working can critically affect teachers on the management of teaching, such as increased workload, increased accountability, and curriculum changes, which, in turn, impact their professional identity (Skinners et al., 2021). Grounded on Apple's (198 (Apple 1986)) conceptual framework of intensification thesis, Ballet and Kelchtermans(2009) indicated that teachers' professional identity was at stake because of their intensification experience in their daily work. On the other hand, teaching requires teachers to continually pour time and energy to learn new teaching theories and practices, reflect on teaching, and participate in professional networks, among other things (ten Dam & Blom, 2006). These practices usually require extra time and energy to fulfill, but it is the effective path to potentially enhancing their P.I. However, as the workload increases, such activities are often significantly sacrificed.

Thus, the present study employed teachers' working time per day to represent workload and proposed that teachers' workload negatively affects their P.I.

Moderating role of work stress

Teachers' workload may lead to various work-related stresses, and teaching is often referred to as one of the "high stress" professions (Travers & Cooper, 1996; Dunham & Varma, 1998; Kyriacou, 2000). Among all the sources of teachers' work stress, studies emphasized that workload was one of the major drivers and contributors to work stress (Ilongo, 2014; Kyriacou & Sutcliffe, 1978; Lu et al., 2012). That, in turn, results in many negative impacts, such as job burnout (Kyriacou, 1987; Yu et al., 2015), low job satisfaction (Dogan et al., 2018; Trivellas et al., 2013), exhaustion and frustration (Kyriacou & Sutcliffe, 1978), and reduced commitment (Manthei et al., 1996). Thus, work stress can negatively impact the organization's development (e.g., organization productivity and culture) and personal and professional development (e.g., perceptions of teaching and P.I.). Even though few studies have examined the relationship between teachers' work stress and their P.I., some studies did find a negative relationship between P.I. and emotional burnout (Avanzi et al., 2018; Fisherman, 2015; Lloyd & King, 2001), which is usually caused by the stresses individuals faced in their work (McManus et al., 2002).

Sammons et al. (2007) found that teachers tended to feel that their workload makes them tired and stressed. Such feelings of stress might increase over the years since researchers indicated that teachers' workload increased (Easthope & Easthope, 2000), negatively affecting their emotions (Samad et al., 2010). Specifically, work overload may cause significant emotional exhaustion (Stewart, 2015) that might

negatively affect the formation of P.I. Indeed, researchers indicated that "the emotion brought to the context and that generated by the context will affect this identity" (Beauchamp & Thomas, 2009, p. 184). Similarly, other researchers found that negative emotions strongly influenced teachers' P.I. (Timoštšuk & Ugaste, 2012). Hence, teachers' P.I. can be (re)shaped based on their emotional experiences. It is plausible that work stress could negatively affect teachers' P.I. because of its negative emotional consequences.

Because of the interrelationship between workload, work stress, and P.I., we proposed that the relationship between workload and P.I. was moderated by work stress. We propose moderation rather than mediation effect of work stress because work stress is a subjective evaluation. A high workload may not necessarily lead to high stress, depending on how individuals perceive the work stress and their personal characteristics. For instance, workaholic was positively related to work stress, which was positively related to long working hours per week (Aziz & Cunningham, 2008). Whether teachers perceive workload as stressful depends on their characteristics. If teachers enjoy teaching, a high workload may not be perceived as stressful. In contrast, teachers may feel stressed if they face other issues (e.g., poor peer relations or dislike of teaching), even if there is a regular workload. In particular, we hypothesized that teachers who report a low workload with low work stress will present high P.I., and teachers who indicate a high workload with high work stress will present low P.I. The current study focused on in-service teachers' P.I. since most previous studies were conducted on novice or student teachers' P.I. (Antonek et al., 1997; Izadinia, 2013; Schepens et al., 2009). More importantly, however, teachers' P.I. usually forms based on endogenous feelings (Tickle, 2000) and is an active, dynamic, and continuously changing structure (Cattonar et al., 2007), and it is continually reshaped throughout their career (Richardson & Watt, 2018; Trent, 2010). Moreover, in-service teachers' P.I. was also related to commitment (Ball & Goodson, 1985; Day et al., 2005), pedagogy and teaching (Agee, 2004; Korthagen, 2004), education policy environment (Robinson & McMillan, 2006), and attitudes toward educational changes (Beijaard et al., 2004) and children (Beckett & Gough, 2004; ten Dam & Blom, 2006).

In summary, the purpose of the current study was to explore the moderation effect of in-service teachers' work stress on the relationship between their workload and P.I. in rural areas. The study may contribute to the teaching literature in the following ways. First, few studies have explored the significant role of work-related factors on teachers' P.I. (Beijaard et al., 2004). By analyzing the most work-related factors (e.g., workload and work stress), the present study sought to identify how work-related factors might affect

Table 1 Total responses and percentages for each demographic variable (N = 18,227)

Variables	N (*Percentage*)
Gender	
Male	4,945 (*27.1%*)
Female	13,282 (*72.9%*)
Age	
18 to 34	5,708 (*31.3%*)
35 to 50	10,703 (*58.7%*)
51 to 69	616 (*9.6%*)
Missing	71 (*0.4%*)
Marriage Status	
Single	2,272 (*12.5%*)
Married	15,204 (*83.4%*)
Divorced	589 (*3.2%*)
Widowed	80 (*0.4%*)
Unidentified	82 (*0.4%*)
Education	
Middle school or lower	939 (5.1%)
Middle vocational education and training	6,459 (35.4%)
High school	912 (5.0%)
Higher vocational education and training	4,561 (25.0%)
Undergraduate	5,102 (28.0%)
Master's	260 (1.4%)
Teacher Certificate	
Yes	17,811 (*97.7%*)
No	416 (2.3%)
School Level	
Kindergarten	1,267 (*7.0%*)
Elementary school	9,773 (*53.6%*)
Middle school	4,773 (*26.2%*)
High school	1,253 (*6.9%*)
Other	1,161 (*6.4%*)
Years of Teaching	
Less than 10	5,785 (*32.6%*)
10 to 19	4,454 (*23.5%*)
20 to 29	5,318 (*28.5%*)
30 to 39	1,223 (*7.0%*)
More than 40	56 (*0.2%*)
Missing	1,391 (*8.2%*)
School location	
City	3,242 (*17.8%*)
Rural area	15,045 (*82.2%*)

teachers' P.I. Second, few quantitative studies were conducted regarding teacher P.I. (Lentillon-Kaestner et al., 2018). Using a large sample, in the present study, we conducted an analysis focusing on the moderation role of work stress on the association between teachers' workload and P.I. Third, most previous studies focused on student teachers' P.I. (Izadinia, 2013; Lim, 2011). As P.I. is a continuously changing structure (Cattonar et al., 2007), the findings from the current study will provide evidence regarding how work-related factors affect in-service teachers' P.I., which

can help practitioners and policymakers identify potential ways to prevent a decrease in teachers' P.I.

Methods

Participants

The study participants included 18,227 kindergarten, elementary, middle, and high school teachers in rural areas from five provinces in China (e.g., Guizhou, Henan, Inner Mongolia, Qinghai, and Tibet). The participants were recruited online via the research network of the university. Of those, 72.9% (13,282) were female, aligned with Tang's (2019) finding that teaching was a female-dominated profession in rural China. The mean age of the participants was 39 years old (*SD* = 8.25), ranging from 18 to 61 years old. Most teachers (83.4%) were married, and 35.4% had middle vocational education and training. Nearly all the teachers (97.7%) had a national standard teaching certificate, and 32.6% had been teaching for less than 10 years. Among them, 53.6% worked in elementary school. 82.2% of schools were in rural areas, such as counties, townships, and villages (Table 1).

Measures

No existing scales were found in existing literature for assessing teachers' P.I. and work stress in China. Therefore, all questionnaires were developed and modified by the research team. Based on Li et al. (2016) book, the items for each questionnaire were selected and modified. After initial items were selected and modified, local education experts were invited to evaluate the appropriateness of each selected item based on their professional experience. Factor analysis and internal reliability were performed for each scale to examine its internal structure.

Teachers' workload. The current study employed working time to represent teachers ' workload based on previous researchers' suggestions (Angrave & Charlwood, 2015; Fiksenbaum et al., 2010). The questionnaire asked teachers to indicate their total working hours per day. In the current study, align with the previous discussion on teacher working hours (Spurgeon et al., 1997), we defined teachers' workload as low if they worked less than 9 hours per day, medium if they worked between 9 to 11 hours per day, and high if they worked more than 11 hours per day.

Teachers' P.I. Teachers' P.I. was measured with 10 items based on empirical work on social identity and organizational identity (e.g., Li et al., 2016; Xue, Chen et al., 2013). However, the exploratory and confirmatory factor analysis results indicated that one factor with five items fit the data well. Thus, we used this five-item scale to assess P.I.

Teachers were asked to indicate their responses on a 5-point Likert scale (*1 = strongly disagree* to *5 = strongly agree*). Examples of items are "Teachers' work is challenging and interesting" and "Teachers' work creates opportunities to learn new things." The Cronbach's alpha was 0.78, indicating good reliability.

Teachers' work stress. A total of 10 items were selected and modified to measure teachers' work stress based on studies of work stress, organizational stress, and academic stress (e.g., Kahn et al., 1964; Li et al., 2016; Lu et al., 1997). The confirmatory factor analysis results showed that all 10 items fit the data well and were used to measure teachers' work stress. Teachers were asked to indicate if they feel stressed in certain situations using a 5-point Likert scale (*1 = not at all stressed* to *5 = very stressed*). Example situations were "Schools' evaluation of teachers" and "Students' academic performance." Cronbach's alpha was .88, suggesting good reliability.

Control variables

We controlled for several variables that might have affected the proposed relations but were not directly interested in the present study. First, we controlled for participants' age and gender because they might affect teachers' workload (e.g., Tang, 2019). Further, we controlled school levels (i.e., kindergarten, elementary, middle, and high school) because teachers' working hours may vary in different school levels (e.g., Avanzi et al., 2018).

Procedure

The current study was part of a large project on teacher professional development in Chinese rural areas, which lasted two years. All questionnaires were distributed and collected online via the research network of the university. Before administering the questionnaire, research teams visited 10 cities and counties in five provinces in China, conducting meetings with local government officials, district leaders, superintendents, principals, and teacher representatives. A QR code and a URL link were generated for the survey and were distributed to individual teachers. Before participants began the survey, informed consent was obtained, and no incentives were offered. The study was approved by the university institutional review board.

Data Analysis

The mean, standard deviation, and correlations among study variables were analyzed. The moderation effect of work stress (*M*) on the association of workload (*X*) and teachers'

Table 2 Demographic characteristics of the respondents

	1	2	3
1. Teachers' professional identity	-		
2. Work stress	− 0.05***	-	
3. Working hours per day	− 0.10***	0.13***	-
M	3.83	3.64	9.25
SD	0.66	0.64	1.93
α	0.78	0.88	-

Note. **$P < .005$. *** $P < .001$ (2-tailed)

P.I. (*Y*) was examined using the PROCESS macro by Hayes (2017; model 1).

Results

Descriptive statistics

As shown in Table 2, teachers showed relatively high levels of teachers' P.I. and work stress (*M* = 3.83, and *M* = 3.64, respectively). The average working hours was 9.25 per day (*SD* = 1.93). Even though the correlation coefficients were low, teachers' P.I. was negatively and significantly related to work stress and working hours (*r* = -.05, and *r* = − .10, *ps* = 0.000, respectively), and the correlation between work stress and working hours (*r* = .13, *p* = .000) was positive and significant.

Main and moderation effect

As shown in Table 3, the results indicated that the moderation effect of work stress on the relationship between working hours and P.I. was significant $F(9, 18,146) = 69.935$, $p < .001$, $R^2 = 0.034$, although the R^2 was small. Regarding the main effect, working hours has a significant and negative effect on teachers' P.I. $\beta = − 0.027$, $t(18,156) = -10.018$, $p < .001$. However, work stress has no significant effect on teachers' P.I. $\beta = 0.014$, $t(18,156) = -1.772$, $p < .001$. Regarding the interaction effect, the interaction of working hours and stress has a significant and negative effect on teachers' P.I. $\beta = − 0.015$, $t(18,156) = -3.352$, $p < .001$.

The results also showed that the additional interaction of working hours and work stress was a significant change to the mode $F(1, 18,146) = 11.237$, $p < .001$, R^2 change = 0.0006. Moreover, the simple slope analysis showed that work stress had a significant moderation effect on teachers' P.I. in teachers with a low ($b = − 0.02$, t = -4.58, $p < .01$; 95% CI: $− 0.026 − − 0.01$), medium ($b = − 0.03$, $t = -10.02$, $p < .01$; 95% CI: $− 0.03 − − 0.02$) and high level levels of work stress ($b = − 0.04$, t = -9.68, $p < .01$; 95% CI: $− 0.04 − − 0.03$). Therefore, for all three levels of stress, teachers P.I. decreases when their working hours increase.

Table 3 Analysis of moderation effects on teachers' professional identity

	Professional identity			
	b	*SE*	*t*	ΔR^2
Dependent Variables				
Working hours	−0.027***	0.032	-10.018	
Work stress	0.014	0.008	-1.772	
Working hours * Work stress	−0.015***	0.004	-3.352	0.0006
Control Variables				
Age	−0.0002	0.0006	−0.400	
Gender	0.033**	0.011	3.036	
School level 1(kindergarten)	0.338***	0.026	12.976	
School level 2 (elementary)	0.081***	0.020	4.131	
School level 3 (middle)	−0.055**	0.021	-2.684	
School level 4 (high)	−0.013	0.026	−0.525	

Note. $N = 18,156$ ** $p < .01$, *** $p < .001$; [a] Gender coded: 0 = male and 1 = female
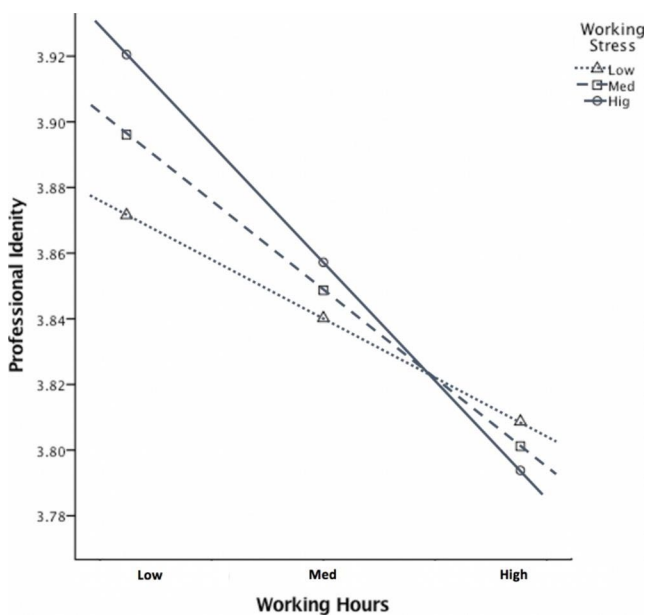
Fig. 1 *The moderating effect of work stress on the association between working hours and professional Identity*

Figure 1 shows that when teachers' working hours are at low and medium levels, teachers who presented higher work stress reported a higher level of P.I. It seems that teachers' working stress can increase their P.I. when teachers have a low and medium level of working hours. However, when teachers' working hours are high, teachers with higher work stress show a lower P.I. level.

Discussion

Building on previous studies and suggestions (Dugas et al., 2020; Beijaard et al., 2004; Sammons et al., 2007), the current study explored the moderation effect of work stress on the association between teachers' working hours and their P.I. After controlling for age, gender, and grade levels, our findings revealed that the more hours teachers worked, the lower their P.I. In addition, we found that all levels of teachers' work stress negatively affect the relationship between working hours and P.I. However, it should be noticed that the observed relationship was weak but significant ($b = -0.015$, $p < .001$). The small effects found in this study were not surprising given the very large sample size of our study, which is consistent with the small effect size found in national and international data (e.g., PISA) with a large sample size (e.g., Jerrim et al., 2019).

Our findings partially overlapped with previous studies. In particular, we found that teachers' workload negatively affects P.I., which evidences Ng and Feldman's (2008) idea that individuals might devote more time to the activities that validate and reinforce their social identities. While for teaching, this could be true if teachers worked low or average working hours. The negative effect of teachers' working hours on P.I. also goes beyond previous research findings (Greenhaus et al., 2012), which only indicated the negative correlation between these two variables, by providing empirical evidence on the negative directional effect. More importantly, we found the negative moderation effect of teachers' work stress on the association between their workload and P.I. However, the coefficient was low. One reason for the low correlation among variables might be due to the large sample size used in the study, which might be similar to the true value of correlation in the population. Moreover, we found that work stress might increase teachers' P.I. when teachers working hours are at low and medium levels. Specifically, when teachers have low or average working hours, those who reported higher work stress also reported higher P.I. Such results provided additional information on previous findings that stress might pose threat to the development of professional identity (Edwards et al., 2010; Hensel and Stoelting-Gettelfinger, 2011; Maor & Hemi, 2021). One possible explanation underlying such mechanisms might be that teachers' work stress can mobilize working energy, which might further contribute to the formation of their P.I. when they worked below the average working hours. Indeed, a mild level of stress improved their performance, and higher work stress can only motivate teachers with low working hours (Welford, 1965). It might also be because the stress that is produced at low or average working hours might become a representation of the challenge of their work. Teachers' P.I. will be reinforced when they overcome such challenges. Researchers found that challenge-related stress positively predicated work loyalty and negatively predicated job withdrawal, job search, and intention to quit (Boswell et al., 2004). Because the direct effect of working stress on teachers' P.I. was insignificant, teachers might be

able to manage or tolerate the stress within average working hours regardless of stress level. However, this effect was mitigated when teachers' working hours increased. When teachers working hours are at a high level, teachers with lower stress presented a higher level of P.I. These results might indicate a threshold (11.01 working hours per day in the current study) on the working hours and stress, which almost reach the high working hours for teachers.

Contributions and implications

This study contributed to the literature by providing empirical evidence on the important role of work-related factors (e.g., workload and work stress) in the in-service teachers' P.I. Previous studies have provided strong evidence on how self, self-perception, and self-concept influenced the formation of teacher identity (e.g., Antonek et al., 1997; Lim, 2011; Sugrue, 1997), but limited attention was given to how contexts might affect this process (Beijaard et al., 2004). Considering the significant amount of time teachers spent at their workplace, the present study used teacher workload and stress to represent the context factors and found that teachers' workload significantly and negatively affected how they view their profession. This relationship was moderated by work stress. However, school leaders and policymakers need to pay attention to the fact that, based on the results from the current study, teachers only tend to have a higher level of P.I. when their working hours are at or below the medium level. Therefore, when applying interventions or policies to enhance teachers' P.I., school leaders and policymakers need to consider the balance between work stress and workload. This means that principals and superintendents need to properly assess this balance to increase their teachers' P.I., further decreasing teachers' turnover (Hong, 2010). For example, school leaders or policymakers might want to consider decreasing teachers' workload by minimizing non-teaching workload (e.g., administrative duties) since non-teaching duties are more likely to generate stress (OECD, 2019). More importantly, they should provide activities that can contribute to the development of teachers' P.I., such as personalized professional development programs and social movements that emphasized the value of teaching.

Moreover, previous researchers have expressed concern about the lack of quantitative research on teachers' P.I. (Lentillon-Kaestner et al., 2018). Using a large sample in the present study, we employed a quantitative method to explore the moderating effects of work stress as a work-related factors contributing to in-service rural teachers' P.I. Meanwhile, as teachers' P.I. is considered dynamic and unstable (Cattonar et al., 2007), we focused on the in-service

teachers' P.I. instead of pre-service teachers' P.I. (Izadinia, 2013; Lim, 2011).

Last, we collected our data mainly from schools in rural areas with limited teaching resources and funding. Rural teachers need to develop a stronger P.I. to stay in the teaching profession and provide quality teaching than those in cities. The present study results provide a more holistic picture of teachers' P.I. by studying this underrepresented population.

Limitations and suggestions for future research

The current research also has some limitations that may offer future research directions. Even though our findings showed the moderating effect of work stress on relationships between workload and teachers' P.I., our study was cross-sectional so that future studies might test our model in a longitudinal design. Moreover, in the current study, we only tested two of the most common work-related factors (i.e., workload and work stress). Future studies might want to include more work-related factors, such as peer support and organizational culture. In addition, future researchers might want to examine how specific types of work-related stress (e.g., teaching and administrative work) influenced P.I. Furthermore, the correlation coefficients obtained in the current study were low, although this phenomenon may reflect the true relationships among the variables in the population. Future research might want to further examine the findings using the large sample size. Last, the findings were based on a population in China, which might not be able to generalize to other countries. However, It will be interesting to compare results among different cultural contexts.

Conclusion

The current study examined the moderating effect of teachers' work stress on the relationship between teachers' workload and professional identity and found the significant moderation effect of teachers' work stress on such a relationship. Moreover, our findings suggested that only low or medium levels of workload and high-stress levels can promote teachers' P.I. in the specific context of rural schools.

Data sharing Statement

The datasets analyzed in the current study are available on the Open Science Framework (osf.io), which can be found in the link below:

Declarations

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