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Successful teacher: Personality and other correlates

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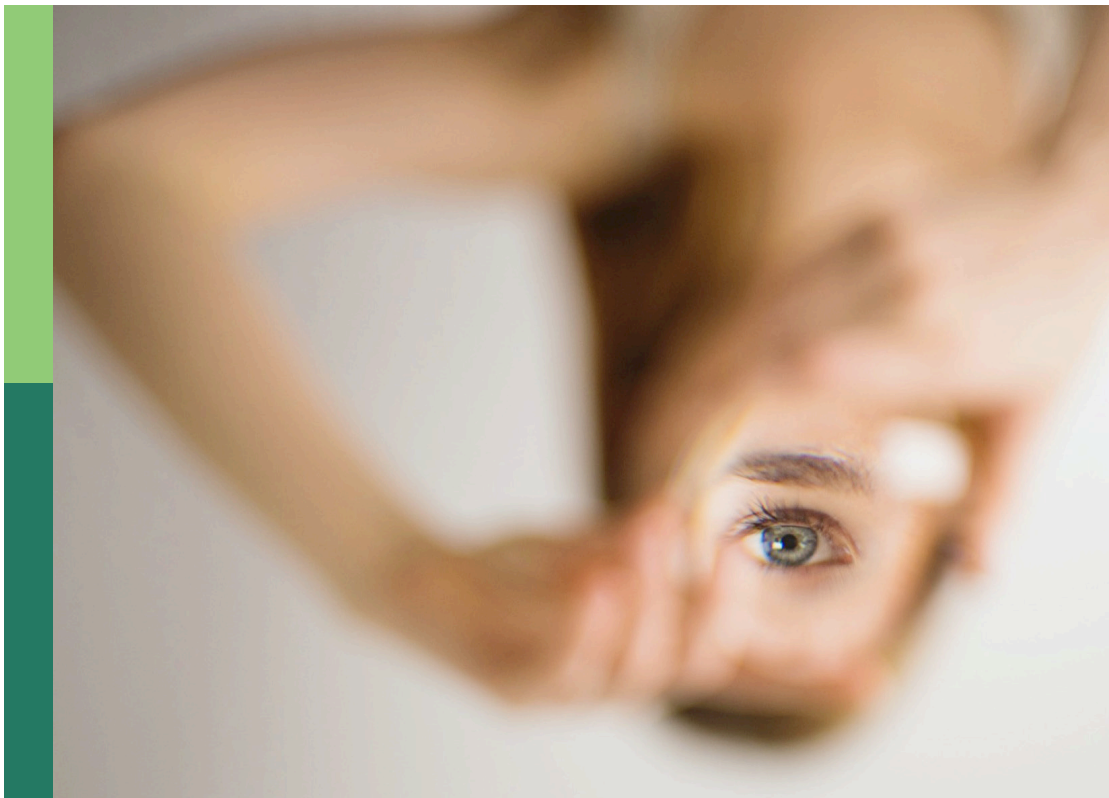

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Successful teacher: Personality and other correlates

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Editorial: Successful teacher: personality and other correlates

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Editorial on the Research Topic
Successful teacher: personality and other correlates

Successful teachers are "builders" of destinies, not just people who come to school to share information with students; they are the ones who are a strong influence on the student's development. They know that have chosen this career for the crucial role of the teaching profession in society, whether society recognizes it or not! But what does such a teacher look like? We believe that above all—beyond the subject they teach—a successful teacher makes students believe in themselves, love school, and have deep values that will channel students' destinies in the future. The personality of the teacher greatly influences the students and can have great consequences many years after the end of school.

The importance of this issue started around the 1920s (e.g., Brubacher, 1921) to outline the characteristics of successful and less successful teachers, with more than 1,000 articles published in this field until nowadays (e.g., Burić et al., 2023; Zhi and Wang, 2023). Thus, this Research Topic offered a professional space for new findings on how teachers' personalities can influence teaching, learning, and classroom climate. The relevance of the concept is still high and 14 authors from six countries and three different continents (Asia, Europe, and South America) have contributed with their articles to build a valuable Research Topic.

Thus, Zhu et al. investigated the mediating effect of substitute teachers' psychological capital on the relationship between organizational commitment and turnover intention. The authors worked with 384 substitute teachers and their results revealed that psychological capital partially mediates the organizational commitment and turnover intention relationship. These results highlighted the importance of teachers' high organizational commitment, to become, more confident in planning their steps and more motivated in achieving goals, even when they are facing challenging experiences. Commitment in the educational area seems to be an essential pillar, strongly related to teachers' burnout or turnover. In this sense, Chen et al. investigated the relationship between social support and professional commitment and the mediating effect of teachers' subjective wellbeing (satisfaction with life and positive affect). Their study was conducted with 778 kindergarten teachers. The results showed that social support does not predict professional commitment directly but indirectly through the mediation of positive affect and life satisfaction (components of subjective wellbeing). The authors highlighted that their model could be a possible way to increase teachers' love for their job and dedication. The motivation behind wellbeing and teachers' retention remains a subject open to investigation. Thus, Shi et al. explored how teachers' motivation related to work engagement, workplace wellbeing, and retention intention. The authors conducted their research working with 1,199

kindergarten teachers. The results revealed three motivation profiles ("low value-high cost," "moderate all," and "high-value-low cost"), with teachers with lower education levels being more motivated at work and teachers with higher education levels being more inclined to turnover their profession.

Next, Macovei et al. examined to what extent personality traits, role ambiguity, and relational competence predict teacher subjective wellbeing. The authors worked with 105 university teachers and the results revealed that three of the personality traits, emotionality, extraversion, and conscientiousness were significant predictors of teaching efficacy, school connectedness, and teacher subjective wellbeing. Instead, honesty-humility, agreeableness, and openness to experience were not. These findings highlighted the necessity for universities to have more information about how teachers perceive their roles as university teachers. Based on this, different trainings could be applied to reduce role ambiguity. Next, Yue et al. focused on the influence of teachers' personality characteristics which contribute to the development of occupational anxiety caused by China's "double reduction" policy. Based on the grounded theory, the authors conducted in-depth interviews with 45 in-service teachers. Results indicated that teachers had different understandings of the "double reduction" policy and the level of anxiety was influenced mainly by their subjective understanding of the educational reform, not by external factors. The role of internal and external factors influencing teachers' behaviors was also, approached by Markelj et al. who examined the dynamics of teacher burnout, over the school year, with individual and environmental factors in the school context. The authors worked with 718 teachers, in three waves. The results revealed that teachers experience stress, especially in work not directly related to teaching and that time and energy demands of working with students, teacher characteristics, and classroom management were common significant predictors for teacher burnout, at all three time points.

School context was also taken into consideration by Zhao and Jin who explored the cross-cultural differences (American, Finnish, and Chinese teachers) in teacher perceptions of school climate. Latent class analysis was conducted for each country and gender and teaching experience were used as predictors. The results identified four groups/classes labeled positive participation and teacher-student (TS) relationships, positive discipline and TS relationships, moderate, and low participation. These findings emphasized the necessity to consider cultural differences when drawing on the experiences of other countries. Next, Rad et al. investigated Integrative-Qualitative Intentional Behavior by applying the theory of planned behavior. The research was conducted with 300 preschool teachers. The results revealed that two dimensions namely perceived power/control beliefs and behavioral intention were identified as being the most important ones, in adopting qualitative and inclusive behaviors.

A special category of teachers is English as a foreign language teachers (EFL teachers) and Yan et al. investigated the relationship between EFL teachers' beliefs about classroom-based assessment (CBA) and their assessment practices. They conducted their investigation with 195 Chinese primary school EFL teachers. Their findings presented that teachers' beliefs about the CBA process (planning assessment, collecting learning evidence, making professional judgments, and providing appropriate feedback) were significant predictors for their assessment practices. The authors also emphasized the positive impact of CBA on developing learners' autonomy. Next, Liu et al. focused on EFL teachers' emotions and investigated the relationship between teachers' growth mindset, teaching enjoyment, work engagement, and teacher grit. The research was conducted with 486 Chinese EFL teachers. Their findings, applying structural equation modeling (SEM), revealed that teaching enjoyment, teacher grit, and growth mindset directly predicted EFL teachers' work engagement. Additionally, teaching enjoyment and growth mindset predict indirectly teacher's work engagement through the mediation of teacher grit.

Research in the field of EFL teacher work engagement continues with the study of Heng and Chu, who analyzed other predictors, thus expanding knowledge. The authors investigated the role of self-efficacy, reflection, and resilience as predictors of teachers' work engagement. They worked with 512 EFL teachers and the results showed that teacher work engagement was directly predicted by analyzed variables such as teacher self-efficacy, reflection, and resilience. Teacher reflection also had an indirect impact on work engagement through teacher resilience. Furthermore, teacher reflection influenced work engagement indirectly mediated by resilience and similarly, self-efficacy influenced work engagement indirectly through teacher reflection and resilience. These results could have significant effects on teaching staff, teacher training programs, school administrators, and policymakers, for future EFL teacher instruction and their retention in the EFL educational system and preventing burnout. The EFL teachers' self-efficacy was next investigated by Chen who added the loving pedagogy disposition construct, both variables being considered as protective factors against teachers' burnout. The author worked with 428 English teachers from China and after applying the structural model, he identified the negative effect of loving pedagogy on teacher burnout and the mediating role of teacher self-efficacy. The important role of teacher self-efficacy was highlighted also by Zeng et al. in their meta-analysis by introducing a more complex concept such as information technology integration self-efficacy to be analyzed correlated with technology pedagogical and content knowledge. The authors included in their meta-analysis 28 independent samples, from 2007 to 2022, with a total of 7,777 subjects, and the results indicated that teachers' information technology integration self-efficacy and TPACK have a moderate positive correlation. The relationship between these two variables was moderated by the subjects' career stages, but not by gender, disciplines, teaching stages, and measurement tools. This result highlights the crucial role of integration technology information in the field of teacher education.

The research carried out within the present Research Topic reflects the multitude and complexity of the correlates associated with the teacher's personality. These results could help teachers to become more efficient and flexible in the educational process, aspects that can contribute to their wellbeing. Also, researchers in the educational field could find new Research Topics.

Author contributions

ES: Conceptualization, Writing—original draft. TSD: Supervision, Writing—review and editing. JF: Supervision, Writing—review and editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

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The impact of organizational commitment on turnover intention of substitute teachers in public primary schools: Taking psychological capital as a mediator

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This research aimed to explore the impact of organizational commitment on turnover intention of substitute teachers in public primary schools in Xuzhou, and applied psychological capital as a mediator variable to establish a research model. A questionnaire was conducted with 400 substitute teachers using convenience sampling. The results show that organizational commitment has a negative yet significant effect on turnover intention. It also shows positive impact on psychological capital. Furthermore, psychological capital is shown to negatively impact turnover intention, while having a mediating effect between organizational commitment and turnover intention.

KEYWORDS

substitute teachers, organizational commitment, turnover intention, psychological capital, public primary schools

Introduction

The COVID-19 pandemic has blurred the lines between personal work and personal life, resulting in a more unequal work-life balance for teachers (Schmidt-Crawford et al., 2021), and more pressure on teachers (Crook, 2020). On the other hand, statistics and facts have shown that substitute teachers are under great pressure (Vorell, 2011; Gershenson, 2012), and their vocational satisfaction is lower than that of non-substitute teachers (Topchyan and Woehler, 2021), which will potentially cause substitute teachers to have higher turnover intention (Kurniawaty et al., 2019). Teacher Mobility has a serious impact on the quality of school teaching, on students' academic developments, and even on the school community (Räsänen et al., 2020). Thus, the key factors and influencing mechanisms that affect the turnover intention of substitute teachers must be explored.

One of the basic doctrines of social exchange theory is that relationships develop over time into trusting, loyal, and mutual commitments (Cropanzano and Mitchell, 2005). Social exchange theory claims that employees are connected by a network made of ties whose

strength influences their intention to keep or leave their jobs (Holtom et al., 2008). Researchers believe that studying turnover intentions may benefit an organization more than actual turnover (Islam et al., 2016). There are various factors that may influence turnover intention and contribute to job-hopping behavior, including organizational support, job satisfaction, commitment, burnout, emotional exhaustion, job stress, career plateau, person-organizational fit, work engagement and job embeddedness (Lee et al., 2018; Huang et al., 2021; Kim and Kim, 2021). These reasons are often the motivation for employees to voluntarily change their workplace (Lake et al., 2018). Research has indicated that organizational commitment affects turnover intention (Wasti, 2003; Jehanzeb et al., 2013; Guzeller and Celiker, 2019), and this impact in the current research would be extremely amplified. However, results of empirical studies are scarce. Therefore, investigating this topic further to obtain additional evidence to remedy deficiencies in past research is worthwhile.

In addition to organizational commitment, one known way to effectively influence employees' willingness to leave is to increase their stress tolerance (Çelik, 2018). Psychological capital consists of four dimensions: optimism, hope, self-efficacy and flexibility (Luthans et al., 2007a), which all affect the attitude of employees conducting their work and improving their endurance (Avey et al., 2009). As an individual psychological variable that can be managed, developed and improved, psychological capital can promote the decrease of turnover intention (Imran et al., 2017; Koo et al., 2020). Moreover, psychological capital often mediates turnover intention studies (Jeon et al., 2016; Bouzari and Karatepe, 2017; Sepeng et al., 2020). Therefore, we believe that psychological capital also plays a mediation role in the relationship between organizational commitment and turnover intention.

There are two remarkable innovations in this research: first, although there is some research on the turnover intention of school teachers (Alev and Bozbayindir, 2021; Liu et al., 2021), there is no distinction between substitute teachers and in-service teachers in these studies, and research on turnover intention of substitute teachers is lacking. Therefore, we considered substitute teachers as the sample in the present study to compensate for the shortcomings of past studies. Second, the current research applies organizational commitment, psychological capital, and turnover intention to the theory of social exchange to understand the mediating role of psychological capital in the relationship between organizational commitment and turnover intention. However, the influence mechanism of this relationship is still unclear. Therefore, the current study uses public primary school substitute teachers as the sample, organizational commitment as the independent variable, psychological capital as the intermediary variable, and turnover intention as the dependent variable to explore the three aspects of the organizational commitment, psychological capital and turnover intention. The inter-influence mechanism provides a new direction for reducing substitute teachers' turnover intention and further enriches social exchange theory.

The research questions in the current study are as follows:

1. Does the organizational commitment of substitute teachers in public primary schools affect their turnover intention?
2. Does the organizational commitment of substitute teachers in public primary schools affect their psychological capital?
3. Does the psychological capital of substitute teachers in public primary schools affect their turnover intention?
4. Does the psychological capital of substitute teachers in public primary schools play a mediating role in the influence of organizational commitment on turnover intention?

Literature review

Theoretical basis-social exchange theory

Based on social exchange theory, we seek to understand the influence mechanism among organizational commitment, psychological capital, and turnover intention. Social exchange theory is the study of human behavior at the micro level using theories from sociology, psychology and economics (Homans, 1958), making it one of the most powerful tools for understanding workplace behavior (Malik et al., 2011). Social exchange theory deals with three principles including rationality, reciprocity and specificity principle to explain the relationships between employee and employer (Foa and Foa, 2012). The first rationality principle reasons that employees will have association with that organization which can provide desirable rewards and satisfy its employees needs and wants. The second reciprocity principle theorize that social relationship is always reciprocal between employee and employer. The third specificity principle postulates that only reciprocity type can endure an exchange relationship between the employees and an organization (Foa and Foa, 2012).

The establishment of a relationship between the organization and employees results in the employees exchanging their loyalty to the organization and their own labor for the rewards given by said organization (Rhoades and Eisenberger, 2002). Conversely, if the individual feels that the relationship is not good for them, they are likely to abandon the relationship (Lai et al., 2014). Substitute teachers are paid less and perform better than non-substitute teachers, raising questions of distributive justice and potentially encouraging counterproductive behavior (Chernyak-Hai and Rabenu, 2018).

In gist, the three principles of social exchange theory underpinned the reciprocal relationships between organizational commitment, psychological capital and turnover intention. According to social exchange theory, the more loyal an individual is to the organization, the higher his psychological capital and the lower his turnover intention.

Organizational commitment and turnover intention

Becker (1960) was the first to define organizational commitment where he argued that as 'Unilateral efforts' to an

organization increased, the tendency to embrace all kinds of work within the organization was called organizational commitment. Some scholars believe that organizational commitment is an internalized code of conduct (O'Reilly and Chatman, 1986). This integration of internal pressures aligns the employee's behavior with the thoughts and interests of the organization (Wiener, 1982). Similarly, organizational commitment can also be viewed as a person's psychological attitude toward organizational relationships, including whether the individual is willing to stay in the organization (Allen and Meyer, 1990). Meyer and Allen (1991) divided organizational commitment into three dimensions, namely, emotional commitment, continuing commitment and normative commitment. It can be seen from this that organizational commitment is a link between individuals and organizations (Mathieu and Zajac, 1990). Organizational commitment is interpreted as a function of workplace attitudes, behaviors, and management (Islam et al., 2018). In the current study, we adopt the definition of Allen and Meyer (1990) and define organizational commitment as a person's psychological attitude toward organizational relationships, including whether the individual is willing to remain in the organization.

Today, long-term employee retention and reduced employee turnover have become huge challenges for every organization (Top and Ali, 2021). Ideal turnover is for incompetent employees, when talented, skilled, and capable employees leave against the employer's wishes (Shim, 2010). Porter et al. (1974) suggests that the avoidance behavior that employees exhibit when they are dissatisfied with their jobs is called turnover intention. Turnover is divided into voluntary turnover and involuntary turnover (Shepherd et al., 2020). Numerous studies have demonstrated a positive relationship between personal intentions and departure behavior. Individuals with high overturn intentions tend to be perceived as less productive and always try to find a way out of the organization (Hamza et al., 2021). Therefore, academic scholars should rely on employee turnover intention as an alternative to actual turnover to reduce organizational losses (Anwar and Qadir, 2017).

As a variable of employees' attitudes toward the organization, organizational commitment is a core predictor of turnover behavior, exit tendency and organizational citizenship behavior (Mathieu and Zajac, 1990; Sinclair et al., 2005). Organizational commitment can help organizations retain a talented workforce (Islam et al., 2014). Consequently, we proposed hypothesis 1 of this study.

> *H1*: Substitute teachers' organizational commitment significantly and negatively affects their turnover intention.

Organizational commitment and psychological capital

Luthans et al. (2005) first put forward the theory of psychological capital and believe that psychological capital refers to a person's growth and development of a positive psychological state. At the same time, psychological capital emphasizes the psychological origin of an individual, which includes four aspects: self-efficacy, hope, optimism, and resiliency (Gooty et al., 2009). Self-efficacy is a perception or belief about an individual's own abilities, whereas optimism is a positive expectation and therefore has no relation to an individual's actual abilities (Luthans et al., 2010). The hope is that one sticks to the goal, adjusts the channel actively and flexibly, and achieves your goal at some point; when encountering difficulties, being able to persevere, recover quickly, and catch up to achieve success is resilience (Luthans et al., 2007b). As a shared latent ability, psychological capital is believed to be critical to human motivation, cognitive processing, effort success, and performance in the workplace (Peterson et al., 2011). In the current study, we adopted the definition of Luthans et al. (2007b) and defined psychological capital as a person's growth and development of a positive psychological state.

The more employees perceive their organization's support of them, the more commitment they will give to the organization (Aube et al., 2007), and in this harmonious organizational environment, the employee's psychological capital will also increase (Hui et al., 2014). In previous studies is has been shown that organizational commitment is positively related to psychological capital (Idris and Manganaro, 2017; Nguyen and Ngo, 2020), which also shows that these two variables are closely related. Psychological capital has been shown to have a positive and significant effect on organizational commitment (Youssef and Luthans, 2007; Yildiz, 2018), but the effect of organizational commitment on psychological capital has not been confirmed, which is also a gap in the current research. Consequently, we proposed hypothesis 2 of this study.

> *H2*: Substitute teachers' organizational commitment significantly and positively affects their psychological capital.

Psychological capital and turnover intention

Psychological capital is a psychological resource that enables employees to adapt to challenging environments, maintain a positive work attitude in the work environment, and remain in their organization (Luthans et al., 2005; Kim et al., 2017). If a person's psychological capital is higher, turnover intention will be lower (Avey et al., 2008). Therefore, psychological capital has a significant negative impact on turnover intention (Karatepe and Karadas, 2014; Karatepe and Avci, 2017; Yan et al., 2021). Based on the above discussion, we propose Hypothesis 3 of this study.

> *H3*: Substitute teachers' psychological capital significantly and negatively affects their turnover intention.

The mediation role of psychological capital in the relationship between organizational commitment and turnover intention

To fully understand how organizational commitment influences substitute teachers' turnover intention, we should also consider the possible mediating role of employee characteristics, especially related to individuals' psychological assets. Luthans et al. (2005) argue that psychological capital is a positive psychological resource that can be influenced by various organizational or leadership variables. As an individual psychological variable that can be managed, developed, and improved, psychological capital can promote the decrease of turnover intention (Imran et al., 2017; Koo et al., 2020). Moreover, psychological capital often plays a mediation role in turnover intention studies. For example, Jeon et al. (2016) found that psychological capital acts as a mediator in the relationship between transformational leadership and turnover intention. Bouzari and Karatepe (2017) research found that servant leadership style affects employees' turnover intention through the mediating effect of employees' psychological capital. Sepeng et al. (2020) found that psychological capital mediates the relationship between authentic leadership and turnover intention. Therefore, we proposed hypothesis 4 of this study.

> *H4*: Psychological capital has a mediating effect between substitute teachers' organizational commitment and turnover intention.

Materials and methods

Research framework

A research framework was constructed according to the aforementioned hypotheses (Figure 1).

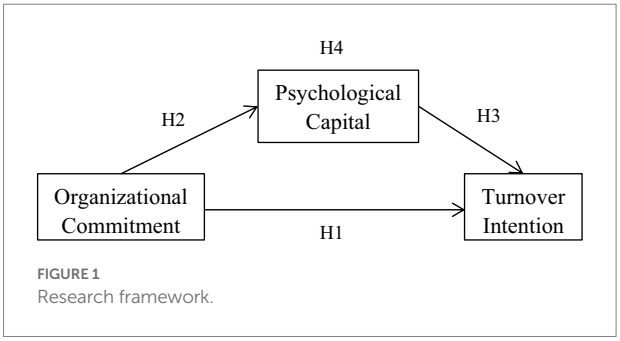

FIGURE 1
Research framework.

Research instruments

The organizational commitment, turnover intention, psychological capital scales employed by this study are detailed as follows:

Organizational commitment scale

The organizational commitment scale was devised by Allen and Meyer (1996) with satisfactory reliability. The scale contains three dimensions and 18 items. The scale contains 3 dimensions and 18 items. The affective commitment has six items including "I have a strong sense of belonging to my school," and the normative commitment has six items including "I should be fully committed to school," and six questions such as "I will lose a lot if I leave my current school" for sustained commitment. The scale adopts a 5-point scale (1 = strongly disagree; 5 = strongly agree). Cronbach's α was 0.733 for affective commitment, 0.705 for sustained commitment and 0.869 for normative commitment, respectively.

Turnover intention scale

The turnover intention scale was devised by Farh et al. (1998). The scale consists of one dimension and 4 items, an example of which is "I've always wanted to quit my current job." The scale adopts a 5-point scale (1 = strongly disagree; 5 = strongly agree). The third question is a reverse coded item. The scale has Cronbach's α of 0.84 and homogeneity reliability of 0.78, so the scale is more reliable.

Psychological capital scale

The psychological capital scale in this study uses the revised item and structure of the psychological capital of Luthans et al. (2007a) questionnaire by Wen et al. (2009). The scale contains four dimensions and 16 items and adopts a 5-point scale (1 = strongly disagree; 5 = strongly agree). An example of the self-confidence dimension is "I believe I can contribute to discussions of school organizational strategies"; for the hope dimension, such as "I can think of many ways to achieve my current work goals"; the resilience dimension includes "I am able to handle a lot of things at once in my work"; "I always see the bright side of things in my work" is for the optimistic dimension. The Cronbach's α of each scale and total scale is between 0.7031 and 0.8125.

Research participants

The questionnaire was distributed to substitute teachers in 18 urban public primary schools in Xuzhou, Jiangsu Province, covering the five municipal districts.

Procedure

Quantitative methods are gaining popularity as an efficient modeling tool (Rad et al., 2022a), so this study used the questionnaire method. The study was divided into pilot test and formal test. Two questionnaires were administered to different participants.

The pilot test questionnaire was conducted among 110 substitute teachers in public primary schools in Xuzhou using the

convenience sampling method. There were 101 valid questionnaires, the response rate was 91.82%. The online questionnaire was distributed online by Wechat from February 12, 2022 to March 3, 2022. The pilot test results show that the extreme value *t*-test of each item is >0.3, the correlation between the corrected item and the total score is >0.4, and the factor loading is >0.5; in the reliability analysis, the Cronbach's α is >0.8; in confirmatory factor analysis, the CR value of each questionnaire is >0.7, and the AVE value is >0.4. According to the results, no inappropriate questions were found, so a total of 38 questions were reserved to continue the formal questionnaire survey.

In the formal questionnaire survey, partcipants submitted the survery through WeChat group. With reference to Tinsley and Tinsley (1987), the number of questionnaires distributed should be combined with the number of questions, and the ratio of the number of items to the sample size should be between 1:5 or 1:10. There are 38 items in this survey, and the maximum ratio is 1:10. So this study needs at least 380 valid samples. Considering that some questionnaires may be invalid, 400 questionnaires are given out. 384 valid questionnaires were collected.

Statistical analysis

Firstly, descriptive statistics and Pearson's correlation coefficients were performed for the organizational commitment, turnover intention and psychological capital variables using SPSS 22.0. Finally, we explored the specific relationship between pairs of the three variables and examined the mediation role of psychological capital in the impact of organizational commitment on turnover intention.

Results

The following is an analysis of the descriptive statistics of the participants, variable descriptive statistics and correlation analysis, the predictive power of organizational commitment to turnover intention, and the mediating effect of psychological capital on the relationship between organizational commitment and turnover intention.

Descriptive statistics of the participants

A total of 400 questionnaires were distributed and returned; 384 valid outcomes result in a valid return rate of 96%, constituted by 171 (44.53%) male respondents and 213 (55.47%) female respondents. In terms of age distribution, the number of respondents in the group aged 20–25 is the same as that of the group aged 25–30: 124 (32.29%). The age groups of 30–35 and 35–40 consist of 65 (16.93%) and 49 (12.76%) respondents respectively, while 22 (5.73%) respondents were aged 40 or above. For educational attainment, 71 respondents (18.49%) graduated with an associate degree, 251 people (65.36%) had undergraduate degrees only, and 62 respondents (16.15%) had master's degrees or above.

Variable descriptive statistics and correlation analysis

As shown in Table 1, the mean (*M*) and standard deviation (*SD*) of each variable are as follows: organizational commitment ($M = 2.149$ and $SD = 0.640$), turnover intention ($M = 3.640$ and $SD = 1.018$), and psychological capital ($M = 2.945$ and $SD = 1.063$). Because all three scales were rated on 5-point scales, organizational commitment and organizational commitment exhibited moderate-to-low average scores, and turnover intention exhibited moderate-to-high average scores. Organizational commitment was negatively related to turnover intention ($r = -0.660$, $p < 0.001$), organizational commitment was positively correlated with psychological capital ($r = 0.570$, $p < 0.001$), psychological capital was negatively correlated with turnover intention ($r = -0.686$, $p < 0.001$). The correlation coefficient of each pair was 0.570–0.686, indicating no collinearity.

Regression analysis

This study examined the mediating effect of substitute teachers' psychological capital on the relationship between organizational commitment and turnover intention based on the premise that the effects of demographic variables, that is, gender, age, and education are controlled. As shown in Table 2, the organizational commitment of substitute teachers significantly and negatively impacted turnover intention ($\beta = -0.652$, $t = -16.653$, $p < 0.001$) in Model 1, and therefore, hypothesis H1 checks out. The organizational commitment of substitute teachers significantly and positively affected psychological capital ($\beta = 0.556$, $t = 13.103$, $p < 0.001$) in Model 2; therefore, hypothesis H2 is valid. In Model 3, after adding the mediating variable psychological capital, substitute teachers' organizational commitment had a significant negative effect on turnover intention ($\beta = -0.387$, $t = -9.546$, $p < 0.001$) and their psychological capital significantly and negatively influenced turnover intention ($\beta = -0.476$, $t = -11.675$, $p < 0.001$), and hence, hypothesis H3 is confirmed. The β value for the effect of the organizational commitment of substitute teachers on turnover

TABLE 1 Variable descriptive statistics and correlation analysis.

Variable	M	SD	OC	TI	PC
OC	2.149	0.640	1		
TI	3.640	1.018	−0.660***	1	
PC	2.945	1.063	0.570***	−0.686***	1

***$p < 0.001$. **$p < 0.01$. *$p < 0.05$.
OC, organizational commitment; TI, turnover intention; PC, psychological capital.

TABLE 2 Mediating effect of psychological capital on the relationship between organizational commitment and turnover intention.

Variable	Model 1		Model 2		Model 3		VIF
	TI		PC		TI		
	β	*t*	*β*	*t*	*β*	*t*	
Male	0.059	1.518	−0.028	−0.651	0.046	1.377	1.025
20–25	0.094	1.139	0.021	0.233	0.104	1.469	4.614
26–30	0.084	1.014	−0.089	−0.994	0.041	0.582	4.632
31–35	0.047	0.660	−0.091	−1.182	0.003	0.057	3.411
36–40	0.073	1.111	−0.079	−1.106	0.035	0.628	2.895
College	0.071	1.379	0.070	1.249	0.104	2.357*	1.800
University	0.043	0.846	0.012	0.219	0.049	1.119	1.780
OC	−0.652	−16.653***	0.556	13.103***	−0.387	−9.546***	1.506
PC					−0.476	−11.675***	1.527
R^2	0.444		0.345		0.592		
Adj R^2	0.432		0.331		0.582		
F	37.389***		24.711***		60.373***		

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

β is the standardized regression coefficient. OC, organizational commitment; TI, turnover intention; PC, psychological capital.

intention decreased from −0.652, up to the significant level, in Model 1 to −0.387, up to the significant level, in Model 3. Thus, psychological capital plays a partial mediation role in the effect of organizational commitment on turnover intention in substitute teachers, and so, hypothesis H4 is valid. Furthermore, this study used the Sobel test to verify the mediating effect and used unstandardized regression coefficients and standard errors to calculate it. The formula for the Sobel test which is z-value = a × b/ SQRT($b^2 \times s_a^2 + a^2 \times s_b^2$), a = raw (unstandardized) regression coefficient for the association between the organizational commitment and the psychological capital·s_a = standard error of a·b = raw coefficient for the association between the psychological capital and the turnover intention (when the organizational commitment is also a predictor of the turnover intention)·s_b = standard error of b. Z value of >1.96 represents a significant mediating effect (Sobel, 1982), and the present study showed that psychological capital ($Z = -8.698$, $p < 0.001$) has a significant mediating effect. In Model 3, the VIF was <10 and no covariance problem was noted.

Based on the above analysis, psychological capital has a significant partial mediating effect between organizational commitment and turnover intention. Details are given in Table 2.

Discussion

Firstly, the results of this study show that the organizational commitment of substitute teachers in public primary schools in Xuzhou has a significant negative effect on turnover intention. This is consistent with the findings of Wasti (2003), Jehanzeb et al. (2013), and Guzeller and Celiker (2019). Substitute teachers have precarious jobs and low organizational commitment to the school, and they may lose their jobs due to changes in policies and positions. Instead of being resigned, they actively look for a better platform, so their tendency to leave is high.

Second, this study found that organizational commitment positively affects the psychological capital of substitute teachers. Although some previous literature has demonstrated a positive correlation between organizational commitment and psychological capital (Idris and Manganaro, 2017; Nguyen and Ngo, 2020), this is the first study to demonstrate that organizational commitment positively predicts psychological capital. Therefore, improving the organizational commitment of substitute teachers will also help improve their psychological capital.

Third, the results of this study show that the psychological capital of substitute teachers in Xuzhou public primary schools has a significant negative impact on turnover intention. This is consistent with the study of Avey et al. (2008), Karatepe and Karadas (2014), Karatepe and Avci (2017), and Yan et al. (2021). In the current educational environment, substitute teachers face pressures from various aspects, such as low wages, instability, and psychological imbalance. Maintaining a good level of psychological capital is not only particularly important to reduce the turnover intention of substitute teachers, but also for the improvement of education quality and the educational environment.

Finally, the results show that the psychological capital of substitute teachers in public primary schools in Xuzhou has a partial mediating effect between organizational commitment and turnover intention. When substitute teachers receive high organizational commitment, they will be more motivated to move towards their goals, have more confidence in choosing plans to achieve their goals, and be better able to demonstrate that they can achieve their goals through the necessary effort, even in the face of challenging work. The confidence brought by successful

completion will also make positive attributions and enhance their willpower to recover when the encounter problems and difficulties, which can stimulate the psychological capital of substitute teachers, and under the effect of this positive psychology, they will perform the job itself and the school is more likely to generate higher satisfaction, which in turn reduces substitutes' turnover intention.

Practical implications

It is worth considering increasing the use of the psychological capital questionnaire in the process of selecting substitute teachers to improve the stability of those hired as substitute teachers. The reliability and validity of the questionnaire of psychological capital is in accordance with standards of psychometrics, meaning it could be used as a measurement tool. Understanding and mastering the psychological capital status of substitute teachers in the initial stage of employment is important for carrying out targeted intervention and stabilizing them. It is better to grasp the change of the substitute teachers' psychological capital in real time as far as possible, and find the regular contents to provide the empirical basis for making more effective intervention programs.

Organizational support and learning environments are among the aspects that provide HR with the highest level of return, especially in terms of its organizational commitment (Islam et al., 2013). In order to reduce the turnover tendency of substitute teachers, education departments and schools should strengthen their organizational commitment from the following aspects. First, attach importance to the cultivation and guidance of the substitute teachers' professional quality, and provide them with more opportunities to learn and practice. Both formal and informal training can have a positive impact on teachers' knowledge, skills and competencies (Rad et al., 2022b). And employee's training affects positively organizational commitment and it ultimately reduces turnover and turnover intentions (Bodjrenou et al., 2019). Second, conduct educational exchanges and experience-sharing activities for new and old teachers, and provide favorable conditions for substitute teachers to have the opportunity to participate in targeted school-based and out-of-school training and to improve their professional qualities and educational and teaching capabilities, help them grow from novice teachers as quickly as possible. Knowledge sharing in an organization promotes organizational commitment among employees, because it encourages active social interaction to achieve mutual benefits (Curado and Vieira, 2019). Third, substitute teachers who have excellent performance should be given material and spiritual rewards to create a good office environment. Employees care about the support and benefits the organization provides them (Nazir et al., 2018). The school should actively help these substitute teachers solve certain difficulties in their lives and ensure the teachers feel the warmth of the organization directly to enhance their commitment to the organization, so as to improve psychological capital and reduce turnover intention. Finally, in the first few months of working, the work experience of substitute teachers is crucial to the formation of emotional commitment. Shanks et al. (2020) found that organizational onboarding support for new teachers can promote new teacher retention. The school should give more attention to first-time and novice teachers in life and work. For example, holding relevant seminars or having a variety of social or league-building activities for new teachers.

Research limitations and future directions

The main limitation of this study is that the coverage of primary schools is not wide enough as only substitute teachers from 18 public primary schools in the city of Xuzhou were selected. More data would allow for extrapolation of the results to public primary schools outside of the city of Xuzhou. Moreover, mixed research methods including interviews and the survey would be better for in-depth investigation. Last, a survey administered to permanent teachers would be beneficial for comparing substitute teachers and non-substitute teachers.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Dhurakij Pundit University. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

KZ designed the study, analyzed the data. XW drafted the manuscript. MJ assisted in analyzing and interpreting the data. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The mediating effect of subjective well-being in the relationship between social support and professional commitment among mainland Chinese kindergarten teachers

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Kindergarten teachers' professional commitment affects their emotional input and turnover intention, and it is affected by the spiritual and material factors of teachers' families, kindergartens, and society. Therefore, this study aimed to investigate the mediating effect of the dimensions of subjective well-being in the relationship between social support and professional commitment. The study is grounded in human ecology theory and social exchange theory. We surveyed 778 kindergarten teachers from different educational systems in Guangdong Province in China. We used the "Appreciative Social Support" and "Subjective Well-being" Scales and the "Professional Commitment Questionnaire." The results showed that the four variables of social support, positive affect, life satisfaction, and professional commitment of kindergarten teachers were significantly and positively correlated with each other: social support positively predicted positive affect and life satisfaction, positive affect and life satisfaction positively predicted professional commitment, and social support indirectly influenced professional commitment through the parallel and chain path of positive affect and life satisfaction. This represents a compound multiple mediating effects on professional commitment.

KEYWORDS

kindergarten, professional commitment, subjective well-being, social support, positive affect, life satisfaction

Introduction

Kindergarten teachers (KTs) have the important responsibility of fostering children's wisdom and shaping their personalities. Preschool children are often vulnerable and poorly socialized, which makes the work of teachers complicated and the responsibility, heavy (Zhang, 2004; Lu and Wang, 2006; Hu, 2020). Additionally, in China, there is a shortage of

work resources, and the working conditions are relatively poor (Fan and Li, 2018); KTs are one of the lowest-paid professional groups in the teaching force (Nelson, 2001; Hu, 2020). Heavy workload and low salary are important predictors of Chinese teachers' turnover intention (Liu and Onwuegbuzie, 2012; Hu, 2020). High rates of resignations and burnout of teachers have become obstacles to the development of preschool education in China (Wang et al., 2015; Zhou et al., 2020), and this has become a worldwide problem (Hong, 2010; Wells, 2015). Most KTs stay in the front line of early childhood education throughout their lives; they are loyal to their duties, care for young children, love their jobs, have deep feelings for young children, and show a high degree of recognition and emotional dependence on their profession. High levels of professional commitment (PC)—the individual teacher's internal "psychological contract"—and internalization of social norms result in reluctance to change their profession (Tang et al., 2015). What forces support them in maintaining their PC? Is it the spiritual satisfaction from the profession or the material satisfaction from the salary, or the support and affirmation from family, kindergarten children, or friends? Or is it the personal happiness that comes from the realization of self-worth in the profession? Various interacting factors affect the PC of KTs; thus, it is beneficial to improve PC by exploring the influence of each factor.

Literature review

Social support and professional commitment

PC is defined as the "practitioner's emotion, or attitude about their positions" (Rusbult and Farrell, 1983; Blau, 1985; Lee et al., 2000), "the individual's motivation to continue in the job" (Hall, 1968), "the psychological connection the practitioner establishes with the positions" (Vandenberg and Scarpello, 1994), and "the individual's identification, enjoyment, and engagement with their positions" (Aranya et al., 1981; Meyer et al., 1993; Deng et al., 2019; Wang, 2019). These perspectives emphasize a unidimensional feature of PC, focusing on the practitioners' emotions and motivations toward the occupation, rather than the full picture of PC. Meyer et al. (2012) define it from a multidimensional perspective; they define PC as the degree to which individuals internalize their professions through their emotions, commitment, and social norms, such that they are unwilling to change their occupations. The definition includes three dimensions: affective commitment, continuance commitment, and normative commitment. A teacher's PC is the manifestation of occupational commitment in the field of education and refers to an individual teacher's feelings toward education and motivation to choose to continue in the profession (Rusbult and Farrell, 1983). It can also refer to teachers' occupational identity (Meyer et al., 1993), sense of belonging, work commitment, and willingness to continue in the teaching profession (Hu and Li, 2018). KTs' PC refers to the behaviors and attitudes that are formed based on the internalization of norms about whether they can maintain loyalty to their profession (Chen and He, 2015; Liu, 2018), It is the combination of KTs' emotional input, loyalty, and willingness to stick to their posts.

Human ecology is a science that studies the relationship between individuals and the environment. Researchers analyze the relationship between individual careers and the environment from the human ecological perspective, and research has found that retention decisions are the result of the interaction between decision-makers and the work environment (Danes and Rettig, 1995). Moreover, social support—as one of the environmental factors—is closely related to PC and the intention to stay (Pomaki et al., 2010; Tang et al., 2015). Conversely, organizational commitment is negatively related to the propensity to leave (Chen and Li, 2009). Principal and colleague support also has a direct effect on teachers' PC (Kusum and Billingsley, 1998; Singh and Billingsley, 1998), and family support is positively related to the individual achievements of educators (Bataineh, 2009). Teachers' initiative, participation in decision-making, information feedback, cooperation, learning opportunities, available resources, and other factors influence their PC (Firestone and Pennell, 1993). KTs' support from the organization and society is positively related to job performance (McGinty et al., 2008); support from family/friends is significantly and negatively related to teachers' turnover intention (Zhou et al., 2020), and KTs' social support is significantly and positively related to PC (Tang et al., 2015; Shi, 2017; Xu et al., 2017). Work environment, job satisfaction, and recognition by others are positively related to the level of professional commitment of novice KTs (Feng, 2020), that is, if teachers receive more social support, they show higher PC and retention (Guo et al., 2021).

Social support and subjective well-being

Sarason (1981) argues that social support "is the subjective perception of interaction or the objective existence of interaction;" Wills (1991) argues that social support is "the individual's perception of being cared for, respected, and part of a mutually supportive social network." This is the understanding of social support from the perspective of social interaction. In this sense, social support is a two-way activity, which is the act of offering mutual help and support when individuals encounter difficulties. Such social support comes from social or community organizations (Taylor, 2011), superiors (Bruce and Blackburn, 1992; Vroom, 2008), peers (Chiaburu and Harrison, 2008), family, friends, or other groups (Sarason et al., 1990). Social support can be divided into subjective and objective forms (Barrera, 1986; Vangelisti, 2009). Subjective social support, that is, moral support, refers to when individuals feel their importance and value in social relationships, such as being valued, respected, and liked by others. Objective social support,

that is, material support, refers to individuals receiving financial help and material support from society or organizations. Social support comprises care for individuals in need by the provision of practical and material support. However, it is also a potential resource that can be used when individuals are managing stress and solving problems; in such a case, it is referred to as moral support. KTs' social support is often derived from moral and material care, comfort, and help from family, relatives, friends, classmates, leaders, colleagues, and other members of society (Qu, 2019). Zhang (2012) finds that Chinese KTs' had moderate-to-high levels of social support, with significant differences according to marital status, age, teaching experience, class size, and monthly salary. Social support was significantly correlated with subjective well-being (SWB; Zeng, 2009; Song and Fan, 2013; Lu and Yang, 2014; Pu, 2014; Zhao, 2016). The more subjective support available for KTs, the higher the level of SWB (Zeng, 2009), which, in turn, had a positive effect on support utilization (Li, 2007).

Subjective well-being and professional commitment

SWB is a holistic assessment of an individual's quality of life—based on personal criteria—and consists of two main components: life satisfaction (LS) and affective index (Diener, 1984). LS belongs to the cognitive aspect of SWB, while the affective index belongs to emotional experience, that is, experiencing positive emotions and a lack of negative emotions. This model of psychological well-being comes from the contributions of Diener (1984) and Diener et al (1999). Factors affecting teachers' SWB include individual factors, such as personality (Ni et al., 2006; Chen et al., 2012; Mao and Xie, 2013), individual teaching motivation (Li et al., 2010), and individual professional psychology (Luo et al., 2006; Zuo and Xi, 2008; Cui, 2010; Li, 2010; Chen et al., 2012; Zhou, 2014). It also includes social factors such as life events, quality of survival, coping styles, interpersonal psychology, academic environment, marital stress, and socioeconomic status (Cui, 2016; Luo and Wang, 2016; Lei and Li, 2018). The influence of teachers' SWB on their work attitudes and behaviors is mainly reflected in work engagement, work stress, burnout, professional identity, and PC (Wang, 2014; Pi, 2018; Li, 2019; Wu, 2019; Wang and Wang, 2020; Peng, 2021). The higher teachers' SWB, the higher their work engagement, professional identity, and PC (Wang, 2014; Pi, 2018; Peng, 2021).

Positive affect, life satisfaction, and subjective well-being

According to social exchange theory (Gouldner, 1960; Blau, 1964), social support predicts and promotes employees' job satisfaction (Ferguson et al., 2012; Zhang et al., 2015). When employees receive support from organizational leaders and colleagues, they enjoy their jobs and are more loyal to the organization. Conversely, when employees do not receive support, it leads to job dissatisfaction and reduced loyalty to the organization (Lambert et al., 2016). Different dimensions of social support can predict SWB (Xu, 2011), and social support affects PA (Zhao, 2016). PA has the highest correlation with instrumental support; LS has the highest correlation with emotional support, and PA influences LS. The more emotional support KTs receive, the higher their LS and SWB, and the lower their negative affect (Jiang, 2020). KTs' quality of work life is related to PC (Daud, 2010). Job satisfaction plays a mediating role, with the work environment and recognition from others indirectly influencing PC through job satisfaction (Feng, 2020). KTs will experience higher job satisfaction and be more loyal to the organization when they have good relationships with children, managers, and colleagues, and have opportunities to grow (Daud, 2010). KTs' social support affects their job satisfaction directly, and indirectly through the single-path mediating role of job engagement and the chain-mediating role of self-efficacy and job engagement (Wu et al., 2020). Concerning the role of the PA aspect of social support in SWB, instrumental support stimulates PA, affective support influences LS, and PA influences LS, which enhances personal SWB. Moreover, KTs with high SWB generate high PC. There are reasons to believe that PA and LS mediate between social support and the PC of KTs, and this mediation occurs as a compound multiple mediating effects (Liu and Ling, 2009).

Thus, we propose the following research hypotheses:

> *H1:* PA mediates between KTs' social support and PC.
>
> *H2:* LS mediates between KTs' social support and PC.
>
> *H3:* PA and LS play a multiple mediating role in the relationship between KTs' social support and PC.

We construct a compound multiple mediating effect theoretical model to explore the mediating roles of PA and LS between social support and the PC of KTs to provide a theoretical basis for their PC and management.

The complete hypothesized model is presented in Figure 1.

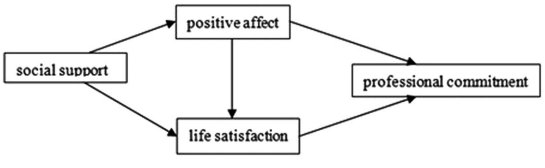

FIGURE 1
The posited model.

Methods

Participants and data collection

Participants comprised 778 KTs from all over Guangdong Province, which is a developed area in China. Their ages range from 18 to 55 years ($M = 31.75$, SD = 8.26), and their years of experience range from 0 to 38 years ($M = 9.75$, SD = 8.37).

Measures

Social support

This study assessed social support using the Chinese version of the Perceived Social Support Scale (PSSS). The PSSS was originally developed by Zimet (1987). It consists of 12 self-assessment items across three subscales—support of family, friends, and others. Each item is scored on a 7-point scale, with higher scores indicating a better level of social support. In this study, Cronbach's alpha coefficient for the scale was 0.951.

Subjective well-being

SWB was measured with a Chinese version of the Subjective Well-Being Scale (SWBS). The SWBS consists of two parts: the Satisfaction with Life Scale and the Affective Scale. The Satisfaction with Life Scale developed by Diener et al. (1985), consists of five questions that ask participants to rate how satisfied they are with their lives and how close they are to their ideal lives. The scale is scored on a seven-point scale (1–7 satisfaction levels in ascending order). The internal consistency coefficient of the scale was 0.84. The Affective Scale was based on Affectometer 2 developed by Kammann and Flett (1983). Responses were rated on a 5-point scale ranging from 1 for extremely nonconforming to 5 for very conforming. The scores for the two dimensions were calculated separately. The Cronbach's alpha coefficient for the Life Satisfaction Scale in this study was 0.915, and the Cronbach's alpha coefficient for the Affective Scale (positive affect component) was 0.903.

Professional commitment

PC was measured with the Chinese version of the Professional Commitment Questionnaire (Zuo and Xi, 2008). It consists of 22 questions and is divided into three commitment dimensions: emotional, sustained, and normative. The questionnaire was scored on a six-point scale, ranging from "very uncommitted" to "very committed." In this study, the Cronbach's alpha coefficient for the questionnaire was 0.898.

Research procedures and statistical methods

Before the implementation of the study, we compiled the selected questionnaires and published them online. Teachers were invited to participate in the online survey, which was available for 2 weeks. We collected 778 valid questionnaires.

Data statistics and analysis were completed using SPSS 23.0 and Amos 23.0, and the analysis techniques included a reliability test, common method deviation test, correlation analysis, and a mediating effect model test.

Results

Check for common method bias

The study data were derived from KTs' self-reports; therefore, there may have been a common method bias. Based on the investigation of confidentiality and the reverse scoring of some items, a Harman single-factor test was used to test data for common method bias (Podsakoff and Organ, 1986). The results showed that seven factors with a characteristic root greater than one were obtained without rotation, and the variance revealed by the first factor was 34.68%, less than the 40% critical standard (Ferguson et al., 2012). Therefore, the results indicated there was no serious common method bias in this study.

Descriptive statistics

Table 1 shows the average values, SDs, and correlation matrices for each variable. Social support was positively correlated with PA and LS and PC ($p < 0.01$). PA was positively correlated with LS and PC ($p < 0.01$). LS was positively correlated with PC ($p < 0.01$).

Mediation model test with adjustment

The structural model's assessment involves the goodness-of-fit (GoF) index, path coefficient, and significance test. The GoF index includes the normed fit index [NFI, >0.8 recommended by Hooper et al. (2008)], root mean square error of approximation (RMSEA, <0.08), GoF index (GFI, >0.9), comparative fit index (CFI, >0.9), and incremental fit index [IFI, >0.9, recommended by

TABLE 1 Descriptive statistics and correlation coefficients of the key study variables (n=778).

	1	2	3	4
1 SS	—			
2 PA	0.57**	—		
3 LS	0.52**	0.73**	—	
4 PC	0.30**	0.48**	0.48**	—
M	67.90	36.46	22.70	89.88
SD	13.36	6.52	6.70	16.22

SS, social support; PA, positive affect; PC, professional commitment; LS, life satisfaction.
**$p < 0.01$.

Hau et al., 2004]. In this study, we used a latent variable structural model to construct a relationship model between the four variables of social support, PA, LS, and PC to examine the mediating effects among them. The observed variables corresponding to social support were "family," "friend," and "other"; the observed variables corresponding to PC were "affective," "continued," and "normative." After correction, the structural equation model fit index was $\chi^2/df = 2.46$ (the remaining fit indexes are shown in Table 2). The results indicate that the model fits well.

The path diagram of the effects of social support, PA, and LS on PC (Figure 2) shows that social support positively predicted PA ($\beta = 0.60$, $p < 0.001$) and PA positively predicted PC ($\beta = 0.29$, $p < 0.001$), indicating that social support can indirectly influence PC through the mediation of PA; social support positively predicted LS ($\beta = 0.21$, $p < 0.001$) and LS positively predicted PC ($\beta = 0.23$, $p < 0.001$), indicating that social support can have an indirect effect on PC through the mediation of LS. In addition, PA positively predicted LS ($\beta = 0.60$, $p < 0.001$), suggesting that social support can have an indirect effect on PC through the mediation of PA and LS.

We tested the significance of the mediating effect using bias-corrected percentile Bootstrap analysis (5,000 random samples) with a confidence interval set at 95% (not including 0). The results are shown in Table 3. The mediating effect consisted of indirect effects arising from three pathways: SS → PA → PC; SS → LS → PC; and SS → PA → LS → PC. Within these pathways, SS → PA → PC and SS → LS → PC are parallel multiple mediating effects, and SS → PA → LS → PC indicates the chain multiple mediating effects. Therefore, the indirect effect of KTs' social support on PC was achieved through compound multiple mediating effects of PA and LS. Thus, H1, H2, and H3 were supported by the results.

Discussion

Previous studies have shown that KTs' social support is significantly and positively related to PC (Tang et al., 2015; Shi, 2017; Xu et al., 2017). Higher support from leaders results in improved professional commitment from teachers (Kusum and Billingsley, 1998; Singh and Billingsley, 1998). Further, different dimensions of social support are good predictors of SWB (Xu, 2011); emotional support is positively related to LS, and instrumental support is positively related to PA (Jiang, 2020). The higher the SWB of teachers, the higher their work engagement, professional identity, and PC (Wang, 2014; Pi, 2018; Peng, 2021).

TABLE 2 Model fit indexes.

Fit index	RMSEA	CFI	NFI	IFI
Proposed value	<0.08	>0.9	>0.9	>0.9
Estimated value	0.04	0.99	0.99	0.99

RMSEA, root mean square error of approximation; CFI, comparative fit index; NFI, normed fit index; IFI, incremental fit index.

Our finding—that there were significant positive correlations between KTs' social support, PA, LS, and professional commitment—is consistent with the results of previous studies (Tang et al., 2015; Zhao, 2016; Shi, 2017; Xu et al., 2017; Jiang, 2020). The factors affecting KTs' professional commitment are multifaceted, and social support, PA, and LS are important factors. Further, the optimal guarantee of these factors is necessary for teachers to have high professional commitment. When working with children aged 3–6, kindergarten teachers need patience, care and responsibility, and high emotional input and persistence in their work. Only with high recognition and support from families, kindergartens, and society can they maintain positive emotions and high life satisfaction. This is what motivates kindergarten teachers to maintain their PC.

This study found that PA mediated the relationship between social support and professional commitment of KTs, which verified H1, indicating that social support indirectly influences professional commitment through the mediation of PA; LS mediated the relationship between social support and professional commitment of KTs, which verified H2, indicating that social support indirectly influences professional commitment through the mediation of LS. The compound multiple mediating role of PA and LS between KTs' social support and professional commitment verified H3. The present study is consistent with previous research findings that social support affects PA (Zhao, 2016), LS (Jiang, 2020), job satisfaction, and professional commitment (Daud, 2010; Ferguson et al., 2012; Zhang et al., 2015). It is also consistent with the findings that PA influences LS, and higher LS results in higher SWB (Jiang, 2020). It also supports the findings that higher SWB of teachers is linked with higher job commitment, professional identity, and PC (Wang, 2014; Pi, 2018; Peng, 2021). Meanwhile, this study explores the influence of SWB as a mediating factor in two major dimensions and presents more clearly the compound multiple mediating role of two factors—PA and LS—between social support and professional commitment.

Most KTs are women (Song, 2019). Owing to the different gender roles and social division of labor, particularly among married female teachers, KTs are bound to allocate part of their energy to family life, and the time and energy they devote to their work will be reduced, which will inevitably affect their work engagement and effectiveness. However, recognition and support from family members, relatives, and friends, love and support from kindergarten leaders, and understanding and help from colleagues, enable teachers to gain spiritual comfort at work, maintain positive emotions, and experience pleasure and a sense of accomplishment derived from life and work. They will experience professional value and self-fulfillment in their work, and thus develop emotional commitment and dependence on their profession and be reflected in higher job input and show higher PC. In contrast, as the public attaches importance to preschool children's development and recognizes the profession of KTs, the social and economic status of KTs will significantly

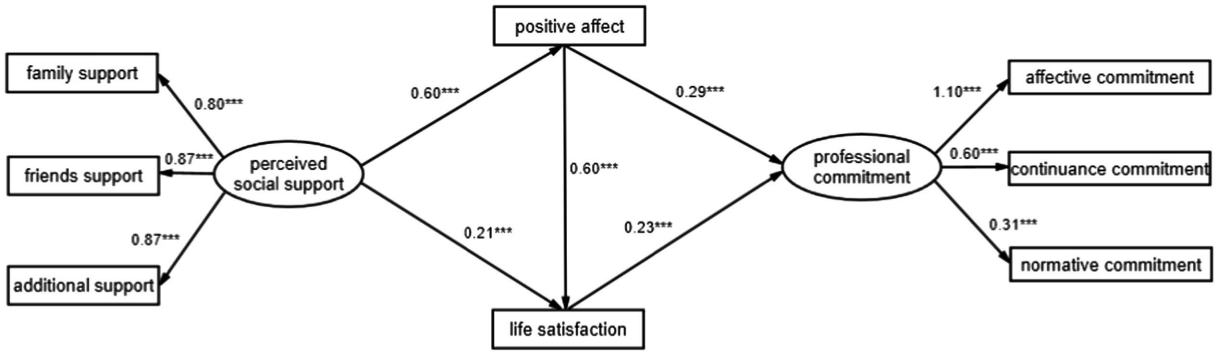

FIGURE 2
The path relationship between perceived social support, positive affect, and life satisfaction on professional commitment.

TABLE 3 Bootstrap analysis of the significance test of the intermediate model effect.

	Path relationships	Standard indirect effects	Bootstrap (95%CI)	
			Upper limit	Lower limit
Intermediary	SS → PA → PC	0.60 × 0.29 = 0.17	0.14	0.20
effect	SS → LS → PC	0.21 × 0.23 = 0.05	0.03	0.07
	SS → PA → LS → PC	0.60 × 0.60 × 0.23 = 0.08	0.06	0.10
Total intermediation effect		0.6 × 0.29 + 0.21 × 0.23 + 0.60 × 0.60 × 0.23 = 0.3	0.23	0.37

SS, social support; PA, positive affect; PC, professional commitment; LS, life satisfaction.

improve. Simultaneously, a series of national preschool education policies and regulations have been introduced to guide the standardized and healthy development of KTs; thus, their working environment has been optimized, and pre-and post-service training mechanisms have improved the levels of professionalism. Teachers' recognition of their profession has changed, and more teachers are willing to stay at their posts, demonstrating high levels of PC.

Conclusion

KTs' social support may not directly predict PC. There are three paths from social support to PC. This social support influences PC through the path of PA and LS, and the compound multiple mediating effect from PA to LS to PC. The provision of social support for KTs should focus on stimulating PA and increasing LS to promote high levels of PC. This will lead to increased love for the job, dedication, and improved quality of teaching.

Limitations

This study had some limitations, and here, we provide suggestions for addressing them in future research. First, the subjects of this study are from economically developed areas in Guangdong Province, which cannot reflect the general economic level in China. Future studies should expand the sample scope to regions with different economic development levels to increase sample representativeness, thus improving the results' authenticity and objectivity. Second, the sample is composed of teachers who were willing to participate; their gender, age, years of teaching, education level, and other characteristics are not balanced, which will affect the objectivity and universality of the research results. Future studies should balance these factors as much as possible to reflect the actual composition of kindergarten teachers.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

SC: conceptualization, data curation, writing—original draft, and writing—reviewing and editing. YL: formal analysis and visualization. ZM: writing—reviewing and editing. XC: investigation, data collection, and writing—reviewing. TS: investigation and writing—reviewing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Motivational profiles of kindergarten teachers in minority areas of China and their association with outcomes

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Academic discourses regarding teacher motivation have been on-going for decades for those who teach in ethnic minority areas. Yet research findings failed to provide a consistent conclusion regarding if kindergarten teachers' motivation pattern would vary based on a case-to-case scenario. Therefore, further studies are needed to probe the motivation patterns among this population. The study firstly examined kindergarten teachers' motivational profiles based on Expectancy Value Theory (EVT), and then examined how teachers' motivation related to outcome variables (work engagement, workplace wellbeing, and retention intention). Participants included 1,199 kindergarten teachers from ethnic minority areas in China. Latent profile analysis identified three motivation profiles for teachers: low value-high cost (profile 1), moderate all (profile 2), and high value-low cost (profile 3). Teacher with different motivation profiles had significant differences in work engagement, workplace wellbeing, and retention intention. In addition, chain mediation analysis revealed that work engagement and workplace wellbeing mediated the relationship between motivation profiles and retention intention. The implications of the findings for study are discussed.

KEYWORDS

kindergarten teacher motivation, work engagement, workplace wellbeing, retention intention, minority

Introduction

Teacher motivation in Chinese ethnic minority areas has been a focal point during domestic and international academic discourse (Wu et al., 2020; Long, 2021; Long and Yuan, 2021). Motivation is a critical component of teacher professionalism and a factor in teacher retention (Alexander et al., 2020). Previous research have substantiated the correlation between reduced motivation and lowered morale (Wang et al., 2019), which in turn would lower the overall education quality (Long and Yuan, 2021). Therefore, it is critical to investigate kindergarten teacher work motivation in ethnic minority areas to avoid the chain effects caused by insufficient motivation.

However, previous investigations have indicated that teachers' work motivation had different impacts on their behaviors (Abós et al., 2018). A possible reason for that is that most studies on teacher motivation traditionally used a variable centered method, in which the influence of specific teacher motivation of teacher behavior has typically been explored discretely (e.g., Li and Gong, 2020; Hong et al., 2021). Such a methodology usually failed to take the possibility of unobservable subgroups into consideration and therefore provided a limited interpretation to the data. As a result, a thorough investigation that relies on the interaction of multiple motivating characteristics is imperative to an accurate apprehension of the overall phenomena of kindergarten teacher motivation, because motivational features do not operate independently upon one another; rather, they may influence teacher behavior in a multiplicative way (Wigfield et al., 2006). For instance, teachers teach not only because they need to obtain financial benefits and other welfare, but also because they find teaching enjoyable as such (Guo and Sun, 2018; Rad et al., 2022c). Therefore, kindergarten teachers' motivation profiles may vary based on various motivational factors.

This study, under the framework of Expectancy Value Theory (EVT), uses a person-centered methodology to explore the motivation profiles of kindergarten teachers in ethnic minority areas in China. Person-centered approaches categorizes individuals into common profiles with similar motivational patterns (Thommen et al., 2021). This is especially accommodating when numerous variables are being studied simultaneously, while little is known about how they interact. Overall, the aims of this study were to (a) identify subgroups with similar motivational profiles using latent profile analysis, (b) explore the effect of motivation profiles on psychological outcomes, and (c) investigate the psychological mechanism underlying the association between motivation profiles and work engagement, workplace wellbeing, and retention intention.

Teachers' motivation from the expectancy value theory

Seen as differentiated and multi-dimensional, motivation is considered to be a combination of internal features and processes that would provide rationales behind individual's behaviors (Pintrich, 2003). Different motivational theories have been used to the teaching profession by some scholars in order to examine the complexity of motivation (Thommen et al., 2021), including EVT- one of the most extensively utilized theory to describe individual motivational processes in an educational context (Osman and Warner, 2020). Action-driving motivation, as assumed by EVT, has two key components: expectancy for success and task values. Expectancy refers to an individual's belief in his ability to successfully perform a task; Task values are subjective assessments of task priority, through which individuals could distinguish among attainment value, intrinsic value, utility value, and cost (Eccles and Wigfield, 1995, 2002). Attainment value is understood as the importance to the individual of finishing a task. Intrinsic value refers to the pleasure that an individual feel in completing a task. When appreciating utility value, one would usually gain a sense of success should the completion of a given task is in alignment with the fulfillment of one's personal plan or goal. Finally, cost refers to the negative aspects of an individual undertaking a task, such as individual anxiety for the devotion required by the task or the negative outcomes of the tasks (Eccles and Wigfield, 2002). In summary, these components of expectancy and values converge to guide individuals to make behavioral decisions (Nagengast et al., 2013; Osman and Warner, 2020).

The EVT framework facilitates the examination of multiple motivational characteristics, as motivation for a particular behavior is an outcome of the combination of individual expectations and task values. For instance, some teachers may have high attainment value and consider teaching to be extremely rewarding (Collie and Martin, 2017), whereas others may have low utility value but maintain a high self-efficacy (Li, 2018). The interaction between the values and expectancy components explains why teachers are particularly motivated when both components score strongly (Thommen et al., 2021). More precisely, one component of motivation may partially compensate for another, reducing the negative impact on overall motivation (Trautwein et al., 2012). Thus, by utilizing EVT, the purpose of our study is to gain a thorough understanding of the key features of teacher motivation, which not only provides compelling evidence for a person-centered approach but may also have significant implications for teacher professional development and educational quality improvement.

Teachers' motivation: Toward a person-centered approach

Teachers' motivations may vary across various instructional domains because of the unobservable subgroups and unique motivational subcomponents. Previous studies mostly focused on teacher motivation from a variable-centered perspective (Durksen et al., 2017; Ahn et al., 2021). This approach can be used to investigate the unique associations between two or more independent motivation variables and outcomes (e.g., engagement, wellbeing; Parker and Martin, 2009), but it requires that all samples belong to the similar population and have the same parameter estimates. This ignores the potential of unobservable subgroups and reduces the study validity due to incorrect findings interpretation. Therefore, a person-centered approach is needed to identify naturally co-existing subgroups of teachers who display a variety of motivational features.

Such an approach was used in previous research regarding teacher work motivations. For example, Wang et al. (2019) discovered four latent motivation profiles among Chinese special-post teachers: high intrinsic-high extrinsic motivation, high intrinsic-low extrinsic motivation, low intrinsic-high extrinsic motivation, and a balanced motivation. Thommen et al. (2021) investigated mathematics teachers' work motivation and identified complex configuration of profiles: low performance goal oriented, high performance goal oriented, high performance-avoidance goal oriented. These studies indicated that teachers engage in their teaching for a variety of reasons. When it comes to teachers in China, due to the effects of job content, cultural variety, and geography, there may be differences in the motivations of kindergarten teachers in China's ethnic minority areas and other groups (Cai and Yuan, 2018; Xia, 2020). Therefore, more study is needed to determine the various motivation profiles of kindergarten teachers in ethnic minority areas. Accordingly, we aimed to investigate profiles of kindergarten teacher motivation applying person-centered method.

The possible association between teacher motivation profiles and outcomes and its underlying mechanism

Various motivation profiles would impact individual teachers based on a case-by-case scenario and therefore lead to different outcomes. From a social cognitive perspective, teachers would experience favorable outcomes (e.g., work engagement, workplace wellbeing and retention intention) when they possess a strong motivation to perform required tasks (Anthony and Ord, 2008). However, empirical data is insufficient for researchers to draw conclusions regarding the impacts of the identified motivation profiles of kindergarten teachers on the outcome variables. As teachers are expected to have different motivations across various domains (Gorozidis and Papaioannou, 2014), it is vital to investigate the impacts of profiles of motivation to provide a more comprehensive perspective to illustrate the effect mechanism of identified motivation profiles of kindergarten teachers on outcomes. Previous studies have shown that highly motivated teachers would generally hold greater self-esteem, which in turn, would lower their turnover rate (Torquati et al., 2007). Nonetheless, the influence of motivation profiles on engagement and workplace wellbeing has not been fully scrutinized, as the individual psychological performance influenced by motivation profile differs (Grant, 2008). Thus, it is necessary to clarify how the link between motivation profile and retention intention is affected by engagement and workplace wellbeing.

Work motivation has been highlighted as an important variable influencing teacher retention. Retention intention is individual's perception of the likelihood of remaining in the same institution (Price and Mueller, 1981). It has been corroborated that teachers who were highly motivated at work were more likely to remain with the organization (Zhang et al., 2019). Another study with pre-service teachers demonstrated that the teaching intentions of teacher subgroups were more or less associated with different motivation profiles (Richardson and Watt, 2006). Thus, we hypothesize that teachers with varying motivation profiles will have varying influences on their retention intention.

Teachers' motivation profiles may predict retention through teachers' work engagement. Work engagement refers to a favorable attitude toward work highlighted by vigor, dedication, and absorption (Schaufeli et al., 2006). Based on Conservation of Resources Theory, motivation, as the processing resources, enables the accumulation of extra resources (Hobfoll, 2002). Work engagement as an additional accumulated resource has been found in job-related studies (Valero and Hirschi, 2016). For example, teachers' autonomous motivation (defined as intrinsic) was found to be a positive predictor of work engagement by Li et al. (2015). Jansen in de Wal et al. (2014) examined the association between motivation profiles of secondary school teachers and their engagement, and found that "extremely autonomous" profile could most positively predict teacher engagement. Furthermore, regarding the link between work engagement and retention intention, earlier study revealed that engagement could exert potential effects on retention intention. One meta-analytical finding indicated a negative association between work engagement and attrition, indicating that work engagement might positively predict teacher's retention intention (Halbesleben, 2010). According to the relevant literature, our present study speculated that work engagement possibly presents as a mediating link between motivation profiles and retention.

Moreover, motivation profiles may predict retention intention through teachers' workplace wellbeing. Workplace wellbeing refers to individuals' cognition of satisfaction at work, as well as their emotional and psychological experiences and health state at work (Zheng et al., 2015). According to the person-organization fit theory (Kristof, 1996), when employees' motivations are highly aligned with those of their job, they are more likely to respond positively to organizational practices. Such an alignment would lead to an increase in optimism and positive attitudes at work, indicating job wellbeing (Fu et al., 2020). Howard et al.'s (2016) study also indicated that individuals with highly motivated profiles demonstrated improved work performance and higher wellbeing. Furthermore, research suggests that workplace wellbeing could exert potential effects on retention intention. According to Sears et al. (2013)'s

model of wellbeing improvement and employer outcomes, the deterioration of work-related wellbeing was expected to cause employees' psychological withdrawal from work, hampered performance, and ultimately in resignation (Sears et al., 2013; Bardach et al., 2022). Thus, this study hypothesizes that workplace wellbeing would mediate the association between motivation profiles and retention intention.

There may be a link between work engagement and workplace wellbeing. Work engagement is an essential strategy to attain self-actualization in the workplace through effort (Yang et al., 2019), whereas wellbeing is viewed as the consequence of self-actualization (Rothmann, 2008). Yang et al. (2019) indicated that employees with had higher work engagement perceived greater levels of employee wellbeing. Thus, employees' work engagement has a favorable effect on their wellbeing (De-la-Calle-Durán and Rodríguez-Sánchez, 2021).

Work engagement and workplace wellbeing may jointly mediate the link between motivation profiles and retention intention. Job Demands-Resources model (Bakker et al., 2004) illustrated how engagement and workplace wellbeing would joint force to exert an impact on the correlation between motivation profiles and retention intention. Namely, greater wellbeing at work is determined by work resources via work engagement. Related studies showed that resources (such as self-efficacy as an aspect of motivation) are significantly associated with work engagement and wellbeing (Lee, 2019; Han et al., 2020). Similar studies also indicated that teacher with attainment value have greater positive work engagement and wellbeing. Furthermore, work engagement and wellbeing were predictor variables of retention (Brunetto et al., 2014; Fu et al., 2020). Taken together, it is reasonable to hypothesize that work motivation profiles could indirectly predict the retention intention of kindergarten teachers via the chain mediating roles of work engagement and workplace wellbeing.

To conclude, our third aim is to investigate the impact of motivation profiles on outcome variables. On this premise, exploring the process mechanism of motivation profiles impacting retention intention is our fourth research goal.

Current study

Several gaps in existing studies on teacher motivation characteristics were discovered throughout our review of the literature. First, previous research in teacher groups found inconsistent motivational characteristics (Durksen et al., 2017; Ahn et al., 2021). Unique profiles may exist in the kindergarten teachers. Consequently, more investigations are required to confirm the profile characteristics of kindergarten teachers in ethnic minority areas in China. Second, empirical research on the career motivations of kindergarten teacher in ethnic minority areas in China remains limited. Furthermore, it is necessary to clarify the outcomes of differences in kindergarten teachers' motivation profiles, and the complex mechanism between kindergarten teacher motivation profiles and retention intention. Responding to these gaps, the current study's aims were quadruple: First (RQ 1), Given the paucity of person-centered research, latent profile analysis (LPA) is used to identify kindergarten teachers' motivation profiles. Second (RQ 2), to extend previous study indicating that kindergarten teachers' motivation profiles may affect their subjective experience of long-term teaching, we intended to evaluate if the motivation profile of kindergarten teachers is associated with their work engagement, workplace wellbeing, and retention intention. Lastly (RQ 3), to elaborate on the process by which the identified motivation profiles of kindergarten teachers influence the outcome variables, we attempted to illustrate the internal mechanism between motivation profiles and outcome variables. Through the above description, the following four research questions are investigated:

RQ 1: What motivation profiles appear among a sample of kindergarten teachers in ethnic minority regions in China?
RQ 2: Do teacher motivation profiles differ in different outcome variables (work engagement, workplace wellbeing, and retention intention)?
RQ 3: How do motivation profiles relate to work engagement, workplace wellbeing, and retention intention?

Figure 1 illustrates the theoretical model that guides current research questions. To respond to RQ1, a person-centered strategy is used to search for evidence of relatively homogeneous subgroups within the overall samples based on EVT and prior literature (Eccles and Wigfield, 2002; Wang et al., 2019). We hypothesized that the identified motivation profiles would reflect disparities in motivation levels among kindergarten teachers in China's ethnic minority areas (high, medium, and low).

Regarding RQ2, we proposed that more favorable motivation profiles would be positively correlated with more positive work engagement, workplace wellbeing, and retention intention.

Concerning RQ3, we were interested in the mechanism underlying the association between distinct motivation profiles and retention intention. Based on previous theories (e.g., conservation of resources theory, etc.) and studies, we expected that a favorable motivation profile would enhance kindergarten teacher's retention intention through a greater work engagement and workplace wellbeing. In contrast, we anticipated that the negative motivation profile would diminish kindergarten teacher's retention intention through a lower work engagement and worsened workplace wellbeing.

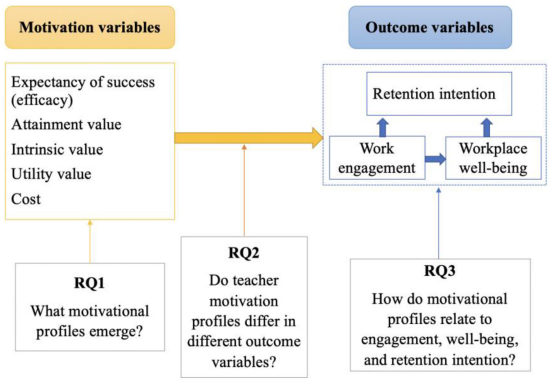

FIGURE 1
Theoretical model.

Materials and methods

Participants and procedures

A total of 3,378 adolescents participated (Me = 15.60, SD = 1.51) in this study, include ageing 1,513 (44.70%) boys, 1,820 (54.00%) girls, and 45 participants (1.30%) with missing gender information; among them were 1,237 middle school students (seventh and eighth graders), 2,109 high school students (tenth and eleventh graders), and two participants with missing grade information. Participants and their parents received informed consent information from the school and were told they could leave the study whenever they desired. They completed the questionnaire in the classroom, and all measurements and procedures were approved by the Institutional Review Board (IRB) of the authors' institution.

Convenience sampling was used to obtain kindergarten teachers' data in ethnic minority areas of China in 2021. Teachers working in 32 kindergartens (such as Ningxia Hui Autonomous Region, Tibetan Autonomous Prefecture, etc.) were sampled. All respondents were notified that their participation in this research was entirely voluntary and the study was for academic purposes. A total of 1,199 valid questionnaires were received. Among the participants, 1,159 identified themselves as female (96.7%), and 40 identified themselves as male (3.30%). Regarding educational level, 283 participants reported to be post-secondary graduates/high school graduates, and 911 (76%) self-identified as undergraduates and 5 (0.4%) claimed to be postgraduates. Regarding teaching experience, 878 teachers (73.2%) had less than 2 years of teaching experience, while 321 teachers (26.8%) had more than 2 years of teaching experience. 768 (65%) were Han, 402 (33.5%) were Hui, and the rest of the samples were from other ethnic groups (such as Bai, Tibetan, Dai, etc.). The institution of the first author's Institutional Review Board (IRB) authorized the research procedure.

Measures

Teaching motivation

The EVT created by Eccles and Wigfield (2002) was used to measure kindergarten teachers' teaching motivation in ethnic minority areas in China. The questionnaire included five subcomponents: Expectancy of success (self-efficacy, e.g., "I'm fit to be a kindergarten teacher."), attainment value (e.g., "Being a kindergarten teacher allows me to contribute to society."), intrinsic value (e.g., "I adore working with kids."), utility value (e.g., "I got a decent salary for local kindergarten."), and cost (e.g., "Kindergarten teachers have less competitive pressure."). A five-point Likert scoring were applied, with 1 indicating "*completely disagree*" and five indicating "*completely agree.*" Cronbach's alphas for the motivation components ranged from 0.795 to 0.892 in this study. CFA showed a good fit, $\chi^2/df = 3.29$, $p < 0.001$, RMSEA = 0.044, CFI = 0.989, TLI = 0.982, SRMR = 0.026.

Working engagement

The Utrecht Work Engagement Scale (Schaufeli et al., 2006) was used to assess work engagement, it includes three subdimensions, namely vigor (two items, e.g., "I feel energetic at work."), dedication (three items, e.g., "I am passionate about my work."), and absorption (two items, e.g., "I was drowned in my work."). A five-point Likert scoring were applied, with one indicating "*completely disagree*" and five indicating "*completely agree.*" Cronbach's alpha for this scale was 0.951. CFA showed a good fit, $\chi^2/df = 3.6$, $p < 0.001$, RMSEA = 0.047, CFI = 0.996, TLI = 0.994, SRMR = 0.008.

Workplace wellbeing

The workplace wellbeing scale was established by Zheng et al. (2015) to assess kindergarten teachers' workplace wellbeing (six items, e.g., "In general, I'm content with my current employment."). A five-point Likert scoring were applied, with 1 indicating "*completely disagree*" and five indicating "*completely agree.*" In the current investigation, Cronbach's alpha was 0.963 for this scale. CFA showed a good fit, $\chi^2/df = 8.3$, $p < 0.001$, RMSEA = 0.078, CFI = 0.992, TLI = 0.987, SRMR = 0.009.

Retention intention

The retention intention of kindergarten teachers was measured using the retention scale developed by

Guo and Sun (2018), which consists of four items (e.g., "I intend to continue to teach in kindergarten"). A five-point Likert scoring were applied, with one indicating "*completely disagree*" and five indicating "*completely agree.*" The Cronbach's alpha in current research was 0.910. CFA revealed a good fit, $\chi^2/df = 2.9$, $p < 0.001$, RMSEA = 0.040, CFI = 0.998, TLI = 0.995, SRMR = 0.009.

Data analysis

For preliminary data processing, descriptive statistics, correlation analysis, and multinomial logistic regression, SPSS 23.0 was utilized. Mplus 7.4 was used to run CFA, LPA, and mediation analysis using the robust maximum likelihood estimation (MLR) (Muthén and Muthén, 1998). To evaluate model fit, the following fit indices were used: The Chi squared goodness of fit test (χ^2), the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root means square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The cutoff criteria suggested by Hu and Bentler (1999), CFI $\geq$ 0.90, TLI $\geq$ 0.90, RMSEA $<$ 0.08, SRMR $<$ 0.1, were used to evaluate the data fit (Chen, 2007).

To answer the RQ 1, we conducted LPA to identify teachers' work motivation profiles. First, one to five class models were examined after the probability profiles of teacher motivation were run with an unconditional LPA. Second, a number of statistical measures, including the Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size adjusted BIC (aBIC), Vuong-Lo-Mendell-Rubin-likelihood ratio test (VLMR), Lo-Mendell Rubin adjusted LRT test (LMR-A), Bootstrap likelihood ratio test (BLRT), and entropy, were used to identify the best solution. Lower AIC, BIC, and aBIC generally indicated better fit of the model. Entropy, which ranges from 0 to 1, described the precision of the categorization, with a larger number suggesting more accuracy (McMullen et al., 2018). The *p*-values of BLRT and VLMRT were significant, showing that k profile model suited the data better than the K-1 profile model (Nylund et al., 2007).

To address the RQ2, we investigated how motivation profiles influence outcome variables (work engagement, workplace wellbeing, and retention intention). Variance analysis was used to investigate differences in outcome variables between latent profiles.

Regarding the RQ 3, we conducted mediation analysis (Hayes, 2013) to determine whether the effect of teaching motivation profiles on retention intention passes through work engagement and workplace wellbeing after controlling for age and gender. The significance level of the indirect effect was assessed using bootstrapping approaches. A bias-corrected bootstrap confidence interval of 95% excluding zero implied that the indirect influence is significant.

Results

Preliminary analyses

Latent variable correlations were displayed in **Table 1**. Modified CFA showed a suitable fit, $\chi^2/df = 10.17$, $p < 0.001$, RMSEA = 0.087, CFI = 0.934, TLI = 0.899, SRMR = 0.077. All indicators were found to be significantly linked with one another. The average scores of intrinsic value, attainment value, utility value, self-efficacy, and cost had modest correlations, indicating that LPA was appropriate.

Profiles of teaching motivation

As further evidence for identifying the best profile solution, we examined the characteristics of profiles. **Table 2** displayed the fit indices of LPA. AIC, BIC, and aBIC continued to fall from the first- to fifth-profile model. **Table 2** displayed the fit indices of LPA. From the first to the fifth profile model, AIC, BIC, and aBIC continued to decrease. When the fourth profile was included, the AIC, BIC, and adjusted BIC decreased, the reductions were small ($\triangle$AIC = 1145.71; $\triangle$BIC = 1079.56; $\triangle$aBIC = 1120.85, respectively) when compared to the fit index in first three subgroups. Furthermore, the entropy of the third-profile (entropy = 0.946) was better than that of the fourth-profile ($p = 0.004$) from the VLMR and BLRT results. Notably, the fourth- and fifth-profile model produced profiles that were almost comparable to those produced by the three-profile model (based on the group disparities in these indicators). These profiles merely subdivided the percentage of specific indicators of motivation variable, with no further comparison value. Overall, the third-profile model was adopted in current study.

Table 3 showed the average posterior probabilities of profile membership. The probabilities for the three-profile model were 97.30, 98.10, and 97.10%, respectively, indicating reasonable discriminability and reliability (Nagin, 2005).

Latent means of the five motivational indicators from the third-profile were provided in **Table 4**. This study identified three unique motivation profiles for kindergarten teachers labeled "low value-high cost" (profile 1), "moderate all" (profile 2), and "high value-low cost" (profile 3) in **Figure 2**. These labels were allocated based on scores for specific indicators of motivation variables (i.e., intrinsic value, attainment value, utility value, self-efficacy, cost), and the group difference on those indicators. The "low value-high cost" (profile 1) accounted for 11.1% of the overall sample, and these kindergarten teachers in this profile showed lower intrinsic value, attainment value, utility value, moderate self-efficacy, and highest cost. For this group, Kindergarten teachers in ethnic minority areas have insufficient teaching ideal and beliefs, and the teaching profession cannot satisfy their physical needs, resulting in higher teaching pressure. Kindergarten

teachers in ethnic areas with "moderate all" (profile 2) showed moderate intrinsic value, attainment value, utility value, self-efficacy and cost, accounting for 57.4% of the sample. For this group, these kindergarten teachers believed they are suitable for teaching in kindergarten to some extent, had a moderate interest in teaching and a sense of achievement, and were concerned about children's development; they also expected the rewards of wealth and social status that come with teaching in ethnic areas, and they experienced stress and tension at work (such as facing the assessment and evaluation of the Education Bureau). Nearly 31.5% of the kindergarten teachers belonged to the "high value-low cost" profile (profile 3) and had high intrinsic value, attainment value, utility value, self-efficacy, and low cost. Kindergarten teachers in this profile experienced positive values of teaching, and they were not afraid of difficulties in teaching (such as resourcefully resolve conflicts and contradictions between parents and kindergarten).

TABLE 1 Correlations of latent variables.

	1	2	3	4	5	6	7	8
1. Intrinsic value	1							
2. Attainment value	−0.436***	1						
3. Utility value	0.479***	−0.212**	1					
4. Self-efficacy	−0.249**	0.531***	−0.209**	1				
5. Cost	−0.315**	0.180**	−0.623***	0.151**	1			
6. Work engagement	0.622***	−0.244**	0.535***	−0.252**	−0.365***	1		
7. Workplace wellbeing	0.657***	−0.314**	0.580***	−0.325***	−0.405***	0.833***	1	
8. Retention intention	0.767***	−0.337**	0.602***	−0.283**	−0.420***	0.720***	0.781***	1

**$p < 0.01$; ***$p < 0.001$.

TABLE 2 Model fit results of latent profile analyses.

No. of profiles	AIC	BIC	aBIC	Entropy	VLMR	BLRT
1	38739.77	38861.91	38785.68			
2	35663.14	35851.44	35733.92	0.921	0.000	0.000
3	33753.82	34008.29	33849.47	0.946	0.000	0.000
4	32608.11	32928.73	32728.62	0.940	0.004	0.000
5	30515.53	30902.31	30660.90	0.943	0.000	0.000

TABLE 3 Average latent class probabilities for most likely class membership (row) by latent class (column).

	Profile 1	Profile 2	Profile 3	*N* (%)
1	0.973	0.027	0.000	133 (11.1%)
2	0.009	0.981	0.010	688 (57.4%)
3	0.000	0.029	0.971	378 (31.5%)

TABLE 4 Adjusted standardized means and standard errors of the three motivation profiles.

Variables	Profile 1		Profile 2		Profile 3		*F*	*Post-hoc*
	M (95% CI)	*SE*	*M* (95% CI)	*SE*	*M* (95% CI)	*SE*		
Intrinsic value	2.29 [2.15, 2.42] ^{2,3}	0.07	3.89 [3.87, 3.93]^{1,3}	0.02	0.487 [4.84, 4.89] ^{1,2}	0.02	1805.36***	3 > 2 > 1
Attainment value	3.01 [2.85, 3.18]^{2,3}	0.08	4.07 [4.04, 4.09] ^{1,3}	0.01	4.91 [4.89, 4.93] ^{1,2}	0.01	1122.79***	3 > 1 > 2
Utility value	2.34 [2.21, 2.48]^{2,3}	0.07	3.26 [3.20, 3.31] ^{1,3}	0.03	4.04 [3.95, 4.14] ^{1,2}	0.05	230.41**	3 > 1 > 2
Efficacy	3.56 [3.41, 3.70]^{2,3}	0.07	3.97 [3.94, 3.99] ^{1,3}	0.01	4.69 [4.65, 4.74] ^{1,2}	0.02	409.58**	3 > 2 > 1
Cost	3.78 [3.63, 3.92]^{2,3}	0.07	3.08 [3.02, 3.15] ^{1,3}	0.03	2.55 [2.42, 2.67] ^{1,2}	0.06	79.75***	3 > 2 > 1
Engagement	2.92 [2.77, 3.07]^{2,3}	0.08	3.68 [3.64, 3.72] ^{1,3}	0.02	4.47 [4.41, 4.53] ^{1,2}	0.03	386.577***	3 > 2 > 1
Wellbeing	2.96 [2.79, 3.12]^{2,3}	0.08	3.85 [3.82, 3.89] ^{1,3}	0.02	4.62 [4.57, 4.70] ^{1,2}	0.03	446.179***	3 > 2 > 1
Retention intention	2.62 [2.47, 2.76]^{2,3}	0.07	3.76 [3.72, 3.80] ^{1,3}	0.02	4.67 [4.63, 4.71] ^{1,2}	0.02	839.578***	3 > 2 > 1

1, Profile 1; 2, profile 2; 3, profile 3.

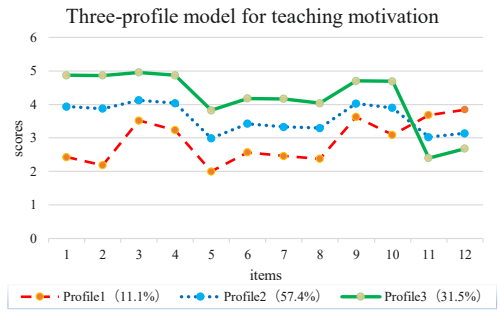

FIGURE 2
Three-profile model for kindergarten teacher motivation.

Outcomes of kindergarten teachers' motivation profiles

Table 4 displayed the means of these outcome variables, and statistical significance of the comparison at the level of each pairwise outcome variables for the three profiles. Figure 3 depicted the exact means of the three outcome variables.

The results indicated that the "low value-high cost" (profile 1) had significantly lower work engagement, workplace wellbeing, and retention intention than the "moderate all" (profile 2) and "high value-low cost" (profile 3). Among the three profiles, the "high value-low cost" (profile 3) had the most positive effects on work engagement, workplace wellbeing, and retention intention.

Examination of the mediation model

Figures 4, 5 illustrated the findings of chained mediation analysis. All the models' effects indices were reported in Tables 5, 6. With "moderate all" (profile 2) as the reference group, "low motivation-high cost" (profile 1) had direct effects ($\beta = -0.249$, $p < 0.001$) on retention intention. The "low motivation-high cost" (profile 1) was related with lower work engagement ($\beta = -0.419$, $p < 0.001$). Work engagement was significantly linked to workplace wellbeing ($\beta = 0.770$, $p < 0.001$), and workplace wellbeing was significantly related with retention intention ($\beta = 0.492$, $p < 0.001$). Further study performed the bootstrapping method. Repeated samples were taken 1,000 times and 95% confidence intervals were calculated. The results ranged from −0.510 to −0.326 (not including zero), indicating that work engagement and workplace wellbeing could partially mediate the association between "low motivation-high cost" (profile 1) and retention intention. Specifically, results revealed that the total mediating effect of the three mediating paths was −0.319. The total effect was 0.568, which was the sum of the direct and total mediation effects. The effect size was the value of each mediation effect divided by the total effect. The effect size of the three mediation paths was 15.14, 13.03, and 27.99%, respectively.

With "moderate all" (profile 2) as the reference group, "high value-low cost" (profile 3) had direct effects ($\beta = 0.270$, $p < 0.001$) on retention intention. The "high value-low cost" (profile 3) was associated with higher ($\beta = 0.552$, $p < 0.001$) work engagement. Work engagement was significantly connected with workplace wellbeing ($\beta = 0.762$, $p < 0.001$), and workplace wellbeing was significantly connected with retention intention ($\beta = 0.514$, $p < 0.001$). A bootstrapping method was also used to further analysis mediating effect (1,000 bootstrap). This finding revealed a range of 1.024–1.152 (not including zero), indicating that work engagement and workplace wellbeing could partially mediate the association between "low motivation-high cost" (profile 2) and retention intention. Specifically, the results revealed that the total mediating effect of the three mediating paths was 0.360. The total effect was −0.521. The effect size of the three mediation paths is 12.38, 10.47, and 34.29%, respectively.

Discussion

This study adds to our understanding of kindergarten teachers' motivation by (1) modeling the complexity of kindergarten teachers' motivation using LPA; (2) evaluating the relevance of kindergarten teachers' profiles for outcome variables, namely, work engagement, workplace wellbeing, and retention intention; and (3) exploring the association mechanism between kindergarten teacher profiles and retention intention. These findings contribute to prior study by developing a holistic view of the complicated system that links work motivation, antecedents, and outcomes among kindergarten teachers in ethnic minority areas in China.

Kindergarten teachers' motivation profiles

The primary goal of our research was to establish the motivation profiles of kindergarten teachers based on EVT. The findings, which were consistent with earlier study, revealed that kindergarten teachers from ethnic minority areas in China may have more than one reason for choosing teacher as their profession.

Among the work motivation of kindergarten teachers, three distinct profiles were identified: "low value-high cost," "moderate all," and "high value-low cost." The most common profile was "moderate all," which characterized by relatively moderate motivation indicators (i.e., intrinsic value, attainment value, utility value, self-efficacy, and cost). This indicated that most teachers (57.4%) had profiles that indicated patterns of moderate all in all indicators. 31.5% kindergarten teachers

FIGURE 3
Outcome levels in the final 3 profile solution.

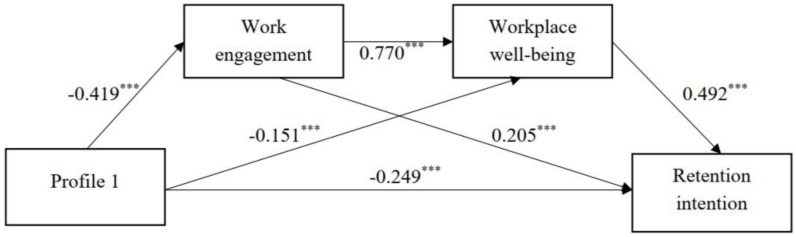

FIGURE 4
Mediating role of work engagement and workplace wellbeing in the association between "low motivation-high cost" (profile 1) and retention intention. Moderate all (profile 2) was the reference group of kindergarten teacher motivation profiles. Unstandardized path coefficients were reported.

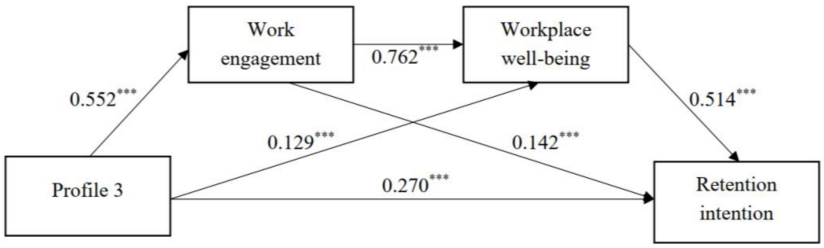

FIGURE 5
Mediating role of work engagement and workplace wellbeing in the association between "high value-low cost" (profile 3) and retention intention. Moderate all (profile 2) was the reference group of kindergarten teacher motivation profiles. Unstandardized path coefficients are reported.

belonged to the "high value-low cost," which was the most idealized configurations of teachers. Because these teachers not only had positive intrinsic value, attainment value, utility value and higher efficacy in teaching, but also had lowest cost, which meant that teachers have the confidence to actively overcome difficulties in teaching. The proportion of "low value-high cost" (11.1%) was the lowest, resulting in the lowest intrinsic value, attainment value, utility value, self-efficacy, and highest cost. This is because teachers' teaching behavior was influenced by a low sense of achievement, material dissatisfaction, a lack of interest in teaching, low teaching efficiency and great work pressure.

These findings also supported the EVT that a teacher's motivation to teach is the result of a conjunction of motivating indicators. Hence, a sole factor would not be sufficient to accurately predict a teacher's motivation behavior, and numerous positive elements could be mobilized to motivate

TABLE 5 Models' effects indices.

Effect	Path relationship	Effect size	Bootstrapping (95% CI)	Relative mediation effect (%)
Direct effect	Profile 1 → retention intention	−0.249	[−1.191, −0.883]	43.84
Indirect effect	Profile 1 → engagement → retention intention	−0.086	[−0.314, −0.143]	15.14
	Profile 1 → wellbeing → retention intention	−0.074	[−0.288, −0.131]	13.03
	Profile 1 → engagement → wellbeing → retention intention	−0.159	[−0.510, −0.326]	27.99
Total indirect effect		−0.319	[−1.612, −1.318]	56.16
Total effect		−0.568		100

Low motivation-high cost = profile 1.

TABLE 6 Models' effects indices.

Effect	Path relationship	Effect size	Bootstrapping (95% CI)	Relative mediation effect (%)
Direct effect	Profile 3 → retention intention	0.270	[0.840, 0.988]	42.86
Indirect effect	Profile 3 → engagement → retention intention	0.078	[0.060, 0.208]	12.38
	Profile 3 → wellbeing → retention intention	0.066	[0.075, 0.162]	10.47
	Profile 3 → engagement → wellbeing → retention intention	0.216	[0.306, 0.454]	34.29
Total indirect effect		0.36	[1.024, 1.152]	57.14
Total effect		0.63		100

High value-low cost = profile 3.

kindergarten teachers to engage in optimum teaching behavior. The study also sheds light on the association between kindergarten teachers work motivation and the geographical areas they are working in. Previous research have indicated that most kindergarten teachers regarded teaching as a demanding and stressful profession (Zhang et al., 2019; Rad et al., 2022a), especially for those who work in metropolitan areas (Cao, 2008). Nonetheless, this study found that several kindergarten teachers in ethnic minority areas demonstrated a relatively positive work motivation pattern, which could be explained by China's affirmative action policies favoring ethnic minority areas. For instance, since 2010, the government has implemented a variety of educational reforms aimed at increasing teachers' motivation to teach in ethnic minority areas, including meeting their material needs (e.g., decent salary), providing more opportunities for professional development and promotion, and forging a comfortable work environment (Long, 2021; Long and Yuan, 2021).

Differences in outcome variables among profiles

The present study's third aim was to investigate if teacher motivation profiles differ in different outcome variables (work engagement, workplace wellbeing, and retention intention). The study discovered some differences across the three motivation profiles in terms of engagement, workplace wellbeing, and retention intention. The "high value-low cost" profile reported better work engagement, workplace wellbeing, and retention intention than the other profiles. The "moderate all" profile exhibited less work engagement, workplace wellbeing and retention intention than "high value-low cost" profile. Kindergarten teachers with the "high value-low cost" profile appear to be more advantaged than those with the other profiles, because positive work attitudes of teachers will promote better work performance, which will subsequently support education quality development (Rad et al., 2022b). Kindergarten teachers with the "low value-high cost" profile, on the other hand, appear to be at risk because they showed the least work engagement, workplace wellbeing, and retention intention, which could lead to attrition and shortages of teachers (Hong et al., 2021), affecting the quality of kindergarten education in minority areas (Long, 2021). These findings supported previous researches (Li et al., 2015; Howard et al., 2016; Zhang et al., 2019), demonstrating that more favorable motivation profiles were link to higher work engagement, workplace wellbeing, and retention intention.

Associations between kindergarten teacher motivation profiles and outcomes

This study's fourth aim was to examine the underlying mechanism between the work motivation profiles and kindergarten teachers' retention intention in ethnic minority areas in China. It was found that work engagement and

workplace wellbeing emerged as mediators between work motivation profiles ("high value-low cost" profile; "low value-high cost" profile) and retention intention.

Regarding the first mediation link (i.e., motivation profiles-work engagement-retention intention), we found that the kindergarten teachers in the "low value-high cost" profile ("high value-low cost" profile) had a lower (higher) work engagement, compared to those in the "moderate all" profile, which was aligned with conservation of resources theory. Because processing resources (such as motivation) promotes the acquisition of extra resources (Hobfoll, 2002). Previously, similar accumulated effects on work engagement have been established (Valero and Hirschi, 2016). Furthermore, the findings also demonstrated that people who perceive higher (lower) work engagement are more (less) motivated to stay at the same organization, which in line with Sánchez-Cardona et al. (2021)'s view. According to the above views, positive motivation (i.e., "high value-low cost" profile) may initiate a behavior process that makes work more engaging, resulting in a desire to remain in the same organization.

In terms of the second mediation link (i.e., motivation profiles-workplace wellbeing-retention intention), findings indicated that kindergarten teachers in the "low value-high cost" profile ("high value-low cost" profile) had lower (higher) workplace wellbeing than those in the "moderate all" profile, which is consistent with person-organization fit theory. This meant that when employees' motivations are highly aligned with those of their job, they are more likely to respond positively to organizational practices, resulting in increased positive affect and attitudes at work, indicating job wellbeing (Fu et al., 2020; Samfira and Paloș, 2021). Additionally, the results also confirmed that individuals who perceive higher (lower) workplace wellbeing are more (less) motivated to stay with their current post, which consistent with model of wellbeing improvement and employer outcomes (Sears et al., 2013). That is, workplace wellbeing could influence employees' psychological disengagement from work and their capacity to perform, which may ultimately result in resignation or long–term employment (Sears et al., 2013; Bardach et al., 2022). According to the above perspective, more motivated teachers (those with a "high value-low cost" profile) experienced a greater sense of workplace wellbeing that might predict teachers' retention intention.

Finally, the chain mediation model demonstrated that kindergarten teacher work motivation profiles could indirectly influence their retention intention via the chain-mediated effect of work engagement and workplace wellbeing. Specifically, compared with those in the "moderate all" profile, kindergarten teachers in the "low value-high cost" profile ("high value-low cost" profile) could decrease (enhance) work engagement, which may in turn affect kindergarten teachers' workplace wellbeing and further predict their retention intention, in line with Job Demands Resources Model. This study also suggested that the mechanism of work motivation profiles influencing kindergarten teachers' retention intention was complicated. Even though this study identified independent mediating effects of work engagement and workplace wellbeing, and the chain mediating effect they generate, all three paths had partial mediating effects. We found that, among all the paths in which kindergarten teachers' work motivation profiles affect their retention intention, the chain mediating path had the greatest indirect effect value ("high value-low cost" profile → work engagement → workplace well-being → retention intention). This finding indicated that "high value-low cost" profile of kindergarten teachers was the most ideal group, because these kindergarten teachers had a stronger retention intention and demonstrated positive internal work experience. Therefore, among effort to retain kindergarten teachers in China's ethnic minorities, greater emphasis should be placed on improving their enthusiasm and developing their internal psychological resources.

Research implications

Our findings have some practical implications for understanding kindergarten teachers' motivation profiles and the important factors associated with it. First, the study indicated that expectancy of success, attainment value, intrinsic value, utility value and cost may help differentiate motivation profiles. This provides an effective intervention method by satisfying teachers' demands, identifying the deficiencies in the teaching profession, and assisting them in coping with challenges.

Second, these results suggest that minority kindergarten teachers with lower education level were more motivated at work, while highly educated teachers were less likely to be motivated and therefore more likely to turnover. Therefore, such a dilemma posed a challenge for education administrators and stakeholders—how to balance among teachers' effectiveness, motivation, and retention. One strategy is to promote holistic programs that integrate kindergarten teacher motivation and desired outcomes (work engagement, workplace wellbeing, and retention intention).

Limitations

This study has limitations that need to be addressed. First, while self-report was adequate for measuring psychological characteristics, the accuracy of the results could be further increased should more additional objective indicators and assessments be used. Second, additional predictive indicators and outcome variables for work motivation could be considered

in order to improve the predictive effect of motivation profiles. For instance, minority policy, past practical experiences, or emotions may all have differing associations with these characteristics. Third, the cross-sectional methodology would not be able to provide a definitive conclusion about causation, and a longitudinal study should be used to analyze changes in kindergarten teacher profiles and to highlight the interaction of these variables. Finally, the profiles in a northwest ethnic minority context has limited implications for other cultural backgrounds, as cultural differences could lead to variation in the number and configuration of the teacher motivation profiles. Identifying profiles may differ in different provinces of China and other nations with their own education evaluation systems (i.e., the developmental prospects of preschool teachers vary by region in China).

Conclusion

This study firstly classified kindergarten teachers' motivation profiles in ethnic minority areas in China. The findings revealed that kindergarten teachers may have more than one reason for choosing teachers as their profession. Secondly, kindergarten teacher with different motivation profiles have significant differences in work engagement, workplace wellbeing, and retention intention. Finally, work engagement and workplace wellbeing mediated the association between motivation profiles and retention intention.

Data availability statement

The original data in this study are available from DS (dashengshi@yahoo.com) or MZ (zhangmm817@foxmail.com) upon request.

Ethics statement

The studies involving human participants were reviewed and approved by the Institutional Review Board (IRB) of Minzu University of China. The participants provided their written informed consent to participate in this study.

Author contributions

DS and MZ planned the design of the study, organized the data collection and formal analysis, and drafted the original draft. MZ, YC, RJ, and XY reviewed and edited the draft. All authors contributed to the manuscript and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Exploring classroom-based assessment for young EFL learners in the Chinese context: Teachers' beliefs and practices

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Classroom-based assessment (CBA) is an approach for learning improvement that has been advocated as having strong potential in enhancing learner autonomy of young language learners (YLLs). This study investigated Chinese primary school English as a foreign language (EFL) teachers' beliefs about CBA, their assessment practices, and the relationship between their CBA beliefs and practices. Drawing on data from a survey of 195 Chinese primary school EFL teachers, results showed that the teachers positively believed in the value of various CBA processes, including planning assessment, collecting learning evidence, making professional judgments and providing appropriate feedback, and they also attempted to enact these assessment practices; belief-practice alignment was also identified, showing that teachers' beliefs about CBA were significant predictors of their assessment practices. Implications are provided for promoting the implementation of CBA for YLLs in similar contexts.

KEYWORDS

classroom-based assessment, young language learners, teachers' beliefs, Chinese English-as-a-foreign-language learners, teacher education, China

Introduction

Classroom-based assessment (CBA) emphasizes the integration of assessment in the instructional process in order to facilitate student learning (Cizek, 2010). Ever since Black and Wiliam (1998) landmark work on the role of teachers' classroom assessment in maximizing students' learning gains, CBA has been drawing increasing research attention. CBA is considered particularly critical for young language learners (YLLs), defined as children aged approximately 6–12 learning a foreign or second language (Britton, 2021). This is because YLLs bring to their language learning their own unique characteristics of cognitive, social, emotional and physical growth, literacy development, and vulnerability (McKay, 2006). Characteristics such as these warrant special attention to assessment of YLLs. Thus, CBA has been strongly promoted for YLLs given its potential to foster children's development of self-regulation (Butler, 2021).

However, despite a growing research interest in assessment of YLLs, little empirical evidence has been reported on how language teachers implement CBA in young learner

contexts. In their critical review of the most important publications on assessing YLLs' language abilities over the past two decades, Nikolov and Timpe-Laughlin (2021) noted that CBA for YLLs is an area in need of more consideration and research. Specifically, the limited body of research on CBA for YLLs has examined the accuracy of CBA as a tool for measuring the language abilities of YLLs, effectiveness of CBA as a means of stimulating language learning of YLLs, and teachers' CBA practices for YLLs as well as influencing factors (e.g., Butler and Lee, 2010; Liu and Brantmeier, 2019; Kaur, 2021). These studies yielded mixed results about the accuracy of CBA for YLLs, unpacked the effects of CBA on YLLs' language learning performance and attitudes, and offered insights into the current status of the implementation of CBA for YLLs. Nevertheless, much less attention has been paid to teachers' beliefs and practices pertinent to CBA for YLLs. This is an important gap because teachers' beliefs can have a powerful impact on their instructional practices (Pajares, 1992; Borg, 2003; Dixon et al., 2011; Sun and Zhang, 2021). The extent to which CBA is effectively implemented in young learner classrooms will be affected by teachers' beliefs about the purposes and nature of CBA. Examining the interaction between teachers' CBA beliefs and practices, therefore, can help us better understand how CBA can be integrated into language instruction to young learners. Understanding teachers' beliefs is also an essential part of teacher education programs that aim to promote change in teachers' classroom behaviors (Borg, 2011; Wu et al., 2021a). Studying teachers' beliefs about CBA, therefore, may shed light on how to design teacher professional development activities aimed at promoting the enactment of CBA for YLLs.

To fill this void, this study aims to investigate primary school English-as-a-foreign-language (EFL) teachers' beliefs and practices related to CBA in the Chinese context. The study contributes to the literature by uncovering teacher belief-practice relationships in CBA for YLLs. It also seeks to offer practical implications for teacher educators, school administrators and policy makers so as to help advance the implementation of CBA in young EFL learner contexts.

Literature review

CBA

CBA refers to any assessment embedded in classroom instruction, either explicit or implicit, regarded as in opposition to traditional large-scale tests external to the classroom (Turner, 2012). Technically, it is viewed as a process that "teachers and students use in collecting, evaluating, and using evidence of student learning" (McMillan, 2013, p. 1). In this sense, CBA is a process-based practice rather than a simple assessment instrument. CBA is broadly conceived as serving two purposes: summative assessment (SA) and formative assessment (FA), often referred to as assessment of learning and assessment for learning, respectively (Brookhart, 2004; Wu et al., 2021c). SA is primarily designed to 'elicit evidence regarding the amount or level of knowledge, expertise or ability' (Wiliam, 2001, p. 169) for administrative or reporting purposes, with a focus on scores. FA, on the other hand, focuses on using assessment to promote student learning (Black and Wiliam, 2009). It emphasizes the provision of descriptive feedback (rather than scores) as evidence about student learning, through which students are informed about their strengths and weakness, and scaffolded to close the gap between their current and desired performance (Sadler, 1989). Students, in particular, play a vital role in the assessment process, whereby they have an awareness of learning goals and assessment criteria, and actively engage themselves in self-and peer assessment (Pryor and Crossouard, 2008). Assessment conducted in this way is seen to have great potential in developing students' capacity to self-regulate their learning (Assessment Reform Group, 2002; Panadero et al., 2018). Notwithstanding the two different purposes for assessment, the boundary between SA and FA is not as clear cut as usually represented because the same assessment information can be used for different purposes at different times (Rea-Dickins, 2007). It is how the information is used which provides the key distinction. In some cases, SA can be used formatively and FA can be used to serve a summative function (Dixson and Worrell, 2016; Dolin et al., 2018). Summative tests, for example, which typically take place at the end of a unit or term to record learning attainments, can be used to adjust teaching and improve students' learning in the future. FA practices, such as self-and peer assessment, have the potential to generate a lot of data about students' progress, which can be recorded and further used for summative reporting purposes. More recently, scholars have pointed out that, in an assessment for learning culture, all assessments, including those for administrative and reporting purposes, can and need to be implemented with a central aim of facilitating learning (Black and Wiliam, 2018; Davison, 2019).

Researchers have put forward a number of frameworks casting light on how to translate CBA for learning principles into practice. These include Black and Wiliam (2009) five strategies of formative assessment, Hill and McNamara (2011) framework for CBA processes, Davison and Leung (2009) framework for teachers-based assessment, and more recently learning-oriented assessment related frameworks (Carless, 2011; Turner and Purpura, 2016). Despite their differences, all the frameworks emphasize three instructional processes that are critical to student learning improvement, i.e., where learners are going, where they are in their learning, and how to get there (Wiliam and Thompson, 2008). Davison and Leung (2009) framework is particularly operational as it conceptualizes CBA into a cycle of four steps, addressing the process-based feature of CBA. It provides a working approach for the analysis of teachers' classroom-embedded assessment practice, and thus was selected as the analytical framework for the present study.

The first step of Davison and Leung (2009) framework, planning assessment (PA), focuses on clarifying learning goals and assessment criteria to ensure that students have an awareness of

where they are going. Selecting assessment methods that suit the needs of students is also an important element of this step. The second step, collecting learning evidence, is to collect instructionally tractable evidence of student learning, which can be achieved through various methods, such as spontaneous assessment opportunities (SAO), planned assessment opportunities, and formal assessment tasks (FATs; Hill and McNamara, 2011; Turner and Purpura, 2016). In the next step, making professional judgments (MPJ), collected learning evidence is interpreted in relation to established standards (i.e., criterion-referenced assessment) or students' progress made over time (i.e., pupil-referenced assessment). The final step, providing appropriate feedback, moves students forward through descriptive feedback that enables students to recognize their learning gap and monitor their own learning to close such gap. These four steps of CBA are interrelated with one another, rather than separated, and need to be implemented in a holistic way to fulfil the overriding aim of supporting student learning.

Assessing YLLs

Assessing YLLs warrants a great deal of attention because of their unique age-related characteristics, which are generally categorized into three types: growth, literacy and vulnerability (McKay, 2006). First, YLLs are undergoing cognitive, social and emotional, as well as physical growth, which is nonlinear and dynamic (Berk, 2017). For example, they have short attention span, usually love physical activities, and are developing social awareness and a sense of self-esteem, which generates a strong demand for teachers to select or conduct appropriate assessment tasks (Patekar, 2021). Second, compared with older or adult learners, YLLs are still developing literacy skills in their first language when they are learning a foreign language, and this can have both conflicting and constructing influence on their literacy skills in the foreign language (Butler, 2016). Third, YLLs are particularly vulnerable to adults' praise and criticism concerning their assessment performance. Their experience with assessments can have a long-lasting impact on their learning motivation, self-confidence, and learning outcome (Butler, 2019).

Against the backdrop of the above unique characteristics of YLLs, researchers have proposed principles for effective assessment of YLLs (Edelenbos and Vinjé, 2000; Hasselgreen, 2000; Cameron, 2001). Some key principles are summarized as follows: assessment tasks should fit with YLLs' learning experience, reflecting those activities conducted in class; traditional achievement tests should not be viewed as the only form of assessment, instead, alternative forms of assessment, such as student portfolios, self-and peer assessment, need to be promoted for YLLs; assessment processes should help YLLs to monitor their language learning and develop their self-regulation abilities. CBA has been recognized as a practical solution to address such principles. It incorporates clear clarification of learning goals, multiple assessment methods, and quality feedback toward learning goals. Through CBA, YLLs can become aware of goals, develop positive learning attitudes, and gradually develop a sense of control over their own learning (Butler, 2021).

Given that assessment of YLLs is a newly emerging field (Hasselgreen, 2012), many areas have been underexplored, among which is CBA for YLLs, in particular. Limited research on this area has, however, highlighted that the implementation of CBA in young learner contexts is less than straightforward. For example, teachers of young learners fail to make assessment criteria explicit (Hild and Nikolov, 2011), frequently apply traditional assessment methods (e.g., objective tests; Prošić-Santovac et al., 2019; Yan et al., 2021), provide mostly evaluative feedback (e.g., marks) (Brumen et al., 2009), and mainly use assessment for summative purposes (Rixon, 2016). Moreover, research suggests that much can constrain teachers' CBA enactment, such as teachers' low assessment literacy (Vogt and Tsagari, 2014), lack of training in assessment (Patekar, 2021), limited opportunities for professional development (Lee et al., 2019), tight curriculum content (Mak and Lee, 2014), and an examination-oriented culture (Kaur, 2021). It could thus be said that although CBA is regarded as an effective approach to the improvement of YLLs' learning, the implementation of CBA in local contexts is a challenging endeavor.

L2 teachers' beliefs and practices regarding CBA

Despite the aforementioned research efforts into the enactment of CBA in young learner contexts, teachers' beliefs and practices about CBA for YLLs, as well as their relationship, remains largely under-investigated. Teacher beliefs, used interchangeably with teacher conceptions and teacher cognition, generally refer to "the unobservable cognitive dimension of teaching—what teachers know, believe and think" (Borg, 2003, p. 81). Teachers hold beliefs about various aspects of their work like teaching, learning, teachers, students, curriculum and materials (Borg, 2001), and their beliefs exist as a system wherein some core beliefs are stable and hard to change, while others are peripheral (Pajares, 1992). Studies have shown that teachers' beliefs can exert a powerful influence on their instructional decisions (Burns et al., 2015; Li, 2020), though such beliefs may not always be reflected in their practices (Johnson, 1992; Dixon et al., 2011). Multiple factors, such as contextual complexities (e.g., class size, time constraints, authority's influence), teachers' teaching experience, and students' needs, can determine the extent to which teachers can act according to their beliefs (Phipps and Borg, 2009; Roothooft, 2014). In this study, teachers' CBA beliefs refer to teachers' views toward the processes of CBA, including PA, collecting evidence, making professional judgments, and providing feedback, and teachers' CBA practices are described as the enactment of these processes.

Research on L2 teachers' beliefs and practices related to CBA has produced mixed results. There is evidence of a powerful effect that teachers' beliefs have on the way they

implement CBA practices (e.g., Mui So and Hoi Lee, 2011; Wang, 2017; Prošić-Santovac et al., 2019; Wu et al., 2021b). Mui So and Hoi Lee (2011), for instance, investigated English-as-a-second-language (ESL) secondary school teachers' beliefs and practices of CBA for learning and found that their assessment practices consistently reflected their beliefs about the purpose of CBA. Similar congruence between teachers' CBA beliefs and practices was identified in EFL contexts (Zhou and Deneen, 2016; Wu et al., 2021c). However, more studies have reported discrepancies teachers' CBA beliefs and practices (e.g., Xu and Liu, 2009; Chen et al., 2014; Gan et al., 2018; Nasr et al., 2018; Vattøy, 2020; Wang et al., 2020; Mäkipää, 2021). For example, in their study of two university EFL teachers' enactment of CBA, Chen et al. (2014) found that the teachers expressed positive attitudes toward students' involvement in the assessment process, whereas in their actual practice, they seldom engaged students in self-and peer assessment. More recently, Vattøy (2020) interviewed ten secondary EFL teachers in Norway and found misalignment between teachers' beliefs and practices regarding formative teacher feedback. These studies have also shown that L2 teachers' CBA beliefs and practices are affected by individual factors (e.g., students' needs, core beliefs held by teachers and their teaching experience) and sociocultural factors (e.g., policy support, class size, time constraints, prescribed curriculum and assessment culture).

One significant gap emerges from the existing studies on L2 teachers' CBA beliefs and practices is that a majority of the previous studies were concerned mainly with secondary and university teachers, and less space has been devoted to teachers of YLLs. More research is needed regarding teachers' beliefs and practices pertinent to CBA in young learner contexts. As discussed earlier, YLLs set themselves apart from older learners due to their special age-related characteristics. While previous research has offered insights into how secondary and university language teachers perceive and enact CBA for older learners, whether teachers of YLLs manifest similar beliefs and practices about CBA remains unknown. Given that teachers' beliefs are context-dependent (Yu et al., 2020), further investigation into teachers' beliefs and practices about CBA in young learner contexts is essential. Another important gap is that previous studies on L2 teachers' CBA beliefs and practices merely focused on one or two aspects of CBA, with an intensive discussion on self-and peer assessment and teacher feedback (e.g., Chen et al., 2014; Vattøy, 2020; Mäkipää, 2021). To address this gap, two recent studies, conducted by Wang et al. (2020) and Wu et al. (2021c) respectively, have attempted to investigated language teachers' beliefs about CBA in a more comprehensive way. Nonetheless, both studies were contextualized within university EFL classrooms. Thus, the current study, situated in the Chinese context, aims to investigate primary school EFL teachers' beliefs and practices relating to the holistic process of CBA, including PA, collecting evidence, MPJ, and providing feedback.

Research questions

Informed by the research gaps discussed above, this study seeks to address the following three questions:

RQ1: What beliefs do primary school EFL teachers hold about the processes of CBA?

RQ2: How do primary school EFL teachers implement CBA practices?

RQ3: To what extent do primary school EFL teachers' beliefs about CBA align with their practices?

Methodology

A questionnaire-based survey study was conducted to answer the research questions. Descriptions of the instrument, data collection, participants, and data analysis are provided in the ensuing sections.

Instrument

Our research instrument, the Primary School English Teachers' CBA questionnaire, was developed in a larger study on the implementation of CBA for young learners in China (Yan, 2020). The questionnaire comprised four sections: Perceived-purpose Scale, Perceived-process Scale, Practice Scale, and Demographic Information. The present study focused on the Perceived-process Scale and the Practice Scale, which examined teachers' beliefs about the processes of CBA and their self-reported CBA practices, respectively.

Following Dörnyei and Taguchi (2010) guidelines, we first identified potential constructs of the Perceived-process Scale and the Practice Scale with reference to Davison and Leung (2009) framework of CBA. As discussed earlier, four dimensions are included in this framework: PA, collecting learning evidence, making professional judgments and providing appropriate feedback. The dimension collecting learning evidence was designed in this study to emphasize three types of assessment methods: SAO, planned assessment opportunities and FATs. Given the importance of distinguishing descriptive feedback from evaluative feedback (Wiliam, 2010), both types of feedback were included in the dimension providing appropriate feedback. Thus, seven potential constructs were included in both the Perceived-process Scale and the Practice Scale: PA, using SAO, using planned assessment opportunities, using FATs, MPJ, providing descriptive feedback (PDF), and providing evaluative feedback (PEF).

Forty-four items were initially generated for both scales, most of which were drawn from the Beliefs about Assessment and Evaluation questionnaire (Rogers et al., 2007), the Classroom Assessment questionnaire (Cheng et al., 2004), the "Learning How to Learn" project's questionnaire (James and Pedder, 2006), and the Assessment Practices Inventory (Zhang and Burry-Stock, 2003). Some items were generated on the basis of the

semi-structured interviews conducted with three primary school EFL teachers who did not participate in the main study. The first researcher interviewed the three teachers individually, during which an open, comprehensive topic was discussed: What do you think about the purposes of teachers' classroom assessment and what assessment practices do you employ when assessing your students? The teachers' responses were used as a source for the item pool. For example, when asking about assessment practices, one teacher described that "I frequently check whether students have mastered what they learned in class through classroom tests, dictation and recitation." This guided the writing-up of the questionnaire items such as "Teachers collect evidence of learning through classroom tests" and "Teachers collect evidence of learning through dictation." Two 6-point Likert scales were established to study teachers' beliefs about CBA in the Perceived-process Scale (1 = Not important at all, 2 = Not important, 3 = Somewhat important, 4 = Important, 5 = Very important, 6 = Completely important), and their self-reported CBA practices in the Practice Scale (1 = Never, 2 = Very rarely, 3 = Rarely, 4 = Occasionally, 5 = Frequently, 6 = Always), respectively.

Finally, to examine the content validity, two experts and a group of postgraduates were invited to provide feedback on the content relevance, clarity and comprehensiveness of the two scales, based on which two items were dropped, retaining 42 items, and some items were revised. The items were originally generated in English, and then translated from English to Chinese by the first author and a doctoral student, using a back-translation method (Nunan and Bailey, 2009). The questionnaire was then piloted with 26 primary school English teachers, who did not participate in the main study and provided comments on questionnaire clarity and administration procedures. Modifications were made and a finalized questionnaire was obtained (Appendix A).

Data collection

The first author collected the questionnaire data. A convenience sampling strategy that is commonly used in L2 research (Dörnyei, 2007) was used to collect questionnaire responses from teachers who were teaching EFL at primary schools in China. Specifically, the target participants were primary school EFL teachers from one municipality and one province in China, to whom the first researcher had access. To approach these participants, an information sheet was first sent to six primary school EFL teaching advisors in the two places, who had the responsibility of providing guidance to teachers' daily teaching and were in charge of all teachers in their own districts. An online questionnaire invitation was then sent out to primary school teachers through the advisors. A total number of 312 questionnaires were received. Of those, 117 questionnaires with an obvious response set (i.e., almost the same answers for all the items) were excluded, leaving 195 valid responses.

Participants

As Table 1 shows, a majority of the teacher participants were female (96.9%, $n = 189$), and most teachers were aged under 40 years (72.9%, $n = 142$). Over three quarters of the teachers held a bachelor's degree (78.5%, $n = 153$), with a small minority holding a master's degree and a degree lower than the Bachelor (21.5%, $n = 42$). About half of the participants had 6 to 20 years' experience of teaching EFL to primary school students (52.3%, $n = 102$); 33.8% ($n = 66$) had less than 5 years and 13.5% ($n = 27$) had over than 20 years. The number of teachers from public schools (88.2%, $n = 172$) was larger than that from private schools (11.8%, $n = 23$). Of the participants, 69.2% ($n = 136$) taught lower grade levels (Grades 1, 2, 3 and 4), and a similar number taught higher grade levels (Grades 5 and 6) (64.1%, $n = 125$). Most participants had completed a course on assessment or received training in assessment (64.6%, $n = 126$).

Data analysis

Questionnaire data was analyzed using SPSS 24. Missing data, outliers, and normality distribution were checked first. Exploratory factor analysis (EFA) was then conducted to explore

TABLE 1 Demographic information of the teacher participants.

Demographics	Groups	Number	Percentage
Gender	Male	6	3.1
	Female	189	96.9
Age	Under 30	51	26.2
	31–40	91	46.7
	41–50	45	23.1
	Over 50	8	4.0
Educational qualification	Under Bachelor	30	15.4
	Bachelor	153	78.5
	Master	12	6.1
Teaching experience	Less than 1 year	18	9.2
	1–5 years	48	24.6
	6–10 years	22	11.3
	11–15 years	45	23.1
	16–20 years	35	17.9
	Over 20 years	27	13.8
School type	Public	172	88.2
	Private	23	11.8
Grade level	Grade1	14	6.7
	Grade 2	8	4.1
	Grade 3	49	25.1
	Grade 4	65	33.3
	Grade 5	67	34.4
	Grade 6	58	29.7
Assessment-related course	No	69	35.4
or training	Yes	126	64.6

the underlying constructs of the Perceived-process Scale and the Practice Scale. Assumptions were checked through Kaiser-Meyer-Olkin's (KMO) Test of Sampling Adequacy and Bartlett's Test of Sphericity. Factors were extracted using principal axis factoring with non-orthogonal rotation (Direct Oblimin, $\delta = 0$) solution. A factor loading with a minimum absolute value of 0.30 was required. The results indicated a 37-item seven-factor solution and a 31-item six-factor solution for the Perceived-process Scale and the Practice Scale, respectively, (underlying constructs of the perceived-process scale and practice scale).

To answer RQ1 regarding teachers' beliefs about CBA, descriptive analysis was conducted to obtain a general understanding of teachers' beliefs about the seven factors. And repeated-measures ANOVA was calculated to examine the differences of teachers' beliefs among different factors. The same analyzes were run to answer RQ2 regarding teachers' self-reported CBA practices. To answer RQ3 regarding teachers' belief-practice relationship, correlation analysis and multiple regression analysis were carried out. Correlation analysis was performed to examine whether there existed a direct relationship, and the latter was performed to explore how well teachers' CBA beliefs could predict their practices.

Results

Underlying constructs of the perceived-process scale and practice scale

Underlying constructs of the perceived-process scale

In the process of EFA of 42 items on the Perceived-process Scale, five items yielded cross-loadings over 0.30 on more than one factor and thus were discarded. The cross-loading of four items (Item 1.12, Item 1.26, Item 1.28 and Item 1.31) may be explained by the fact that the four key steps of CBA are interrelated with one another. For instance, Item 1.12 'Teachers collect evidence of learning through classroom observation', which was initially designed as a potential item for the construct using SAO, cross-loaded onto the construct PDF. The potential construct using SAO emphasizes that incidental assessment opportunities like teacher observation can be generated by teachers to timely obtain learning evidence and provide immediate feedback (Turner and Purpura, 2016). From a conceptual perspective, this construct not only addresses the method of evidence collection but also the formative purpose of using such method, and thus is related to the potential construct PDF that has a focus on evidence use. Therefore, it can be deduced that the cross-loading of Item 1.12 was justified. Besides, the cross-loading of another item, Item 1.7, may be associated with construct clarity.

According to Davison and Leung (2009), selecting appropriate assessments is an important element of the construct PA, based on which Item 1.7 was generated as "Teachers select appropriate assessment methods according to students' needs when PA." This potential item, however, cross-loaded onto the construct PA and the construct using SAO. This finding indicates that the construct PA appears to require clarification and offers a possibility of considering selecting appropriate assessment methods as an element of collecting learning evidence. After the five cross-loading items were removed, seven factors were extracted, with a cumulative contribution of 72.54% (KMO = 0.934, $df = 666$, $p < 0.001$). Cronbach's alpha coefficients (α) of the seven factors ranged from 0.834 to 0.953, indicating good internal consistency.

Table 2 shows that Factor 1, PDF contained seven items ($a = 0.953$) regarding using feedback to improve student learning, such as identifying strengths and weaknesses in relation to learning goals and finding solutions to help students improve their learning. Factor 2 included six items ($a = 0.911$), revealing how regular instructional activities like oral presentations and role plays can be conducted as assessment opportunities, where students often play an active role in the assessment process, for instance, being involved in self-and peer assessment. These six items were originally designed to be covered by the construct planned assessment opportunities, which addresses that teachers can design or plan instruction-embedded activities to elicit student learning. However, in order to highlight students' active role, this factor was relabeled student-involving assessment opportunities (SIA). Factor 3, using FAT, included five items ($a = 0.886$) showing the use of more formal types of assessments (e.g., classroom tests, dictation, oral reading and reciting). Factor 4, PEF, included four items ($a = 0.834$) focusing on providing feedback to students and parents about their achievement through scores and grades. Factor 5, PA, covered six items ($a = 0.847$) in relation to establishing and sharing instructional objectives and assessment criteria with students. Factor 6, MPJ, contained three items ($a = 0.889$) showing how judgments of students' performance could be made by comparing their performance to pre-set learning goals or their previous performance. Factor 7, using SAO, included six items ($a = 0.881$) revealing how informal and unplanned assessments (e.g., teacher questioning, teacher-student conversations) could be embedded in daily instruction to modify teaching and provide immediate feedback to students. It can be seen that the original seven constructs of the Perceived-process Scale were retained with EFA.

Underlying constructs of the practice scale

In the process of EFA of the 42 items on the Practice Scale, four items had lower loadings of 0.30, four items loaded on more than one factor, and another three items were identified as outlying ones at they were unrelated to other items on the same factor. The cross-loading of the items on the Practice Scale (Item 2.10, Item 2.11, Item 2.25, Item 2.28) is likely to be explained by the precision of language wording. For example, Item 2.25 'I take account of students' language knowledge (e.g., vocabulary, grammar) when interpreting assessment data', as a potential item for the construct making professional judgments, was cross-loading onto the construct using FAT. A careful examination of

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TABLE 2 Results of the perceived-process scale.

Items	Factor loading						
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
	PDF	SIA	FAT	PEF	PA	MPJ	SAO
Item 1.42	0.890						
Item 1.41	0.880						
Item 1.40	0.854						
Item 1.39	0.828						
Item 1.38	0.742						
Item 1.37	0.696						
Item 1.27	0.318						
Item 1.19		0.807					
Item 1.18		0.799					
Item 1.17		0.653					
Item 1.20		0.638					
Item 1.16		0.546					
Item 1.15		0.540					
Item 1.22			0.809				
Item 1.23			0.766				
Item 1.24			0.718				
Item 1.21			0.641				
Item 1.25			0.352				
Item 1.34				0.754			
Item 1.33				0.602			
Item 1.35				0.568			
Item 1.36				0.394			
Item 1.1					0.788		
Item 1.2					0.721		
Item 1.5					0.519		
Item 1.3					0.427		
Item 1.4					0.394		
Item 1.6					0.305		
Item 1.30						0.809	
Item 1.29						0.712	
Item 1.32						0.603	
Item 1.11							−0.707
Item 1.10							−0.694
Item 1.8							−0.647
Item 1.9							−0.592
Item 1.14							−0.435
Item 1.13							−0.371

this item showed qualitative difference in wording as compared to some other potential items for the same construct. The use of "take account of" seemed to indicate that this item focused on what to be assessed. However, other items like Item 2.29, and Item 2.30 used "compared students' current performance against" to suggest a clear focus on how to make sense of assessment data. The wording difference, as a result, might affect participants' interpretation of the items. In the final solution, 11 items were discarded and six factors were extracted, explaining 71.48% of variance (KMO = 0.925, $df = 465$, $p < 0.001$). Cronbach's Alpha coefficients (a) of the six factors ranged from 0.848 to 0.954.

As Table 3 shows, Factor 1, PDF, contained six items ($a = 0.954$) reflecting teachers' use of detailed feedback to help students recognize their strengths and weaknesses in learning and move their learning forward. Factor 2, PA, with seven items ($a = 0.885$), reflected teachers' practices of establishing and sharing instructional objectives and assessment criteria with students as well as selecting appropriate assessment methods. Factor 3, SIA,

TABLE 3 Results of EFA of the practice scale.

Items	Factor loading					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
	PDF	PA	SIA	FAT	SAO	MPJ
Item 2.41	0.952					
Item 2.38	0.865					
Item 2.42	0.845					
Item 2.40	0.803					
Item 2.39	0.754					
Item 2.37	0.722					
Item 2.5		−0.847				
Item 2.1		−0.817				
Item 2.2		−0.772				
Item 2.7		−0.706				
Item 2.6		−0.687				
Item 2.3		−0.686				
Item 2.4		−0.520				
Item 2.16			0.865			
Item 2.17			0.839			
Item 2.15			0.721			
Item 2.18			0.690			
Item 2.14			0.436			
Item 2.22				0.826		
Item 2.21				0.662		
Item 2.23				0.639		
Item 2.24				0.637		
Item 2.13					−0.557	
Item 2.19					−0.554	
Item 2.12					−0.501	
Item 2.20					−0.477	
Item 2.9					−0.353	
Item 2.30						−0.702
Item 2.32						−0.673
Item 2.29						−0.500
Item 2.31						−0.477

with five items ($a = 0.871$), reflected teachers' use of instruction-embedded assessment opportunities where students played a major role (e.g., self-assessment, peer assessment). Factor 4, FAT, with four items ($a = 0.848$), showed teachers' use of FATs to collect learning evidence (e.g., classroom tests, dictation). Factor 5, SAO, with five items ($a = 0.859$), revealed teachers' use of incidental instruction-embedded assessments (e.g., observation, oral questioning). Factor 6, MPJ, with four items ($a = 0.879$), showed how teachers made professional interpretation of assessment information. The results show that only six constructs were retained with EFL, with the original construct PDF being dismissed. The reason is that two initial items (Item 3.35 and Item 3.36) of PDF had a lower loading of 0.30 during the process of factoring. Another two items (Item 3.34 and Item 3.34) of PDF loaded onto the factor FAT and were regarded as outlying variables because these two items focused on how teachers reported students' performance while the four items of the factor FAT were related to teachers' use of formal tasks to evaluate students' performance. This was confirmed by the reliability coefficient for the factor FAT, showing that Cronbach's alpha became higher if Item 3.33 and Item 3.34 were deleted.

Teachers' CBA beliefs

Descriptive data of teachers' beliefs of the CBA processes are displayed in Table 4. The seven factors derived from the Perceived-process Scale all had a mean score higher than 4.0 ("Important"), indicating that the teachers believed that the various processes of CBA were important for the enhancement of

TABLE 4 Descriptive data of teachers' CBA beliefs.

CBA beliefs	*M*	*SD*
Beliefs of planning assessment (PA)	5.07	0.55
Beliefs of using spontaneous assessment opportunities (SAO)	4.83	0.57
Beliefs of using student-involving assessment opportunities (SIA)	4.67	0.62
Beliefs of using formal assessment tasks (FAT)	4.86	0.56
Beliefs of making professional judgments (MPJ)	4.96	0.56
Beliefs of providing descriptive feedback (PDF)	5.08	0.56
Beliefs of providing evaluative feedback (PEF)	4.64	0.60

TABLE 5 Descriptive data of teachers' CBA practices.

CBA practices	*M*	*SD*
Practices of planning assessment (PA)	5.23	0.55
Practices of using spontaneous assessment opportunities (SAO)	5.07	0.53
Practices of using student-involving assessment opportunities (SIA)	4.55	0.65
Practices of using formal assessment tasks (FAT)	4.96	0.60
Practices of making professional judgments (MPJ)	5.04	0.53
Practices of providing descriptive feedback (PDF)	5.04	0.56

student learning. Specifically, they agreed that PA and PDF were especially valuable, judging from the mean scores that exceeded 5.0 ("Very important").

One-way repeated-measures ANOVA was conducted to examine differences among teachers' beliefs regarding the seven factors. The assumption of normal distribution was satisfied given that the values of skewness (from −0.421 to 0.209) and kurtosis (from −0.251 to 1.037) fell within the cut-off values of|3.0|and|8.0|respectively (Kline, 2011). Mauchly's Test showed that the assumption of sphericity had been violated, x^2 (20) = 68.888, $p < 0.001$, so Greenhouse–Geisser of Huynh-Feldt ($\varepsilon = 0.909$) was applied to adjust degrees of freedom. The results of ANOVA showed that there were significant differences in the importance attached to the CBA processes, F (5.289, 1026.070) = 42.694, $p < 0.001$, $\eta^2 = 0.18$. Follow-up pairwise comparisons with Bonferroni corrections indicated that all pairwise differences were significant ($p < 0.05$) excepted four paired comparisons, namely PA and PDF ($p > 0.05$), SAO and FAT ($p > 0.05$), SIA and PEF ($p > 0.05$), FAT and MPJ ($p > 0.05$). This suggested that the teachers considered PA and PDF to be the most important CBA processes in promoting student learning. As for the specific assessment methods for learning evidence collection, they placed greater emphasis on SAO (e.g., teacher questioning, observations) and FAT (e.g., classroom tests, textbook exercises, recitation), whereas a relatively lower preference was shown for SIA (e.g., self-assessment and peer assessment). They also believed strongly in the value of MPJ (e.g., comparing learning evidence against pre-set goals). Comparatively, from teachers' perspective, SIA and PEF were the least important CBA processes.

Teachers' CBA practices

Table 5 presents the descriptive data of teachers' self-reported CBA practices. The mean scores for PA, SAO, MPJ and PDF exceeded 5.0 ("Frequently") and those for SIA and FAT exceeded 4.0 ("Occasionally"). The results revealed that, on average, the teachers reported frequent-use of PA, SAO, MPJ and PDF and occasional-use of SIA and FAT.

One-way repeated measures ANOVA was applied to examine the differences among the six factors. The data met the assumption of normal distribution (the values of skewness ranging from −0.285 to 0.150, and the values of kurtosis from −0.704 to 0.467), but the assumption of sphericity was violated, x^2 (14) = 79.825, $p < 0.001$.Therefore, Greenhouse–Geisser of Huynh-Feldt ($\varepsilon = 0.877$) was applied. Significant differences were identified in the frequency of different CBA practices, F (4.277, 829.715) = 66.582, $p < 0.001$, $\eta^2 = 0.256$. Follow-up pairwise comparisons with Bonferroni corrections showed that all pairwise differences were significant ($p < 0.05$) except six paired comparisons, namely, SAO and FAT ($p > 0.05$), SAO and MPJ ($p > 0.05$), SAO and PDF ($p > 0.05$), FAT and MPJ ($p > 0.05$), FAT and PDF ($p > 0.05$), MPJ and PDF ($p > 0.05$). The results revealed that, according to the teachers' self-report, PA was the most frequently used CBA practice. As for collecting learning evidence, the teachers frequently used assessment methods of SAO (e.g., oral questioning and observations) and FAT (e.g., classroom tests and recitation tasks), while SIA (e.g., self-assessment and peer assessment) was less frequently used. Meanwhile, they reported frequent use of MPJ (e.g., made judgments of students' performance against learning objectives or their previous performance) and PDF (e.g., providing feedback to students to identify learning strengths and weaknesses). In general, SIA was the least frequently used CBA practice by the teachers.

In summary, Chinese primary school EFL teachers in this study showed strong positive attitudes toward CBA, perceiving that PA and PDF were the most important assessment processes. While they emphasized the value of using multiple assessment methods, they placed more importance on SAO and FATs than student-involving assessment opportunities. MPJ were also considered as imperative for improving student learning. PEF, as opposed to PDF, gained the least popularity among teachers. A similar pattern was identified in their self-reported CBA practices, as they reported the most frequent practice of PA, multiple use of assessment methods to collect students' learning evidence (with a heavy reliance on SAO and FAT), as well as frequent practice of MPJ and PDF. Such a similar pattern seemed to indicate alignment between teachers' beliefs about CBA and their assessment practices.

Relationship between teachers' CBA beliefs and practices

To examine the relationship between teachers' beliefs and their self-reported practices related to CBA, correlation analysis was first conducted. As seen in Appendix B, each of the seven factors of teachers' beliefs about CBA was positively and significantly correlated with the six factors of teachers' self-reported CBA practices. Thus, six multiple regression analyzes using each of the six self-reported CBA practices as dependent variables were conducted, with the seven factors of teachers' beliefs about CBA being set as predictors (see Table 6). The seven factors of teachers' beliefs were found to have a significant effect on teachers' CBA practices.

First, the results of multiple regression showed a significant model for the practice of PA, $R^2 = 0.311$, adjusted $R^2 = 0.286$, $df = (7,187)$, $F = 12.078$, $p < 0.001$. The PA practice was predicted by the factors regarding teachers' beliefs about PA ($\beta = 0.369$, $p < 0.001$) as well as PDF ($\beta = 0.273$, $p < 0.01$). Second, the results showed a significant model for the practice of SAO, $R^2 = 0.331$, adjusted $R^2 = 0.306$, $df = (7,187)$, $F = 13.225$, $p < 0.001$. Such practice was predicted by teachers' beliefs about SAO ($\beta = 0.349$, $p < 0.001$). Third, a significant model was identified for the practice of SIA, $R^2 = 0.232$, adjusted $R^2 = 0.193$, $df = (7,187)$, $F = 6.398$, $p < 0.001$. Likewise, this practice was predicted by the factor of teachers' beliefs about SIA. Fourth, a significant model was found for the practice of FAT, $R^2 = 0.235$, adjusted $R^2 = 0.206$, $df = (7,187)$, $F = 9.191$, $p < 0.001$. In the same vein, the practice was predicted by teachers' beliefs about FAT ($\beta = 0.417$, $p < 0.001$). Regarding the practice of MPJ, a significant model was also identified, $R^2 = 0.299$, adjusted $R^2 = 0.273$, $df = (7,187)$, $F = 11.410$, $p < 0.001$). Such practice was predicted by teachers' beliefs of MPJ ($\beta = 0.253$, $p < 0.01$) and PDF ($\beta = 0.201$, $p < 0.05$). Finally, a significant model was identified for the practice of PDF, $R^2 = 0.376$, adjusted $R^2 = 0.352$, $df = (7,187)$, $F = 23.044$, $p < 0.001$), showing that the factor of teachers' beliefs of PDF was a significant predictor ($\beta = 0.491$, $p < 0.001$).

Overall, the above results revealed strong relationships between Chinese primary school EFL teachers' beliefs about CBA and their assessment practices. Their beliefs regarding PA, SAO, SAI, FAT, MPJ and PDF were found to be important predictors of the related assessment practices.

Discussion

Results of this study indicated that Chinese primary school EFL teachers generally held positive attitudes toward the various processes of CBA, and also reported that they attempted to enact CBA practices in their classrooms to support learning of YLLs. Their beliefs about CBA seemed to have a powerful influence on their assessment practices. Overall, this study contributes to the literature by comprehensively examining teachers' self-reported beliefs and practices regarding CBA for young EFL learners in the Chinese context. Each research question is addressed in light of the findings.

Regarding the first research question, the findings revealed that Chinese primary school EFL teachers agreed on the importance of various processes of CBA (e.g., PA, collecting learning evidence, MPJ, providing appropriate feedback). Similar findings have been reported in the literature (e.g., Wang et al., 2020; Golzar et al., 2022). For example, in the recent study by Golzar et al. (2022), Afghan university EFL teachers perceived that student-involving assessment methods (e.g., self-and peer

TABLE 6 Predictions of teachers' CBA beliefs on CBA practices.

Predictors	Teachers' CBA practices					
	Practice-PA	Practice-SAO	Practice-SIA	Practice-FAT	Practice-MPJ	Practice-PEF
Beta (β)						
Teachers' CBA beliefs						
Belief-PA	0.369***	0.095	−0.141	−0.012	0.088	−0.065
Belief-SAO	−0.048	0.066	0.036	−0.003	−0.050	−0.077
Belief-SIA	0.086	0.157	0.437***	−0.024	0.045	0.199
Belief-FAT	0.028	0.092	0.014	0.417***	0.076	0.077
Belief-MPJ	0.005	−0.011	0.062	0.108	0.253**	0.052
Belief-PDF	0.273**	0.349***	−0.090	−0.008	0.201*	0.491***
Belief-PEF	−0.120	−0.087	0.109	0.047	0.026	−0.004
R^2	0.311	0.331	0.193	0.235	0.299	0.376
Adjusted R^2	0.286	0.306	0.163	0.206	0.273	0.352
df	(7,187)	(7,187)	(7,187)	(7,187)	(7,187)	(7,187)
F	12.078***	13.225***	6.398***	9.191***	11.410***	26.071***

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.

assessment) and quality feedback were of great value in student learning improvement. However, Indonesian EFL teachers in Puad and Ashton (2021) study mainly viewed CBA from a summative perspective, showing negative attitudes about self-and peer assessment and believing in the value of scores and grades in making students accountable. This differs from the finding of the current study. It seems that the teaching and learning context is an important factor on teachers' beliefs about CBA.

As for the specific processes of CBA, the teachers in this study placed the greatest importance on PA, addressing the value of establishing and sharing clear instructional objectives and success criteria with students. This finding is close to Wu et al. (2021b) investigation in the Chinese university EFL context, where the teachers attached importance to communicating learning goals and success criteria to students. The significance of articulation of learning goals and success criteria, as suggested by previous research (Timperley and Parr, 2009; Balloo et al., 2018), is that it enables students to be truly engaged in the process of deep learning rather than surface-level learning that has a focus on task completion, which is important for students' self-regulatory capacity. The teachers in this study also believed that, when making judgments, it was important to compare students' learning performance against pre-set learning objectives or students' previous learning progress. Such beliefs appear to be held by researchers like Airasian and Abrams (2003) and Jacobs and Renandya (2019), who highly emphasize the value of criterion-referenced assessment and pupil-referenced assessments to mitigate the undesirable negative impact of competition, diagnose students' learning needs, and to identify strategies for learning improvement. In addition, the teachers in this study placed greatest emphasis on the value of descriptive feedback to help students understand what was necessary for achievement and how to overcome difficulties in learning. In comparison, they did not place a high value on evaluative feedback. The findings here are similar to Brumen and Cagran (2011) research where the teachers from three European countries (Czech Republic, Slovenia and Croatia) believed that YLLs should be provided with more descriptive and individual feedback rather than numerical grades. As Brumen and Cagran (2011) suggested, young learners would benefit more directly from descriptive feedback on their learning progress and language development.

However, when it comes teachers' beliefs about collecting learning evidence, complex findings were identified in this study. The teachers placed considerable value on the use of multiple assessment methods, including SAO embedded in daily instruction (e.g., teacher questioning), FATs (e.g., classroom tests), and student-involving assessment opportunities (e.g., self-and peer assessment). This finding has also been seen in other studies (Shohamy et al., 2008; Troudi et al., 2009). Multiple assessment methods have the potential to respond to a wide range of L2 students' learning needs (Leung, 2005). In primary schools in China, teachers usually teach large-size classes with up to 50 students (Wang, 2009; Wu et al., 2021b), leading them to use different forms of assessment to address students' learning needs. Despite their positive attitudes toward multiple assessment methods, the teachers in this study perceived student-involving assessments as less important as compared to other assessment types. The relative conservative beliefs about student-involving assessments like self-and peer assessment might reflect the teachers' concern over the subjectivity and validity of these assessment methods. Indeed, although some empirical evidence has indicated the effectiveness of such assessment methods in promoting YLLs' autonomy (e.g., Butler and Lee, 2010; Liu and Brantmeier, 2019), there is widespread beliefs among teachers that YLLs are too immature for evaluating and self-regulating their own learning, as Butler (2019) noted. Similar traditional beliefs about student-involving assessments have been reported in previous empirical studies with YLLs (Tsagari, 2016). Actually, even for older learners, L2 teachers tend to believe that learners do not seem to have sufficient knowledge to accurately assess their own learning (Puad and Ashton, 2021).

Regarding the second research question, the findings of the present study are generally different from those found in Rixon (2016) international survey study where the teachers from over 100 countries across the globe were investigated regarding their assessment practices in young learner classrooms. In Rixon's study, the teachers mainly used assessment for summative purposes, failing to make full use of assessment information to support YLLs' English language learning. By contrast, in the present study, Chinese primary school EFL teachers attempted to enact various CBA practices to enhance YLLs' language learning, such as PA, using multiple assessment methods, and PDF. Such findings are closer to Lee et al. (2019) study that showed the primary school English teachers' attempts to implement CBA in writing classrooms to benefit student learning in the Hongkong context.

The findings about Chinese primary school EFL teachers' attempts to implement CBA practices, despite being self-reported, are also encouraging for Chinese educational policy makers, which suggest that teachers have tried to translate into action principles of CBA for learning. In China, CBA has begun to attract language assessment experts and researchers' attention since the beginning of the new century, and has become a policy-support practice in the Chinese educational system almost at the same time (Gu, 2012). At the primary school level, CBA, as an assessment initiative, was incorporated into the English Curriculum Standards for Compulsory Education (ECSCE) (2011 version; MOE, 2011), aimed at promoting learner autonomy through the integration of CBA into regular instruction. Such an initiative has been readdressed in the newly published ECSCE (2022 version; MOE, 2022). In this study, a series of CBA practices (e.g., clarifying learning goals and success criteria, using multiple assessment methods, MPJ and PDF) had been implemented in young learner classrooms, as reported by the teachers. These findings revealed that Chinese primary school EFL teachers had provided CBA opportunities for young learners to improve their learning. But it has to be borne in mind that all this was based on what they reported.

Nevertheless, this study found that, among the various CBA practices, the teachers reported the lowest frequency of adopting student-involving assessment opportunities like self-and peer assessments; by contrast, teacher-centered FATs were more frequently conducted with YLLs. This is in accordance with research that has identified that student-involving assessment opportunities do not have much of a presence in practice in L2 classrooms (Saito and Inoi, 2017). Based on teachers' self-reports, it appeared that Chinese primary school EFL teachers did not provide genuine opportunities for young learners to take responsibility for their own learning. This may in part be due to the traditional Chinese culture of teaching and learning, where teachers are conceptualized as the authoritative figure, and students are regarded as passive recipients of knowledge (Carless, 2011). A Chinese saying, 'being a teacher for only 1 day entitles one to lifelong respect from the student that befits his/her father' (yiri weishi zhongshen weifu), expresses this hierarchical teacher-student relationship. Having been influenced by this culture throughout their own student life, Chinese EFL teachers are likely to develop firm beliefs regarding the teacher and student roles (Cheng et al., 2021; Sun and Zhang, 2021; Zhang and Sun, 2022). As such, when conducting assessment, teachers tend to still take a dominant role in assessment and monitoring students' learning despite their beliefs about the beneficial impact of student-involving assessments.

The less frequent use of student-involving assessments might also be attributed to teachers' lack of CBA literacy. Although the majority of teachers in this study reported that they had received assessment-related training or attended related courses, it seems possible that insufficient CBA content had been provided. As Xu and Brown (2017) study showed, Chinese university EFL teachers had insufficient CBA training in both pre-service and in-service courses. Hence the lack of CBA training might hinder teachers from developing essential assessment literacy to translate CBA principles into practice. Previous literature has indicated that CBA-literature teachers will be committed to embedding student-involving assessment opportunities into instruction in an ongoing manner (Dixon et al., 2020).

Regarding the third research question, the findings from the descriptive analyzes revealed that teachers' stated beliefs and practices regarding CBA were generally aligned in certain aspects. For example, the teachers highly valued the clarification of learning objectives and success criteria, professional judgments of student learning and the provision of descriptive feedback, which were reflected in their frequent practices of these CBA processes. Similar finding has been reported by Wang et al. (2020) study, showing that the teachers' practices of making learning explicit matched their beliefs about creating a supporting learning environment and clarifying success criteria. In addition, in the present study, the teachers' beliefs on the use of different assessment methods were largely consistent with their practices. The teachers placed the least value on student-involving assessment opportunities, which was correspondingly reflected in their least frequent practice of SIA. This finding is similar to Wu et al. (2021b) study, where the teachers' beliefs and practices were aligned regarding empowering students in the assessment process. Furthermore, the findings of multiple regression analyzes demonstrated that Chinese primary school EFL teachers' beliefs about CBA were important predictors of their assessment practices, echoing the powerful influence of teachers' beliefs on their instructional behaviors (Borg, 2019). The finding of this study is generally like that of Brown et al. (2015) study, which reports alignment between teachers' assessment beliefs and their self-reported assessment practices in the Indian context. Nonetheless, it needs to be kept in mind that there is no evidence in this study as to teachers' actual classroom assessment practices. It could be that, in actual classroom settings, teachers have not fully implemented CBA practices as what they have reported in the survey, because teachers' self-reported teaching practices do not necessarily reflect their actual classroom behavior (Chen et al., 2012). Further research is needed to explore the beliefs/practice nexus.

Conclusion

Chinese primary school EFL teachers were found to place considerable value on the various processes of CBA for YLLs and reported that they had made attempts to implement CBA practices to facilitate the learning of YLLs. However, it would seem that their CBA practices need to be expanded to incorporate student-involving assessment opportunities, which was also reflected in their beliefs that such assessment opportunities were less important than FATs. In general, the teachers' stated CBA beliefs and practices were in alignment.

Three pedagogical implications are drawn. First, it is recommended that teachers design student-involving assessment opportunities contextualized to the learning objectives of a particular lesson or unit. To maximize the benefits of building young learner autonomy, it is advisable for teachers to guide students to understand the learning objectives and success criteria using learner-friendly languages, and to cooperate with students to reflect on and monitor language knowledge and skills that they have mastered. Second, given the powerful impact of teachers' beliefs on their CBA practices, it is suggested that teacher educators provide student teachers with sufficient experiences with CBA, and school administrators establish professional learning communities where meetings are organized to convey CBA principles and teachers can share their assessment experiences. This helps teachers to form positive beliefs about CBA, which, in turn, could motivate them to well utilize CBA as a pedagogical practice. Third, quality pre-service and in-service professional training programs are needed to help teachers master CBA-related knowledge and skills, especially those related to student-involving assessment opportunities. In this way, teachers will become CBA literate and can implement CBA practices more effectively.

Future studies that collect data from multiple sources, such as classroom observations, teacher interviews and teaching documents, are needed to validate teachers' self-reported CBA practices. tMore research is needed to examine students' beliefs about CBA and the consistency between students' and teachers' perspectives. Research on teachers' experience with CBA-related training and the effect on their CBA practices is also warranted.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by The University of Auckland Human Ethics Committee. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

QY: conceived of the initial idea, designed the study, collected and analyzed the data, and drafted of the manuscript. LZ and HD: revised and proofread the manuscript. All authors agreed to the final version before LZ got it ready for submission as the corresponding author.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1051728/full#supplementary-material

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The relationship between teachers' information technology integration self-efficacy and TPACK: A meta-analysis

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Using the method of meta-analysis, this study explored the relationship between teachers' self-efficacy and TPACK in the context of educational information technology integration and focused on the moderating variables that affect the relationship. Through literature search, 28 independent effect sizes with 7,777 subjects were obtained. Heterogeneity test illustrated that random effects model is appropriate. Funnel plot and Begg and Mazumdar's rank correlation test found there was no publication bias in this meta-analysis. After effect size test, it followed that teachers' information technology integration self-efficacy was significantly positively correlated with TPCK ($r = 0.607$, $P < 0.001$). The moderating effect test indicated that the relationship was moderated by the subjects' career stages, but not by gender, teaching stages, disciplines, and measurement tools.

KEYWORDS

TPACK, information technology integration self-efficacy, meta-analysis, teacher, moderating variables

Introduction

Teachers need to have a rich conceptual understanding of the teaching contents, and combine them with teaching professional knowledge such as teaching procedures, teaching strategies, and teaching methods. After continuous development, application, and adjustment, it can be formed Pedagogical Content Knowledge defined by Shulman (1987). The theoretical creation and development of Pedagogical Content Knowledge laid the foundation for the theoretical construction of technology pedagogical and content knowledge (TPACK) by Koehler & Mishra and others. Subsequently, the TPACK questionnaire developed by Schmidt provided measurement tools for relevant empirical research, marking the development and maturity of TPACK theory, and it also attracted more attention to the research on integrating information technology into education and teaching. Although information technology provides good conditions for teaching to create interactive activities, the use of information technology has not had a positive impact on teaching quality. Teachers' knowledge system has undergone a structural change is of positive significance under the background of information technology

integration. That is, from content knowledge, pedagogical knowledge extending to technological pedagogical and content knowledge.

Through the analysis of TPACK research literature in the past 16 years, it assumed that information technology integration self-efficacy is one of the important influencing factors of teachers' TPACK. Holland constructed the technology integration education Model (TIE Model) and investigated the influencing factors of teachers' TPACK (Holland and Piper, 2014). The impact of values, attitudes, self-confidence and self-efficacy of information technology integration has been confirmed (Koçak-Usluel et al., 2015). As Ertmer pointed out, if teachers do not have a strong sense of information technology integration self-efficacy, they can not make full use of information technology to integrate knowledge and teaching skills (Ertmer and Ottenbreit-Leftwich, 2010). At present, few scholars systematically analyze the quantitative relationship between teachers' information technology integration self-efficacy and teachers' knowledge. Accordingly, this study adopted the method of meta-analysis to examine the relationship between them and explore the moderating variables that may affect the relationship, in order to draw a more general and scientific conclusion.

Concept and measurement of information technology integration self-efficacy

Bandura considered when individuals make judgments that they are capable of completing a certain task, their motivation will be enhanced (Bandura, 1982). Self-efficacy referred to beliefs in the abilities that individuals need to organize and implement plans to achieve specific goals (Bandura, 1977). In the field of education research, Bandura's operational definition of teachers' self-efficacy includes seven dimensions: decision-making efficiency; school resource efficiency; teaching efficiency; discipline maintenance efficiency; parental participation efficiency; community participation efficiency; campus atmosphere creation efficiency. Later, Tschannen-Moran and other scholars have revised the definition, which defined as teachers' belief in the organizational and executive ability required for them to successfully complete specific teaching tasks and action processes under a certain background (Tschannen-Moran et al., 1998). In the field of information technology research, based on Bandura's self-efficacy theory, computer self-efficacy (Murphy et al., 1989; Compeau and Higgins, 1995), Internet self-efficacy (Torkzadeh and Van Dyke, 2001; Hsu and Chiu, 2004), and other concepts were put forward one after another, and then relevant measurement tools and scales were also examined and applied.

Wang contended teachers' information technology integration self-efficacy is a perception of the ability to effectively master and use technologies (such as computer, Internet, and multimedia, etc.) to achieve specific teaching objectives (Wang and Zhao, 2021). As information technology is embedded in education and teaching, more and more researches have been conducted on teachers' information technology integration self-efficacy, and the measurement tools aimed at evaluating the ability of teachers to complete expected information technology-related actions in education and teaching are also diversified. The first type is a specially developed measurement tools of information technology integration self-efficacy. Scale compiled by Wang included 16 items, and the pre-test and post-test reliability coefficients are 0.94 and 0.96, respectively (Wang et al., 2004). Since then, the scale has been widely used in the empirical study of teachers' information technology integration self-efficacy (Niederhauser and Perkmen, 2008; Abbitt, 2011; Zahwa et al., 2021), and got further revised and simplified (Perkmen, 2008; Yeh et al., 2021). The second type is measurement tools adapted from the computer self-efficacy and Internet self-efficacy scale, with only partial adjustments in statements (Sahin et al., 2013; López-Vargas et al., 2017; Cai et al., 2019). Blonder developed a questionnaire of high school chemistry teachers self-efficacy in the context of Facebook use, which was adapted from the teachers self-efficacy questionnaire (Tschannen-Moran and Woolfolk Hoy, 2001) and the computer self-efficacy questionnaire (Murphy et al., 1989), consisting of Facebook use self-efficacy and Facebook uses self-efficacy in teaching (Blonder and Rap, 2017). The last type is to directly use the teacher's self-efficacy scale for measurement, but emphasize the background of the use of information technology (Mishne, 2012).

The relationship between information technology integration self-efficacy and TPACK

TPACK is a developmental teacher knowledge structure, which also represents the ability and level of the teacher's information technology integration behavior in class. In 2005, Mishra and Koehler integrated technology into pedagogical content knowledge (PCK), first proposed the concept of technological pedagogical content knowledge (TPCK) (Koehler and Mishra, 2005), and elaborated the constituent elements of TPCK in 2006 (Mishra and Koehler, 2006). In 2007, Thompson and Mishra renamed it TPACK (Technological Pedagogical and Content Knowledge, pronounced "tee-pack"), meaning Total PACKage. It further emphasizes the importance of integrating content knowledge, pedagogical knowledge and technology knowledge (Thompson and Mishra, 2007; Tseng et al., 2022). TPACK includes 7 elements in total: Content Knowledge (CK), Pedagogical Knowledge (PK), Technology knowledge (TK), and other elements are formed by the interaction between the former, namely, Pedagogical Content Knowledge (PCK),

Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), Technological Pedagogical Content Knowledge (TPCK). Therefore, the effective generation of teaching behavior integrated information technology requires teachers to continuously create, maintain and rebuild the dynamic balance between 7 elements, which needs teachers to clearly select what technology to choose and how to integrate it in teaching (Koehler and Mishra, 2009; Almaiah et al., 2022). Information technology integration behavior is a key representation of TPACK ability. More specifically, teachers' belief about their ability to successfully implement information technology integration behavior is closely related to TPACK, and it is one of the vital factors affecting decision-making and the use of technology in class (Abbitt, 2011). The research has confirmed that when teachers have a strong belief in information technology integration and believe that learning and using technology is interesting, important and useful, they will have a stronger motivation to improve the ability of information technology integration, and then obtain a higher level of TPACK (Anderson and Maninger, 2007; Hsu et al., 2017; König et al., 2022). Conversely, teachers with high TPACK levels but low information technology integration self-efficacy, perhaps, do not use these skills effectively (Kaşci and Selçuk, 2021).

TPACK and information technology integration self-efficacy interact with each other, and this interaction also change with research background. In other words, the interaction between them is dynamic, changing and developing. Different research objectives, tools, statistical methods and other factors may lead to different relationships. The review of empirical research literature shows that, on the one hand, TPACK has a positive impact on teachers' information technology integration self-efficacy (Joo et al., 2018; Yang, 2018; Wang, 2020, 2022; Durak, 2021), however, in terms of various dimensions of TPACK, there are certain differences in this relationship. Abbitt found that TPK, PCK, and TK had a significant positive effect on teachers' information technology integration self-efficacy, but PK had a negative effect on it, and TCK and TPCK had no significant effect (Abbitt, 2011). On the other hand, the positive effect of teachers' information technology integration self-efficacy on TPACK has also been proved, namely, the stronger self-efficacy teachers are, the higher TPACK level they get (Semiz and Ince, 2012; He, 2013; Cao, 2016; Chen, 2018; Xu, 2020; Ladendorf et al., 2021). Cai's research on flipped classroom teaching in universities demonstrated that teachers' computer self-efficacy has a positive effect on their TPCK, and this conclusion was also verified in the research on primary and secondary school teachers (Dong et al., 2020). However, the impact of information technology integration self-efficacy on the elements of TPACK is inconsistent. Song found that teachers' information technology self-efficacy has a direct impact on TPK, but has no direct impact on TPCK in the use of digital textbooks (Song and Sun, 2014). In summary, most scholars have confirmed that there is a significant relationship between teachers' information technology integration self-efficacy and TPACK (Oskay, 2017; Tondeur et al., 2017b; Wang and Zhao, 2021), but in all dimensions of TPACK, this relationship is not completely significant (He, 2013; Lachner et al., 2021). Consequently, this study speculated that there are moderating variables in the relationship between teachers' information technology integration self-efficacy and TPACK.

Moderating variables of the relationship between information technology integration self-efficacy and TPACK

Gender

Current research on the gender effect of information technology self-efficacy has not drawn consistent conclusions. Studies have manifested that there is no differences in teachers' information technology integration self-efficacy between different genders (Bursal and Yigit, 2012; Chen, 2021), instead, some studies have shown that men's information technology integration self-efficacy is significantly higher than that of women (Vekiri and Chronaki, 2008; Ifinedo et al., 2020). Similarly, the research on the gender effect of TPACK sub-dimension has not reached a consistent conclusion. Some studies have shown that there is no significant difference in TPACK sub-dimension between teachers of different genders (Karalar and Altan, 2016). However, other studies have shown that there are gender differences in TPACK and its dimensions, that is, female teachers' CK and PCK are significantly higher than that of male teachers (Farrell and Hamed, 2017), while TK is significantly lower than male teachers (Lin et al., 2013; Ekrem and Recep, 2014). Chen found that there are significant gender differences in the overall level of teachers' TPACK, but there is no gender difference in the dimensions of TPK, TCK, and TPCK. In this case, is the relationship between teachers' information technology integration self-efficacy and TPACK also affected by gender? In the past, studies have rarely discussed it. Thus, this study used meta-analysis to explore the moderating effect of gender on the relationship between teachers' information technology integration self-efficacy and TPACK. This study proposed the first hypothesis that gender moderates the relationship between teachers' information technology integration self-efficacy and TPACK.

Measurement tools

In the literature included in meta-analysis, the measurement tools of teachers' information technology integration self-efficacy fall into the following four categories: (1) Measurement

tools were specially developed for information technology integration self-efficacy. The TISE compiled by Wang not only measured teachers' beliefs in technology ability, but also teachers' technology use strategies. Perkmen revised it and finally formed a simplified scale composed of 6 items, which is widely cited in academia. The Information Communications Technology Self-Efficacy (ICTSE) scale designed by Tondeur includes two dimensions: the ability to guide students to use information technology in class and the ability to use information technology in instructional design, consisting of 19 items. This scale focuses on the specific context of information technology use and its related strategies (Tondeur et al., 2017a). (2) Measurement tools were adapted from computer self-efficacy. The original computer self-efficacy scale (CSE) was compiled by Murphy and others, including three dimensions: primary skills, advanced skills and host skills, with 32 items in total (Murphy et al., 1989). Compeau held computer self-efficacy that refers to a judgment of one's capability to use a computer, and underlines the computer ability in the context of completing tasks. For example, "if someone guides me step by step" "I could use software to complete this work," the participants can make a degree judgment from 10 items. Cai replaced "I could use software to complete this work" with "I could teach using flipped classroom Instruction" to conduct empirical research. (3) Teachers' self-efficacy scale was used to measure information technology integration self-efficacy. Some scholars directly use teachers' self-efficacy scale (TSE) (Tschannen-Moran and Woolfolk Hoy, 2001), but they emphasize the practical background of information technology integrated into teaching (Mishne, 2012; Song and Sun, 2014; Joo et al., 2018; Kaşci and Selçuk, 2021). This type of measurement method aims to evaluate teachers' beliefs in their own abilities and accomplishments, which is broader than directly focusing on information technology integration self-efficacy. In short, the focus of teachers' information technology self-efficacy measurement tools is various. This meta-analysis put forward the second research hypothesis that measurement tools have a moderating effect on the relationship between teachers' information technology integration self-efficacy and TPACK.

Career stages, disciplines and teaching stages

In accordance with current literature, the subjects of the research mainly include pre-service teachers and in-service teachers. Most of the pre-service teachers are college students, who are receiving or have received systematic training in Technological Pedagogical and Content Knowledge, while in-service teachers often have rich teaching experience. So, we believe that these subjects probably have some differences in information technology integration self-efficacy and TPACK, and it is necessary to investigate the moderating role of career stages. Moreover, there are few studies on the effect of their teaching disciplines and teaching stages. Research revealed that each level of mathematics teachers' TPACK is significantly lower than that of English teachers and reading teachers, with the gap of 15% in TPCK (Farrell and Hamed, 2017); other studies concluded that science teachers' TK and TPCK are significantly higher than mathematics teachers (Jang and Tsai, 2012). Some scholars found there is significant difference in every dimensions of TPACK in different teaching stages (Li et al., 2022), but some other scholars believed that although primary school teachers do not have the same level of knowledge and skills compared with high school teachers, while their ability to integrate information technology into teaching practice may be similar (Farrell and Hamed, 2017). In the light of the previous research conclusions, there is no consistent conclusion about the differences between the effect of teaching subject and teaching stages. Accordingly, it is necessary to explore the moderating effect of the two on the relationship between teachers' information technology integration self-efficacy and TPACK, so as to draw a more general research conclusion. In conclusion, the current research mainly investigates the following two questions:

> *First, what is the relationship between teachers' information technology integration self-efficacy and TPACK?*
>
> *Second, is there a moderating effect on the relationship between information technology integration self-efficacy and TPACK from gender, measurement tools, career stages, disciplines and teaching stages on ?*

Methods and materials

Literature search and screening

Literature search

TPACK concept was formally proposed in 2007 (Thompson and Mishra, 2007), therefore, the year 2007 served as the starting point of our search until 2022. In order to retrieve the suitable and substantial quantitative empirical research studies, a systematic and comprehensive search was conducted, based on CNKI, Web of Science, SpringerLink, Google Scholar, and ProQuest. The main search terms are "self-efficacy" and "TPACK."

Literature selection criteria

The inclusion criteria for the literature are as follows:

(1) Research topic: The topic is empirical research on the relationship between teachers' information technology integration self-efficacy and TPACK;

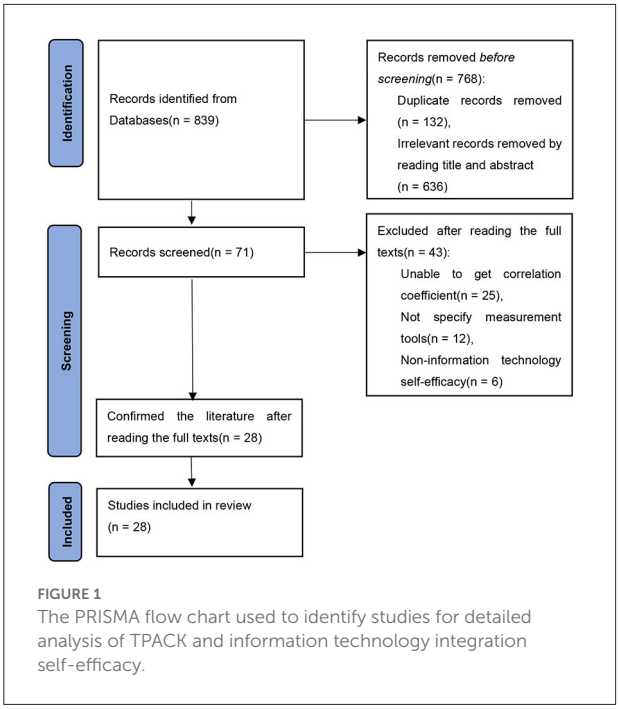

FIGURE 1
The PRISMA flow chart used to identify studies for detailed analysis of TPACK and information technology integration self-efficacy.

(2) Research method: The research method is quantitative empirical, excluding theoretical research or review articles;
(3) Research results: The literature clearly reports the measurement tools of information technology integration self-efficacy, including TISE, ICTSE, CSE, and TSE; The data are complete and clear, the correlation coefficient r between teachers' information technology integration self-efficacy and TPCK, or *F*-value, *t*-value, X^2-value and other statistics which can be converted into r are clearly reported;
(4) Others: The repeated published articles are excluded, and the same data is used only once.

Literature screening process

Literature screening was divided into three steps. The first step was identification, and a total of 839 papers were collected. After primary screening, 636 articles were eliminated by reading the titles and abstracts, and 132 duplicates were removed. The second step was screening. Forty-three articles were deleted based on the screening criteria. The third step was confirmation, through reading the full text again, 28 papers met the selection criteria, including 28 effect values. There are 8 Chinese articles in total, including 5 master's dissertations; and there are 20 English articles, including 1 doctoral dissertations and 1 special article in Indonesian with English abstracts. The flow chart of the article selection process is depicted in Figure 1.

Document coding

The literature included in meta-analysis were coded as follows:

1. Literature information, including independent or first author, publication year;
2. Sample size;
3. Career stages, including pre-service and in-service;
4. Gender is expressed in male proportion;
5. Teaching periods including preschool, primary school, middle school, middle and primary school and university;
6. Teaching subjects, including general subject, English, mathematics, International Chinese, physical education, science, and chemistry;
7. Measurement tools, including TISE, ICTSE, CSE, and TSE;
8. Correlation coefficient.

During the coding process, the validity of the coding was examined through the consistency of the two coders. The first coding consistency was 93.10%. For the documents with inconsistent coding, we finally reached an agreement after discussion. Accordingly, the basic information of the 28 target literature for meta-analysis were identified and coded as shown in Table 1.

Data analysis

In this study, CMA3.0 (Comprehensive Meta-analysis 3.0) was used for meta-analysis, and the correlation coefficient r was used as the effect size. In the coding process, some literature do not directly report the correlation coefficient between information technology integration self-efficacy and TPACK, but report the *F*-value, *t*-value, or X^2-value. We adopted the formula of Wang and other scholars (Wang et al., 2013) to convert it into r value. The applicable condition of fixed effects model is that we assumed all test results have the same and true effect size, and the comprehensive effect is estimate of this common effect size. In contrast, we assumed the true effect size of each study is different in random effects model, and the comprehensive effect is estimate of the mean of the effect size. Specifically, if the total effect size of the meta-analysis is only for the study population and does not generalize to other populations, the fixed effects model should be used; on the contrary, if the subject groups, measurement tools, and experimental paradigms of the meta-analysis literature are different, these differences will affect the final results, and it is reasonable to use random effects model in this case (Wu and Liu, 2014). This study pressed for explore the moderating effect of each variable, therefore, using random effects model is in line with the actual situation.

TABLE 1 Basic information of the original study included in the analysis.

References	*N*	Career stages	Teaching stages	Male%	Disciplines	Measurement tools	r	Dependent variable
Mishne (2012)	32	In-service	Primary school	18%	General subject	TSE	0.32	TPCK
Wang (2014)	150	In-service	Middle school	50%	English	TISE	0.18	TPCK
Wang (2020)	226	Pre-service	University	19.03%	International Chinese	TISE	0.76	TPCK
Durak (2021)	401	In-service	Middle and primary school	41.90%	General subject	TISE	0.612	TPCK
Cai et al. (2019)	111	In-service	University	40%	General subject	CSE	0.55	TPCK
Yang (2018)	150	In-service	Middle school	50%	English	ICTSE	0.33	TPCK
Oskay (2017)	54	In-service	Middle and primary school	43%	General subject	CSE	0.486	TPCK
Tondeur et al. (2017b)	688	Pre-service	Middle and primary school	26.20%	General subject	ICTSE	0.65	TPCK
Abbitt (2011)	45	Pre-service	Preschool	4%	General subject	TISE	0.813	TPCK
Joo et al. (2018)	396	Pre-service	Middle school	35.50%	General subject	TSE	0.49	TPCK
Semiz and Ince (2012)	756	Pre-service	Middle and primary school	56.20%	Physical education	TISE	0.77	TPCK
López-Vargas et al. (2017)	208	In-service	Middle and primary school	22.10%	General subject	CSE	0.448	TPCK
Dong et al. (2020)	366	In-service	Middle and primary school	42.30%	General subject	CSE	0.62	TPCK
Song and Sun (2014)	340	In-service	Primary school	20.61%	English	TSE	0.56	TPCK
Wang and Zhao (2021)	298	Pre-service	Middle and primary school	36.58%	General subject	CSE	0.797	TPCK
Kaşci and Selçuk (2021)	1,127	In-service	Primary school	39.20%	General subject	TSE	0.76	TPCK
Zahwa et al. (2021)	27	Pre-service	Primary school	50%	Science	TISE	0.736	TPCK
Keser et al. (2015)	713	Pre-service	Middle and primary school	37%	General subject	TISE	0.779	TPCK
Sahin et al. (2013)	163	Pre-service	Middle and primary school	44%	General subject	CSE	0.58	TPCK
He (2013)	150	In-service	Middle school	27%	English	TISE	0.36	TPCK
Chen (2018)	110	In-service	Middle school	13.60%	English	TISE	0.786	TPCK
Cao (2016)	255	Pre-service	Middle and primary school	50%	Mathematics	TISE	0.728	TPCK
Chen (2021)	127	Pre-service	Middle school	18.10%	Chemistry	TISE	0.431	TPCK
Xu (2020)	281	Pre-service	Middle and primary school	11.40%	English	TISE	0.574	TPCK
Karalar and Altan (2016)	271	Pre-service	Primary school	28.80%	General subject	TSE	0.55	TPCK
Ariani (2015)	166	In-service	Primary school	50%	Mathematics	TISE	0.403	TPCK
Nathan (2009)	100	Pre-service	Middle and primary school	94%	General subject	TISE	0.42	TPCK
Bakar et al. (2020)	66	In-service	Middle school	15.20%	Mathematics	TISE	0.733	TPCK

(1) In order to save space, only the first author is listed in the table; (2) The proportion of men is 50%, indicating that there is no gender distinction in the literature; (3) General subject refers to the subjects that are not distinguished.

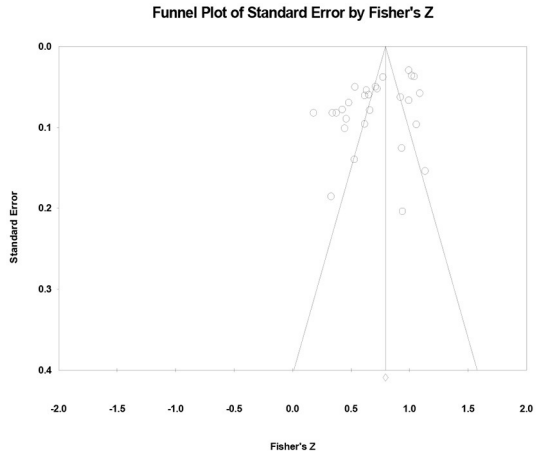

FIGURE 2
Funnel plot of effect sizes of the correlation between information technology integration self-efficacy and TPCK.

Results

Homogeneity test

According to Higgins' classification standard of I^2, 25, 50, and 75% represent low, medium, and high degree of heterogeneity, respectively (Higgins et al., 2003). The results of the heterogeneity test ($Q = 429.03$, $I^2 = 93.71$, $p < 0.001$) proved that 93.71% of the observed variation is owing to real differences in this relationship between information technology integration self-efficacy and TPCK. The Tau-squared value was 0.056, indicating that 5.6% of the variation between studies could be used to calculate the weight. When the effect sizes are heterogeneous, random effects model is usually used for meta-analysis, which is consistent with the previous inferences.

Assessment of publication bias

It can be seen from the funnel plot (Figure 2) that the distribution of literature selected by meta-analysis is basically symmetrical. And there are few points at the bottom right of the funnel plot, which represented that there are few studies with large effect size and poor accuracy; in addition, most of the points are concentrated at the top of the funnel plot, and the points are concentrated at the vertex, indicating that the error is small and the sample size is large. Consequently, the meta-analysis of this study is little affected by publication bias.

Because the funnel plot may be subjective, the Begg and Mazumdar's rank correlation test is further used to evaluate the publication bias. The test results demonstrated that Kendall's Tau value is -0.196 ($p > 0.05$), indicating that there is no publication bias in this meta-analysis, which is consistent with the funnel plot results.

Main effect test

The random effect model was used to test the effect size of the literature that met the requirements. This meta-analysis includes 28 independent samples, with a total of 7,777 subjects. The results of random effect model manifested that the correlation coefficient between teachers' information technology integration self-efficacy and TPACK is 0.607 (CI = 0.545–0.663, $Z = 14.776$, $p < 0.001$), indicating that teachers' information technology integration self-efficacy and TPACK have a moderate positive correlation.

Moderating effect test

This study examined the moderating effects of subjects' gender, career stages, teaching stages, disciplines, and measurement tools on the relationship between teachers' information technology integration self-efficacy and TPACK.

The results in Table 2 showed that the career stage of the subjects ($Qb = 4.296$, $P < 0.05$) affects the relationship between teachers' information technology integration self-efficacy and TPCK. Specifically, the correlation coefficient between pre-service teachers' information technology integration self-efficacy and TPACK is 0.666, which is significantly higher than that of in-service teachers. Gender ($Qb = 2.448$, $P > 0.05$), teaching stages ($Qb = 7.118$, $P > 0.05$), disciplines ($Qb = 8.370$, $P > 0.05$), and measurement tools ($Qb = 1.140$, $P > 0.05$) of the participants, all these above have no moderating role on the relationship between teachers' information technology integration self-efficacy and TPACK.

Discussion

Relationship between teachers' information technology integration self-efficacy and TPACK

This study conducted a meta-analysis of the empirical research on the relationship between teachers' information technology integration self-efficacy and TPACK in recent 16 years, including 28 studies and 7,777 subjects. The results showed that teachers' information technology integration self-efficacy is significantly positively correlated with TPACK ($r = 0.607$, $p < 0.001$), indicating that teachers' information technology integration self-efficacy is closely related to TPACK. As one of the important contributing factors of teaching reform, technology has been confirmed by many studies. Teachers' belief

TABLE 2 The moderating effect of the relationship between teachers' information technology integration self-efficacy and TPACK.

Moderator	Category	k	r	95% CI	Qb(df)	*p*
Male proportion	0–20%	7	0.666	0.539, 0.763	2.448(3)	0.485
	21–40%	10	0.619	0.512, 0.706		
	41–60%	10	0.568	0.447, 0.668		
	81–100%	1	0.42	−0.074, 0.749		
Career stages	pre-service	14	0.666	0.594, 0.727	4.296(1)	0.038
	In-service	14	0.538	0.425, 0.635		
Teaching stages	Preschool	1	0.813	0.542, 0.931	7.118(4)	0.13
	Primary school	6	0.581	0.436, 0.696		
	Middle school	7	0.497	0.353, 0.618		
	University	2	0.673	0.453, 0.815		
	Middle and primary school	12	0.645	0.561, 0.715		
Disciplines	Mathematics	3	0.639	0.45, 0.773	8.37(6)	0.212
	English	6	0.493	0.338, 0.622		
	International Chinese	1	0.76	0.494, 0.896		
	Physical education	1	0.77	0.522, 0.898		
	Chemistry	1	0.431	−0.009, 0.731		
	Science	1	0.736	0.337, 0.911		
	General subject	15	0.619	0.54, 0.688		
Measuring tools	TISE	15	0.634	0.542, 0.711	1.140(3)	0.767
	ICTSE	2	0.513	0.190, 0.736		
	CSE	6	0.599	0.439, 0.722		
	TSE	5	0.568	0.382, 0.709		

in the function of information technology affects the teaching practice of integrating information technology (Abbitt, 2011; Anderson et al., 2011); teachers' belief in information technology ability also affects teachers' attitude toward using information technology in teaching (Papastergiou, 2010; Rohaan et al., 2012). At the same time, teachers who believe in the usefulness of technology are more willing to integrate technology into the classroom, which will have a positive impact on learning results (Nathan, 2009; Karataş, 2014). For instance, the positive impact of TPACK on student academic achievement has been verified by multiple meta-analysis studies (Young, 2016). Bandura held the opinion that the conjunction of interactions between people and context is a key idea in social cognitive theory (Bandura, 2001). In view of the individual factors of teachers and the complex education system, we believe that the improvement of teachers' information technology integration self-efficacy has higher requirements for the information technology environment at the school level, and in turn, it also affects the information technology environment at school. So, the positive relationship between teachers' information technology integration self-efficacy and TPACK should be highly valued by educational practitioners. We can attempt to improve teachers' TPACK level through the improvement of teachers' information technology integration self-efficacy.

Besides, this study further verified many previous research conclusions, that is, teachers' information technology integration self-efficacy is closely related to teachers' technology use behavior. Teachers' technology self-efficacy affects their technology integration behavior in the classroom (Compeau and Higgins, 1995; Albion, 1999). The experience of using technology inside and outside the classroom promotes teachers to establish their faith in the function and value of technology (Lumpe and Chambers, 2001). The higher the ICT self-efficacy level pre-service teachers have, the more frequent information technology integration behaviors they generate (Kavanoz et al., 2015). In classroom teaching, teachers with higher ICT self-efficacy tend to show more positive emotions in the process of information technology integration (Moreira-Fontán et al., 2019). TPACK, as the representation of teachers' information technology integration in teaching practice behaviors, its importance should also arouse the attention of educational practitioners and managers. Although TPACK is a compound concept, after the continuous in-depth theoretical and practical research, it has reached a consensus in academia: The professional knowledge related to a successful subject specific integration of technology is commonly subsumed under the concept of technological pedagogical content knowledge. Accordingly, the further clarification of the relationship between

information technology integration self-efficacy and TPACK in this study provided a clear operational path for teachers' professional development.

Moderating effect of the relationship between teachers' information technology integration self-efficacy and TPACK

The moderating role of gender

The results of inter group difference analysis showed that gender of the subjects did not affect the relationship between teachers' information technology integration self-efficacy and TPACK, and there was no significant moderating effect (Qb = 2.448, $P > 0.05$). This study is divided into four groups according to the male proportion. There is a significant positive correlation between teachers' information technology integration self-efficacy and TPACK in the group. This correlation gradually decreases with the increase of the male proportion between groups, and the difference is not statistically significant, but this result should be paid attention to. The conclusion of this meta-analysis is consistent with that of some previous studies. There is no gender difference in teachers' information technology integration self-efficacy (Keser et al., 2015), at the same time, there is no gender difference in TPACK (Redmond and Peled, 2019). Therefore, the test of the moderating effect of gender on the relationship between teachers' information technology integration self-efficacy and TPACK is worth further discussion in the follow-up research. We can try to divide male and female into groups to verify the moderating effect of gender more directly, so as to come to scientific research conclusions.

The moderating role of career stages

The results of inter group difference analysis showed that the career stages affected the link between teachers' information technology integration self-efficacy and TPACK, and there was a significant moderating effect (Qb = 4.296, $P < 0.05$). Although the relationship between teachers' information technology integration self-efficacy and TPACK in pre-service and in-service stages reached a significant level, the pre-service teachers group was significantly higher than in-service teachers group. The reason for this moderating effect may lie in the differences in their cognition and action of information technology integration. Under the digital background, the integration of technology and teaching is an important measure for teachers to cultivate students' ability to cope with the digital future. Thus, it is generally argued that pre-service teachers should acquire subject-specific professional knowledge regarding technology integration to support their future students' learning. In this regard, some scholars have found that pre-service teachers should develop adequate motivational orientations (e.g., self-efficacy) (Backfisch et al., 2020). Despite the potential of integrating technology for teaching, however, research has demonstrated that in many educational systems teachers rarely adopt technology into teaching (Fraillon et al., 2020). From this point of view, it may be explained that the correlation coefficient in the pre-service teacher group is higher than that of in-service teacher group. The confirmation of this result also enlightens us to focus on the information technology integration self-efficacy and TPACK level of in-service teachers.

The moderating role of measurement tools

The results of inter group difference analysis revealed that the measurement tools had no effect on the relationship between teachers' information technology integration self-efficacy and TPACK, and had no significant moderating effect (Qb = 1.140, $P > 0.05$). It is inconsistent with our hypothesis. This result further illustrated the stability of the relationship between teachers' information technology integration self-efficacy and TPACK, which is not affected by objective research conditions and other factors. As the previous literature review showed, the measurement tools of teachers' information technology integration self-efficacy in this study are divided into three types, including four scales. The TISE measurement tool developed by Wang has specific measurement content, examples are as follows, "I feel confident that I have the skills necessary to use the computer for instruction" "I feel confident I can mentor students in appropriate uses of technology." Computer self-efficacy (CSE) reflects teachers' information technology integration self-efficacy through the measurement of teachers' belief in the ability to use computers in the teaching process, which is also reasonable. In addition, the classic teacher self-efficacy scale is used to measure, and the meta-analysis literature included all emphasizes the self-efficacy in the context of information technology integration. Although it is not a direct measurement tools, it still has strong pertinence. In a word, the measurement tools of teachers' information technology integration self-efficacy have no moderating effect, which proves that the measurement tools and methods in this study are scientific, and provides an important reference for subsequent research.

The moderating role of teaching stages and disciplines

The results of inter group difference analysis illustrated that the participants' teaching stages (Qb = 7.118, $P > 0.05$) and teaching subjects (Qb = 8.370, $P > 0.05$) had no moderating effect on the link between teachers' information technology

integration self-efficacy and TPACK. This result is inconsistent with our hypothesis. However, we should be cautious about this conclusion. In terms of the literature included in this meta-analysis, there are only 1 and 2 papers in preschool and university, respectively; at the same time, teaching subjects are also relatively scattered, among which chemistry, physical education, science and international Chinese are all included in only one paper, and there are 15 articles that do not distinguish disciplines. Nevertheless, this meta-analysis also gave an empirical research conclusion. However, it is worth noting that teaching is a complex practical activity. In specific and special teaching situations, the effectiveness of TPACK mostly depends on the compatibility between teachers and Context in teaching (Herring et al., 2008). The value of TPACK lies in instructing teachers how to promote teaching. TPACK has different representations in different subjects and backgrounds, only by conducting refined research on it from the perspective of various subjects can teachers improve their TPACK level in a targeted manner.

Limitations

First, although this study tries to broaden the ways of collecting literature and increase the types of publications to avoid publication bias, as a result of language constraints, only Chinese and English literature are searched, and there are still documents that meet the selection criteria that are not included in the meta-analysis. Second, in the analysis of moderating effect, the sample distribution of some moderating variables is not balanced, and some moderating variable subgroups only include several independent studies, which may affect the analysis of moderating effect. For example, there are few studies on the stage of preschool and university. Third, the moderating effect of subjects' age was not tested. At present, most studies on the age effect of TPACK have confirmed that there is a negative correlation. Song showed that young teachers under the age of 25 have advantages in TK and TPK compared with teachers of other age groups; López-Vargas found that teachers' TK, TCK, PK were also negatively correlated with age; Li and Cai found that TPACK of Taiwan in-service teachers based on online teaching was negatively correlated with age and teaching age (Lee and Tsai, 2010). Another study showed that age was only negatively correlated with technology-related TPACK dimensions, such as TK, TCK, TPK and TPCK (Liang et al., 2013; Koh et al., 2014). Chen found that teachers' TK was negatively correlated with age, while TCK, TPK, TPCK were not correlated with age. There are also individual studies that show that all dimensions of teachers' TPACK have nothing to do with teachers' age (He, 2013; Wang, 2014). Then, it remains to be studied whether age has a moderating effect on the relationship between teachers' information technology integration self-efficacy and TPACK.

Conclusions

Using the method of meta-analysis, this study found that there was a moderate positive correlation between teacher' information technology integration self-efficacy and TPACK. The relationship between them was moderated by the subjects' career stages, but not by gender, disciplines, teaching stages and measurement tools.

In terms of theoretical significance, based on previous research conclusions, this paper systematically confirmed the relationship between teachers' information technology integration self-efficacy and TPACK through meta-analysis. It is an expansion of theoretical research in both the field of teacher education research and educational information technology research, which helps theoretical researchers gain a more general and scientific understanding of the relationship between them. To be specific, the contribution of theoretical research is from the perspective of examining the moderating effect of related factors, to explore the influence of gender, measurement tools, career stages, disciplines and teaching stages. At present, such research literature is still rare, which lays a certain foundation for future related research.

As for practical significance, in the digital era of information technology involvement in education and teaching reform, teachers' information technology knowledge and competency is related to teachers' professional development practice, and it also determines the quality of education and teaching. TPACK is increasingly valued by education practitioners. The conclusion drawn in this study provides an empirical reference for the decision-making of teacher education practitioners, and also offers a specific operational direction for the professional development of pre-service teachers and in-service teachers. For example, in order to enhance self-efficacy of teacher information technology integration, education administrators can organize teacher training and formulate daily management systems. At the same time, teachers should also strengthen their own self-efficacy of information technology integration and improve their own TPACK literacy level based on their own actual professional development.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

YZ and SL: conceptualization and validation. YZ and YW: methodology. YZ: formal analysis, writing—original draft

preparation, visualization, supervision, and funding acquisition. YW and SL: writing—review and editing. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Personality traits, role ambiguity, and relational competence as predictors for teacher subjective wellbeing

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The coronavirus pandemic has significantly reshaped the way teaching activities are carried out, thus intensifying the stress felt by teachers. The teacher-student relationship has also changed under the influence of social constraints. Together, these have affected teachers' work efficiency and redefined their connection with the school. The present study aims to examine the extent to which personality traits, role ambiguity, and relational competence predict teacher subjective wellbeing. The study sample consisted of 105 university teachers. Three hierarchical multiple regression analyses were conducted separately for each of the three criterion variables used in this research: *teaching efficacy*, *school connectedness,* and *teacher subjective wellbeing*. The results indicated that the personality traits *emotionality*, *extraversion*, and *conscientiousness* are significant predictors for all three variables, while *honesty-humility*, *agreeableness,* and *openness to experience* are not predictors for any of the variables. However, in the third step of the regression analysis, *conscientiousness* was found to lose its predictive quality for the variables *school connectedness* and *teacher subjective wellbeing*, its place being taken by *emotionality*. Both *role ambiguity* and *relational competence* are significant predictors for *teaching efficacy*, for *school connectedness,* and for *teacher subjective wellbeing*. Based on these results, universities can design some measures to reduce role ambiguity of teachers and can identify areas of training needed to increase their relational competence, while simultaneously reducing the costs associated with wellbeing and productivity problems. Several training modules and courses are proposed to be designed and included in the curriculum of initial and in-service teacher training programs, in order to contribute to increasing teachers' performance.

KEYWORDS

teacher subjective wellbeing, personality, role ambiguity, relational competence, university teachers

1. Introduction

In order to manage technological progress and social change, people need to constantly develop new skills—they need high-quality education. Therefore, educators

are constantly being given new and increasingly complex tasks and a particular social responsibility to prepare children, young people, and adults for the demands of today's world and for the future. There is a consensus in the literature that the teaching profession is particularly challenging and demanding, that social responsibility is at a high level, and that teachers are expected to perform at their best, with dedication, availability, and commitment (Kebritchi et al., 2017; la Velle, 2020). Compared to many other professions, the teaching profession also has a strong vocational component (Köpsén, 2014), as it is not just about applying teaching techniques or methods of working with students (Balaș and Bran, 2014), but is also done "with the soul," involving the personality traits of the teacher to a large extent.

In recent years, however, it can be observed that the teaching profession is becoming less and less attractive (European Education and Culture Executive Agency et al., 2019; European Commission et al., 2021), and the level of motivation and job satisfaction is decreasing among teachers (Skaalvik and Skaalvik, 2011). As in other fields of work, in the post-COVID-19 pandemic period, there is also talk about the phenomenon referred to in the press as "The Great Resignation," even in the field of education. The level of professional stress is high among teachers, pressure, and burnout being among the most important reasons for leaving the profession (O'Brennan et al., 2017). We are currently experiencing a marked reduction in interest, motivation, and professional commitment, while an unexpectedly large number of teachers are increasingly willing to change their job or even their profession (Steiner and Woo, 2021; Nguyen et al., 2022). In the context of the need to understand the factors and reasons that determine these types of attitudes and decisions of teachers, great emphasis must be placed on the teachers' self-reported levels of wellbeing, their personality traits, the ways they relate to each other in school and the roles they are expected to fulfil.

There are three main research orientations related to the concept of wellbeing: social wellbeing, psychological wellbeing, and subjective wellbeing (Huang et al., 2022). In what regards the objective approach of the term, Kahneman (1999) defines wellbeing as "objective happiness" referring to the quality of life measured in terms of health, material status, access to education or social services, etc.

Bradburn (1969) states that psychological wellbeing occurs as a consequence of the dominance of positive affects over negative effects (high wellbeing) or vice versa (low wellbeing).

The term "subjective wellbeing" refers to people's emotional and cognitive evaluations of their lives (Diener and Lucas, 1999; Alexandrova, 2005); in this case, people use personal standards to make general judgments about the quality of their lives at a given point in time and are expressed by what they call happiness, peace, fulfillment, and life satisfaction (Diener et al., 2003). In this paper, the focus is on teacher subjective wellbeing, i.e., the theoretical construct around which the research hypotheses will be formulated, and the empirical research will be structured.

2. Teacher subjective wellbeing

Research on subjective wellbeing has emerged as an important area of focus for psychology in this millennium (Pavot, 2008). The subjective wellbeing typically refers to the self-reports on health (physical, emotional, and spiritual), success, work-life balance, and to the result of the individual's evaluation of his/her own life, so that he/she may (or may not) consider it a fulfilled existence (Diener and Seligman, 2004). Subjective wellbeing is the result of an overall assessment of the quality of life from the person's own perspective. It is a perception of the extent to which "a person believes or feels that his or her life is going well" (Diener et al., 2018, p. 15).

"Because subjective wellbeing refers to affective experiences and cognitive judgments, self-report measures of subjective wellbeing are indispensable" (Eid and Larsen, 2008, p.4). The indicators used to measure subjective wellbeing include emotional components, based on the balance between positive affect and negative affect, and cognitive components, based on life satisfaction. The subjective wellbeing has been explained in a hedonic approach as the way a person uses everything around him/her in order to gain utility and develop positive emotions, based on external conditions and constructive experiences (Bradburn, 1969; Kahneman, 1999).

In what regards the teachers' work lives, some of the studies on teacher subjective wellbeing approach the issue from the perspective of experiencing positive emotions and a high level of life satisfaction, describing subjective wellbeing as teachers' positive psychological functioning at work (Renshaw et al., 2015a). Other, more numerous studies (*cf.* Renshaw et al., 2015a), analyze subjective wellbeing from the perspective of a low level of negative mood or affect, looking at indicators such as occupational stress and coping mechanisms (Lambert et al., 2009; Parker et al., 2012) or burnout (Aluja et al., 2005; Maslach and Leiter, 2008; Fleming et al., 2013). Teachers coping strategies can predict occupational wellbeing (Parker et al., 2012). There are also combined approaches in which subjective wellbeing is described as the result of the ongoing balance between positive and negative aspects of working life, such as between levels of engagement and burnout (Parker et al., 2012) or between teacher efficacy and burnout (Pas et al., 2012).

Teacher wellbeing is "an individual sense of personal professional fulfillment, satisfaction, purposefulness, and happiness, constructed in a collaborative process with colleagues and students" (Acton and Glasgow, 2015, p.101).

As the sum (effect) of positive aspects of a teacher's professional life, subjective wellbeing is analyzed and measured in terms of various indicators, such as teaching efficacy and experiencing positive emotions at work (van Horn et al., 2004), resilience level (Beltman et al., 2011), manifesting pro-social attitudes and relations (Hascher and Waber, 2021), etc. The theoretical multidimensional model of occupational wellbeing of teachers proposed by van Horn et al. (2004) includes five dimensions: affective, cognitive, professional, social, and psychosomatic. The overall level of wellbeing results from combining the intensity of

positive or negative manifestations of these dimensions. Positive emotions have emerged as the fundamental predictor of overall subjective wellbeing (van Horn et al., 2004).

The importance of using positive indicators of teacher subjective wellbeing, such as positive emotions and cognition, has been highlighted in studies that have related teacher wellbeing to student wellbeing (Renshaw et al., 2015b), students' motivation and teaching efficacy (Nie et al., 2012). The quality of the relationship with students as well as the ability of teachers to support their students in times of crisis also condition the level of teacher wellbeing (Falk et al., 2022).

As a result of empirical research, it has been found that there is no significant inverse correlation between positive and negative experiences involved in subjective wellbeing. Attempting to reduce teachers' negative states does not necessarily result in an increase in their positive states, and an increase in subjective wellbeing does not automatically occur when there are no threats or barriers to wellbeing (Diener et al., 2005). Objective circumstances may not explain all the variance in wellbeing judgments (Diener et al., 2018). In the absence of this relationship, in order to understand how subjective wellbeing manifests itself, it proves equally necessary and useful to discuss inter-individual differences and the role that teacher's personality may play in their subjective value judgments about their own lives. Thus, it is possible that some of the cognitive and affective components of subjective wellbeing may be predicted by certain personality traits, by the level and sources of teachers' stress, and by the quality of the relationships with others.

3. School connectedness

School connectedness is a particular form of social connectedness, which teachers experience at the workplace. Social connectedness refers to the experience of belonging to a social relationship or network and includes a person's subjective awareness of being in close relationship with the people around. Social connectedness is a mediator in the relationship between extraversion and subjective wellbeing (Lee et al., 2008). Having supportive relationships is one of the strongest predictors of wellbeing, with a notably positive effect (Myers, 2003).

School connectedness manifests as a result of the interaction between two inter-dependent emotions and attitudes (Monahan et al., 2010, p. 3): "school attachment (that entails close affective relationships with school community) and school commitment (characterized by an emotional investment and the sensation of doing well in school)."

Creating a sense of connectedness among staff members establishes a positive organizational climate in the school, and, as a result, student and teacher involvement in all activities increases, and student or teacher dropout is greatly reduced (Thapa et al., 2013). Furthermore, teachers who feel a sense of belonging in their school communities have a strong connection with their students and with the school management and tend to feel less professional burnout (O'Brennan et al., 2017). For teachers in their first years of activity, close interpersonal relationships and the support received from colleagues and administrative staff is very important. The lack of this support from the school community is one of the reasons why teachers leave their jobs (Marlow et al., 1997). There are studies indicating that teachers' level of job dissatisfaction and their intention to resign is proportional to the extent to which they feel less connected to their students (Martin et al., 2012).

Studies on teachers' sense of belonging to the school are much fewer in number compared to the plethora of studies investigating the students' sense of belonging and their connectedness to the school, as a prerequisite for good educational outcomes (Rogerson, 2004). There are surprisingly few studies investigating the relationship between the sense of belonging (or the school connectedness) of teachers and various aspects of a teacher's work, such as teaching efficacy, job satisfaction, work motivation, and contentment, etc.

There are also no significant studies investigating the relationship between the teachers' personality traits and the intensity of the sense of connectedness they establish with the school or the intensity of their sense of belonging to the school community. Further research on aspects of school connectedness and teaching efficacy found that teachers who feel happy at school, who feel valued and appreciated, tend to have a positive attitude toward work and, consequently, higher productivity (Battistich et al., 1997).

4. Teaching efficacy

Teacher sense of efficacy was described as "the belief that the teacher can help even the most difficult and unmotivated students" (Berman et al., 1977, p.136) and the extent to which a teacher believes he or she has the capacity to affect student performance (Khan et al., 2015).

Starting from the premise that the level of teaching efficacy is given by the students' results, the teachers' sense of efficacy is studied based on three main tasks that a teacher performs in a school environment, namely: efficacy of the instructional strategies, efficacy of classroom management, and efficacy of engagement in students' motivation (Nie et al., 2012). During the pandemic, the scores of teacher sense of efficacy (for both instruction and engagement) were lower than in the studies conducted before the pandemic. The data also show that "teachers who are teaching virtually had the lowest efficacy scores compared to teachers teaching in a hybrid or all in-person model" (Pressley and Ha, 2021).

Using the Teacher Efficacy Scale to measure teachers' attitude toward working with students, some studies highlighted another two dimensions of teacher efficacy: general teaching efficacy and personal teaching efficacy (Saklofske et al., 1988; Hoy and Woolfolk, 1993).

There are two approaches to teaching efficacy in the literature: (a) efficacy in relation to the students, understood as a manifestation of the teachers' confidence that they can control or influence students' learning activity; and (b) efficacy in relation to oneself, understood as part of self-efficacy, the cognitive process

by which teachers build the confidence that they are capable of achieving a certain level of performance in their activities.

5. Personality traits

The teacher's personality is one of the most important and complex variables in the educational process.

The Five-Factor Model is currently the dominant paradigm in personality research and one of the most common starting points in researching teachers' personalities influence on the teaching-learning process (Gongz, 2017). The Five-Factor Model of personality includes the following dimensions: neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience. Neurotic people are nervous, high-strung, insecure, self-pitying, impatient, jealous and envious, subjective and impulse-ridden, and emotional and impatient. Extraverted people are sociable, fun-loving, affectionate, friendly, spontaneous, talkative, active, warm and passionate, dominant, and bold. Openness describes imaginative, original, creative, curious, daring, analytical, independent, liberal, artistic people. Agreeable people are empathetic, kind, altruistic, warm and compassionate, lenient, open-minded, cheerful, gullible, straightforward, and humble. Conscientious people appreciate productivity and efficiency, and are dependable, well organized, scrupulous, self-disciplined, practical, persistent, intelligent, responsible, and ambitious (Costa and McCrae, 1992).

It cannot be argued that there are specific personality traits that predispose a person to high levels of wellbeing (McCallum, 2021), but it has been shown that the main factors that are strongly associated with wellbeing include optimism, extraversion, and self-esteem (Costa and McCrae, 1980; Diener et al., 2003; Gale et al., 2013; van Allen et al., 2021).

There are authors who recommend the use of new models or theories of personality in the study of teacher personality, such as the HEXACO model (Ashton and Lee, 2007; Gongz, 2017; McAbee et al., 2019). This model was developed by Ashton and Lee using methods similar to the Five-Factor Model but describes six personality dimensions, namely honesty-humility (H), emotionality (E), extraversion (X), agreeableness (A), conscientiousness (C), and openness to experience (O). The description of the extraversion, conscientiousness, and openness to experience dimensions from HEXACO is similar to those from the Big Five, but the individual characteristics described by the agreeableness and neuroticism from the Big-Five model are split between honesty-humility, agreeableness, and emotionality scales in the HEXACO model. Emotionality, for example, overlaps only partially with the neuroticism factor in the Big Five, because it includes both negative emotions, such as fear and anxiety, as well as emotionally neutral manifestations, such as sentimentality and dependence. In HEXACO, agreeableness refers to people who forgive easily, judge others leniently, are willing to compromise and cooperate with others, and control their anger easily. The sixth factor, called honesty-humility, is specific to the HEXACO model and correlates very strongly with the agreeableness factor in the Big-Five model. People with very high scores on honesty-humility are not interested in manipulating others for their own gain, are not tempted to break the rules, are not interested in luxury or opulence, and are not interested in elevating their own social status. People with very low scores on this factor flatter others to get what they want, pursue material gain, have an intense sense of self-importance, and are not shy about breaking rules for their own benefit (Lee and Ashton, 2013; Ashton et al., 2014). Low levels of honesty-humility correspond to high levels of psychopathy, machiavellianism, and narcissism, which are Dark Triad personality constructs; by introducing this factor into their model, the HEXACO authors filled the gap left by other measurements of the Big-Five personality traits (Paulhus and Williams, 2002; Gaughan et al., 2012; Howard and van Zandt, 2020).

"The HEXACO model can be successfully used in research when behaviors and traits found on the Honesty–Humility, Agreeableness and Emotionality dimensions are of specific interest, including the study of teacher personality. An individual teacher who scores low on the H factor may have a proclivity for anti-social acts. It is also probable that a teacher with a personality pattern of high levels of H and A, and low level of E, would have a tendency for pro-social altruistic behaviors and inclined toward forgiveness and tolerance, which is an important propensity in every aspect of the educational process." (Göncz, 2017, pp. 90–91).

Starting from these postulations, we have formulated the first hypothesis of our research:

> *H1*: Personality traits positively relate to teaching efficacy, school connectedness and teacher subjective wellbeing.

6. Role ambiguity

A role is a set of expectations about the desirable behaviors of a person occupying a certain position within a social structure. When these expectations are imprecise or unclear to the person, role ambiguity will manifest as the uncertainty about whether the role will be fulfilled in accordance with the expectations of others (Carter and Harper, 2016).

Alongside role conflict, role ambiguity is a dimension of role stress (Rizzo et al., 1970; Karatepe et al., 2006; Coelho et al., 2011; Schmidt et al., 2014). Some authors (Kahn et al., 1964; Peiró et al., 2001) introduce a new dimension of role stress, namely "role overload," while others propose the term "job ambiguity" together with a tool to measure its three facets: work method, scheduling, and performance criteria (Breaugh and Colihan, 1994).

"Role ambiguity is referred to as the lack of clarity about duties, objectives and responsibilities needed to fulfil one's role and is often experienced in technology, social and job changes." (Urien et al., 2017, p.139). Role ambiguity is a stressor for both the role occupant and for those around them (Doherty and Hoye, 2011). The intensity of stress felt by the individual when experiencing role ambiguity is

determined by their role identity salience and the degree of uncertainty felt when having to align their goals with the role. In organizations, role ambiguity is most often manifested when communication and coordination of activities are poor or when the role occupant is expected to solve tasks outside those included in the job description (Carter and Harper, 2016; Urien et al., 2017).

By analyzing the differences between the manner in which the employee describes his/her role and the way in which the organization presents it in the published job description, under the section "abilities, interests, knowledge, skills, work activities, work context, work styles, and work values," Saha et al. (2019, p.137) observe that role ambiguity "is associated with depleted wellbeing, such as increased heart rate, increased arousal, decreased sleep, and higher stress, …with lower job performance such as decreased organizational citizenship behavior and decreased individual task performance."

Lack of clarity about the fundamental requirements of the job can be the cause of repeated failures that consistently diminish the employee's sense of occupational self-efficacy. Ambiguous role circumstances can deter him/her from putting even more effort into the job, effort that can create frustration, anxiety, and fatigue over time (Acker, 2003; Tomas, 2021). Role ambiguity negatively affects job performance and can result in job burnout (McCormack and Cotter, 2013; Olivares-Faúndez et al., 2014; Wu et al., 2019). Role ambiguity can also be associated with mental health problems such as depression and anxiety (Schmidt et al., 2014).

Considering the results of these studies, we have formulated the second hypothesis of our research:

> *H2*: Role ambiguity negatively relates to teaching efficacy, school connectedness and teacher subjective wellbeing.

7. Relational competence

Relational competence (also called interpersonal competence) is a manifestation of social and emotional competence (SEC). SEC has been defined as "the ability to understand, manage, and express the social and emotional aspects of one's life in ways that enable the successful management of life tasks such as learning, forming relationships, solving everyday problems, and adapting to the complex demands of growth and development" (Elias et al., 1997, p. 2). Teachers' social and emotional skills are essential for developing the same types of skills in their students, but also for developing the students' ability to learn in general (Jennings and Greenberg, 2009; Schonert-Reichl et al., 2015).

According to Jensen et al. (2015), (as cited in Aspelin and Jonsson, 2019, p. 265), "the true core of relational competence… consists of being able to meet students and parents with openness and respect, to show empathy and to be able to take responsibility for one's own part of the relationship as an educator."

Vidmar and Kerman extracted the specific components of this competence starting from a concept proposed by Juul and Jensen (2010) (as cited in Vidmar and Kerman, 2016). The analyzed components are:

- the ability *to see* the students, in other words, treating them as autonomous persons capable of actively building and maintaining a relationship by understanding what lies beyond their obvious behaviors;
- leadership: refers to the teacher's ability to manage the educational process, being fully aware of the student's individuality and taking care of his/her integrity;
- authenticity: the teacher's ability and willingness to include personal elements in the relationship (e.g., thoughts, values, and beliefs) and to develop subject-subject relationships rather than subject-object relationships, in which the student is merely a recipient of the knowledge transferred by the teacher;
- accountability: the teacher's ability to initiate and maintain contact with students and to develop a positive, supportive relationship with them.

The first two components of this model were grouped into one component called *respect for individuality*. In their model, Vidmar and Kerman (2016) included three components of relational competence: *respect for individuality, responsibility,* and *authenticity*. In the scale they developed, the authenticity factor was not validated; therefore, this scale measures only the first two factors.

The study of the teachers' relational competence has largely focused on its effects on student wellbeing and learning or teacher job stress or job performance; few studies examine the link between this competence and teacher wellbeing (Friedman, 2000; Kyriacou, 2001). Personal relationships with students provide teachers with intrinsic rewards and add meaning to their work; when these relationships are conflictual, disrespectful, or distant, they experience negative affects, their efficacy beliefs deteriorate, and they begin to feel helpless (Spilt et al., 2011). In Shann (1998) study, the teacher-student relationships had the strongest impact on teacher job satisfaction. In Yoon (2002) study, negative affect, teacher stress, and negative relationships were strongly correlated, and teacher stress predicted negative teacher-student relationships.

Based on these results, we have devised the third hypothesis that underlies our research:

> *H3*: Teacher relational competence positively relates to teaching efficacy, school connectedness and teacher subjective wellbeing, after controlling the effect of personality traits and role ambiguity.

8. Materials and methods

8.1. Participants

The convenience sample consisted of 105 Romanian university teachers, with academic titles of assistant professor, associate

professor, and university professor. Of these, 49.5% are men and 50.5% are women, 33.3% are professors in civilian universities ("Lucian Blaga" University of Sibiu and "Aurel Vlaicu" University of Arad) and 66.7% are professors in military academies ("Nicolae Bălcescu" Land Forces Academy of Sibiu; "Henri Coandă" Air Force Academy of Brașov, and "Mircea cel Bătrân" Naval Academy of Constanța).

8.2. Procedure

Participation in this study was voluntary. Initially, 250 teachers were invited to take part in the research; of these, only 105 agreed to participate. The research team collected the work email addresses of the teachers in the targeted civilian universities and military academies. The owners of the email addresses received a message containing a link allowing them to access the questionnaires in electronic format, together with a brief description of the purpose of the research and measures used. Data were collected between July and September 2022, using a convenience sampling method. The questionnaire was set up so as not to collect respondents' email addresses, thus ensuring the anonymity of the responses. The teachers were not remunerated for their participation and were informed that the research was for scientific purposes only.

8.3. Measures

1. *Teacher Subjective Wellbeing Questionnaire* (Renshaw et al., 2015a) is a scale consisting of eight items, assessing the teachers' work-related wellbeing. It consists of two subscales—*teaching efficacy* and *school connectedness*; the authors indicate that scores on these two subscales can be used as stand-alone wellbeing measures, along with a general *teacher subjective wellbeing* score. The participants need to give their answers on a four-point Likert scale, from (1) almost never to (4) almost always. Cronbach's alpha for the entire scale was 0.90, for *teaching efficacy* subscale was 0.85, and for *school connectedness* subscale was 0.87.
2. *Personality traits* were measured using *HEXACO-60* personality inventory (Ashton and Lee, 2009), a 60-item measure using a five-point Likert scale, from (1) strongly disagree to (5) strongly agree. This inventory consists of six scales: honesty-humility (H), emotionality (E), extraversion (X), agreeableness (A), conscientiousness (C), and openness to experience (O). Cronbach's alpha for the entire scale was 0.73, and for the subscales ranged from 0.58 to 0.82 (Table 1).
3. *Role ambiguity* was measured using the five-item subscale from *Teacher Stress Inventory* developed by Schutz and Long (1988). This subscale measures the stress level of teachers as a consequence of insecurity induced by the ambiguity of their role at work. The participants were asked to give their answers on a five-point Likert scale, from (1) strongly disagree to (5) strongly agree. As recommended, positively phrased items were reversely scored in order to accurately reflect the stress level of the respondents. Cronbach's alpha for the entire scale was 0.82.
4. *Teacher's Relational Competence Scale* (Vidmar and Kerman, 2016) is an 11-item measurement tool that also uses a five-point Likert scale from (1) very rarely or never to (5) always or very often. The authors identified two dimensions of the teacher's relational competence—*individuality* and *responsibility*. In our study, only the total score obtained by the respondents on the entire scale was used. Cronbach's alpha for the entire scale was 0.83.

Socio-demographic variables such as gender and type of higher education institution (civilian university or military academy) were also collected.

8.4. Data analysis

The statistical software package SPSS 27.0. was used for data analysis. To test the hypotheses, three hierarchical multiple regression analyses were conducted separately for *teaching efficacy*, *school connectedness,* and *teacher wellbeing* as criterion variables, and *personality traits*, *role ambiguity,* and *relational competence* as predictor variables. Personality traits were introduced in the first step because they are the most stable variables. Role ambiguity was introduced in the second step as it was considered to have a strong influence on teachers' wellbeing, and relational competence was introduced in the last step, as a strong mediator between wellbeing and stress caused by the role ambiguity.

9. Results

The descriptive statistics and the correlation matrix between the research variables are included in Table 1.

The first hypothesis of this research stated that *personality traits positively relate to teaching efficacy, school connectedness, and teacher subjective wellbeing* and was partially supported by the results. *Emotionality* correlated negatively and significantly with teaching efficacy ($r = -0.23$, $p = 0.015$), school connectedness ($r = -0.34$, $p < 0.001$), and teacher subjective wellbeing ($r = -0.31$, $p = 0.001$). *Extraversion* correlated positively and significantly with teaching efficacy ($r = 0.46$, $p < 0.001$), school connectedness ($r = 0.51$, $p < 0.001$), and teacher subjective wellbeing ($r = 0.53$, $p < 0.001$). *Conscientiousness* also correlated positively and significantly with teaching efficacy ($r = 0.38$, $p < 0.001$), school connectedness ($r = 0.24$, $p = 0.012$), and teacher subjective wellbeing ($r = 0.33$, $p = 0.001$). *Agreeableness* correlated positively and significantly only with school connectedness ($r = 0.23$, $p = 0,018$). *Honesty-humility* and

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TABLE 1 Correlation matrix between research variables.

	Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1	Teaching efficacy	3.36	0.60	(0.85)										
2	School connectedness	3.12	0.71	0.719**	(0.87)									
3	Teacher subjective wellbeing	3.24	0.61	0.914**	0.939**	(0.90)								
4	Honesty-humility	3.88	0.50	0.115	0.017	0.067	(0.72)							
5	Emotionality	2.83	0.57	−0.237*	−0.342**	−0.316**	0.008	(0.79)						
6	Extraversion	3.58	0.53	0.461**	0.518**	0.530**	0.004	−0.454**	(0.82)					
7	Agreeableness	3.23	0.42	0.110	0.231*	0.189	0.267**	−0.170	0.274**	(0.58)				
8	Conscientiousness	3.95	0.44	0.385**	0.244*	0.333**	0.317**	−0.082	0.199*	0.129	(0.72)			
9	Openness to experience	3.72	0.45	0.162	0.88	0.131	−0.007	−0.139	0.240*	0.040	0.178	(0.72)		
10	Role ambiguity	2.05	0.75	−0.499**	−0.660**	−0.632**	−0.063	0.166	−0.372**	−0.220*	−0.288**	−0.129	(0.82)	
11	Relational competence	4.04	0.51	0.404**	0.387**	0.426**	0.147	0.076	0.313**	0.141	0.360**	0.282**	−0.319**	(0.83)

$N = 105$; Teaching efficacy, School connectedness, Teacher subjective wellbeing = Criterion variables; Honesty-humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness to experience = Personality traits; Values of the internal consistency alphas are displayed in the diagonal; $^{*}p < 0.05$; $^{**}p < 0.01$.

openness to experience did not correlate significantly with any of these three variables. In conclusion, only three of the six personality traits (emotionality, extraversion, and conscientiousness) correlate significantly with teaching efficacy, school connectedness, and teacher subjective wellbeing, while two personality traits (honesty-humility and openness to experience) do not correlate at all with these variables, and one of them (agreeableness) significantly correlates only with school connectedness.

The second hypothesis stated that *role ambiguity negatively relates to teaching efficacy, school connectedness, and teacher subjective wellbeing* and is fully supported by the results: *role ambiguity* correlated negatively and significantly with teaching efficacy ($r = -0.49$, $p < 0.001$), school connectedness ($r = -0.66$, $p < 0.001$), and teacher subjective wellbeing ($r = -0.63$, $p < 0.001$). Therefore, role ambiguity negatively correlates to teaching efficacy, school connectedness, and teacher subjective wellbeing.

The third hypothesis was formulated as follows: *teacher relational competence positively relates to teaching efficacy, school connectedness, and teacher subjective wellbeing, after controlling the effect of personality traits and role ambiguity.* Table 2 presents the results of the regression analysis with the three dependent variables.

Regarding *teaching efficacy* as a criterion variable, in the first step, personality traits accounted for 30% of the variance and the model was significant [$F(6,98) = 7.20$, $p < 0.001$], with extraversion ($\beta = 0.39$, $p < 0.001$) and conscientiousness ($\beta = 0.29$, $p = 0.002$) as significant predictors. By adding the role ambiguity as independent variable in the second step of the regression model, and by controlling the influence of personality traits, the predictive value of the second model increases to 39% [$\Delta R^2 = 0.090$; $F(1,97) = 14.42$, $p < 0.001$], with role ambiguity as a significant predictor ($\beta = -0.33$, $p < 0.001$). In the third step, the relational competence was added to the regression model ($\beta = 0.19$, $p = 0.043$) resulting in an increase of the predictive value of the model to 42% [$\Delta R^2 = 0.025$, $p = 0.043$; $F(1,96) = 4.21$, $p = 0.043$], after controlling the influence of the personality traits and role ambiguity.

In what regards *school connectedness* as a criterion variable, in the first step, personality traits accounted for 31% of the variance and the model was significant [$F(6,98) = 7.53$, $p < 0.001$], with only extraversion ($\beta = 0.41$, $p < 0.001$) as a significant predictor. By adding in the second step of the regression model the role ambiguity as independent variable, and by controlling the influence of personality traits, the predictive value of the second model increases to 54% [$\Delta R^2 = 0.22$; $F(1,97) = 48.27$, $p < 0.001$], with role ambiguity as significant predictor ($\beta = -0.53$, $p < 0.001$). In the third step, relational competence was added to the regression model ($\beta = 0.21$, $p = 0.007$), resulting in an increase of the predictive value of the model to 57% [$\Delta R^2 = 0.033$, $p = 0.007$; $F(1,96) = 7.47$, $p = 0.007$], after controlling the influence of the personality traits and role ambiguity. In the third step of the regression, emotionality becomes a significant predictor for school connectedness ($\beta = -0.19$, $p = 0.013$).

Regarding *teacher subjective wellbeing* as a criterion variable, in the first step, personality traits accounted for 34% of the variance, and the model was significant [$F(6,98) = 8.56$, $p < 0.001$], with extraversion ($\beta = 0.43$, $p < 0.001$) and conscientiousness ($\beta = 0.24$, $p = 0.007$) as significant predictors. By adding the role ambiguity as independent variable in the second step of the regression model and by controlling the influence of personality traits, the predictive value of the second model increases to 52% [$\Delta R^2 = 0.18$; $F(1,97) = 37.20$, $p < 0.001$], with role ambiguity as a significant predictor ($\beta = -0.47$, $p < 0.001$). In the third step, teacher relational competence was added to the regression model ($\beta = 0.22$, $p = 0.008$) resulting in an increase of the predictive value of the model to 56% [$\Delta R^2 = 0.034$, $p = 0.008$; $F(1,96) = 7.44$, $p = 0.008$], after controlling the influence of the personality traits and role ambiguity. In the third step of the regression, emotionality becomes a significant predictor for school connectedness ($\beta = -0.16$, $p = 0.042$).

These results indicated that teacher relational competence positively relates to teaching efficacy, school connectedness, and teacher subjective wellbeing, after controlling the effect of personality traits and role ambiguity. Therefore, the third hypothesis received full statistical support.

10. Discussion

This study aimed to examine the relationship between personality traits, role ambiguity, relational competence, and teacher subjective wellbeing and to identify the degree to which the first three variables predict the last, by using a sample of university teachers.

The first hypothesis was partially supported by the results: three of the six personality traits—emotionality, extraversion, and

TABLE 2 Hierarchical regression analysis predicting teacher efficacy, teacher school connectedness, and teacher subjective wellbeing.

Variables	Teaching efficacy			School connectedness			Teacher subjective wellbeing		
	R^2	ΔR^2	*B*	R^2	ΔR^2	*B*	R^2	ΔR^2	*B*
Step 2	0.306**	0.306**		0.316**	0.316**		0.344**	0.344**	
Honesty-humility			0.034			−0.063			−0.019
Emotionality			−0.040			−0.132			−0.097
Extraversion			0.395**			0.414**			0.437**
Agreeableness			−0.053			0.092			0.028
Conscientiousness			0.297**			0.170			0.246**
Openness to experience			0.011			−0.064			−0.032
Step 2	0.396**	0.090**		0.543**	0.227**		0.526**	0.182**	
Honesty-humility			0.048			−0.040			0.001
Emotionality			−0.044			−0.137			−0.102
Extraversion			0.297**			0.258**			0.297**
Agreeableness			−0.094			0.027			−0.031
Conscientiousness			0.222*			0.050			0.139
Openness to experience			0.006			−0.072			−0.039
Role ambiguity			−0.335**			−0.533**			−0.476**
Step 2	0.421*	0.025*		0.576**	0.033**		0.560**	0.034**	
Honesty-humility			0.038			−0.053			−0.012
Emotionality			−0.097			−0.199*			−0.164*
Extraversion			0.243*			0.196*			0.234**
Agreeableness			−0.099			0.021			−0.036
Conscientiousness			0.179*			0.001			0.089
Openness to experience			−0.031			−0.114			−0.082
Role ambiguity			−0.304**			−0.497**			−0.440**
Relational competence			0.192*			0.218**			0.222**

$N = 105$; Teaching efficacy, School connectedness, Teacher subjective wellbeing = Criterion variables; Honesty-humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness to experience = Personality traits; *$p < 0.05$; **$p < 0.01$.

conscientiousness—significantly correlated with teaching efficacy, teacher school connectedness, and teacher subjective wellbeing, while one of the personality traits—agreeableness—significantly correlated only with school connectedness. Honesty-humility and openness to experience did not correlate significantly with any of these three variables. However, when these personality traits were introduced into the regression analysis, we observed that extraversion and conscientiousness remained predictors for teaching efficacy during each step of the analysis and only in the first step for teacher wellbeing; in steps two and three, conscientiousness loses its quality as a predictor for school connectedness and teacher wellbeing, being replaced by emotionality.

Extraversion remains the only personality trait that positively predicts all three dimensions of teacher wellbeing at work during all three steps of the regression analysis for the sample of university teachers included in this research. Highly extraverted individuals have a positive view of themselves, are confident in their abilities when leading or addressing groups of people, enjoy social interactions and encounters, and generally experience positive feelings of enthusiasm, energy, and optimism, feel popular, and enjoy being in the spotlight (Ashton and Lee, 2009). Consequently, the higher the level of the teachers' extraversion, the stronger their sense of success in teaching and the more they value their professional achievements. These teachers love to interact with student groups both formally, in lectures and seminars, and informally, in extracurricular activities and meetings. They are enthusiastic and have a high level of energy and optimism which they project into their activities and relationships with students and peers.

The results obtained in this study are similar to those of other authors. Extraversion is the personality trait most strongly associated with subjective wellbeing (Costa and McCrae, 1980; Lee et al., 2008; Aghababaei and Arji, 2014). Extraversion and conscientiousness were also predictors of subjective wellbeing for teachers in the study conducted by Albuquerque et al. (2012). Positive affect, as a component of wellbeing, has a strong association with extraversion (Diener et al., 2003).

Conscientiousness predicts the teaching efficacy and the subjective wellbeing of the university teachers in the sample. Individuals with high scores on this trait consistently organize both their time and their physical environment, work in a disciplined manner to achieve their goals, strive to accurately solve tasks, do not shy away from difficult or challenging tasks, and deliberate carefully when making decisions (Ashton and Lee, 2009). Therefore, these characteristics participate in creating the sense of teaching effectiveness and subjective wellbeing at work.

Introducing role ambiguity as a predictor variable in the second step of the regression analysis excludes conscientiousness as a predictor for school connectedness and teacher wellbeing, but not for teaching efficacy. Therefore, this personality trait remains significant for the respondents' sense of teaching efficacy, but not for their overall sense of wellbeing at work or their sense of connectedness to their higher education institution. Conscientiousness as a personality trait loses its ability to mitigate the stressful effects of role ambiguity; when teachers do not have enough information to successfully deal with their current tasks or cannot anticipate what tasks will be assigned to them in the future, they must turn to coping strategies in which they mobilize their cognitive and behavioral resources in order to adapt to stressful circumstances (Răducu and Stănculescu, 2022).

Furthermore, where teachers are affected by role ambiguity, conscientiousness becomes insignificant to their sense of connection to the university in which they work. In this case, teaching identification appears to be a factor with a strong mediating impact between role stress (role conflict and role ambiguity) and psychological distress: "Low levels of role ambiguity and role conflict were associated with high levels of teaching identification, which in turn was associated with low levels of anxiety and hopelessness […] Teachers with a strong professional identity may see their role as a calling rather than a job. Being a teacher is a matter of pride that generates a positive self-concept" (Pretorius and Padmanabhanunni, 2022, p. 9).

As stated in the second hypothesis, role ambiguity negatively related to teaching efficacy, school connectedness, and teacher subjective wellbeing. Uncertainty about job tasks, goals, and responsibilities at work induces a state of stress that may manifest itself in negative affective states, such as anxiety and depression. In the case of a university teacher, for example, the teaching and research tasks formally included in the job description may be supplemented by informal expectations that are not adequately defined or for which they may not be adequately prepared. The period of the coronavirus pandemic triggered significant changes in teachers work, with direct effects on their mental health. The new conditions imposed online teaching, hybrid teaching, asynchronous classes, and social distancing classes that added a consistent additional stress to this professional group that, even before the pandemic, had been considered as one of the most exposed to stress-related disorders (Răducu and Stănculescu, 2022). Teachers at all levels of education have had to restructure their teaching activities, learn how to use new technologies, and at the same time provide support to their students and parents on how to use them (Rad et al., 2022). The overlap of work and personal space and work and family responsibilities caused by remote online teaching has increased the psychological pressure felt by teachers; this has been supplemented by feelings of social isolation and limited contact with supportive resources, such as managers, peers, and school administrators (Baker et al., 2021). The effects were strong on their feelings of effectiveness in teaching and assessment, feelings of connectedness to the school, and general wellbeing.

Lastly, the research results confirmed the third hypothesis, which argued that teacher relational competence positively relates to teaching efficacy, school connectedness, and teacher subjective wellbeing, after controlling the effect of personality traits and role ambiguity.

The introduction of the relational competence as a predictor variable during the third step of the regression analysis highlights

the importance of emotionality as a predictor of school connectedness and teacher subjective wellbeing. The HEXACO-60 model describes individuals with high emotionality scores as anxious, sensitive to low levels of stress, with a strong fear of physical danger, and with high emotional needs generating intense emotional attachments to other people. In our study, the higher the level of teachers' emotionality, the lower their sense of connection to their university, their subjective sense of wellbeing, and teaching efficacy. Although relational competence adds a small percentage to the proposed model's ability to predict teacher subjective wellbeing, we believe it may mitigate the negative effects of emotionality as a personality trait and role ambiguity as a professional stressor.

11. Theoretical and practical implications

Numerous studies indicate that personality is the strongest predictor of subjective wellbeing, with extraversion being associated with the individuals' positive affects and neuroticism being associated with negative affects. Studies have indicated that the HEXACO model shows strong significant relationships with wellbeing constructs and its use in the study of these constructs is more advantageous than the use of the Big-Five or BIS-BAS models. The honesty-humility trait, for example, measured only by the HEXACO, appears not to be beneficial for a person's subjective state of wellbeing (Aghababaei and Arji, 2014; Anglim et al., 2020).

This study focused on the power of the six-dimensional framework of personality structure of HEXACO to predict subjective wellbeing of university teachers. Our results are in line with the findings of other researchers that have used HEXACO and found extraversion to be the strongest predictor of wellbeing, followed by conscientiousness and emotionality.

With regard to role ambiguity, two main types of solutions are discussed in the literature: solutions that depend on the occupant of the role and solutions that depend on the management of the organization (Rogelberg, 2007).

Individually, teachers can engage in a process of self-reflection in which they identify the sources of their role ambiguity and their intrinsic bias in how they perceive this ambiguity. By using self-reflection methods and tools, teachers can directly self-assess their own skillset, interests, and level of adaptation to the current role and indirectly estimate their level of productivity, job satisfaction, and wellbeing, both in the current role and in possible future roles. On the other hand, universities can collect more information about how teachers perceive their roles. Based on this, they can identify the area of training needed to reduce role ambiguity, while simultaneously reducing the costs associated with teachers wellbeing and productivity problems. Employers can also intervene in job descriptions, formulating them so that they are much clearer in terms of the skills, competences, and responsibilities required by the job holder. Another proposed solution concerns the creation by universities of tools that can be included in workplace design: social media platforms, online engagement forums, "or even email profile description spaces, where they can regularly update their self-explained expertise and role descriptions, along with manager or peer-appraised testimonials" (Saha et al., 2019, p.137).

It is important to remember that, for some employees, role ambiguity can trigger proactive behaviors whereby they shape their role in a creative or innovative way. If this is the case for universities, they should recognize and reward those teachers who redefine the boundaries of their role, as they bring role and skill diversity to their profession and use a set of coping strategies (Samfira and Paloș, 2021) that could be extended across work communities (Wang et al., 2011; Saha et al., 2019).

The teachers' relational competence can be improved through learning and practice, alongside teaching and classroom management competencies (Jensen et al., 2015,). "Thus, teachers need to know how to form, maintain, improve, and strengthen the quality of the relationships: how to work consciously and systematically with the relationship as a space for development and learning" (Vidmar and Kerman, 2016, p. 43). Relational competence is part of a broader category of social and emotional competencies (SEC), which can be grouped into five clusters: self-awareness, self-regulation, social awareness, relationship skills, and responsible decision-making (Schonert-Reichl et al., 2017). Teachers can follow different training programs to develop the competences they lack (Mara and Mara, 2011), but it is necessary to transfer these practices into their daily work. To facilitate this transfer, universities need to cultivate a type of culture that values the development of these skills and implement a set of policies that support their practical application (Jones and Bouffard, 2012).

Based on these results, modules (as component parts of courses), but also stand-alone courses, can be designed and included in the curriculum of initial and in-service teacher training programs, in order to contribute to increasing teachers' performance. Therefore, in what follows, we will present some proposals, namely two possible training modules and one course, which can be included in teacher training and professional development programs offered by universities.

a. A first proposal concerns a training module that can be generically called *Teacher Personality* (TP), focused on the analysis by teachers/future teachers of their own personality profile based on the Big-Five model, with emphasis on the analysis of the connection between each personality dimension, the teacher's classroom behavior, and a series of concepts associated with job performance and teaching efficacy. During the TP module, learners can be introduced to and practice different teaching strategies and models of teaching behavior related to each personality dimension. Given that extraversion and conscientiousness appear to be the strongest predictors of teaching efficacy (Kim et al., 2019), effective teaching, and professional development strategies closely related to these dimensions can be practiced during the TP module

classes. For example, a teacher with a low level of conscientiousness needs to learn and practice using effective ways of organizing and planning activities, time and competing priorities management, and general organization skills. On the other hand, introverted teachers need to learn and practice assertive communication, social interaction, and group management techniques. Highly emotional teachers need to learn emotional control techniques and low agreeableness teachers need to practice their ability to empathize and manage frustration. Although studies do not indicate a significant correlation of openness to experience with teaching efficacy, this dimension is an essential component of the continuing professional development that also helps promote the scientific research skills of university teachers. Therefore, it needs to be developed through methods that stimulate motivation for lifelong learning.

b. The second proposal concerns a course that could be called *Professional Stress Management* (PSM) and that could be included in the offer of universities for continuous teacher training. The PSM course should incorporate information on strategies for managing role stress, focusing on identifying stressors, and managing personal reactions to them, on building healthy coping strategies, setting personal boundaries, getting support from supervisors and colleagues, and accessing the resources needed to perform the role effectively. Role stress consists of role conflict (generated by incompatible expectations that hinder role performance), role overload (role expectations that exceed the employee's resources), and role ambiguity (unclear role expectations that fail to guide the employee's behaviors; Hindin, 2007). The practical-applicative value of this course can be enhanced by conducting case studies and group discussions using both the theoretical knowledge acquired and the personal experience of the trainee-teachers.

c. A third proposal concerns a training module that can be generically called *Teacher Relational Competence* (TRC), built around the "relational competence model" developed by Aspelin et al. (2021). In the TRC module, trainee-teachers can be challenged to analyze problematic educational sequences, as well as also typical cases. Role-plays related to the management of teacher-student relationships can be organized, aimed at developing the three dimensions of teacher relational competence, as follows:

- *Communicative competence*, based on those skills that enable the teacher to harmonize with students during verbal and non-verbal communication;
- *Differentiation competence,* focusing on the skills that help the teacher regulate physical and psychological distance in their relations with the students;
- *Socio-emotional competence,* pivoting on those skills that help teachers manage the emotional indicators that arise as part of their relationships with the students, including their own emotions as well as the students.

12. Limitations and future directions

The first limitation of this study is generated by the sample size and structure. This sample is not representative of the universities from which the respondents come, much less of the body of university teachers in Romania, neither by size nor by structure. Being a convenience sample, the results of the study cannot be generalized. Self-report measures were used as research instruments, which are generally affected by social desirability bias. As it is a cross-sectional study, its results represent a picture of teacher subjective wellbeing limited to a certain point in time. In addition, while personality traits are relatively stable over time, wellbeing and role ambiguity may vary by time and situation. However, the results of the study are consistent with those obtained by similar studies.

The second limitation of the study is that it does not allow the identification of causal relationships between variables. Further studies could identify, for example, the type of relationship between personality traits and wellbeing, teachers' relational competence, and their perception of role ambiguity/clarity or, moreover, role stress, using other methods such as observation or experiment. Longitudinal studies could identify, for example, the stability over time of the links between the variables studied.

13. Conclusion

Investigating teacher wellbeing and understanding the relationships between it and a range of psychological or social factors is an important scientific endeavor as, beyond the effects on individuals themselves, teacher wellbeing also impacts students and can therefore have important long-term effects (Renshaw et al., 2015a). Without the teachers' wellbeing, it is hard to build up students' wellbeing (Konu et al., 2010). "Cultivating teacher wellbeing it is necessary not just because doing so makes them feel good and satisfied, but also because doing this will transform them to be more engaged, with better results in their activities" (Stănculescu, 2014, p.38).

By examining the relationship between teacher subjective wellbeing, personality, role ambiguity, and relational competence, this paper extended the results of previous studies on teachers' work-related wellbeing. In this research, university teachers' personality traits (extraversion, conscientiousness, and emotionality), role ambiguity, and relational competence predicted their teaching efficacy, school connectedness, and subjective wellbeing. The theoretical and

practical implications of these results may suggest a series of contents for teacher training programs or for university policies aimed at improving the quality of work and professional life of their employees.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

CM: conceptualization, data collection and processing, and writing—original draft, reviewing, and editing. SB: conceptualization, data collection, and writing—original draft, reviewing, and editing. FM-B: data collection and writing—reviewing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The use of theory of planned behavior to systemically study the integrative-qualitative intentional behavior in Romanian preschool education with network analysis

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Predicting preschool teachers' intention to adopt qualitative and inclusive early childhood intentional behaviors represents an important research field. The objective of this research is first to develop and validate a scale to assess the integrative-qualitative intentional behavior (IQIB-ECEC) of preschool teachers in order to achieve SDG4.2's objective of ensuring that all children have access to high-quality pre-primary education and then to systemically analyze the relationship between variables with Network Analysis. The theory of planned behavior (TPB) describes key individual beliefs (attitudes, subjective norms, and perceived behavior control) that affect people's intentions to engage in a certain conduct and has previously been used with success in evaluating people's intentions to adopt a certain behavior. This research represents one of the first Romanian attempts to use the theory of planned behavior to study the Integrative-Qualitative Intentional Behavior in Romanian Preschool Education and systemically analyze results with Network Analysis approach. This study used a randomized 300 Romanian preschool teachers enrolled in a National Training Program entitled Qualitative and Inclusive Early Childhood Education managed by the Romanian Educational Ministry. Data were collected *via* an online questionnaire. The scale validation followed a confirmatory factor analysis (CFA). The fitting of the IQIB-ECEC 19-item scale showed that all coefficients CFI (0.942), TLI (0.920), SRMR (0.0452), and RMSEA (0.0451) bring strong evidence in the favor of the statistical validity of the scale. The final IQIB-ECEC 19 items and 8 factors scale obtained

a Cronbach's alpha of 0.77. The systemic Network Analysis approach was used in interpreting data. The centrality of the network model was further investigated and the clustering coefficients index were calculated. According to the results, perceived power/control beliefs and behavioral intention were detected as the most important dimensions, whereas behavioral beliefs were less important. These findings were discussed in terms of their theoretical and practical significance.

KEYWORDS

integrative-qualitative intentional behavior, preschool teachers, early childhood education and care, SDG4.2, assessment validity, factor structure

1. Introduction

Any society's long-term prosperity will depend on its capacity to advance the well-being and health of the upcoming generations. The youngsters of today will grow up to be the parents, workers, and citizens of tomorrow. Our wise investments in families and children will pay off in the form of lifetime productivity and civic involvement from the next generation. Child development serves as a foundation for both societal and economic progress since competent children provide the foundation for a successful and sustainable society.

Making sure nobody is left behind, particularly the most vulnerable individuals across all goals, is the core objective of equality. Extreme poverty, insurgency, violence between communities, and other issues have all seriously impeded development in numerous nations. Compared to their wealthy contemporaries, children from low-income homes are more likely to drop out of school. There are still significant differences between rural and urban places.

This decisive engagement must be made a reality for all children, youth, and adults in the years leading up to 2030, regardless of where they reside or the challenges they encounter. Equity indices include personal factors like gender, region, ethnicity, language, disability status, and child labor involvement as well as family traits like parents' socioeconomic status, wealth, or educational attainment.

As part of the Sustainable Development Goal 4 (SDG4) targets, nations are required to keep analyzing these statistics in order to improve their quality in order to monitor advancement over time. Policies and rules must take into account educational system inputs in addition to results and outputs in order to successfully monitor some SDG 4 targets. In general, inputs are parts of the education system over which the government has relatively direct influence.

Target 4.2 aims to ensure that all girls and boys have access to high-quality early childhood development and care services by 2030 in order to be prepared for elementary school. Pre-primary education is also an objective of this target. More specifically, access equality to high-quality care and education services is addressed by indicator 4.2.1, which breaks down by gender the percentage of children under five who are on track in terms of their health, learning, and psychological well-being. Because many youngsters do not enroll in full-time educational programs throughout their formative years, the level of their exposure to learning contexts outside the family will vary. It is hard to determine whether this objective has been accomplished because the indicator only counts the proportion of kids who get structured learning, not the program's intensity. Through a range of global development courses, "Education for All" has gained popularity since 1990. It was designated SDG 4 when the Sustainable Development Goals (SDGs) were initially created because it was seen as being extremely important. Education is seen as a tool for fostering peace, establishing nations, and promoting sustainable development. Learning specific abilities, like reading, writing, or counting, increases a child's or adolescent's likelihood of success in life.

The importance of education in promoting sustainable development may benefit not only underdeveloped nations, but also the entire world. The main goal of Sustainable Development Goal 4 (SDG 4) is to guarantee that all people have access to a good education that will enhance their quality of life and the future of their society. Target 4.2's major goal is to guarantee that, by the year 2030, all children gain access to high-quality early childhood education to prepare them for elementary level.

2. Theoretical framework—theory of planned behavior

The theory of planned behavior (TPB) outlines important individual beliefs: attitudes, subjective standards, and perceived behavior control that have an impact on people's intentions to engage in specific behaviors. TPB has been effectively used in individual behavioral change interventions, and as a result, it has served as the basis for numerous research examining teachers' intentions to advance inclusive education. However, little effort was made to integrate these findings into practice (Opoku et al., 2021; Rad et al., 2022a,b).

The Theory of Reasoned Action (TRA) was renamed the Theory of Planned Behavior (TPB) in 1980 in order to foresee a person's intention to engage in a behavior at a certain time and place. The most crucial component of this paradigm is behavioral

intent, which is affected by beliefs about the likelihood that a certain course of action would produce the desired results as well as a personal evaluation of the benefits and drawbacks of those results.

According to the TPB, both motivation (intention) and ability play a role in behavioral success (behavioral control). The behavioral, normative, and control forms of beliefs are distinguished. The TPB consists of six constructs that collectively represent an individual's actual level of control over a behavior.

1. Attitudes: The concept refers to how positively or negatively a person regards the activity of interest. It necessitates considering how actions will influence outcomes.
2. Behavioral intention: This relates to the motivations behind a certain activity; the stronger one's desire is to engage in a behavior, the more probable it is that they will do so.
3. Subjective norms: This concept refers to whether or not the majority of people believe a particular behavior to be acceptable or objectionable. It has to do with whether peers and close friends think the person should engage in the habit, or whether there is social pressure to do or not to execute a specific conduct. Subjective norm is mostly made up of compliance desires and normative ideas.
4. Social norms: The recognized codes of behavior within a community or larger cultural context are referred to by this word. Social norms are viewed as normative or standard among a group of people.
5. Perceived power: The concept refers to how something is perceived as potentially assisting or impeding the performance of an action. According to perceived power, it is believed that each of those factors may be controlled by a person's actions to some level.
6. Perceived behavioral control refers to a person's perception of how simple or challenging it is to engage in the intended activity. Because perceived behavioral control varies between contexts and acts, a person's opinions on behavioral control vary depending on the situation.

Despite consistently producing results over time, the TPB has been criticized for its primary shortcomings, which include the following: while it does take into account normative influences, it still does not take into account economic and environmental elements that might affect a person's intent to engage in a conduct, such as fear, danger, emotions, or prior experience. In addition, it presumes that the person, regardless of purpose, has access to the opportunities and resources required to successfully carry out the required conduct. TPB considers that conduct is the result of a linear decision-making process rather than acknowledging that behavior may change over time.

According to the TPB, one's intentions and views of their ability to regulate their conduct can directly predict their behavior (Ajzen, 1991). Additionally, research indicates that intentions are a secondary mechanism *via* which attitudes, perceived behavioral control, and subjective norms influence behavior (Ajzen, 1991; Ajzen, 2020).

Even while this study suggests that the TPB may be integrated in educational settings (Patterson, 2001; Stanec, 2009; MacFarlane and Woolfson, 2013; Heuer and Kolvereid, 2014; Cooper et al., 2016; Burns et al., 2018; Dunn et al., 2018; Bornschlegl et al., 2021) and used to explain integrative-qualitative conduct in preschool settings, it also emphasizes the need for more qualitative research on the beliefs that surround this behavior in early childhood education and care.

This study served as the foundational stage for subsequent investigation into the applicability of a TPB-guided framework to comprehend and address integrative-qualitative behavior in preschool instruction. The main goal of this theory-based research was to qualitatively examine attitudes, subjective norms, and perceived behavioral control connected to the integrative-qualitative behavior among preschool education using both a deductive and an inductive analytical procedure in order to design a valid a reliable scale for further assessing the integrative-qualitative intentional behavior of preschool teachers with network analysis (NA).

We are relying on this scale when further assessing early education integrative-qualitative intentional behavior of preschool teachers in order to design training programs based on nudges and boosts to empower preschool teachers to sustainably implement an integrative-qualitative intentional behavior at work.

3. Current research

The objective of this research is first to develop and validate a scale to assess the integrative-qualitative intentional behavior (IQIB-ECEC) of preschool teachers in order to achieve SDG4.2's objective of ensuring that all children have access to high-quality pre-primary education and then to systemically analyze the relationship between variables with Network Analysis. Thus, the research first aimed to develop a valid and reliable scale to measure preschool teachers' intentional integrative-qualitative behavior based on theory of planned behavior methodology in order to further assess with Network Analysis the intentional integrative and qualitative behavioral pattern of 300 Romanian preschool teachers. Based on our previous scoping review that clearly indicated that there is a lack of assessing both qualitative and inclusive behaviors in early education (Rad et al., 2022a), we have proposed the IQIB-ECEC scale that will further analyze preschool teachers' behavior with Network Analysis approach. Network analysis (NA) is a set of integrated techniques used to delineate relations among factors and to analyze the structures that emerge from the recurrence of these relations. The use of NA in psychological scale assessment has previously been successful (Suwartono and Bintamur, 2019).

Another important reason for choosing the theory of planned behavior as theoretical framework is that further in this research project our team proposed an intervention

program for preschool teachers designed to enhance actual integrative-qualitative behaviors and particularly we were interested in how we can indirectly attain the desired output, but still controlling for individual factors as identified by Ajzen. By following this methodology, we can further instill self-assessment competencies of preschool teachers in their integrative-qualitative actual behavior based on reflective practice and this newly self-assessment competency in the behavioral domain can further positively affect through cognitive positive transfer processes other educational behaviors related to inclusivity and quality in preschool education.

The basis for the item's generation was the Ajzen methodology and all 24 items were adapted to qualitative-inclusive behaviors in early education for teachers. The 24 items of IQIB-ECEC were measured on a 5-point Likert scale. Utilizing item analysis, confirmatory factor analysis, Cronbach's alpha, CFI, TLI, SRMR, and RMSEA fit indices, we tested the validity and reliability of the IQIB-ECEC scale.

Further, we have investigated the relations between all scales' factors with network analysis in order to explore how to further instill intentional qualitative and inclusive behaviors in Romanian preschool teachers.

This study aimed to reveal the pattern network structure of the 8 dimensions of intentional qualitative and inclusive behaviors in Romanian preschool teachers. Network analysis was applied to the 8 dimensions to define the strong and weak 138 connections in the network, to determine the intensity of interaction in the network, and 139 to reveal the roles of the variables in the network. JASP (Version 0.14; Computer 140 software) was used for the structural determination and visualization of the relationships 141 between variables in the analysis (28).

4. Research methodology

4.1. Participants

The research sample consisted of 300 educators from West Romania's 15 counties, of whom all were female. Participants were selected from a project-based national preschool teacher training program, which started in Romania in the spring of 2021 during the COVID-19 pandemic, based on their availability and consent to participate in this online research. The Romanian Ministry of Education has started a national program entitled Qualitative and Inclusive Early Childhood Education for a total number of 2,000 preschool instructors, out of which 700 preschool instructors from West Romania were managed by Aurel Vlaicu University of Arad's team. After inviting all 700 participants to take part in our online research, 300 valid online responses were returned. In order to collect responses, a Google Form questionnaire of 24 items was created, rated on a typical Likert scale from 1 to 5. Three additional questions were added, that of location, age, and years of previous work experience in preschool education.

Regarding the age of our respondents, the reported age range was between 22 years old and 63 years old, with an average mean of 41 years. As for work experience with preschool children, the range was between 0 and 44 years of previous experience with an average mean of 18 years of work experience.

4.2. Instrument

The basis for the item's generation was the Ajzen methodology and all 24 items were adapted to qualitative-inclusive behaviors in early education for teachers, from former seminal research papers (Ajzen, 1991; Czerniak and Lumpe, 1996; Harland et al., 1999; Hagger et al., 2002; Heath and Gifford, 2002; Francis et al., 2004; Johnson and Hall, 2005; Arnold et al., 2006; Darker and French, 2009; Schomerus et al., 2009; Kortteisto et al., 2010; Lee et al., 2010; Poulter and McKenna, 2010; Ajzen, 2011a,b; Ajzen et al., 2011; González et al., 2012; Greaves et al., 2013; Sun et al., 2015; Hadadgar et al., 2016; Newham et al., 2016; Teo et al., 2016; Qi and Ploeger, 2019; Liu et al., 2021; Pang et al., 2021).

Following an expert small group online meeting for analyzing existent questionnaires based on TPB that have investigated intentional behaviors in educational settings, our research team decided to purposely design an 8 dimensions scale with 24 items (3 items per dimension as recommended by the TPB scale design methodology). The 8 dimensions were: D1. Actual behavior (3 items), D2. Attitudes toward the behavior (3 items), D3. Behavioral beliefs (3 items), D4. Subjective norm (3 items), D5. Social norms/Normative beliefs (3 items), D6. Perceived power/Control beliefs (3 items), D7. Perceived behavioral control (3 items), and D8. Behavioral intention (3 items). After the items' grammatical and contextual structure was selected, all 24 items (3 items per dimension/factor) were adapted according to the Romanian national characteristics in preschool education.

The IQIB-ECEC questionnaire that was completed by the preschool teachers, during November–December 2021, consisted thus of 24 items (8 dimensions), rated on a 5-point Likert scale, ranging from 1 strongly disagree to 5 strongly agree, and three open-ended questions (location in terms of county district, age, and previous work experience in preschool education).

5. Results

This section will further present the statistical validation of the IQIB-ECEC questionnaire and the systemically analysis of all relationships between model's variable with Network Analysis. Since we have followed Ajzen's methodology (Ajzen, 1991, 2011a,b) for designing the theory of planned behavior with 8 factors, we have further addressed the statistical validation of the scale based on already established factors, with a confirmatory factor analysis technique.

5.1. IQIB-ECEC scale statistical validation

Before running the correlation analysis, we firstly looked at means obtained on all purposely designed 8 dimensions of IQIB-ECEC 24-item scale, with the intention of getting a first view of how the data are presenting itself from a descriptive point of view.

Looking at the means we have registered on all investigated dimensions, we can observe the interesting dynamics of the proposed TPB variables (Figure 1). On the dimension of D7. Perceived behavioral control, we find the lowest average m = 3.85, we are somewhat in front of a phenomenon of metaphorical abandonment of integrative-qualitative intentional behavior in front of a behavioral constraint felt by our representative sample of 300 ECEC professionals from Romania. The lack of control over one's own behavior seems to paralyze the whole mechanism of adopting the principles of equity and inclusion in preschool institutions. This aspect is somewhat offset by the higher average obtained on the dimension D8. Behavioral intention, m = 4.76, which reflects the openness of professionals to embrace the behaviors of inclusion and provision of qualitative services to all children.

We have then tested the correlation of each item with the scale and the inter-correlation between items for all 24 items. In Figure 2, we are presenting the correlations heat map of the IQIB-ECEC 24-item scale, utilizing JASP software (version 0.16.3.0).

Confirmatory factor analysis (CFA) is a statistical technique used to confirm the factor structure of a series of observed variables. CFA enables researchers to test the hypothesis that there is a link between observable variables and their underlying latent components (Harrington, 2009; Brown and Moore, 2012). CFA is employed to examine a hypothesis that has already been proposed. It makes an *a priori* model of the target construct's internal structure and evaluates how well it fits the available data (Marsh et al., 2009). The fit between the postulated CFA model and the observed data is assessed using several fit statistics. Researchers use these indices to check whether their model adequately represents the data by reviewing acknowledged criteria (Fokkema and Greiff, 2017).

The confirmatory factor analysis was performed in Jamovi, selecting the following items for each dimension (Factor):

- Factor 1 (D1. Actual behavior): item 1 and item 2,
- Factor 2 (D2. Attitudes toward the behavior): item 5 and item 6,
- Factor 3 (D3. Behavioral beliefs): item 8 and item 9,
- Factor 4 (D4. Subjective norm): item 10 and item 11,
- Factor 5 (D5. Normative beliefs): item 13, item 14, and item 15,
- Factor 6 (D6. Perceived power/Control beliefs): item 16, item 17, and item 18,
- Factor 7 (D7. Perceived behavioral control): item 20 and item 21,
- Factor 8 (D8. Behavioral intention): item 22, item 23, and item 24.

Results obtained for CFA in terms of factor loadings after dropping items that had negative loadings or did not reach the inclusion criteria: item 3, item 4, item 9, item 12, and item 19, for purifying the constructs, are presented in Table 1. Scale purification represents the process of eliminating items from multi-item scales (Wieland et al., 2017).

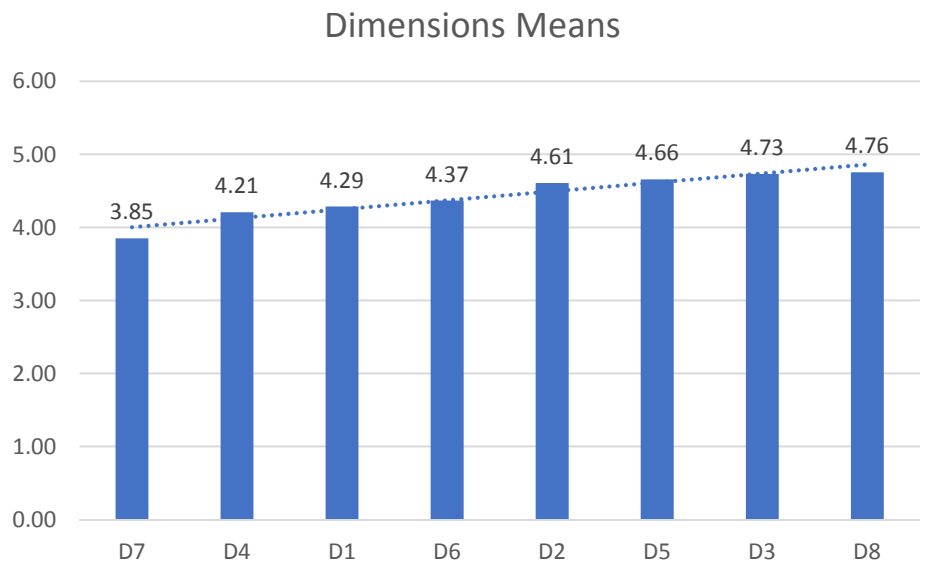

FIGURE 1
Dimensions means of the initial 24 items IQIB-ECEC online questionnaire.

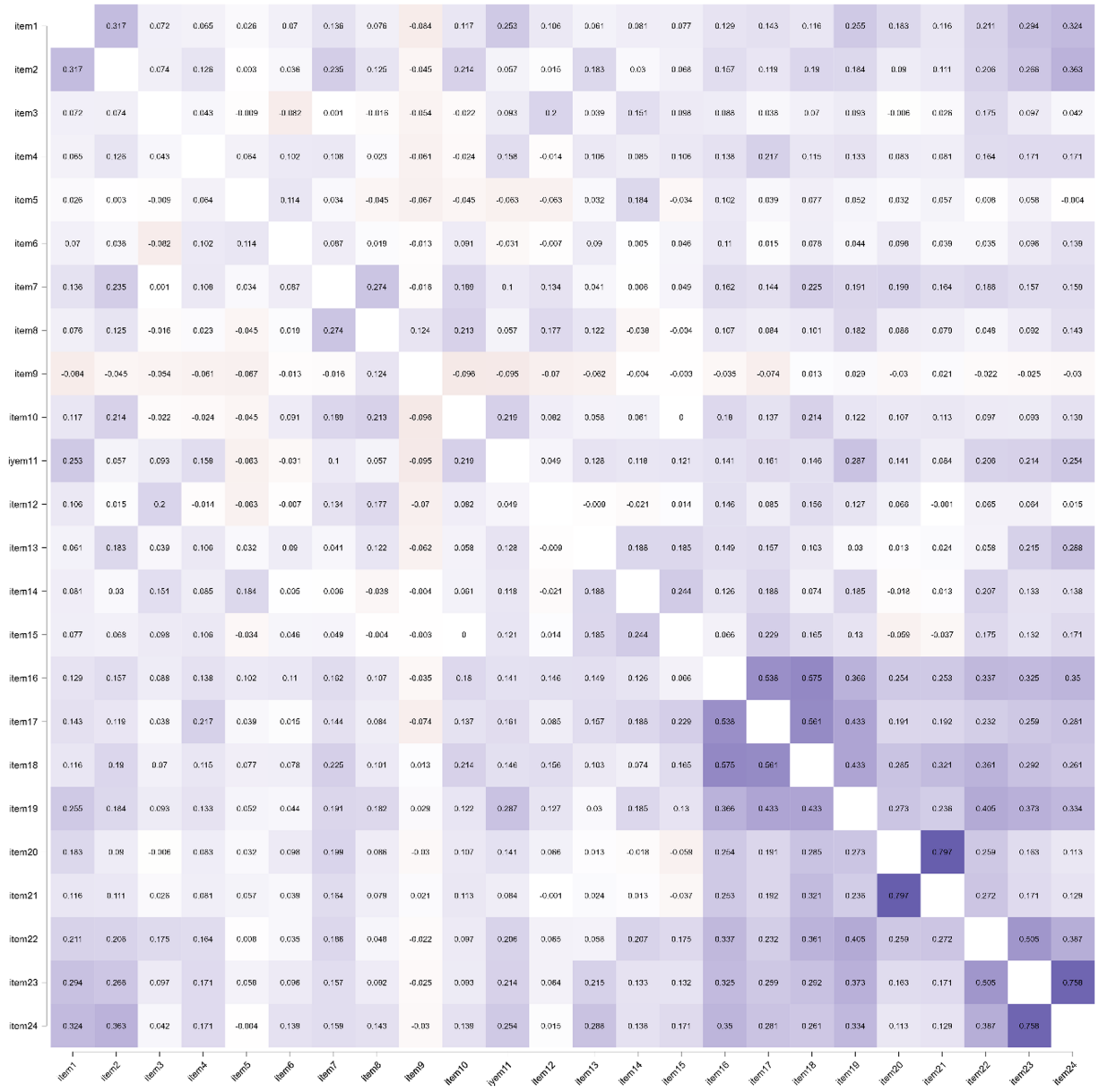

FIGURE 2
Correlations heat map of the IQIB-ECEC 24-item scale.

For the IQIB-ECEC final 19-item scale, Bartlett's test of sphericity reported a χ^2 of 200 with df (124) at a $p < 0.001$.

Regarding the fitting of the IQIB-ECEC 19-item scale, all coefficients CFI (0.942) and TLI (0.920), results supported by literature (Xia and Yang, 2019), SRMR (0.0452), and RMSEA (0.0451) results supported by literature (Kenny and McCoach, 2003; Kenny et al., 2015) depicted in Table 2, bring strong evidence in the favor of the statistical validity of the scale.

Finally, with the remaining items, we have performed an internal consistency reliability analysis of the 19 items IQIB-ECEC scale, on the same sample data. The reliability analysis will allow us to investigate the features of the IQIB-ECEC scale as well as the items that comprise the scales. The reliability analysis process computes a variety of regularly used measures of scale reliability as well as information on the relationships between particular scale items.

The final IQIB-ECEC 19-item scale obtained a Cronbach's alpha employed to check the internal consistency of the scale of 0.77, with a scale mean of 4.49 and a standard deviation of 0.304, a reasonable coefficient in regards to the 8-dimensionality envisaged (Ajzen, 1991, 2011a,b). None of the items if dropped would have raised the internal consistency of the scale (Table 3).

The IQIB-ECEC scale based on the theory of planned behavior showed similar intentional behavioral patterns to other research done in educational settings (Appendix), demonstrating

TABLE 1 Confirmatory factor analysis results for IQIB-ECEC 19-item scale.

				95% confidence interval				
Factor	Indicator	Estimate	SE	Lower	Upper	Z	*p*	Stand. estimate
Factor 1: Actual behavior	Item 1	0.265	0.0358	0.1946	0.335	7.40	<0.001	0.562
	Item 2	0.239	0.0323	0.1760	0.302	7.42	<0.001	0.564
Factor 2: Attitudes toward the behavior	Item 5	0.221	0.1019	0.0211	0.420	2.17	0.030	0.358
	Item 6	0.224	0.1049	0.0181	0.429	2.13	0.033	0.318
Factor 3: Behavioral beliefs	Item 7	0.537	0.0951	0.3509	0.724	5.65	<0.001	0.682
	Item 8	0.192	0.0407	0.1124	0.272	4.72	<0.001	0.401
Factor 4: Subjective norm	Item 10	0.306	0.0629	0.1829	0.429	4.87	<0.001	0.454
	Item 11	0.345	0.0692	0.2090	0.480	4.98	<0.001	0.483
Factor 5: Normative beliefs	Item 13	0.202	0.0369	0.1300	0.274	5.49	<0.001	0.454
	Item 14	0.334	0.0626	0.2112	0.457	5.33	<0.001	0.456
	Item 15	0.261	0.0488	0.1655	0.357	5.35	<0.001	0.451
Factor 6: Control beliefs	Item 16	0.572	0.0423	0.4895	0.655	13.54	<0.001	0.752
	Item 17	0.585	0.0459	0.4948	0.675	12.74	<0.001	0.713
	Item 18	0.623	0.0443	0.5360	0.709	14.07	<0.001	0.776
Factor 7: Perceived behavioral control	Item 20	1.071	0.0752	0.9232	1.218	14.24	<0.001	0.917
	Item 21	1.001	0.0734	0.8569	1.145	13.64	<0.001	0.869
Factor 8: Behavioral intention	Item 22	0.348	0.0373	0.2749	0.421	9.33	<0.001	0.538
	Item 23	0.333	0.0191	0.2956	0.371	17.40	<0.001	0.880
	Item 24	0.325	0.0195	0.2873	0.364	16.72	<0.001	0.853

TABLE 2 Fit results for IQIB-ECEC 19-item scale.

				RMSEA 90% CI	
CFI	TLI	SRMR	RMSEA	Lower	Upper
0.942	0.920	0.0452	0.0451	0.0332	0.0564

the importance of attitudes and subjective norms in predicted teacher behaviors in the context of typically inclusive education (Leatherman and Niemeyer, 2005; Mahat, 2008; MacFarlane and Woolfson, 2013; Garrote et al., 2020; Desombre et al., 2021). Our research focus is on both inclusive and qualitative behaviors, a focus that has never been a topic analyzed so far, even if the SDG4.2 agenda conceptually delimitates this complex competence of preschool teachers of being both inclusive and qualitative.

Concurrent and discriminant validation was not possible due to the inexistence of valid scales for preschool teachers envisaging both inclusive and qualitative intentional behaviors based on TPB theory.

5.2. Network analysis

We will further analyze the meaning of the results, while conducting a network analysis (Jasp software) of the eight dimensions to better understand their relationship. Recent empirical and theoretical evaluations of social networks are discussed, with a focus on psychologic network analysis. Network analysis is a novel and promising tool for describing interactions between several variables. We estimate the relationship between all variables directly rather than attempting to reduce the structure of the variables to their shared information, as is done in latent variable modeling. A network is any system that may be represented by nodes (circles) connected by edges (lines) that indicate the strength of the connection between the nodes. Nodes represent observable variables in psychological networks, while edges show the strength of correlations between two variables, often after controlling for all other factors in the dataset (Burger et al., 2022).

We can use a regularized estimating approach instead of correlations, such as the Extended Bayesian Information Criterion Graphical Least Absolute Shrinkage and Selection Operator, or EBICglasso for short. The EBICglasso calculates partial correlations between all variables and reduces absolute weights to zero. As a result, edge weights are rather distorted, but small edge weights are reduced to zero. This hyperparameter is determined in the EBICglasso using the BIC, an information criterion that considers both model complexity and model fit.

This network has 8 nodes representing the 8 dimensions of the IQIB-ECEC 19-item scale, a maximum of 28 edges, and a sparsity

TABLE 3 Item reliability statistics for the final IQIB-ECEC 19-item scale.

	If item dropped				
	Mean	SD	Item-rest correlation	Cronbach's α	McDonald's ω
Item 1	4.73	0.472	0.3147	0.747	0.770
Item 2	4.80	0.425	0.3066	0.748	0.770
Item 5	4.65	0.617	0.0796	0.761	0.787
Item 6	4.54	0.705	0.1306	0.760	0.783
Item 7	4.33	0.789	0.3129	0.746	0.772
Item 8	4.83	0.480	0.1841	0.754	0.780
Item 10	4.59	0.676	0.2682	0.749	0.775
Item 11	4.42	0.716	0.2675	0.750	0.774
Item 13	4.82	0.447	0.2216	0.752	0.776
Item 14	4.48	0.734	0.1871	0.756	0.778
Item 15	4.67	0.580	0.1680	0.755	0.779
Item 16	4.44	0.762	0.5320	0.727	0.756
Item 17	4.31	0.822	0.4713	0.732	0.761
Item 18	4.34	0.804	0.5591	0.724	0.756
Item 20	3.49	1.170	0.4491	0.735	0.768
Item 21	3.64	1.153	0.4449	0.736	0.768
Item 22	4.57	0.648	0.4725	0.735	0.759
Item 23	4.85	0.379	0.4852	0.741	0.754
Item 24	4.84	0.382	0.4889	0.741	0.753

value of 0.321. This score implies that the network has a low degree of sparsity and a high level of density. This sparsity rate is adequate for a network with 8 nodes. The analysis's use of the EBICglasso estimation reduced the number of estimated edges to 19. Figure 3 is an illustration of the EBICglasso network.

Nodes represent items in psychological networks, whereas edges reflect correlations or predictive associations that may be calculated from data. In our case, each node represents one of the 8 dimensions.

The direction and strength of the connection between nodes, or in our case, dimensions, are indicated by edges. The edge may be positive, as in the case of positive covariance or correlation between the items, or it may be negative. Different colored lines to depict the edges of the graph show the polarity of the interactions: positive relationships are often colored blue or green, while negative relationships are typically colored red (Rhemtulla et al., 2016; Hevey, 2018). As shown in Figure 3, nodes are associated all positively with one another. A weighted edge changes the thickness and color density of the edge linking the nodes to show the strength of a node-to-node link: larger, denser colored lines denote stronger relationships. In a network where there are no connections between nodes, the edge may instead be unweighted and merely indicate whether a link is present or absent.

We have processed our data using R-packages: bootnet, glasso, huge, and mgm (Fruchterman and Reingold, 1991; Friedman et al., 2008; Kraeamer et al., 2009; Foygel and Drton, 2010; Epskamp et al., 2012; Epskamp, 2014; van Borkulo et al., 2014; Haslbeck and Waldorp, 2015; Zhao et al., 2015; Epskamp et al., 2016; Rhemtulla et al., 2016; Robinaugh et al., 2016; Hevey, 2018).

The study's scope included determining the position of the network's eight dimensions. Major centrality indicators such as strength, betweenness, closeness, and expected influence, as well as network density measures such as clustering coefficient indexes, were utilized to evaluate the connections. In order to select the most efficient node, each of these centrality measures makes a different assumption. As a result, each takes a unique strategy to making each node effective or central in a network.

As seen in Table 4, there are four centrality measures employed: betweenness, closeness, strength, and expected influence to identify highly influential nodes (Robinaugh et al., 2016).

Nodes with a high degree of betweenness are nodes that operate as bridges between two or more clusters of nodes that are unable to communicate with one another, and they have the capacity to govern the network. The degree of closeness indicates how near one dimension is to all others. The inverse of farness, that is, the sum of the shortest distances between a node and all other nodes, is defined as the degree of closeness. This value indicates the dimension with which a dimension will have the quickest connection. Furthermore, a central node is swiftly influenced by changes in any area of the network that is close to it, and it can quickly affect changes in distant regions of the network.

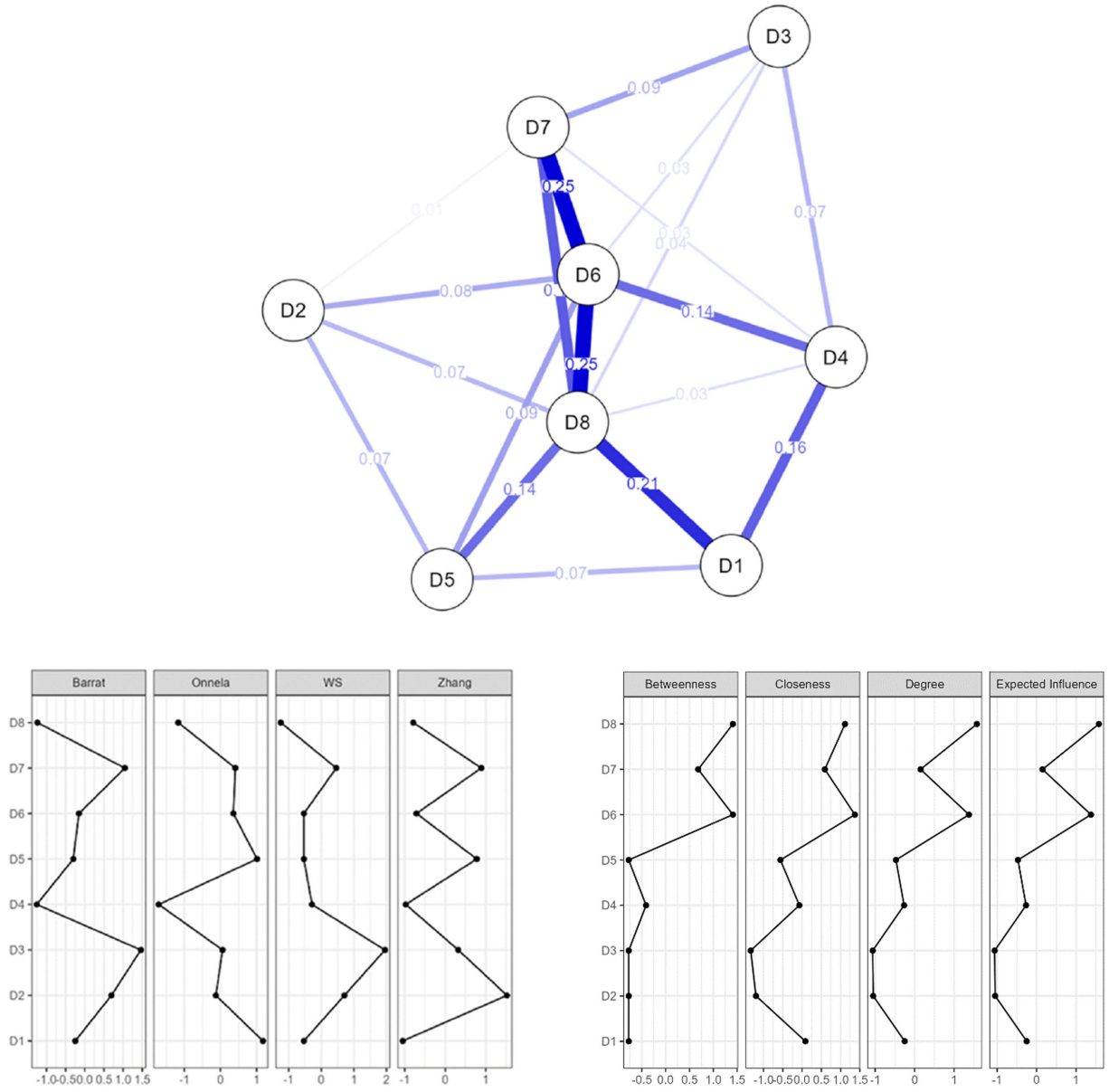

FIGURE 3
Network analysis centrality and clustering plot of the 8 dimensions of IQIB-ECEC scale.

Based on this finding regarding the general structure of the network, it can be said that there is a relationship between the variables and that the variables interact with each other. In the study, four types of measures were used to determine the centrality levels of the dimensions. They were betweenness, closeness, strength, and expected influence. Table 4 presents the centrality measures in detail.

Nodes having a high degree of betweenness are regarded to be in a more important position. As a result, among the variables, D6. Perceived power/Control beliefs and D8. Behavioral intention are the major variables that are highly active in the network (Table 1) and serve as a bridge between other disconnected variables (Figure 1). As a result, the total network is made up of strongly correlated variables, with D6. Perceived power/Control beliefs and D8. Behavioral intention being the two most crucial. Both dimensions 6 and 8 have both the biggest effect over the flow between all dimensions in terms of betweenness. In terms of closeness, the dimension best placed to influence the entire network most quickly is D6. Perceived power/Control beliefs. In terms of strength, the most influential dimension over its immediate neighbors is D8. Behavioral intention, and in terms of expected influence, the same dimension D8. Behavioral intention presents the most prominent characteristics in the analyzed network.

The clustering coefficient measures local cohesiveness and is defined as the fraction of connected neighbors for any vertex.

TABLE 4 Centrality measures per variable.

Variable	Network			
	Betweenness	Closeness	Strength	Expected influence
D1	−0.773	0.086	−0.251	−0.251
D2	−0.773	−1.196	−1.050	−1.050
D3	−0.773	−1.332	−1.063	−1.063
D4	−0.409	−0.071	−0.267	−0.267
D5	−0.773	−0.561	−0.473	−0.473
D6	**1.410**	**1.370**	1.377	1.377
D7	0.682	0.590	0.150	0.150
D8	**1.410**	1.115	**1.577**	**1.577**

The highest values were bolded and discussed in text.

TABLE 5 Clustering measures per variable.

Variable	Network			
	Barrat	Onnela	WS	Zhang
D1	−0.249	1.173	−0.532	−1.047
D2	0.693	−0.129	0.710	1.524
D3	1.463	0.058	1.952	0.323
D4	−1.256	−1.709	−0.284	−0.973
D5	−0.301	1.011	−0.532	0.780
D6	−0.153	0.356	−0.532	−0.709
D7	1.044	0.410	0.461	0.892
D8	−1.239	−1.170	−1.242	−0.789

These coefficients reveal how strongly the dimensions are connected with their neighbors. Clustering coefficients for the dimensions are given in Table 5.

A clustering coefficient is a measure of degree to which nodes in a graph tend to cluster together. Clustering coefficient of a network plays a vital role to influence the behavior of the link prediction technique (Gupta and Sardana, 2015). Clustering coefficients, which quantify the clustering propensity of the network's dimensions, are employed to quantify the frequency of the dimensions in the network. This coefficient, which represents the frequency with which the dimensions are associated, also represents the dimension's importance to the network. A high clustering coefficient indicates that the variables are frequently connected, while a low coefficient indicates that the linkages are rare.

6. Conclusion

The objective of this research was first to develop and validate a scale to assess the integrative-qualitative intentional behavior (IQIB-ECEC) of preschool teachers in order to achieve SDG4.2's objective of ensuring that all children have access to high-quality pre-primary education and then to systemically analyze the relationship between variables with Network Analysis. Thus, the research first aimed to develop a valid and reliable scale to measure preschool teachers' intentional integrative-qualitative behavior based on the theory of planned behavior methodology in order to further assess with Network Analysis the intentional integrative and qualitative behavioral pattern of 300 Romanian preschool teachers. Based on our previous scoping review that clearly indicated that there is a lack of assessing both qualitative and inclusive behaviors in early education (Rad et al., 2022b), we have proposed the IQIB – ECEC scale that will further analyze preschool teachers' behavior with Network Analysis approach.

The basis for the item's generation was the Ajzen methodology and all 24 items were adapted to qualitative-inclusive behaviors in early education for teachers. The 24 items of IQIB-ECEC were measured on a 5-point Likert scale. On a sample of 300 Romanian preschool educators, confirmatory factor analyses proved the IQIB-ECEC scale based on Ajzen's planned behavior theory had eight subscales: actual behavior, attitudes toward the behavior, behavioral beliefs, subjective norm, normative beliefs, perceived power/control beliefs, perceived behavioral control, and behavioral intention, deleting 5 items from the final version of the scale do to negative or very low factor loadings.

Item analysis, confirmatory factor analysis, Cronbach's alpha, and CFI, TLI, SRMR, and RMSEA fit indices were used to examine the validity and internal consistency of the IQIB-ECEC scale. The data validation demonstrated that IQIB-ECEC scale obtained an overall reliable score.

The final scale of 19 items and eight factors has very acceptable construct validity and psychometric properties and should be valuable in further investigations of integrative-qualitative intentional behaviors in preschool education toward both inclusive and qualitative early childhood education as envisaged by SDG4.2. Results indicate that IQIB-ECEC is a valid and reliable measurement for the assessment of integrative-qualitative intentional behaviors in preschool education in terms of actual behavior, behavioral beliefs, perceived power/control beliefs, perceived behavioral control, and behavioral intention.

The systemic Network Analysis approach was used in interpreting data because it is able to effectively operate at multiple

levels, and it describes and makes inferences about relational properties of items, of dimensions/factors, and the entire architecture of intentional behavior.

D6. Perceived power/Control beliefs and D8. Behavioral intention are the major variables that are highly active in the network and serve as a bridge between other disconnected variables. As a result, the total network is made up of strongly correlated variables, with D6. Perceived power/Control beliefs and D8. Behavioral intention being the two most crucial. Both dimensions 6 and 8 have the biggest effect over the flow between all dimensions in terms of betweenness. In terms of closeness, the dimension best placed to influence the entire network most quickly is D6. Perceived power/Control beliefs. In terms of strength, the most influential dimension over its immediate neighbors is D8. Behavioral intention, and in terms of expected influence, the same dimension D8. Behavioral intention presents the most prominent characteristics in the analyzed network.

Behavioral beliefs connect one's intention to the expected consequences and experiences. A behavioral belief is the perceived likelihood that a certain activity will result in a specific event or experience. Although a person may have many behavioral beliefs about any behavior, only a limited number are easily available at any given time. It is considered that the prevalent attitude toward the conduct is determined by these accessible beliefs in conjunction with the subjective values of the expected consequences and experiences. In particular, the appraisal of each outcome or experience adds to the attitude in direct proportion to the person's subjective probability that the activity creates the desired outcome or experience.

The main conclusion of this research is that theory-grounded data can provide information required to comprehend individual perspectives and develop appropriate intervention strategies on areas of expertise and attitudes that need further instilling for the attainment of SDG4.2 goals by 2030, when developing behavioral interventions to address the increasing integrative-qualitative intentional behavior in preschool teachers from a systemically point of view.

7. Discussion and limitations

Several scales for measuring the degree of quality and inclusiveness in early childhood education have been reported (Soukakou, 2012; Ishimine and Tayler, 2014; Soukakou et al., 2018; Steed et al., 2022), but none approached the assessment under the theory of planned behavior framework.

This research results are consistent with previously published prominent studies. Studies show that incorporating children with disabilities in typical preschool classrooms does not result in inferior quality programs or less suitable teacher-child relationships, especially for children with mild to moderate disabilities. The findings highlight the significance of continuing education for early childhood practitioners on high-quality teacher-child interactions (Hestenes et al., 2008). Recognizing that inclusive education can take place in a variety of early childhood education programs involves taking context into account as a potential factor impacting its high-quality execution (Buysse et al., 1999; Buysse and Hollingsworth, 2009; Love and Horn, 2021).

Despite some limitation consisting of the sample characteristics, namely (1) 300 preschool teachers selected among the 700 participants in the national training program entitled Qualitative and Inclusive Early Childhood Education, (2) the planned behavior theoretical single approach of the integrative-qualitative intentional behavior in preschool education scale design, and lastly (3) the CFA used by our team that might yell that we have excluded the qualitative analysis instead of focusing exclusively on statistical measurements, this research represents one of the first studies in applying TPB to integrative-qualitative intentional behavior in preschool teachers and also a preliminary investigation of a factorial model that could be used to further asses these type of behaviors and to represent a basis for further developing behavioral change trainings for instilling integrative-qualitative intentional behavior in preschool education.

The main limitation of this research is represented by the fact that most of the items in the questionnaire have a very high mean in the results (4.5 or higher, from range 1–5, see Table 3), and with such high averages, the instrument does not effectively produce differentiations between different groups of respondents. We argue that the high item means obtained in this research is due to the sensitive aspect and the social desirability imposed by the topic, namely intentional integrative-qualitative behavior in early childhood education and care. In the majority of the cases, the 300 female preschool educators that participated in this research declared that they are willing to further adopt integrative and qualitative behaviors at work. Thus, the high averages on scale's items represent the most important limitation of the IQIB-ECEC 19-item scale.

Future studies should focus on further making comparisons between respondents based on socio-demographic characteristics like gender, age, previous work experience, rural–urban areas, public-private institutions, and development regions.

In order to achieve the inclusive and high-quality early childhood education envisioned by SDG4.2, further research on integrative-qualitative intentional behaviors in preschool education should use the final scale, which has 19 items and eight factors, and has very acceptable construct validity and psychometric properties. Results indicate that IQIB-ECEC is a valid and reliable measurement for the assessment of integrative qualitative intentional behaviors in preschool education and the most important dimensions that impact the network of integrative-qualitative intentional behavior of Romanian preschool teachers are D6. Perceived power/Control beliefs and D8. Behavioral intention.

8. Implications for decision-makers

Romania's early childhood development system is currently dealing with significant challenges. The traditional

approach to kindergarten design and teaching methods must be changed in order to create new educational experiences. The pedagogy of today's educational institutions is closely related to their design, which asks for open, adaptable, and child environments that may better support youngsters' learning activities. We can facilitate better integrative-qualitative behaviors for the smooth achievement of SDG4.2 targets by paying close attention to the role of the preschool teacher as the primary change agent and intended recipient of the regulations and conducting a deep assessment of teachers' perceptions of the innovative methods to early childhood education.

The primary architects of the children's mental architecture are the preschool instructors. The preschool education system must make the transition to a child-centered architectural approach to educational design, which puts the child at the center of the design process and aims to maximize constructive interactions between children and the learning environment.

The ability of the professionals to form wholesome relationships with young children and their knowledge and abilities are the very essence of high-quality early childhood care. The alarming lack of skilled workers in the field today suggests that making significant efforts in educating, attracting, rewarding, and keeping a skilled workforce must be a key concern. Services for young children and their families should be responsibly funded with an eye on benefits against costs. Services that are inexpensive yet fall short of expectations are a waste of money.

It is both a fundamental moral obligation and a vital investment in the social and economic future of our country to address large disparities in opportunity, starting in early childhood. The study of early childhood development can offer a strong foundation for making wise decisions among competing goals and for fostering agreement on a common course of action. Such prudent decisions and concentrated dedication would be in the best interests of the safety of our society's future. A strong foundation for future academic achievement, enhanced productivity at work, and responsible community engagement throughout adulthood is laid by policy initiatives that support nurturing relationships and a wealth of learning opportunities for young children.

The growth of all children is continually tracked through systems, allowing for the early detection of issues that require attention and the formulation of viable solutions. This can be done in the context of routine medical treatment by adequately qualified doctors, nurse practitioners, or developmental experts as well as by continued monitoring of qualified early care and education professionals.

To ensure that all children are enrolled in early intervention services, outreach efforts should be increased, so that children with developmental disabilities can learn the adaptive skills necessary to attain their full potential. Early treatments that encourage good changes in development can lay a stronger basis for subsequent attainment of higher-level talents. This emphasizes the essential necessity to detect sensory deficiencies as soon as possible after birth in order to give corrective equipment as well as the proper recovery-oriented services during the period when the fundamental brain architecture is developing.

When policymakers guarantee that all young children who are at high risk of falling behind in school participate in high-quality, evidence-based programs, the benefits are substantially greater than when only a sample of eligible children is served. It also emphasizes the need to avoid prematurely categorizing families and children who may benefit from early care as being vulnerable. The knowledge, aptitude, and interpersonal relationships skills of the teachers (Samfira and Maricuțoiu, 2021; Samfira and Paloș, 2021) reflect the quality of the early childhood services provided.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Centrul de Cercetare Dezvoltare si Inovare in Psihologie. The patients/participants provided their written informed consent to participate in this study.

Author contributions

GB-D: reviewing the methodology of the paper. LC: reviewing the results of the paper. GV: reviewing the conclusions of the paper. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Appendix

Integrative-qualitative intentional behavior in preschool education scale (IQIB - ECEC)

Authors: *Dana Rad, Adela Redeș, Alina Roman, Anca Egerău, Raul Lile, Edgar Demeter, Tiberiu Dughi, Sonia Ignat, Evelina Balaș, Roxana Maier, Csaba Kiss, Vasile Mărineanu, Mușata Bocoș, Graziella Corina Bâtcă-Dumitru, Lavinia Denisia Cuc, Gabriela Vancu, Gavril Rad, Roxana Chiș.*

Dimension	Item
D1. Actual behavior	1. I propose daily activities in which all the children feel good.
	2. If a child is not accepted by the collective, I always find integration solutions.
D2. Attitudes toward the behavior	3. I worry about a child if they feel marginalized.
	4. By early observing children's behavior, problematic situations can be prevented.
D3. Behavioral beliefs	5. I believe that all children should benefit from the same services.
	6. In my opinion, all children should have equal access to educational resources.
D4. Subjective norm	7. Most people close to me believe that the integration of all children into the collective is essential.
	8. Most educators consider themselves to be objective in evaluating children's progress.
D5. Normative beliefs	9. It is necessary for the kindergarten to provide more educational resources.
	10. It would be very good for the children if the integration process is permanently monitored.
	11. Not only the kindergarten can ensure the holistic integration of the child in society.
D6. Perceived power/Control beliefs	12. It is up to me to keep all class problematic situations under control.
	13. It is in my power to ensure that no child is discriminated.
	14. It is in my knowledge that the integration of children is holistic.
D7. Perceived behavioral control	15. The decision to equally relate to all children belongs only to me.
	16. I do not need support to deal with unforeseen situations that arise in the class.
D8. Behavioral intention	17. I expect to be responsive to all the children's needs regardless of my mood.
	18. I want to be receptive to all the needs of children regardless of the situation.
	19. I intend to be receptive to all children's needs, regardless of context.

Notes: The IQIB - ECEC is rated on a 1 to 5 Likert scale, where 1 represent total disagreement and 5 represents total agreement.
For IQIB - ECEC scale interpretation the average mean of all 19 items can further be utilized.
The higher the score, the higher is the integrative qualitative intentional behavior of the preschool teachers.

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The dynamics of burnout among Slovenian primary school teachers over the school year in relation to their perceptions of various predictors of burnout in the school context

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This study examined the dynamics of teacher burnout over the course of the school year in relation to individual and environmental factors in the school context based on a three-wave panel design using an MBI-ES questionnaire and a self-constructed inventory to measure individual and environmental factors of burnout. The sample consisted of 718 teachers from 32 Slovenian primary schools; 163 of them participated in all measurements. The major limitation of this study is the high attrition rate. However, attrition analysis showed no significant differences between the initial sample and the panel group on background variables and burnout dimensions or on environmental and individual factors. Burnout was present but not pronounced among participating teachers: Emotional exhaustion was moderately high and depersonalization and personal accomplishment were low. Over the course of the school year, burnout did not increase consistently and gradually; we found only a statistically significant increase in personal accomplishment in the middle of the school year and a statistically significant greater sense of burnout at the end of the school year. As stress accumulates over time, we would expect burnout to increase. We hypothesize that participants reduced the effects of stress through various coping strategies and/or replenish their resources. We believe that the school year is not long enough for burnout to develop. The number of stressors perceived by teachers was significantly related to burnout rates. Teachers experience stress, especially in work not directly related to teaching, and from their own performance expectations. Multivariate regression analyses yielded three different but similar models of predictors of burnout that explained 25 to 50% of the variance in teacher burnout. Regardless of the instability of the models, the time and energy demands of working with students, teacher characteristics, and classroom management are the stable antecedents in the predictor models of teacher burnout.

KEYWORDS

dynamics of burnout, individual and environmental predictors of burnout, longitudinal, MBI-ES questionnaire, stressor, teacher burnout

1. Introduction

The burnout phenomenon was originally described among professionals working in the human services field, particularly in professional care (Maslach et al., 1996). Burnout is a serious occupational risk that results from an extensive and prolonged response to work stress in the workplace (Maslach et al., 2001; Pietarinen et al., 2021). It manifests itself in three dimensions:

emotional exhaustion (EE), depersonalization (DP), and a diminished sense of personal accomplishment (PA) and occurs in individuals who work with people (Maslach et al., 1996, 2001).

Education is one of the most stressful work environments (Johnson et al., 2005; EU-OSHA, 2009; Fisher, 2011; Grant-Rankin, 2017; Worth and Van den Brande, 2019) because it involves multiple tasks (e.g., lesson preparation and classroom management) and interactions with multiple groups of people (e.g., students, colleagues, and parents; Jensen et al., 2012). The intense relational nature of classrooms means that teachers are vulnerable to emotionally draining and discouraging experiences (Maslach et al., 1996); therefore, the potential for emotional distress for teachers is high. Grant-Rankin (2017) argues that teacher burnout is already a universal phenomenon: nearly half of teachers in India are burned out (Shukla and Trivedi, 2008 in Grant-Rankin, 2017), half of South Jordanian teachers of both genders are emotionally exhausted (Alkhateeb et al., 2015 in Grant-Rankin, 2017), 15% of Swedish teachers show high rates of burnout on at least two dimensions of burnout and 4% of teachers on all (Arvidsson et al., 2016), and 83% of Slovenian primary school teachers reported a decrease in PA, 58% reported an increase in EE, and 22% reported an increase in DP (Depolli Steiner, 2014).

Prolonged exposure to psychosocial hazards leads to burnout, usually initially through EE to DP and decreased PA (Maslach and Leiter, 2016). EE is the most important and obvious manifestation of burnout (Maslach and Leiter, 2016). The authors suggest that teacher burnout begins with excessive stress working with students, parents, and other school personnel, while on the other hand, there is a lack of support at work and effective stress management skills. This leads to EE in teachers, which manifests in a lack of positive emotions and feelings such as frustration, anger, hostility, anxiety, and restlessness. Emotionally exhausted teachers begin to emotionally distance themselves in their interactions and do not engage with students as they would like. Increasing EE releases depersonalizing behaviors as a defense mechanism (increased DP). Teachers begin to underestimate their students' problems, even though they are still professionally active and enjoy their educational accomplishments. The teacher's disinterest in the students or his/her negativity and harshness toward the students promotes negative behaviors in the students. Thus, the teacher faces more and more failures and feels a low PA. Teachers do not feel that they have an impact on students and therefore may be disappointed in themselves or their work.

Llorens-Gumbau and Salanova-Soria (2014) suggest that the development of burnout in teachers may begin with chronic job demands or stressors, which in turn can deplete their energy resources and lead to burnout. They found that both causal and reverse causal relationships are simultaneously active in the reciprocal relationships between structural (obstacles and facilitators) and affective factors (burnout and engagement) and work self-efficacy. Kim and Burić (2020) report similar findings: Experiencing burnout (both exhaustion and disengagement) predicts teachers' future self-efficacy levels more strongly than the other way around.

Several research findings (e.g., Hakanen et al., 2008; Schaufeli et al., 2011; Kim and Burić, 2020) suggest relative stability in burnout levels over time, suggesting that teachers will experience similar levels of burnout if no changes are made (Kim and Burić, 2020). Therefore, it is important to examine the associations between teacher burnout and other factors and constructs in order to ameliorate or even prevent the development of burnout.

In the past, many studies have examined the correlates of teacher burnout. Research suggests that burnout in teachers is influenced by subjective factors rather than objective factors. For example, a meta-analysis on teacher burnout found that gender, marital status, subject area, and educational status had very little influence on teacher burnout, although the differences were statistically significant (Yorulmaz and Altınkurt, 2018).

Previous research has also contributed to understanding the contribution of job characteristics to primary teacher burnout. In the past, researchers have consistently reported similar sources of stress for primary school teachers. For example, Thomas et al. (2003) found that time and workload pressure were ranked as the greatest source of stress, followed by parental expectations and demands, student behavior and student problems, negative community attitudes toward teaching, problems with school administration and staff, and lack of professional recognition. In Herman and Reinke (2015), reported similar sources of primary teacher stress, including (a) administrative expectations, (b) challenging colleagues, (c) time demands and limited resources, (d) diverse student needs and differentiated instruction, (e) student behaviors and attitudes, (f) lack of preparation, (g) working with parents, and (h) life stress. Stressors from all listed sources of stress are repeatedly identified as facilitators of burnout in primary school teachers. For example, high workload and pressure, work-privacy conflict, job insecurity, staff affiliation and consensus on mission, destructive social interactions, emotional demands, noise and vocal stress, classroom management, student achievement, poor cooperation, inadequate support, lack of planning and preparation, and task orientation have been found to increase the risk of burnout for teachers (Kokkinos, 2007; Stauffer and Mason, 2013; Aloe et al., 2014; Malinen and Savolainen, 2016). In turn, autonomy, supervisory support, opportunities to receive constructive feedback, and professional recognition have been shown to reduce risk (Kokkinos, 2007; Stoeber and Rennert, 2008).

Over the past decade, much of the research has focused on explaining individual characteristics of primary teachers related to burnout. For example, affectivity, novelty seeking, persistence, self-direction, workplace engagement, resilience, self-efficacy, neuroticism, conscientiousness, extraversion, burnout crossover, stress coping strategies, proactive self-regulation strategies (Kokkinos, 2007; Brudnik, 2009; Mojsa-Kaja et al., 2015; Burić et al., 2019; Meredith et al., 2020; Pietarinen et al., 2021; Shakeel et al., 2022).

Many studies have helped to understand the contribution of job characteristics and individual teacher factors to classroom stress separately; however, their joint effect has not been adequately explored. Collie and Mansfield (2022) report that for some teachers and schools, certain sources were more important than others. Thus, they emphasize the importance of considering both individual and school contexts when addressing and reducing stress in interventions.

Transactional theories have an even more complicated position on the relationship between constructs. Recall first: according to Selye (1946 in Fimian, 1982), stress is a hypothetical construct that represents a state of equilibrium between the individual responding to environmental demands and the actual environment, and stressors are events in the environment that represent a change in the usual environmental conditions and require extensive adaptive responses from the individual. Transactional theories understand stress as an internal state in which an individual's psychological characteristics (e.g., personality traits, cognitive appraisal of the stressor, stress coping strategies, social support, previous experiences with the stressor, or current mood) moderate the relationship

between the environment and the stress (Biggs et al., 2017). These can mitigate or amplify the effects of the stressor: Teachers interpretation of the situation (perception of and attitudes toward the stressor and their own resources for overcoming it) is important to the intensity and duration of the stressor (McCormick and Barnett, 2011; Parker et al., 2012). Psychological characteristics found to moderate the impact of external stressors in primary teachers include coping strategies (e.g., Herman et al., 2020), self-efficacy (e.g., Shakeel et al., 2022), teacher reflection (e.g., Košir et al., 2015), neuroticism (e.g., Goddard et al., 2006), striving and occupational commitment (e.g., Jepson and Forrest, 2006), psychological capital and flourishing (Freire et al., 2020), irrational beliefs (e.g., Bernard, 2016), and job satisfaction (e.g., Zang et al., 2022). It is also important what individuals do when they perceive high levels of stress: poor recovery experiences in the form of low leisure relaxation and non-restorative sleep partially mediated the relationship between effort-reward imbalance and lower occupational efficiency (Gluschkoff et al., 2016). In addition, Zhao et al. (2022) found that work–family conflict plays a mediating role between job stress and burnout among primary and secondary teachers. Therefore, teachers may perceive, interpret and respond to different sources of stress differently (Collie and Mansfield, 2022).

1.1. Research problem

Limited research has been conducted on the development of primary teacher burnout during the school year. For example, study of Capel (1991) showed no significant differences between teacher burnout at the three time points during the year, although most teachers showed the highest burnout in February. The profile analysis showed that the direction of change (if any) was not necessarily the same between the three time points. This suggests that there are some factors in the school environment that influence the development of burnout.

However, there are still many unexplained relationships between the development of primary teacher burnout on the one hand and the school environment and primary teacher characteristics on the other. Therefore, the purpose of this study is to examine the dynamics of burnout in primary teachers over the course of the school year in relation to their perceptions of various stressors in the school environment.

We hypothesize that the experience of burnout changes and intensifies during the school year. During the school year, some stressors are constantly present, while there are a number of stressors that are one-time, transient, or sporadic. Because stress accumulates over time (Taris et al., 2001), we hypothesize that perceived burnout increases during the school year.

According to transactional theories, teachers' cognitive appraisal of stressors is an important mediator of burnout development (Depolli Steiner, 2014). Therefore, we hypothesize that the number and importance of primary teachers' perceived stressors should correlate with perceived burnout. If individuals do not eliminate the negative effects of stress, the effects of microstressors add up (Taris et al., 2001).

A literature review by Thomas (2004) pointed to the associations between perceptions of work and feelings of overwhelm and suggested that "feeling overwhelmed at work" may be an antecedent and possible proxy for EE and DP. For example, subjective workload predicted high levels of burnout in students, while actual workload did not (Jacobs and Dodd, 2003). Thus, another aim of this study is to examine the relationship between subjective feelings of primary teacher burnout, measured primary teacher burnout, and environmental and individual factors. We hypothesize that there is a positive correlation between subjective and measured primary teacher burnout on the one hand and environmental and individual factors on the other.

2. Materials and methods

2.1. Participants and procedure

The study was conducted at three time points in a school year: 1 week before fall break (late October—T1), 1 week before winter break (mid-February—T2), and 1 week before the end of the school year (mid-June—T3).

At the beginning of the school year, a letter was sent to 45 primary schools (10% of all Slovenian primary schools) from all 12 statistical regions explaining the purpose of the survey and asking for their cooperation. Schools were sampled in two steps: (1) by region and (2) by school size and urban/rural setting. The response rate was 71.1% (32 schools): 13 large and 19 small, 10 urban and 22 rural. After obtaining consent from the school principals, one of the researchers attended staff meeting where she explained the purpose and the procedure of the study to the participants and conducted the initial assessment in the teacher conference. School coordinators conducted the other two assessments (handing out questionnaires for participants to answer individually) and returned the paper questionnaires by mail. The first data collection took up to an hour, the second up to 30 min, and the third up to 10 min.

Teachers participated in the study voluntarily. From this point on, we will address primary teachers as teachers. The total sample consisted of 718 teachers (89.3% female). Their mean age was 40.9 years, age ranged from 20 to 62 years, and mean teaching experience was 17.4 years (range of 0 to 41 years). 82.2% of the teachers had a permanent employment and 57.4% were classroom teachers. Most of the participating teachers taught at the grade level (43.9%), 31.5% at the subject level, and 16.6% at both levels. The percentage of teachers from small or large schools was similar (55%/45%), while more teachers were from rural than urban schools (62.0%/38.0%).

At T1, 614 teachers participated, at T2, 306 participated, and at T3, 321 participated (Table 1). Across all three measurements, 22.7% of teachers participated ($N = 163$). At least 360 teachers (50.1%) participated in at least two of the measurements.

Results on dynamic of burnout were calculated using the final sample of 163 teachers who participated at all three time points. In the final sample, 11.0% of teachers were male and 89.0% were female. Their mean age was 40.9 years, age ranged from 25 to 58 years, and mean

TABLE 1 The number of teachers participating in three time points.

I	II	III	Teachers	
			N	%
Yes	Yes	Yes	163	22.7
		No	90	12.5
	No	Yes	79	11.0
		No	282	39.3
No	Yes	Yes	28	3.9
		No	25	3.5
	No	Yes	51	7.1

teaching experience was 17.5 years (range of 0 to 36 years). Compared to the total sample, more teachers (85.3%) had temporary employment and more teachers (60.1%) were classroom teachers. Most of the participating teachers taught at the grade level (42.9%), 33.7% at the subject level, and 17.8% at both levels. Similar to the total sample, more teachers were from small (59.5%) and rural schools (73.6%), although both percentages were higher.

2.2. Variables

This study was part of a larger research project aimed at examining the effects of individual and environmental factors, coping mechanisms, and resource replacement on the dynamics of burnout among teachers during the school year. Data for this study came from three domains: (1) demographic and job information, (2) assessment of burnout, and (3) assessment of environmental and individual factors.

The demographic and job information domain included questions on: gender, age, years of teaching experience, type of employment (permanent/temporary employment), school district (urban/rural), educational level, and whether or not you are a classroom teacher. Participants had to generate their own code. In case they forgot it, all listed variables were measured in all three waves to identify the questionnaires of the same person.

Burnout was measured using the MBI-ES questionnaire (Maslach et al., 1996). It consists of 22 items measured on a 7-point Likert scale. These items measure the frequency of experiencing the three independent dimensions of burnout: (1) EE (nine items), (2) DP (five items), and (3) PA (eight items). The individual's degree of burnout is expressed by a high EE and a high feeling of DP and a low PA. The reliability coefficients of the subscales in the original study were as follows: $\alpha_{EE}=0.90$, $\alpha_{DP}=0.79$, $\alpha_{PA}=0.71$ (Maslach et al., 1997). The three-factor structure of the Slovenian translation of MBI-ES was confirmed with principal component analysis (PCA) and the reliability of the instrument was measured with Cronbach's alpha: $\alpha_{EE}=0.88$, $\alpha_{DP}=0.84$, $\alpha_{PA}=0.54$ (Depolli Steiner, 2014). The internal consistency of the instrument was also estimated in this study at the first measurement ($N=614$) using Cronbach's coefficient alpha. Reliability coefficients for the subscales were as follows: $\alpha_{EE}=0.90$, $\alpha_{DP}=0.68$, $\alpha_{PA}=0.77$.

An additional question ("*To what extent do you feel burned out?*") measured subjective feelings of burnout (SFB) on a 5-point Likert scale (1—*I do not feel burned out at all*; 5—*I feel completely burned out*). SFB is highly and positively significantly correlated with EE at all three time points ($0.74\leq r\leq 0.78$), positively statistically significantly correlated with DP at all three time points ($0.32\leq r\leq 0.43$), and negatively significantly correlated at T2 and T3 ($-0.4\leq r\leq -0.26$).

Assessment of environmental and individual factors was measured using a self-constructed inventory developed in an independent preliminary study (Markelj, 2008) to identify specific factors that correlate with burnout in teachers. The questionnaire was administered at T1. It consists of 42 items that were rated on a 5-point Likert scale (1—*I strongly disagree*; 5—*I strongly agree*). PCA of the total sample ($N=614$) yielded 13 factors (Kaiser-Guttman criterion, scree plot analysis): teacher characteristics (e.g., *I am steadfast*; *I am positively life-oriented*), time and energy demands of working with students (e.g., *I find it difficult to work with a heterogeneous class*), student learning characteristics (e.g., *my students have poor study habits*), administration and job responsibilities (e.g., *I have a lot of administrative work*), ambition (e.g., *lack of recognition for extra work bothers me*), classroom management (e.g., *I find it difficult to discipline the class*), initiative and creativity (e.g., *I try new pedagogical approaches*), subjective work demands (e.g., *I feel I am not doing enough for the students*), working conditions (e.g., *the working conditions I work under are inadequate*), relationships with management (e.g., *I have the opportunity to be actively involved in decisions about the school*), sense of control (e.g., *my work tasks are clear*), personal responsibility (e.g., *I have high expectations of my work*), and relationships with colleagues (e.g., *I do not have many conflicts with my colleagues*). In the second step, we used Varimax with Kaiser normalization as a rotation method. Thirteen components explained 60.1% of the total variance. Difficulty indices of all items were appropriate ($0.40\leq p\leq 0.89$), discrimination index analysis revealed 13 items with an index below 0.20 and 5 items below 0.25. Internal consistency was estimated with Cronbach's coefficient alpha. Reliability coefficients for the subscales were as follows: 0.72, 0.73, 0.75, 0.75, 0.54, 0.60, 0.68, 0.39, 0.50, 0.47, 0.34, 0.22, and 0.34, respectively.

2.3. Data analyses

Data analyses were performed using SPSS 26.0, and graphical representations were created using MS Excel. All statistical analyses, including burnout, were performed with the panel group ($N=163$). Descriptive and correlational analyses of background variables and environmental and individual factors were performed with the total sample at T1 ($N=614$).

For attrition analysis, we used the following calculation: $\frac{2\times y\times 100}{2x+z}$, where x is the number of participants at baseline, y is the number of participants who left the study at a given time point, and z is the number of participants who entered the study at a given time point. In the correlation analysis between the background variables and the burnout index, we used the Eta coefficient, Spearman's ρ, or Pearson's r, depending on whether the variable was nominal, ordinal, or at least interval scaled.

To track the development of burnout over the school year, we calculated the *M*, *SE*, *SD*, and percentages of the burnout dimensions and SFB. Normality of the distributions for all variables was tested using the Kolmogorov–Smirnov test (K–S test). To test for differences between measurements, we used One-way Repeated-Measures ANOVA for EE and PA (*post-hoc* test: *t*-test) and the Friedman test (*post-hoc* test: Wilcoxson signed rank test) for DP and SFB, depending on the results of the K-S test. Correlations between MBI burnout dimensions and SFB were calculated using the Spearman correlation coefficient.

We calculated the M and SD for individual and environmental factors. The normality of the distributions of the categories of the factors was tested using the K-S test. The analysis of the burnout factors was performed in two ways: (1) a rank analysis of the individual and environmental factors according to the teachers' subjective importance for burnout and (2) a correlation analysis between the categories of the burnout factors and the burnout index.

To examine the relationships between burnout and the categories of environmental and individual factors, we calculated Spearman's correlation coefficient. In the correlation analysis, we used the burnout index (IB), which ensures the continuity of the index (Demšar, 2003). Formula for calculating I_B: $I_B=4\times\frac{M_{\mathrm{EE}}}{6}+2\times\left(\frac{M_{PA}}{6}\right)+1\times\frac{M_{DP}}{6}$. M_{EE}, M_{PA}, and M_{DP} are the average score of the individual on all three dimensions of burnout. The possible range of I_B is from 0 to 6, with a higher score indicating a higher level of burnout.

To examine the predictive contribution of the environmental factor and individual burnout factor categories, multiple regression was conducted using a model *Forward*. The burnout factor category was included in the multiple regression analysis if it was significantly correlated with the burnout index at least two time points. There were nine categories of environmental and individual burnout factors that met this criterion (*time and energy demands of working with students, teacher characteristics, classroom management, student learning characteristics, subjective work demands, administration and job responsibilities, working conditions, ambition*, and *sense of control*).

3. Results

3.1. Attrition analysis

Attrition analysis showed an attrition rate of 56.4% from T1 to T2 and 34.7% from T2 to T3; the overall attrition rate (from T1 to T3) was 62.3%. To examine whether the leavers differed from the panel group, we compared their background variables (age, gender, teaching experience, urban/rural school district, being a classroom teacher, permanent/fixed-term employment) and dependent variables (average scores for the dimensions of burnout at T1 and 13 environmental and individual factors). Results showed that there were significant differences between groups for type of employment ($\chi^2 = 7.181$, $df = 2$, $p = 0.028$), type of school district ($\chi^2 = 35.625$, $df = 2$, $p = 0.000$), and being a classroom teacher ($\chi^2 = 11.066$, $df = 2$, $p = 0.026$). There were no significant differences between groups on burnout dimensions or environmental and individual factors.

We also calculated correlations between background variables and the burnout index in all three measurements (Table 2).

All correlations between the background variables and the burnout index are very weak and positive. The burnout index correlates significantly with age, years of teaching experience, and average number of students in the classroom. Since the differences between the sample in the T1 group and the panel group were found in terms of type of employment, type of school district, and being a classroom teacher or not, and these background variables are also not correlated with the burnout index, we can proceed with the statistical analyses, but still with caution in interpretation.

TABLE 2 Correlation analysis of background variables and burnout index in three time points.

Background variable		Index of burnout in T1	Index of burnout in T2	Index of burnout in T3
Gender	*Eta* Coefficient	0.025	0.004	0.098
	N	614	306	321
Age	*r*	**0.163***	**0.209***	**0.123***
	p	0.000	0.000	0.028
	N	613	306	319
Type of employment	*Eta* Coefficient	0.188	0.180	0.083
	N	612	305	320
Years of teaching	*r*	**0.157***	**0.208***	**0.113***
	p	0.000	0.000	0.044
	N	613	306	319
School district	*Eta* Coefficient	0.009	0.115	0.027
	N	614	306	321
Size of the school	*ρ*	0.039	0.075	0.041
	p	0.332	0.191	0.462
	N	614	306	321
Instructing educational level	*Eta* Coefficient	0.126	0.130	0.138
	N	613	306	321
Being a classroom teacher	*Eta* Coefficient	0.024	0.108	0.094
	N	612	306	321
Average number of students in the classroom	*r*	0.046	**0.127***	**0.129***
	p	0.262	0.028	0.023
	N	594	302	313

*Correlation is significant at the 0.05 level. Significant correlations are in bold.

3.2. Burnout development

Table 3 shows the descriptive statistics of the burnout questionnaire for the panel group at all three time points. Scores in the upper third of the distributions of EE and DP and in the lower third of PA represent high burnout (Maslach et al., 1996). Accordingly, scores from EE represent moderate burnout and scores from DP and PA represent low burnout for participants over the course of the school year.

The percentage of teachers with high burnout on three different dimensions (Figure 1) shows that EE is the most pronounced dimension (about 40% of teachers at all three time points). Low PA is reported by about 10% of teachers, while high DP is reported by no more than 1% of teachers.

Mean scores for the three burnout dimensions vary only slightly over the school year (Table 3). EE and DP decrease slowly over the school year; PA increases from T1 to T2 and decreases in T3, but not below the T1 score. The differences are not statistically significant ($F_{EE} = 1.634$, $df = 2$, $p = 0.197$; $\chi^2_{DP} = 0.289$, $df = 2$, $p = 0.865$; $F_{PA} = 2.276$, $df = 1.9$, $p = 0.108$), except between the values of PA at T1 and T2 ($t = -2.355$, $df = 162$, $p = 0.020$).

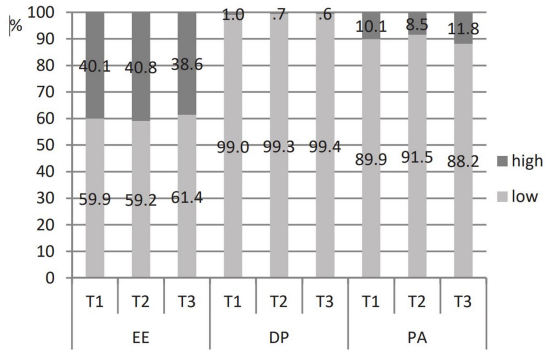

FIGURE 1
Percentage of teachers with high and low burnout dimensions at three time points.

TABLE 3 Descriptive statistics of burnout questionnaire for panel group in three time points.

	N	Min	Max	*M*	*SD*	Skewness	Kurtosis	Kolmogorov–Smirnov *Z*	*p*
EE/T1	163	3	45	21.02	8.62	0.21	−0.38	0.690	0.728
EE/T2	163	0	50	20.42	9.94	0.20	−0.32	0.783	0.573
EE/T3	163	0	41	19.93	9.90	0.23	−0.70	0.827	0.500
DP/T1	163	0	21	5.65	4.41	0.82	−0.01	2.058	0.000
DP/T2	163	0	21	5.64	4.37	0.81	0.35	1.563	0.015
DP/T3	163	0	18	5.58	4.44	0.69	−0.21	1.356	0.051
PA/T1	163	17	46	33.85	6.00	−0.43	−0.19	1.119	0.163
PA/T2	163	22	48	34.86	5.42	−0.23	−0.23	1.058	0.213
PA/T3	163	11	48	34.19	6.58	−0.39	0.23	0.727	0.666
SFB/T1	163	1	5	2.51	1.03	0.04	−0.87	2.607	0.000
SFB/T2	163	1	5	2.40	0.99	0.05	−0.86	2.781	0.000
SFB/T3	163	1	5	2.75	1.03	−0.16	−0.66	2.913	0.000

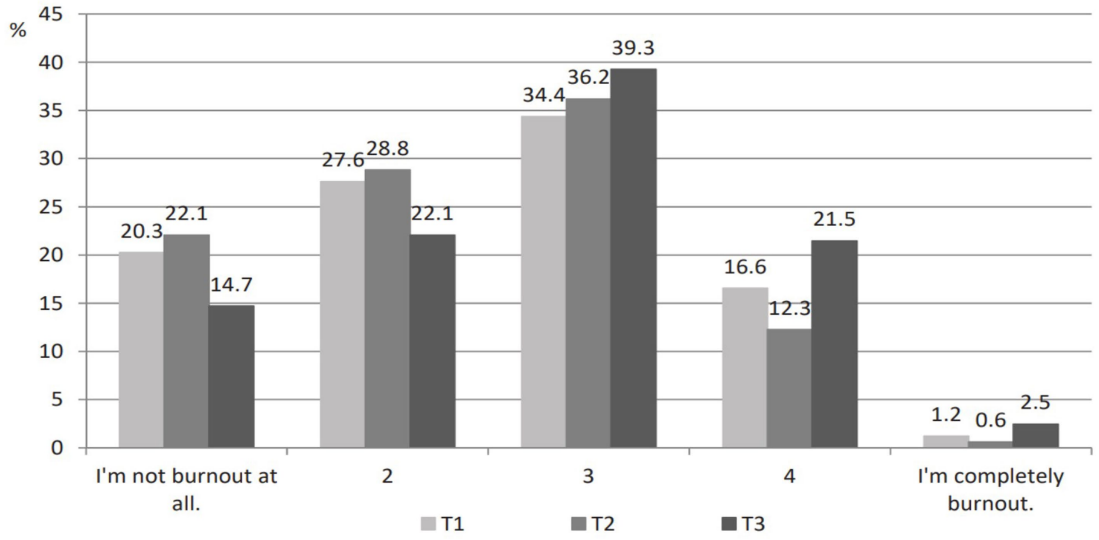

FIGURE 2
SFB in three time points—percentage of teachers.

Teachers rated their SFB as low to moderate over the year, similar to MBI scores. The mean score of SFB first decreased from T1 ($M = 2.51$, $SD = 1.03$) to T2 ($M = 2.40$, $SD = 0.99$) and then increased from T2 to T3 ($M = 2.75$, $SD = 1.03$). Differences between measurements during the school year were statistically significant ($\chi^2_{SFB} = 16.055$, $df = 2$, $p < 0.001$). Post-hoc tests revealed that the difference between T1 and T2 and T1 and T3 was not statistically significant ($Z_{1\text{-}2} = -1.509$, $p = 0.131$; $Z_{1\text{-}3} = -1.757$, $p = 0.079$), while the difference between T2 and T3 was statistically significant ($Z_{2\text{-}3} = -4.573$, $p < 0.001$). Figure 2 shows that at T1 and T2, about 15% of teachers have a strong sense of burnout (scores 4 and 5) and about half have a low or no sense of burnout (scores 1 and 2). At T3, the percentage of teachers decreases significantly for low scores (scores 1 and 2) and increases for higher scores (score 4). At the end of the school year, about a quarter of them have a strong sense of burnout.

Table 4 shows the correlation analysis between MBI dimensions and SFB. There are statistically significant correlations between the dimensions of burnout and SFB for all three measurements, except SFB and PA for the first measurement. The PA dimension is negatively related to the other dimensions of burnout and SFB for all three measurements: the relationship is insignificant to small ($-0.35 < \rho < -0.10$) for the first two measurements and moderate ($-0.40 < \rho \leq -0.49$) for the third measurement. The correlations between EE and DP are moderately positive for all three measurements (ρ about 0.50). SFB is highly positively correlated with EE for all three measurements ($0.74 < \rho < 0.79$) and moderately positively correlated with DP ($0.31 < \rho < 0.43$).

3.3. Burnout levels in relation to teacher demographic characteristics and teaching contexts

The age and years of teaching experience of the participating primary teachers correlate with the burnout index on all three measurements (Table 2). The correlations are weak and positive

TABLE 4 Correlation analysis of burnout dimensions and SFB for panel group in three time points.

	SFB	EE	DP	PA
T1				
SFB				
ρ	1.000			
p	.			
N	163			
EE				
ρ	**0.744****	1.000		
p	0.000	.		
N	163	163		
DP				
ρ	**0.401****	**0.508****	1.000	
p	0.000	0.000	.	
N	163	163	163	
PA				
ρ	−0.096	**−0.239****	**−0.347****	1.000
p	0.223	0.002	0.000	.
N	163	163	163	163
T2				
SFB				
ρ	1.000			
p	.			
N	163			
EE				
ρ	**0.784****	1.000		
p	0.000	.		
N	163	163		
DP				
ρ	**0.428****	**0.564****	1.000	
p	0.000	0.000	.	
N	163	163	163	
PA				
ρ	**−0.264****	**−0.290****	**−0.328****	1.000
p	0.001	0.000	0.000	.
N	163	163	163	163
T3				
SFB				
ρ	1.000			
p	.			
N	163			
EE				
ρ	**0.780****	1.000		
p	0.000	.		
N	163	163		
DP				
ρ	**0.316****	**0.457****	1.000	
p	0.000	0.000	.	
N	163	163	163	
PA				
ρ	**−0.395****	**−0.475****	**−0.490****	1.000
p	0.000	0.000	0.000	.
N	163	163	163	163

**Correlation is significant at the 0.01 level. Significant correlations are in bold.

TABLE 5 Descriptive statistics and averages of burnout index comparison between gender at three time points.

Gender		*N*	*M*	*SD*	Min	Max	*t*	*p*
Index of burnout—T1	Women	18	2.19	0.78	0.91	3.66	0.567	0.452
	Men	144	2.35	0.84	0.39	4.71		
	All	162	2.33	0.83	0.39	4.71		
Index of burnout—T2	Women	18	1.99	0.93	0.00	3.40	1.638	0.202
	Men	144	2.29	0.93	0.34	5.13		
	All	162	2.26	0.93	0.00	5.13		
Index of burnout—T3	Women	18	2.14	0.90	0.67	4.18	0.227	0.634
	Men	144	2.26	0.98	0.34	4.39		
	All	162	2.25	0.97	0.34	4.39		

$(0.12 < r_{age} < 0.21;\ 0.11 < r_{years\ of\ teaching} < 0.21)$. There were no statistically significant differences in burnout levels related to gender (Table 5).

The majority of teachers (82.4%) are tenured. Table 6 shows the relationships between the type of employment and the burnout index.

The type of employment has been shown to be an important factor related to burnout. Teachers who are employed for a period of time have, on average, lower levels of burnout than tenured teachers. The differences between the groups were also found to be statistically significant at T1 and T2. Teachers with permanent positions have, on average, longer work experience and are also older. They are also more emotionally involved in their work ($F_{EE\text{-}T1} = 9.352$, $df = 1$, $p = 0.003$; $F_{EE\text{-}T2} = 6.360$, $df = 1$, $p = 0.013$) than temporary teachers. The latter are likely to be aware that they will leave at the end of the school year and that they have no significant influence on what happens in their current workplace. Consequently, they are more likely to accept the work environment as it is and are less concerned about the current situation.

More than half of the teachers (57.5%) also have classroom teaching responsibilities. Table 7 shows differences in burnout index between teachers who take on a classroom task and teachers who do not at three time points.

Performing the function of a classroom teacher did not prove to be an important factor in relation to experiencing burnout. In T1 and T3, classroom teachers had higher average burnout indices than non-classroom teachers; in T2, the opposite was true. At none of the measurements did the differences between classroom teachers and non-classroom teachers prove statistically significant. These results are somewhat surprising given that many teachers perceive classroom teaching as an additional and demanding burden. In addition to the greater administrative burden, teachers also perceive classroom teaching as stressful because they subjectively take responsibility for student success, behavior, and experiences.

TABLE 6 Descriptive statistics and averages of burnout index comparison between teachers with permanent and temporary position at three time points.

Type of employment		*N*	*M*	*SD*	Min	Max	*t*	*p*
Index of burnout—T1	Temporary	23	1.89	0.69	23	1.89	8.268	0.005*
	Permanent	138	2.41	0.83	138	2.41		
	All	161	2.34	0.83	161	2.34		
Index of burnout—T2	Temporary	23	1.81	1.10	23	1.81	6.583	0.011*
	Permanent	138	2.34	0.88	138	2.34		
	All	161	2.26	0.93	161	2.26		
Index of burnout—T3	Temporary	23	2.09	1.21	23	2.09	0.708	0.401
	Permanent	138	2.28	0.93	138	2.28		
	All	161	2.25	0.97	161	2.25		

*Correlation is significant at the 0.05 level.

TABLE 7 Descriptive statistics and averages of burnout index comparison between teachers who take on a classroom task and teachers who do not at three time points.

Classroom teaching responsibilities		*N*	*M*	*SD*	Min	Max	*t*	*p*
Index of burnout—T1	Yes	98	2.30	0.85	0.39	4.40	0.331	0.566
	No	64	2.38	0.81	0.49	4.71		
	All	162	2.33	0.83	0.39	4.71		
Index of burnout—T2	Yes	98	2.23	0.87	0.34	4.54	0.243	0.623
	No	64	2.30	1.02	0.00	5.13		
	All	162	2.26	0.93	0.00	5.13		
Index of burnout—T3	Yes	98	2.28	0.98	0.45	4.32	0.235	0.629
	No	64	2.20	0.95	0.34	4.39		
	All	162	2.25	0.97	0.34	4.39		

Depending on educational level (Table 8), teachers teaching at the grade level had the lowest burnout levels, whereas teachers teaching at the subject level or teachers teaching both levels had similar burnout levels at all three time points. We found statistically significant differences in the burnout index only at T1.

3.4. Environmental and individual factors of burnout

Teachers reported an average of 13.5 ($SD = 4.9$) individual factors and factors in the school environment that strongly influence them. Correlation analysis revealed significant positive low to moderately high correlations between the number of burnout factors teachers rated as important and the three burnout dimensions ($\rho = 0.44$ at T1, $\rho = 0.38$ at T2, and $\rho = 0.32$ at T3).

Teachers rated how much they were affected by environmental and individual factors related to burnout. They rated most of the items as averagely burdensome ($1.67 \leq M_i \leq 4.18$). The most stressful items represent work not directly related to teaching (*administrative work*, *complexity of work*, *teachers' own expectations of their job performance*, and *introduction of new teaching methods*). Environmental and individual burnout factors related to *sense of control*, *relationships with colleagues*, and *time and energy demands of working with students* were rated as least stressful. All items related to teaching and other work with students were in the middle of the scale of burnout predictors according to the ranking of mean scores.

TABLE 8 Descriptive statistics and average comparison of burnout index between teachers at different educational level at three time points.

Educational level		*N*	*M*	*SD*	Min	Max	*F*	*p*
Index of burnout—T1	Grade level	70	2.14	0.79	0.39	4.40	4.326	0.015*
	Subject level	55	2.52	0.95	0.55	4.71		
	Teaching at both levels	29	2.52	0.54	1.27	3.39		
	All	154	2.35	0.83	0.39	4.71		
Index of burnout—T2	Grade level	70	2.09	0.89	0.34	4.02	2.797	0.064
	Subject level	55	2.38	1.06	0.00	5.13		
	Teaching at both levels	29	2.52	0.72	1.18	4.54		
	All	154	2.27	0.93	0.00	5.13		
Index of burnout—T3	Grade level	70	2.10	0.93	0.40	4.39	1.509	0.224
	Subject level	55	2.39	1.10	0.34	4.34		
	Teaching at both levels	29	2.33	0.84	0.69	4.01		
	All	154	2.25	0.98	0.34	4.39		

*Correlation is significant at the 0.05 level.

As described in the Method section, PCA analysis yielded 13 categories of environmental and individual predictors of burnout (Table 9). Similar to the item analysis, we can see that the most stressful categories of predictors of burnout among teachers are related to administration and job responsibilities, followed by subjective perception of responsibility. The least stressful categories of predictors of burnout are also similar to the item analysis: *working conditions*, *sense of control*, and *relationships with colleagues* have the

TABLE 9 Descriptive statistics of categories of predictors of burnout in T1.

Categories of burnout factors	*N*	Min	Max	*M*	*SD*	Skewness	Kurtosis	Kolmogorov–Smirnov *Z*	*p*
Administration and job responsibilities	610	1.0	5.0	3.85	0.89	−0.69	0.02	2.96	0.000
Personal responsibility	611	1.5	5.0	3.68	0.89	−0.08	−0.96	3.64	0.000
Initiative and creativity	610	1.0	5.0	3.66	0.72	−0.22	0.10	2.27	0.000
Subjective work demands	610	1.0	5.0	3.28	0.65	−0.13	0.18	2.63	0.000
Time and energy demands of working with students	611	1.0	5.0	3.16	0.76	−0.13	−0.34	1.53	0.020
Ambition	610	1.0	5.0	3.07	0.76	0.03	−0.26	1.85	0.000
Classroom management	611	1.0	5.0	2.98	0.76	−0.02	−0.02	2.02	0.000
Relationships with management	610	1.0	5.0	2.71	0.75	0.11	−0.06	2.37	0.000
Student learning characteristics	610	1.0	5.0	2.65	0.81	0.05	−0.29	2.35	0.000
Teacher characteristics	610	1.0	4.8	2.14	0.62	0.52	0.58	2.24	0.000
Working conditions	611	1.0	5.0	2.06	0.93	0.63	−0.31	3.85	0.000
Relationships with colleagues	611	1.0	5.0	1.97	0.93	0.70	−0.42	4.91	0.000
Sense of control	610	1.0	5.0	1.76	0.74	1.08	1.37	4.66	0.000

least impact according to teachers. The categories of predictors related to students are in the middle of the rankings. Thus, similar to the item analysis, we can conclude that (1) teachers are mainly burdened by work that is not directly related to teaching in the classroom and by their own expectations of work performance, and (2) schools, on average, are likely to take good care of teachers' working conditions.

Correlation analysis of categories of burnout factors (Table 10) showed that burnout was statistically significantly correlated with *time and energy demands of working with students* ($0.33 < \rho < 0.51$), *teacher characteristics* ($0.26 < \rho < 0.47$), *classroom management* ($0.26 < \rho < 0.40$), *student learning characteristics* ($0.29 < \rho < 0.36$), *personal responsibility* ($0.23 < \rho \leq 0.34$), and *working conditions* ($0.15 < \rho < 0.24$) at all three time points. All correlations were positive and ranged from insignificant to moderate.

3.5. Predictors of burnout

We performed multiple regression separately for three measurements of burnout (Tables 11, 12). The proposed models of predictors for all time points are different yet similar.

The model for T1 yielded seven important predictors of burnout that predicted 48.2% of the variance in the burnout index and was statistically significant ($F(7.602) = 79.97$, $p = 0.000$). All predictors were found to be significant. The strongest predictors were *teacher characteristics* ($\beta = 0.388$) and *time and energy demands of working with students* ($\beta = 0.257$).

The model for T2 revealed four significant predictors of burnout that predicted 29.2% of the variance in the burnout index and was statistically significant ($F(4.247) = 25.44$, $p = 0.000$). All predictors were found to be significant. The category *time and energy demands of working with students* ($\beta = 0.267$) also proved to be the strongest predictor of burnout index in this model, followed by the *personal responsibility* ($\beta = 0.186$) and *teacher characteristics* ($\beta = 0.182$).

The model for T3 revealed four significant predictors of burnout that predicted 23.2% of the variance in the burnout index and was statistically important ($F(4.236) = 17.82$, $p = 0.000$). All predictors, except *classroom management*, were found to be significant. The category *teacher characteristics* ($\beta = 0.235$) proved to be the strongest predictor of the burnout index in the final model, followed by *student learning characteristics* ($\beta = 0.190$) and *time and energy demands of working with students* ($\beta = 0.188$).

4. Discussion

The present study had two objectives. The first was to examine the dynamics of burnout during the school year, and the second was to examine the relationships between burnout and individual and environmental factors in the school context based on a three-wave panel

TABLE 10 Bivariate correlation between burnout index and categories of factors of burnout in three time points.

Categories of burnout factors		Index of burnout		
		T1	T2	T3
Teacher characteristics	ρ	**0.468**	**0.264**	**0.331**
	p	0.000	0.000	0.000
	N	610	252	241
Time and energy demands of working with students	ρ	**0.504**	**0.455**	**0.334**
	p	0.000	0.000	0.000
	N	611	252	241
Student learning characteristics	ρ	**0.359**	**0.297**	**0.327**
	p	0.000	0.000	0.000
	N	610	252	241
Administration and job responsibilities	ρ	**0.219**	**0.214**	0.109
	p	0.000	0.001	0.091
	N	610	252	241
Ambition	ρ	**0.244**	**0.208**	0.097
	p	0.000	0.001	0.135
	N	610	252	241
Classroom management	ρ	**0.392**	**0.378**	**0.265**
	p	0.000	0.000	0.000
	N	611	252	241
Initiative and creativity	ρ	−0.046	0.057	0.044
	p	0.255	0.365	0.496
	N	610	252	241
Personal responsibility	ρ	**0.320**	**0.340**	**0.232**
	p	0.000	0.000	0.000
	N	610	252	241
Working conditions	ρ	**0.231**	**0.155**	**0.167**
	p	0.000	0.014	0.010
	N	611	252	241
Relationships with management	ρ	**0.142**	0.019	0.100
	p	0.000	0.763	0.121
	N	610	252	241
Sense of control	ρ	**0.156**	**0.148**	0.136
	p	0.000	0.018	0.035
	N	610	252	241
Subjective work demands	ρ	−0.006	−0.023	0.079
	p	0.883	0.717	0.224
	N	611	252	241
Relationships with colleagues	ρ	**0.138**	0.093	0.075
	p	0.001	0.143	0.247
	N	611	252	241

Significance level is set at 0.05. Significant correlations are in bold.

design. Our goal was to examine which individual and environmental factors best predict current and future levels of burnout.

Maslach et al. (1996) claim that scores in the upper third of the distributions of EE and DP and in the lower third of PA represent high burnout. Accordingly, the results of this study indicate that burnout is present, although not pronounced, among participating primary school teachers. Scores from EE represent moderate burnout and scores from DP and PA represent low burnout for participants over the course of the school year. On the other hand, the percentage of teachers experiencing high EE is high and the mean scores of subjective feelings of burnout are higher than the objectively measured level of burnout. Maslach et al. (2001) assert that EE is the most obvious manifestation of burnout. These findings may point to the problem of excessive emotional strain on teachers on the one hand and a lack of support in the workplace on the other. If emotional stress continues, emotional and energetic reserves may decrease in the future and feelings of frustration, anger, hostility, anxiety, and fear may increase. This is consistent with suggestion of Llorens-Gumbau and Salanova-Soria (2014) that the development of burnout in teachers may begin with chronic job demands or stressors that first influence the rise of EE. Interventions for emotionally exhausted teachers are necessary to prevent depersonalization and maintain existing interpersonal relationships and feelings of personal accomplishment.

Correlation analysis between MBI dimensions revealed low negative correlations of PA with the other two dimensions and moderate positive correlations between EE and DP. The correlations between dimensions should be low because the authors of the MBI questionnaire (Maslach et al., 1996) used principal factoring with iteration and orthogonal (varimax) rotation in extracting the factors (dimensions of burnout). Lourel and Gueguen (2007) used a meta-analysis of research on the theoretical dimensionality of MBI to show that DP and PA are always negatively correlated, EE and DP are always positively correlated, and that EE and PA are not always negatively correlated. Maslach et al. (1996) state that EE is the burnout dimension that is most similar to an orthodox stress variable and therefore yields similar results. However, they caution that limiting the concept of burnout to EE means that it is simply defined as experienced stress. Since SFB directly expresses teachers' experience of burnout, this is the logical reason why SFB correlates so strongly with EE.

Analysis of burnout dynamics over the course of a school year is interesting. In T2, the average scores of PA increased significantly. The explanation could be that after the first assessment period (T2 was about 3 weeks after the end of the first assessment period), teachers saw the first results of their efforts and the feeling of PA increased accordingly. At the end of the school year, a non-significant decrease in PA was observed. Correlation analyzes revealed that the more teachers perceived EE, the more they felt DP. In such a state, teachers certainly feel less PA about their work. Nevertheless, the pathways of burnout development should be further investigated.

Another significant difference that is difficult to explain is the change in subjective feelings of burnout at the end of the school year: On average, teachers experience a stronger sense of burnout than during the rest of the school year. We cannot relate this change to any other change at the end of the school year because there is no other significant change in the measured burnout dimensions. The scores of EE and DP are fairly stable over the course of the school year, but there is a non-significant decrease in PA at the end of the school year. The correlation between SFB and PA increases from insignificant and non-significant at T1 to negatively moderate and significant at T3. A wild guess might be that the subjective feeling of burnout might be related to the stronger correlation between SFB and PA at T3 and a decrease, though not significant, of PA at T3.

TABLE 11 Model summary for multiple regression of burnout predictors with Forward model.

Model summary	*R*	R^2	Adjusted R^2	*SE* of estimate	Change statistics				
					R^2 change	*F* change	*df1*	*df2*	*p*
T1	0.694	0.482	0.476	0.665	0.007	8.024	1	602	0.005
T2	0.540	0.292	0.280	0.803	0.027	9.535	1	247	0.002
T3	0.482	0.232	0.219	0.845	0.030	9.204	1	236	0.003

TABLE 12 Coefficients of categories of individual and environmental factors of burnout, model *Forward*.

Measurement	Model	Unstandardized coefficients		Standardized coefficients	*t*	*p*
		B	*SE*	*β*		
T1	(Constant)	−1.645	0.194		−8.460	0.000
	Time and energy demands of working with students	0.311	0.046	0.257	6.751	0.000
	Teacher characteristics	0.577	0.047	0.388	12.366	0.000
	Classroom management	0.125	0.043	0.103	2.901	0.004
	Student learning characteristics	0.092	0.038	0.081	2.414	0.016
	Personal responsibility	0.190	0.048	0.135	3.993	0.000
	Administration and job responsibilities	0.098	0.034	0.095	2.867	0.004
	Working conditions	0.086	0.030	0.087	2.833	0.005
T2	(Constant)	−0.898	0.343		−2.621	0.009
	Time and energy demands of working with students	0.341	0.085	0.267	4.030	0.000
	Teacher characteristics	0.285	0.086	0.182	3.325	0.001
	Classroom management	0.199	0.079	0.162	2.502	0.013
	Personal responsibility	0.276	0.089	0.186	3.088	0.002
T3	(Constant)	−0.426	0.332		−1.282	0.201
	Time and energy demands of working with students	0.249	0.088	0.188	2.844	0.005
	Teacher characteristics	0.376	0.093	0.235	4.025	0.000
	Classroom management	0.152	0.086	0.114	1.762	0.079
	Student learning characteristics	0.239	0.079	0.190	3.034	0.003

Overall, the differences in the three burnout dimensions at the three different time points are mostly not significant, while the increase in teachers' subjective feelings of burnout at the end of the school year is statistically significant. Our results are consistent with study of Capel (1991) study, which also showed no significant differences in burnout dimensions at the three time points during the year. While in their study most teachers had the highest burnout scores in February, in our study burnout scores were lowest in February. We hypothesize that major events during the school year (e.g., assessment period) contribute to a temporal increase in burnout, particularly the increase in EE. However, we believe that participants were able to reduce the effects of stress through various coping strategies (e.g., Pogere et al., 2019; Herman et al., 2020) and/or replenish their resources (Hobfoll and Shirom, 2000). Furthermore, as stress accumulates over time (Taris et al., 2001), we would expect burnout to increase. However, it appears that the school year is not long enough for burnout to develop. In fact, Hobfoll and Shirom (2000, p. 73) suggest that "the process of burnout is not constant but dynamic and changes over time, and that temporarily eliminating the stress that causes burnout reduces burnout." We must reject our assumption that teacher burnout increases from the beginning to the end of the school year.

We found a significant relationship between teacher burnout and the number of stressors perceived by teachers in the work context. Teachers who experienced fewer stressors in the school environment and/or rated them as less threatening had lower burnout scores on all three measurements. The correlations found were low to moderately

high. According to transactional stress theories, the cognitive appraisal of a stressor in the (work) environment is an important mediating factor between the effects of a potential stressor and the individual's stress response (Stoeber and Rennert, 2008; Depolli Steiner, 2014). The development of burnout is influenced by the amount of microstressors currently impacting the individual or their overall impact over time (Taris et al., 2001). Accordingly, the findings of this study suggest that the more microstressors teachers experience, the more likely they are to develop burnout over time, depending, of course, on their cognitive appraisal, coping strategies, replenishment of resources, and other mediating factors of burnout development (Kim et al., 2019; Herman et al., 2020). This is of particular interest in the context of data on the high average number of perceived stressors among teachers.

The ranking of stressors by mean scores suggests that (1) teachers are particularly stressed by work not directly related to teaching and by their own performance expectations, and (2) teachers do not perceive objective working conditions as stressful. Therefore, we assume that, on average, schools manage work organization and organizational climate quite well, so that teachers do not perceive these potential stressors as stressful.

Correlation analyses of potential stressors and other burnout factors revealed several significant associations between burnout and potential individual and environmental factors in the school context. These are: (1) *teacher characteristics*, (2) *time and energy demands of working with students*, (3) *student learning characteristics*, (4) *classroom management*, (5) *subjective work demands*, (6) *working conditions*, (7) *administration and job responsibility*, (8) *ambition*, and (9) *sense of control*. The most important factors are related to the time and energy teachers invest in their work with students. This is understandable because the time and energy spent directly affect fatigue (Boksem and Tops, 2008; Hockey, 2013). They may also be related to teacher expectations: When teachers invest more energy in classroom management than they expect, they are more emotionally taxed (Gilmour and Wehby, 2020). Consistent with previous research (e.g., Kim et al., 2019), teacher personality traits were also highly associated with burnout, but this needs further investigation.

On the other hand, the comparison of rank and correlation analyses revealed a partial discrepancy between the results. We have already found that the most important factors for teachers primarily include those related to administration and responsibility for work [consistent with previous research of Kokkinos (2007) and Stauffer and Mason (2013)], as well as the subjective feeling of perceiving one's own responsibility for a job well done [consistent with previous research of Ekstedt and Fagerberg (2005) and Tomic et al., (2004)]. We found that the first factor was significantly related to burnout, but the second was not. Thus, teachers feel that extra work is the main cause of their burnout. In contrast, the correlation analysis showed that the most significant associations with burnout were teachers' personality characteristics and their commitment to students. This suggests that the subjective ranking of stressors differs in importance from the objectively measured correlation with burnout. Or, to put it another way, teachers perceive some potential stressors in their environment to be very stressful, but at the same time are unaware that some other potential stressors are much more stressful to them than they perceive. Risk factors that teachers are not aware of are their personality traits, the time and energy they spend working with students, and student learning characteristics. On average, teachers do not perceive themselves as a key factor in the process of transforming the occurrence of stressors and the development of burnout. They may not be aware that personal strength, a positive outlook on life, high self-esteem, work motivation, and job satisfaction are important factors in preventing the occurrence and development of burnout. In addition, teachers do not perceive the time and energy they invest in preparing lessons and working with students as stressful-they likely see it as part of the educational work they have chosen to do. Therefore, they do not subjectively perceive these potential factors as stressful. The same is likely true for student learning characteristics, which are also significantly associated with burnout. Presumably, teachers perceive factors indirectly related to pedagogical work, as well as factors they can influence and believe they can change (e.g., the amount of administrative work), as particularly stressful. However, they do not appear to be stressed by conditions they do not believe they can change.

Multivariate regression analyses revealed three similar models of predictors of burnout. Teacher burnout at all three time points was significantly related to *time and energy demands of working with students*, *teacher characteristic*, and *classroom management*. This means that teachers who are less satisfied with their work, less motivated, have lower personal resilience and self-esteem, and have a more negative outlook on life are more likely to experience burnout. Burnout is also more common among teachers who feel they do not have enough time to work individually with students or implement the curriculum, and among teachers for whom classroom management is challenging.

In addition, at the beginning of the school year, teachers who are more emphatic and have high expectations for their own work, teachers who do not perceive working conditions as adequate and believe they have a lot of administrative and responsible work to do, and teachers who find assessment, differentiation, and working with students with low motivation challenging are more likely to experience burnout. After the first assessment period in the middle of the school year, burnout was additionally experienced by teachers who are more emphatic and have high expectations for their own work, and at the end of the year by teachers who estimate that they teach students with lower learning skills, poor knowledge, and poor study habits.

This study found that predictors of burnout depended on the timing of measurement during the school year. It appears that the dynamics of pedagogical work change over the course of the school year, such that different models better predict levels of burnout at different times during the school year. Regardless of the instability of the models of individual and environmental antecedents, they explain 25–50% of the variance in teacher burnout.

In conclusion, the study found that burnout was present but not pronounced among participating teachers: EE is moderately high and DP and AP are low. Over the course of the school year, burnout did not increase consistently and gradually; only PA and SFB increased statistically significantly. The number of stressors perceived by teachers in the workplace was significantly related to burnout rates. Teachers experience stress, particularly in work not directly related to teaching and through their own performance expectations. Multivariate regression analyses revealed three different but similar models of predictors of burnout. Regardless of the instability of the models, *time and energy demands of working with students*, *teacher characteristics*, and *classroom management* are the stable antecedents in the predictor models of teacher burnout.

The results of this study indicate that the school year is not long enough for burnout to develop. This study suggests that the dynamics of stressors in a school year are not strong enough to influence the development of burnout. Gold and Roth (1993) believe that burnout develops gradually when a person is exposed to stress over a long

period of time or when an individual's needs and wants at work are not met over a long period of time and the individual is unable to eliminate the negative consequences of the stress. More attention should be paid to the development of burnout over the course of a teacher's career.

In addition, the burnout measurements were evenly distributed throughout the school year and were conducted the week before the vacations, as we assumed that teachers were most tired before the vacations and had renewed energy after the vacations. Given the dynamics of school work during the year, we recommend scheduling measurements by assessment period—before the start of the school year, before the end of the first assessment period, and before the second assessment period. It is even better to conduct the measurements before and after the end of each assessment period. The amount and intensity of work is tied to the end of the assessment periods, not the holiday periods.

The major limitation of this study was the changing composition of the sample during the school year. The initial sample was large and representative, but the dropout rate of participating teachers was high on each subsequent measurement. Nevertheless, the attrition analysis showed no significant differences between the initial sample and the panel group on background variables and burnout dimensions or on environmental and individual factors. We did not examine the causes of attrition. We hypothesize that the teachers who dropped out at higher rates were those who already felt overwhelmed and those who did not feel burned out at all and therefore did not find it useful to complete the questionnaire. This may explain why the average burnout rate remained about the same throughout the school year. At the same time, some teachers did not fill out the questionnaires for various reasons only at the first measurement or only at the second measurement.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

NM contributed to the conception and design of the study, organized the database, performed the statistical analysis, and wrote the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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A model of teachers' growth mindset, teaching enjoyment, work engagement, and teacher grit among EFL teachers

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Because of the importance of positive emotions in second language (L2) acquisition, researchers have undertaken studies to investigate L2 learners' emotions. Nevertheless, L2 teachers' emotions still require more scholarly attention. Against this backdrop, we sought to test a model of teachers' growth mindset, teaching enjoyment, work engagement, and teacher grit among English as a foreign language (EFL) teachers. To this end, 486 Chinese EFL teachers volunteered to partake in an online survey and completed the questionnaires of the four constructs in question. Confirmatory factor analysis was performed to ensure the construct validity of the used scales. Then structural equation modeling (SEM) was used to test the hypothesized model. SEM results indicated that teaching enjoyment, teacher grit, and growth mindset directly predicted EFL teachers' work engagement. In addition, teaching enjoyment affected work engagement indirectly via the mediation of teacher grit. Likewise, teacher grit mediated the effect of growth mindset on teachers' work engagement. Finally, the implications of these findings are discussed.

KEYWORDS

teacher grit, growth mindset, teaching enjoyment, work engagement, EFL teachers

1. Introduction

Undoubtedly, a teacher's career is a demanding and stressful one (Troman and Woods, 2000) and emotions play a significant role in teachers' class achievement (Curby et al., 2013); therefore, teachers' emotions are well-worth taking into account (Schutz, 2014; Dewaele, 2020). This has resulted in the exploration of teachers' emotions in numerous studies (e.g., MacIntyre and Gregersen, 2012; Cuéllar and Oxford, 2018; Richards, 2020; Gregersen and MacIntyre, 2021), which have investigated various affective factors. Also, the burgeoning of the positive psychology has encouraged researchers to investigate this issue among second language (L2) researchers (Dewaele, 2005; Dewaele and MacIntyre, 2014; Dewaele et al., 2019; Shao et al., 2019; Moskowitz and Dewaele, 2020; Botes et al., 2021). As a positive affective factor, Foreign Language Teaching Enjoyment (FLTE) has recently been introduced to the literature of applied linguistics

(Proietti Ergün and Dewaele, 2021) and refers to a positive feeling of joy while teaching in the class (Mierzwa, 2019). Teaching enjoyment is argued to be interrelated with teacher resilience, teacher grit, well-being, and work engagement (e.g., Proietti Ergün and Dewaele, 2021; Derakhshan et al., 2022; Xiao et al., 2022). Given the significant role of enjoyment in affecting L2 learning and its potential association with other affective constructs such as motivation, boredom, and engagement (e.g., Guo, 2021; Dewaele et al., 2022; Kruk et al., 2022), further exploration of teaching enjoyment in EFL contexts seems to be warranted.

In addition, given the difficulties and complexities of a teacher's career, a change in one's emotions can contribute to a change in work engagement (Ouweneel et al., 2012) which is directly correlated with the outcomes of class and student's academic performance (Bakker and Bal, 2010). Besides, individuals are able to employ different degrees of engagement (i.e. physically, cognitively, and emotionally) in workplace due to various roles they are assigned, a construct which is referred to as work engagement (Kahn, 1990). Work engagement is concerned with involvement with full potential, abilities, competence, dedication, developmental chances, and interest in perusing goals that can foster teachers' quality and performance (Kim et al., 2013). From this perspective, work engagement is considered as the ability to assess the desired functioning from the teachers (e.g., Schaufeli et al., 2006; Perera et al., 2018). A teacher's work engagement has been documented as an emotionally positive one correlating with self-efficacy and reflection (Han and Wang, 2021), well-being (Rusu and Colomeischi, 2020), and students' academic engagement (Zhang and Yang, 2021). Work engagement is also related with fulfilling positive work-related mindset (Zeng et al., 2019) and is viewed as the opposite of burnout (Bakker et al., 2005).

Furthermore, psychological thoughts and beliefs shape and reshape ones' senses of experiences, life, attitudes, and more broadly, mindsets which significantly affect work engagement and performance in class (Nalipay et al., 2021). Mindset pertains to the beliefs regarding the mutability of one's abilities (Dweck, 2006) which is a motivational construct (Lou and Noels, 2019). Since teachers who hold a growth mindset are more likely to get emotionally and cognitively engaged in their teaching activities and are endowed with greater overall well-being (Zeng et al., 2019), teachers' growth mindset is hypothesized to influence their work engagement. In the meantime, conceptualized as teachers' perseverance and passion to do their instructional activities in spite of challenges (Maiers and Sandvold, 2017), teacher grit is likely to generate positive emotions among individuals that can foster their achievements (Elahi Shirvan et al., 2021). As such, more success chances might be provided for those who are grittier than other individuals due to their consistent interests and perseverant efforts (Duckworth et al., 2009). Also, grittier individuals have a positive growth mindset that contributes to the further development of feeling of pleasure (Hill et al., 2016). Suzuki et al. (2015) claimed that grit is a powerful determiner of work engagement. Against this backdrop, it can be argued that EFL teachers' grit can, like their growth mindset, also affect their work engagement.

Although the L2 research literature is filled with studies focusing on the impact of various affective factors on teachers' performance (e.g., Bangun et al., 2021; Greenier et al., 2021; Li, 2021; Li et al., 2021; Zhang and Koshmanova, 2021), few sporadic studies, to our best knowledge, have investigated the joint effects of teachers' grit, growth mindset, and their teaching enjoyment on work engagement, particularly in EFL contexts. Empirical investigations on the relationships among these factors, their nature, and the potential impact of these non-cognitive factors on teachers' work engagement would have notable contributions to the existing body of literature related to EFL teacher emotions and characteristics. Therefore, as an attempt to shed more light on positive psychology in L2 research and also exploring antecedents of work engagement in EFL contexts, the purpose of the present researchers was to test a model of EFL teachers' work engagement based on teaching enjoyment, teacher grit, and growth mindset.

2. Literature review

2.1. Emotions and individual differences

Learning another language is not a one-dimension processing but it is a multifaceted process in which a combination of various emotional and non-cognitive factors are also called for Oga-Baldwin et al. (2019). This has opened the gate for a plethora of studies investigating different affective factors such as self-efficacy (Young Kyo, 2022), burnout (Xing, 2022), resilience (Chaigneau et al., 2022), foreign language teaching anxiety (Aydin, 2016), self-esteem (Gaybulloyevna, 2022), boredom (Pawlak et al., 2021), psychological wellbeing (Jonas and Hall, 2022), and academic optimism (Lelieur et al., 2022). Also, key subjects of the inquiry in individual differences are beliefs and attitudes, physical and mental behaviors reflections and actions, learning strategies and styles, move and motivations, talent, mindsets, personality traits, and self-regulation (Dörnyei and Skehan, 2003). The results of the abundance of such papers led to a large number of ideas governing new rules in the field of L2 acquisition (Dewaele, 2009).

However, recent studies seem to have suppressed the old ones which used to focus only on threatening factors by shifting the idea from negative psychological factors toward positive ones (MacIntyre et al., 2019). This movement has paved the way for scholars to examine the role of individual differences and emotions under the new scope of positive psychology which has led to the emergence of numerous studies in this regard (e.g., Seligman et al., 2009; Gregersen et al., 2014; Mercer et al., 2016; Dewaele et al., 2019; Wang et al., 2021). The results of the previously mentioned studies illuminate that the process of L2 teaching can be more fruitful and L2 learning might be fostered significantly when emotions and individual differences are taken into account (Dewaele and Li, 2020).

2.2. Teacher mindset

The construct of mindsets or implicit/lay theories was introduced by Dweck (2006). Mindsets refer to one's rudimentary belief systems about different human's traits such as personality factors (Mercer and Ryan, 2010). It is widely recognized that teachers' mindsets play a crucial role in their job achievements (Dweck, 2014). Furthermore, these mindsets tend to form and reform teachers' beliefs of failure and success about their approach to coping with different challenges in L2 education (Cacali, 2019).

Since the learning process itself is a complex one; therefore, the construct of mindset is of high significance in L2 education (Nguyen et al., 2022). Mindsets are divided into two categories of fixed and growth mindsets (Dweck et al., 1995). A fixed mindset is referred to as a belief that one's skills, attributes, personality, and intelligence are fixed and cannot be changed whereas a growth mind is concerned with a belief that the aforementioned factors are malleable and can be enhanced (Haimovitz and Dweck, 2017). Growth mindsets refer changeable beliefs of a person of his/her own abilities when coping with setbacks (Schroder et al., 2019) which are systematically associated with endeavors, attitudes, aims, and learning strategies (Molden and Dweck, 2006). Language mindset pertains to the personal opinions about the changeability of language learning (Shirvan et al., 2021).

The studies on humans beliefs about whether they have the capacity to learn a second or foreign language have recently received much attention among L2 researchers who are interested in investigating if a person considers one's attributes as something fixed or changeable (Lou and Noels, 2019). Mindsets are interrelated with many affective factors such as motivational factors (Lou and Noels, 2019), autonomy (Henriksen et al., 2018), wellbeing and perseverance (Zeng et al., 2019), willingness to communicate (Zarrinabadi et al., 2021), and speaking anxiety (Ozdemir and Papi, 2021). Research on learners' mindsets seems to be well-documented and it is well acknowledged that these affective factors play a significant role in learners' achievement; however, this topic still needs under-investigated for teachers since the literature is quite fragmented in this regard (Bostwick et al., 2020). According to Yeager and Dweck (2020), it can be argued that growth mindset's impacts are replicable, fruitful, and theoretically well-documented for both teachers and learners. With regard to the significance of this construct in educational contexts, Zhang et al. (2017) synthesized the articles published between 1998-2017 on the relationship between learners' academic achievement, their mindsets, and teachers' mindsets. It was revealed that students' mindsets play a crucial role in determining their academic achievement; however, teachers' mindsets were found to have played a mediating role, not a determining a role. In another study, Derakhshan et al. (2022) investigated the relationships between classroom climate, growth mindset, and students' engagement where boredom acted as a mediator. The findings indicated that learners' growth mindset indirectly impacted students' engagement and also, classroom climate and boredom were the significant predictors of learners' engagement.

Additionally, it is argued that the mindset can cause shifts in one's emotions concerning various scopes which are classified into growth mindset and fixed mindset (Yeager et al., 2022). Flexibility in teachers' mindset is referred to as a growth mindset, whereas inflexibility in their mindset is defined as a fixed mindset. Teachers holding a growth mindset consider personality traits and personal teaching skills as a changing phenomenon (Heggart, 2015). On the other hand, those who hold a fixed mindset believe personality attributes and skills as something unmalleable, while growth mindset holders believe that smartness and intelligence can be fostered, whereas fixed mindset holders consider it as an unchanging construct (Zeng et al., 2019). Also, Frondozo et al. (2020) hypothesized that a teacher's mindset alongside their emotions can function as a perdictor of teachers' work engagement. The outcomes indicated that teachers with a growth teaching mindset showed a higher work engagement with teaching enjoyment as a mediating factor. In another study by Patrick and Joshi (2019), it was hypothesized that teachers' prior ideas about the learners and learning have an impact on teachers' mindset. It was revealed that teachers' growth mindset is significantly correlated with students' mindset about their own skills, personality, and attributes. The authors also found that teachers' mindset was able to enhance or deteriorate students' beliefs about their intelligence or skill. Also, Gutshall (2014) conducted a study on the mindset of pre-service teachers since the beginning of their practicum. The findings indicated that their mindset remained stable over their preparation program. Irie et al. (2018) also explored teachers' mindset on their own profession. They found that teachers cared more about their own technical knowledge rather than interpersonal skills since these skills were regarded as natural.

2.3. Foreign language teaching enjoyment

The interest in positive psychology has paved the way for investigating positive emotions as well as the negative ones that foreign language learners and teachers might experience (Dewaele et al., 2018). This picture has changed the frame of many studies into positive psycho-affective factors (Hagenauer and Hascher, 2014). For instance, the concept of enjoyment was a reaction towards the negative factor of anxiety (Zeng, 2021). Foreign language enjoyment (FLE) can be considered as an example of positive emotions (Pekrun, 2006). It is defined as a general good feeling after overcoming an obstacle in a stressful situation (Li et al., 2018). Those who are concerned with enjoyment feel safer in various contexts and do their tasks in a controlled manner (Pekrun et al., 2007). In this vein, learning enjoyment can be defined as the joyful experience of learning through which one can develop a controlled and safe learning environment (Mierzwa, 2019). The construct of enjoyment is a multidimensional construct and includes five underlying components: *emotion, movement, cognition, eloquence, and physiology* (Hagenauer and Hascher, 2014). Among these components, emotional or the affective one refers to the pleasure feeling and the sense of joy in learning contexts, hence it fosters affective and cognitive factors in the learning environment that ultimately rises learners' language achievement (Mierzwa, 2019).

Recently, foreign language teaching enjoyment was introduced to the literature from the studies on foreign language enjoyment by Proietti Ergün and Dewaele (2021). This construct is defined as the broad feeling of positive emotions experienced by teachers in spite of existing obstacles in the context of foreign language teaching (Noughabi et al., 2022). In this regard, Mierzwa (2019) conducted a mixed-methods study among 89 Polish teachers of English. Web questionnaires were used for data collection. It was discovered that teachers experience not only learning enjoyment, but also foreign language teaching enjoyment regardless of exterior factors such as age, residential area, or gender. In another study, Proietti Ergün and Dewaele (2021) the role of well-being and resilience as predictors of FLTE was examined among 174 Italian teachers of English as a foreign language. Their findings indicated that resilience was a strong predictor of FLTE. In another study,

Xiao et al. (2022) tested a structural model of work engagement, self-efficacy, and teaching enjoyment among 315 EFL instructors. Their findings demonstrated that both predictors affected teachers' work engagement, although teacher self-efficacy turned out to be a more powerful predictor than teaching enjoyment. Also, employing 296 English language teachers, Fathi and Naderi (2022) examined the roles of teacher resilience and FLTE in influencing teaching enjoyment. Their results indicated that FLTE was a significant predictor of teacher work engagement.

Wei et al. (2019) probed the interplay between grit, L2 performance, and L2 anxiety among 832 middle-school learners in China. The findings revealed that the learners' grit fosters L2 performance and indirectly enhances FLE. In addition, Lee (2022) tried to shed light on the relationship between grit, classroom enjoyment, and willingness to communicate. The data analyses showed that grit and classroom enjoyment predict willingness to communicate significantly, which supports the idea that positive psychology plays a significant role in fostering the outcome of the class. Moreover, Liu and Wang (2021) discovered that grit, FLE, and L2 performance were significantly correlated with each other. Also, enjoyment was mediated by grit significantly. Moreover, Wei et al. (2019) concluded that grit impacts L2 performance greatly and enjoyment mediated between grit and L2 performance. Also, Jiang and Dewaele (2019) carried out a mixed-methods study to examine FLE and L2 anxiety of 564 EFL learners outside China. Regression analysis showed that FLE was predicted by the variables related to the teachers, while L2 anxiety was related to student-related factors.

2.4. Teacher grit

As previously highlighted, various studies have examined affective factors in the literature of L2 education (Dewaele, 2020). One of these psycho-affective factors that have received much attention is grit (Sudina et al., 2021). Grit, conceptualized as consistent interests and perseverant efforts for fulfilling long-term aims, can play a crucial role in learning another language (McCain, 2017). Duckworth and Quinn (2009) asserted that grit has the same level of significance as aptitude in predicting learners' success, raising the likelihood of achieving more than the natural ability (Duckworth and Quinn, 2009). This positive social-affective trait was introduced by Duckworth and her colleagues in the University of Pennsylvania (Oxford and Khajavy, 2021). Recently, its debate has gained momentum among researchers of various disciplines (Wei et al., 2020). Applied linguistics has not been an exception and some papers (Khajavy et al., 2021; Sudina and Plonsky, 2021; Sudina et al., 2021) have investigated L2 grit among learners and teachers. This construct has been acknowledged as an important construct affecting L2 learning and teaching (Teimouri et al., 2020). Since mastering another language requires much endeavor, persistence, and enduring interest in the process of learning, grit is viewed to be a vital variable as the learners may face numerous failures (Khajavy et al., 2021). In the same vein, a teacher's profession is full of tension and stress that leaves various impacts on teachers' emotional state (Griffith et al., 1999). Under the pressure of teaching, teachers may either show persistence in pursuing their goals or demonstrate a lower motivation; therefore, teachers' grit can help teachers to sustain their passion and perseverance in achieving their aims (McCain, 2017).

Concerning teachers' grit, some studies have been conducted. For instance, Argon and Kaya (2018) explored whether the potential effects of personal factors on teachers' grit. Their findings revealed that only gender played a pivotal role in affecting grit and the other demographic factors failed to exert significant effects on teachers' grit. They reported low levels of teacher grit for their participants as they believed that teachers' needs, wishes, and expectations were not met. However, a mixed-methods study on African-American male teachers conducted by Yates et al. (2015) yielded a different outcome. It was illustrated that there was a significant relationship between a teacher's grit, age, GPA, and their life partner. In the qualitative phase, three themes were also found to be dominant, which included: (a) family, (b) circumstances, and (c) spirituality.

In a recent study, Sudina et al. (2021) tried to develop and validate a questionnaire for measuring grit among teachers. For this, 202 English language teachers were recruited as the participants. Their findings led to a valid and reliable L2-specific grit scale. Also, Azari Noughabi et al. (2022) modelled the relationship between EFL teachers' L2 grit, engagement, and immunity. Having distributed the electronic versions of the scales among 369 EFL teachers, they found that L2 grit and engagement impacted immunity substantially. Faravani (2022) also explored teacher's self-efficacy, grit, and continuing professional development. 204 EFL teachers were selected through convenience sampling. SEM results indicated that grit and self-efficacy acted as powerful predictors of continuing professional development. In another study, Fabelico and Afalla (2020) tested a model of teachers' self-efficacy, grit, and burnout. Their findings indicated that grit was associated with other variables and significantly impacted teachers' educational attainments.

Also, Nazari and Alizadeh Oghyanous (2021) investigated the relationship between job's stress, turnover intention, wellbeing, and grit among EFL teachers. The findings revealed that these factors were significantly correlated but the associations were stronger for novice teachers. Also, the results of interviews showed that career's stress affected emotions and perseverance which were under the impact of institutional and socioeconomic status. However, in another mixed-methods study, McCain (2017) examined the role of teachers' grit in affecting learner's grit and their reading achievement. Survey, observation, and interviews were used to collect the data. The findings demonstrated that there was no significant relationship between the aforementioned factors.

2.5. Teacher work engagement

Work engagement is related to a pleasant mindset about one's own profession characterized by vigor, dedication, and absorption (Schaufeli and Bakker, 2004), which is associated with reflection, creativity, willingness to help colleagues, and respect towards career (Bakker, 2008). In educational contexts, teacher work engagement is defined as an affective variable indicating instructors' voluntary devotion of physical, cognitive, and emotional resources to teaching-specific practices (Klassen et al., 2012). Scholars have introduced various models of work engagement (Choochom, 2016). For instance, Saks (2006) proposed the engagement of the employees is characterized as job and institutional involvement

that might have antecedents (institutional support and critiques) and also consequences (the outcomes of work engagement). Given this, some studies (Rothmann and Hamukang'andu, 2013; Iyer, 2016; Burić and Macuka, 2018) have investigated this psycho-affective factor in educational contexts. Moreover, it is argued that more engagement on the teachers' side contributes to the further engagement and academic achievement of the learners (Zhang and Yang, 2021).

Hultell and Gustavsson (2011) examined the factors affecting teacher burnout and engagement among Swedish beginning teachers. Their findings revealed that the demands of the job directly predicted burnout, whereas job resources were positively correlated with work engagement. Also, Hakanen et al. (2006) investigated burnout and work engagement among teachers via employing Job Demands–Resources Model in a sample of 2038 teachers. They hypothesized that there were two predictors of teacher burnout or work engagement: energetical processes (demanding tasks of a job) and motivational processes (work engagement processes). The data analysis with SEM showed that both processes affected teacher burnout or engagement; however, energetical processes predicted teacher burnout more significantly than motivational processes. In addition, motivational processes affected work engagement more significantly. Additionally, Høigaard et al. (2012) examined teacher efficacy and work engagement and their association with burnout, job satisfaction, and desire to quit among teachers with six years of experience or less. 750 questionnaires were administered to the teachers. It was found that teacher efficacy and work engagement positively predicted job satisfaction and negatively affected teacher burnout. In another study, Xiao et al. (2022) examined a structural model of the teacher self-efficacy, work engagement, and work enjoyment among EFL teachers. To this end, 315 EFL teachers completed an online survey. SEM results showed that self-efficacy and teaching enjoyment were substantial predictors of work engagement, although self-efficacy played a more significant role in affecting work engagement.

In another study, Li et al. (2015) investigated the interconnection between work engagement and value congruence. It was hypothesized that controlled and autonomous motivations play the mediating role. To this end, 767 teachers filled out the questionnaires and the data were analyzed with SEM. It was discovered that there was an indirect relationship between value congruence and work engagement and the mediating effects of the two proposed variables were also verified. In a similar study, Bakker and Bal (2010) tested the model of weekly work engagement among 54 teachers. It was hypothesized that job resources in a week are positively associated with levels of work engagement. Also, they hypothesized that momentary work engagement had a positive impact on weekly work engagement. Multilevel analyses confirmed the hypotheses that autonomy was reported as a positive predictor of work engagement. Additionally, exchanging ideas with supervisors and chances for personal growth were predictors of work engagement.

2.6. The hypothesized model

As was mentioned earlier, research dealing with the association between growth mindset, teaching enjoyment, work engagement, and teacher grit still calls for further empirical inquiry. Moreover, despite that the constructs of growth mindset, teaching enjoyment, work engagement, and teacher grit have been, to greater or smaller extents, the scope of various studies carried out in the realm of foreign language education, to our best knowledge, no study has so far sought to examine the relationships between and/or among the constructs in question. Based on the theoretical and empirical considerations discussed above, a structural model, specifying the interconnections between the constructs (i.e., growth mindset, teaching enjoyment, work engagement, and teacher grit) was hypothesized and is depicted in **Figure 1**.

In light of the findings of Nalipay et al. (2021), it was hypothesized that teaching enjoyment directly impacts teachers' work engagement; therefore, a path from teaching enjoyment to teachers' work engagement was drawn. In addition, a path from teaching enjoyment to L2 teacher grit was conjectured based on the empirical study by Elahi Shirvan et al. (2021), in which enjoyment positively affected L2 grit. Also, based on the empirical findings by some studies (e.g., Singh and Chopra, 2018; Azari Noughabi et al., 2022), we hypothesized that teacher grit significantly predicts work engagement, thus, a path from grit to teaching engagement was also drawn. In addition, according to the Broaden-and-Build theory (Fredrickson, 2001) in which not only positive feelings shape emotional resources, but they also build cognitive ones which can serve as pacifiers for long-term negative emotions, and also consistent with the findings of Hochanadel and Finamore (2015), we hypothesized that growth mindset can impact teacher grit. Moreover, in light of the nature of the construct and some previous studies (e.g., O'Neal et al., 2018; Ma et al., 2020; Lan et al., 2021; Lee and Ha, 2022), we hypothesized that grit acts as the mediator for the impact of teaching enjoyment on teaching engagement. Likewise, due to the characteristics of the constructs and based on the findings of some studies (e.g., Özhan, 2021; Kim et al., 2022), it was hypothesized that grit mediates between the impact of growth mindset on work engagement of EFL teachers. Concerning the hypothesized model, the following hypotheses were proposed:

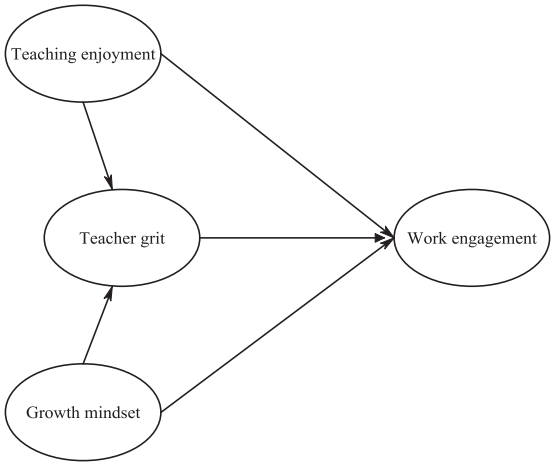

FIGURE 1
The hypothesized model of teaching enjoyment, teacher grit, growth mindset, and engagement.

Hypothesis 1: Teaching enjoyment significantly predicts work engagement.

Hypothesis 2: L2 teacher grit. positively affects teachers' work engagement.

Hypothesis 3: Growth mindset positively influences work engagement.

Hypothesis 4: Grit mediates the effect of teaching enjoyment on teachers' work engagement.

Hypothesis 5: Grit mediates the effect of growth mindset on teachers' work engagement.

3. Materials and methods

3.1. Participants

In this study, a total number of 486 Chinese EFL teachers took part as the participants. Among the participants, 189 were male and 297 were female English instructors who were engaged in teaching English at schools, universities, and language academies in Chinese provinces. Given availability, convenient access, and willingness criteria, the participants were selected based on convenience sampling. They were selected based on convenience sampling procedure. Their age range fell between 21 and 44 years ($M = 25.03$, $SD = 6.74$) and their teaching experience varied from 2 to 21 years of teaching experience ($M = 7.21$, $SD = 5.37$).

3.2. Measures

3.2.1. Teaching enjoyment

In order to measure teaching enjoyment of the participants, the Foreign Language Teaching Enjoyment Scale (FLTES) validated by Proietti Ergün and Dewaele (2021) was used in this study. FLTES includes nine statements which assess three underlying components: 1) Personal Enjoyment (PE), 2) Student Appreciation (SA), and 3) Social Enjoyment (SE). The items are measured on a 5-point Likert scale varying from 1 (strongly disagree) to 5 (strongly agree). A sample item is "The students are stimulating."

3.2.2. Teacher grit

The grit level of the EFL instructors was assessed with the scale validated by Sudina et al. (2021). This self-report scale contains 14 statements which measure two dimensions of L2 teaching grit including consistency of interest (CI) and perseverance of effort (PE). The items are assessed on a 5-point scale from 1 (*not like me at all*) to 5 (*very much like me*). A sample item is "As an ESL/EFL teacher, I am diligent."

3.2.3. Work engagement

Work engagement of EFL teachers participating in this study was gauged with the *Engaged Teacher Scale* (ETS) validated by Klassen et al. (2013). The questionnaire includes 16 statements, rated on a 7- point Likert scale (e.g. 1 = never, 7 = always), which measure four dimensions: *cognitive engagement*, *emotional engagement*, *students' social engagement*: students, and *colleagues' social engagement*. The psychometric properties of this scale have been approved by the previous researchers (e.g., Topchyan and Woehler, 2021). A sample item is "I feel happy when I am working intensely."

3.2.4. Growth mindset

We measured the growth mindset of EFL teachers by adopting the six items originally used in Dweck's (2014) mindset questionnaire. The items of this self-report scale are measured on a 6-point Likert scale varying from 1 (strongly disagree) to 6 (strongly agree). A sample item is "You can always substantially change how intelligent you are."

3.3. Data collection

As the first step to collect the data for this non-experimental study, an electronic survey which included a section for demographic information as well as another section for the four scales was constructed using WeChat application. Creating the electronic version of the questionnaires helped the researchers to collect data from various regions in China. The link of the questionnaires was shared on a large-scale with various teachers in online space. Also, some colleagues and friends cooperated with the first researcher in data collection. As the participants were English teachers and possessed an adequate command of English proficiency, the English versions of the scales were used and there was no need to translate them into Chinese. The necessary explanation on how to complete the items was included in the beginning of the electronic survey. Informed consents were obtained from all participants who were also ensured about the confidentiality of their data. The participation was also announced to be voluntary and the participants could give up at any stage that they wished. Overall, the data collection started in March 2022 and took about 9 weeks to collect all the data.

3.4. Analytic procedure

SPSS 22 and AMOS 23 were used to analyze the collected data in this study. Then SEM was employed to test the hypothesized model in this study. Prior to performing SEM, confirmatory factor analysis (CFA) was used to test the measurement models in order to verify the construct validity of the used scales. Regarding the evaluation of the model fit, a number of goodness-of-fit indices were used: Chi-square divided by degree of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). A model is regarded to have acceptable fit in case $\chi^2/df < 3$, CFI and TLI ≥ 0.90, and RMSEA ≤ 0.08 (Kline, 2011).

4. Results

4.1. Pre-processing of the data

As the initial screening, the collected data were checked for missing values, outliers, and non-normal data. Concerning the

TABLE 1 Number of cases for each measure.

	No of original cases	No of outliers	No of missing cases	No of valid cases
Self-efficacy	486	3	2	481
School climate	486	4	3	479
Wellbeing	486	3	3	480
FLTE	486	2	2	482

TABLE 2 Measurement model of the latent variables.

	χ^2	df	χ^2/df	CFI	TLI	RMSEA	Cronbach's α
Teaching enjoyment	184.32	85	2.16	0.92	0.93	0.06	0.83
Teacher grit	88.71	43	2.06	0.91	0.92	0.07	0.79
Growth mindset	97.33	50	1.94	0.96	0.95	0.05	0.91
Work engagement	412.25	210	1.96	0.95	0.95	0.05	0.81

TABLE 3 Fit indices for the initial and revised models.

	χ^2	Df	χ^2/df	CFI	TLI	RMSEA
Initial model	402.31	196	2.05	0.92	0.91	0.06
Revised model	352.14	182	1.93	0.95	0.95	0.04

missing data, we employed Expectation-Maximization algorithm as a data imputation technique (Kline, 2011). Univariate outliers were determined by converting all the scores to standard scores for each construct. Moreover, we used Mahalanobis D^2 to determine multivariate outliers. Skewness and kurtosis indices were used to examine the data normality and values falling out of ±2.0 were treated as non-normal data (Kunnan, 1998). The outliers and non-normal values were discarded prior to running CFA and SEM. Table 1 depicts the number of valid cases for each construct.

4.2. Validity and reliability of the scales

To verify the validity of the scales used in this research, the measurement models were tested via conducting CFA. Table 2 indicates the goodness of fit indices for each construct.

As some models failed to demonstrate adequate fit to the data, some modifications were made to the models, in which included the omission of two items of work engagement, two teacher grit items, and one item of teaching enjoyment scales as these items' factor loadings were low. The revised model indicated good fit to the data (see Table 3).

Concerning the internal consistency of the questionnaires, the computed coefficient alphas were all higher than 0.70, approving the acceptability of their reliability (Hair et al., 1998) (see Table 2). Then, descriptive statistics and correlations among the constructs were calculated (Table 4).

4.3. Model testing

Employing the maximum likelihood technique and variance-covariance matrices as input, we tested the hypothesized model via AMOS program. The calculated fit indices demonstrated a good fit of the model to the data, thereby confirming all the hypotheses in the final model (see Figure 2). Also, effect size (ES) (Cohen's f^2) was calculated to gain a better understanding of the obtained results.

As illustrated in Figure 2, teaching enjoyment, grit, and growth mindset were the directly predicted work engagement of EFL teachers. Among these constructs, teaching enjoyment was the strongest direct predictor of work engagement ($\beta = 0.44$, $R^2 = 0.19$, $f^2 = 0.23$, large effect size). Growth mindset ($\beta = 0.37$, $R^2 = 0.13$, $f^2 = 0.15$, medium effect size) and teacher grit ($\beta = 0.32$, $R^2 = 0.10$, $f^2 = 0.11$, medium effect size) also directly predicted teachers' work engagement. In addition, teaching enjoyment influenced work engagement indirectly through the mediation of teacher grit ($\beta = 0.41 \times 0.32 = 0.13$, $R^2 = 0.001$, $f^2 = 0.001$, small effect size). Likewise, growth mindset impacted work engagement indirectly through teacher grit ($\beta = 0.36 \times 0.32 = 0.11$, $R^2 = 0.01$, $f^2 = 0.01$, small effect size). Also, it was revealed that teaching enjoyment ($\beta = 0.41$, $R^2 = 0.16$, $f^2 = 0.20$, large effect size) and growth mindset ($\beta = 0.36$, $R^2 = 0.12$, $f^2 = 0.14$, medium effect size) had significant effects on teacher grit.

5. Discussion

The present study aimed at testing a structural model specifying the associations between teaching enjoyment, growth mindset, teacher grit, and work engagement among Chinese EFL teachers.

TABLE 4 Descriptive statistics and correlations.

	M (SD)	1	2	3	4
(1) Teaching enjoyment	3.71 (.92)	1.00			
(2) Teacher grit	3.98 (.89)	0.38**	1.00		
(3) Growth mindset	3.91 (.94)	0.25*	0.33**	1.00	
(4) Work engagement	4.12 (1.02)	0.51**	0.36**	0.32**	1.00

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

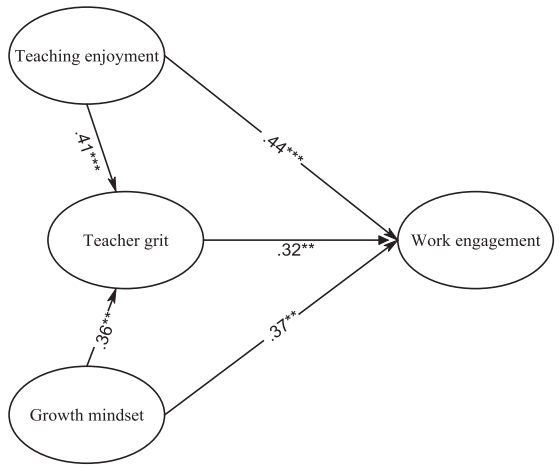

FIGURE 2
The final model of EFL teachers' work engagement. **$p < 0.01$. ***$p < 0.001$.

First, the construct validity of the used scales was confirmed through performing CFA. Then, SEM analyses used to test the hypothesized model yielded several significant findings.

First, teaching enjoyment was found to be a significant predictor of a teachers' work engagement, supporting Hypothesis 1. This finding is in line with the outcomes reported by previous researchers (e.g., Ouweneel et al., 2012; Datu et al., 2022; Elkheloufi and Yean, 2022; Xiao et al., 2022) who demonstrated that positive emotions including feeling of joy and pleasure play a crucial role in affecting work engagement. The contribution of the teaching enjoyment to teachers' engagement can be interpreted with regard to the fact that teachers who do not get bored, feel pleasure in the class, and enjoy the good atmosphere of the class are more likely to be engaged in their teaching activities (Burić and Macuka, 2018). Also, our findings partially support the results of Hakanen et al. (2006), Yapar and Ince (2014), and Li et al. (2021) who found that teaching enjoyment processes negatively affected teacher burn out, which is the opposite counterpart of work engagement (Zeng, 2021).

Second, SEM analysis supported Hypothesis 2 by indicating that L2 grit positively affected EFL teachers' work engagement. This finding mirrors the results reported in the literature (e.g., Suzuki et al., 2015; Nazari and Alizadeh Oghyanous, 2021; Azari Noughabi et al., 2022), which have considered L2 grit as a negative predictor of teachers' job stress and a positive correlate of their engagement and wellbeing. Furthermore, the positive association between grit and work engagement can be justified by the relationship between the elements of grit, consistency of desire and perseverance, and elements of work engagement, attention and enthrallment (Singh and Chopra, 2016). In addition, this finding, in part, resonates with Fabelico and Afalla (2020) who reported that teachers' grit positively impacts their educational achievements. Also, the finding of this study resonates with those of Hodge et al. (2018), Wei et al. (2019), Liu and Wang (2021) who reported that grit significantly predicts engagement. In other words, we argue that EFL teachers who show further consistent interest and perseverant efforts in their teaching activities are more likely to get more emotionally, cognitively, and physically involved in their teaching activities.

Third, it was discovered that growth mindset significantly predicted teachers' work engagement; therefore, Hypothesis 3 was supported. The positive effect of growth mindset on work engagement is in accordance with some studies reported in the literature (Zeng et al., 2016; Caniëls et al., 2018; Patrick and Joshi, 2019; Frondozo et al., 2020; Nalipay et al., 2021; Elkheloufi and Yean, 2022) in which growth mindset possessors show higher work engagement than fixed mindset holders. Therefore, such teachers are more optimistic about enhancing their performance level, leading to their heightened engagement in their teaching practices. Also, the finding of the present study partially accords with the study by Fan (2022) who concluded that the growth mindset plays a mediating role between a teacher's positive psycho-affective variables and work engagement, the findings which was also corroborated by Elkheloufi and Yean (2022). Furthermore, our findings partially support those of Zhao et al. (2021) in which growth mindset indirectly and positively influences work engagement.

Fourth, SEM results indicated that teaching enjoyment affected work engagement through teacher grit (enjoyment → grit → engagement), supporting hypothesis 4. This finding is partially in line with that of Derakhshan et al. (2022) who reported associations among teacher grit, well-being, and foreign language teaching enjoyment. This finding can also be justified in light of Broaden-and-Build theory (Fredrickson, 2001) which posits that positive emotions can broaden individuals' personal resources and foster innovative, exploratory thoughts and actions. From this perspective, we argue that teaching enjoyment as a pleasant emotion broadens teachers' behavioral repertoire and builds their skills and psychological resources, leading their increased consistency of interests and their perseverance of efforts in their teaching practices. This in turn leads to teachers' greater engagement in their instructional activities.

Finally, SEM results indicated that teacher grit mediated the effect of growth mindset on teachers' work engagement (growth mindset → grit → engagement), supporting hypothesis 5. This finding is consistent with that of Zeng et al. (2019) who found teachers' growth mindset affects their work engagement with the mediating effects of well-being and grit. Likewise, Frondozo et al. (2020) also reported that teacher's growth mindset affects their enjoyment and engagement. Likewise, such findings have been verified by Nalipay et al. (2021) who found significant interconnections among teachers' growth mindset, motivation, and engagement. We argue that teachers who believe in the malleability of their competencies devote further efforts and interest (i.e., grit) to enhancing their teaching quality, which in turn leads to their being more emotionally, cognitively, and agentically attached to their teaching practices.

6. Conclusion and implications

In the present study, we aimed to test a structural model of teachers' growth mindset, foreign language teaching enjoyment, teacher engagement, and teaching grit. To our best knowledge, this is the first study to examine the interplay among these latent variables at the same time. For this purpose, first, the

construct validity of the constructs was confirmed via performing CFA. Then, SEM was employed to test the hypothesized model specifying the relationships between these variables. Data analysis revealed that foreign language teaching enjoyment, teaching grit, and growth mindset affected a teacher's work engagement directly and significantly. Also, teacher grit mediated the effects of teaching enjoyment and growth mindset on the work engagement.

Due to the important impact of a teacher's work engagement on the class achievement (Perera et al., 2018; Slišković et al., 2019; Zeng et al., 2019), this construct is worth taking into consideration. Therefore, the impact of various psycho-affective factors affecting this construct needs to be investigated and included in teacher education programs to foster teachers' work engagement and foster this variable to train more engaged teachers and ultimately, enhance the quality of the instruction. Moreover, according to our obtained findings, teaching enjoyment was revealed to directly and positively affect teachers' work engagement. In other words, if teachers hold positive emotions regarding their teaching activities, they will be more engaged in their teaching activities. As a result, it is recommended that teacher educators take initiatives in order to enhance positive emotions of pre-service teachers in their programs so as to raise teachers' work engagement. More in line with our findings, EFL teacher trainers should focus on the potential avenues to foster teachers' teaching enjoyment, grit, and growth mindset so that they can enhance their work engagement in L2 instruction which is intrinsically a demanding enterprise. Also, teaching grit was discovered as another significant factor affecting teachers' work engagement and a mediator affecting the constructs in our model. Given these findings, teacher educators and policy makers, especially in Chinese EFL context, should also think about the practical steps in order to enhance teachers' grit in accomplishing their instructional goals in EFL contexts. Moreover, policy makers, stake-holders, and administrators should take teachers' grit and growth mindset into account in their recruitment criteria as these two constructs were found to affect EFL teachers' work engagement.

Concerning the study limitations some points should be taken into account. The researchers only used quantitative research methods to gather the data. However, using self-report measures are less likely to give in-depth understanding of the nature of the associations among the latent constructs such as enjoyment, grit, growth mindset, and work engagement. As such, future researchers are encouraged to replicate similar studies by employing qualitative methods to triangulate their quantitative findings and shed more light on the interconnections among these constructs. The sample recruited in this study was not a big sample, thereby limiting the generalizability of the findings. Therefore, future researchers are recommended to recruit larger samples from other EFL contexts to increase the generalizability of the findings.

Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by University of Kurdistan, Iran. The patients/participants provided their written informed consent to participate in this study.

Author contributions

LL gathered the data in China and proposed the variables, wrote an initial draft of the manuscript. JF proposed the design, analyzed the data, and supervised the coordination among authors. SA wrote the Introduction and Literature review sections and edited the other sections. KK wrote the Discussion section, did the data pruning, and edited the other sections. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Advancing a cross-cultural understanding of teacher perceptions of school climate: A latent class analysis using 2018 TALIS data

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In recent years, school climate has increasingly received research attention. Most studies have focused only on student perceptions of school climate, whereas little is known regarding teachers' views, and cross-country comparisons are scarce. To advance cross-country understanding of teacher perceptions of school climate, this study used data from the 2018 Teaching and Learning International Study (TALIS) to explore latent classes of teacher perceptions and compared differences between American, Finnish, and Chinese teachers. Latent class analysis revealed that a four-class solution was the most appropriate for each teacher subsample: positive participation and teacher-student relation, positive teacher-student relation, moderate, and low participation for the U.S. and China datasets, while positive teacher-student relation, moderate, negative discipline, and low participation for the Finland dataset. However, measurement invariance across countries was violated. We further investigated the impact of predictors on latent classes of teacher perceptions of school climate. The results revealed varied patterns of cross-cultural differences across countries. Our findings implied that a more reliable and valid scale of teacher perceptions of school climate for cross-country comparison is needed. Tailored interventions are necessary as more than half of teachers perceived moderate and less desired school climate, and educators should consider cultural differences when drawing on experiences from other countries.

KEYWORDS

cultural differences, school climate, latent class analysis, measurement invariance, TALIS 2018

Introduction

School climate comprises shared beliefs, values, and attitudes that shape interactions between students, teachers, and administrators (Mitchell et al., 2010; Gonzálvez et al., 2022). Extant research has suggested that school climate could not only have direct consequential effects on student success (Thapa et al., 2013; Wang and Degol, 2016; Izaguirre et al., 2023, p. 2023), but also significantly impact teacher outcomes, such as attrition

(Djonko-Moore, 2016), efficacy (Meristo and Eisenschmidt, 2014; Hosford and O'Sullivan, 2016), job satisfaction (Zakariya, 2020), and burnout (Konold and Shukla, 2017; Capp et al., 2020; Yang et al., 2022). However, knowledge regarding teacher perceptions of school climate is limited, as most existing studies have been student-focused (Capp et al., 2022; Gonzálvez et al., 2022, p. 202; Wang and Degol, 2016).

Moreover, although students and teachers share objectively similar school environments, their perceptions vary significantly and even conflict due to the different roles and opportunities of teachers and students for observing school climate (Berkowitz et al., 2017; Maxwell et al., 2017; Capp et al., 2021). For instance, teachers, who control daily activities and tasks, reported more positive perceptions of climate than students (Ramsey et al., 2016; Molinari and Grazia, 2022). In addition, teachers were more concerned with classroom-level factors, such as the inconsistent implementation of rules, whereas students were more sensitive to issues at the school level, such as student mobility (Capp et al., 2021; Finch et al., 2023).

A more fundamental question is whether school climate can be simply dichotomized as positive or negative or a more complicated taxonomy is required. A supportive school climate serves not only as a safeguard for students (Berkowitz et al., 2017), but also a protective factor for teachers (Berkowitz et al., 2022). In contrast, teachers working in an unprotected environment may suffer a distressing effect. Perception of negative climate may be a reflection of teachers' contributions to the school and could indicate that they had unpleasant experiences (Capp et al., 2020; Metrailer and Clark, 2022; Herman et al., 2023). Differences in how teachers feel about school climate imply that individual teachers may experience negative or positive school climate; however, there is likely to be a gradation of negative or positive climate (Capp et al., 2021). Exploring the diversity of teacher perceptions could provide alternative information regarding the climate and reveal areas that need improvement and intervention (Ramsey et al., 2016; Maxwell et al., 2017; Baumgarten et al., 2022).

This study used three domains of school climate (i.e., disciplinary climate, teacher-student relationships, and participation among stakeholders) as an initial point to investigate teacher perceptions of climate in different countries. Furthermore, this is one of the first studies to use the latent class model to analyze cross-country comparisons in teacher perceptions of school climate, showing how cultural and contextual factors shape the latent classes of teacher perceptions (Salle et al., 2015).

Literature review

Teacher-focused school climate

As previous literature has mainly concentrated on school climate as perceived by students, the primary definition, theoretical framework, and measurement are based on students' views on climate and its impact on student outcomes, leading to the absence of teacher perspectives of school climate (Berkowitz et al., 2017; Molinari and Grazia, 2022, p. 202; Wang and Degol, 2016). To capture the unique components that make up the experiences of climate among teachers, Capp et al. (2020) proposed a conceptual and empirical model assuming that what teachers encounter as part of their regular tasks, interactions, and engagements has the power to alter how they feel about school climate. For instance, the authors listed two teacher characteristics that potentially influence teachers' views on climate: school levels (i.e., elementary, middle, and high school) and teaching experience. Teachers in elementary schools feel better about school climate than teachers in middle and high schools because of an increase in student violence in middle and high schools compared to elementary schools. Novice teachers perceive less favorable climate than their experienced colleagues due to lower resource support or financial incentives (Koth et al., 2008; Milton et al., 2022).

However, due to data limitation, the conceptual model proposed by Capp et al. (2020) did not include a critical demographic variable: teacher gender. Empirical literature showed that female teachers perceived higher levels of climate than male teachers (Bevans et al., 2007; Shehbaz et al., 2022), as they displayed higher degrees of affinity and lower levels of conflict in their interactions with pupils than male teachers (Drugli, 2013). Moreover, a close teacher-student relationship could protect students from adverse effects, including peer exclusion and shyness (Roorda et al., 2011; Zee and Roorda, 2018; García-Rodríguez et al., 2022), which promotes a disciplinary climate. The present study empirically explored the differences in perceived school climate between female and male teachers and hypothesized that female teachers would report more positive perceptions of climate than male teachers.

Cross-cultural comparisons of teacher perceptions of climate in three countries

The model proposed by Capp et al. (2020) and empirical studies (e.g., Capp et al., 2021) focusing on teachers' perceptions of school climate were based on a single cultural context. Little is known about the role of cross-cultural factors in triggering the perception patterns of climate among teachers. Revealing cross-cultural differences is vital for designing culturally sensitive policies and interventions to encourage teacher participation in schools worldwide (Jahreie, 2022). Moreover, cross-cultural similarities shed light on the analogous and comparable aspects of the school settings and structural similarities, which could inform educators to transfer successful school-based practices from one nation to another (Berkowitz et al., 2017). Cross-cultural similarities also provide information about the similar and consistent parts of education systems that might provide consistency and connectedness for teachers, such as exchange teachers who are moving between countries.

To compare teacher perceptions of school climate in various cultural contexts, the present study used a sample from one European country (Finland), one North American country (the United States), and one Asian country (China). This study was rooted in the cultural-ecological model of school climate suggesting that teachers' perceptions of climate are impacted by an interplay of individual, cultural, and environmental influences (Salle et al., 2015; Chen et al., 2019; Yang et al., 2021). This model clarifies cultural contexts and their contributions to individual perceptions of school climate in general and culturally specific ways, highlighting the

necessity to examine how cultural factors impact perceptions of climate and explore cross-cultural comparisons.

These three countries are of particular interest due to their considerable contrasts in three dimensions of Hofstede's (2005) cultural dimensions theory (Chen et al., 2019): power distance (the degree of inequality in society), individualism (the degree of individualism in society), and masculine (i.e., the degree a person is driven by material success rather than the relationships and quality of life). On a scale ranging from 0 to 100, American society expects low supervisor-subordinate relationships (scores 40 on power distance), extremely enjoys individual freedom (scores 91 on individualism), and moderately chases after earthly achievement (scores 62 on masculinity) (Hofstede et al., 2005). Finnish society extremely disputes unequal relationships (scores 33 on power distance), moderately values individual freedom (scores 63 on individualism), and extremely enjoys sound relationships and quality of life (scores 26 on masculinity) (Hofstede et al., 2005). Chinese people generally accept unequal relationships among people (scores 80 on power distance), highly value collectivism (scores 20 on individualism), and moderately pursue material success (scores 66 on masculinity) (Hofstede et al., 2005).

These cultural differences between the three countries have inevitably been reflected in their education systems, teaching practice, and stakeholder relationships (Barrenechea et al., 2022). For instance, education in China places a strong emphasis on the acquisition of knowledge, as well as the ways in which students organize and use the information they have gained in school (Pelgrum, 2001). Students in the Chinese school system are under a great deal of pressure to do well academically, and the system is often portrayed as being very competitive and stressful. Pupils in the U.S. are encouraged to critique, question, and invent new concepts or ideas, since American teachers are more focused on teaching students how to apply the information they obtain in the classroom to real-world situations (Halpern, 1998; Reilly and Reeves, 2022). Teachers in Finland prioritize fairness above academic achievement and attempt to prevent standardized examinations from being used as a tool for comparing pupils (Sahlberg, 2015).

Applied to perceptions of school climate, teachers' cultural beliefs and attributions are highly impacted by the diverse traditional cultures and education systems (Abacioglu et al., 2022). This is important to cross-national comparisons of climate, as teachers spread and pass on the dominant cultural values, norms, and practices across classrooms, schools, and education systems through their teaching practices and interactions with students, peers, and principals (Kang, 2022). By including teachers from the three countries, the present study provided an opportunity to explore cross-national differences, which could increase our scientific knowledge of the relationship between school ecological factors and teacher perceptions of school climate and carry implications for designing interventions of school climate in different countries.

Latent class analysis

Latent class analysis (LCA) has been extensively used to identify latent classes of individuals in the education field (Lin et al., 2018). LCA can extract exclusive and exhaustive subgroups with homogeneous characteristics (i.e., share a common pattern of responses) from a heterogeneous population (Goodman, 1974; Lanza et al., 2007). It serves the same primary objective as traditional cluster analysis (e.g., hierarchical clustering), which is to identify classes of observations with homogenous response patterns to a set of items (Ma, 2021). However, LCA is a data-driven approach that classifies individuals into derived classes, which are empirically generated (Rosato and Baer, 2012); thus, it could provide more robust and reliable classification results (DiStefano and Kamphaus, 2006). Moreover, multigroup LCA could be employed to assess differences in latent class structure across samples (Fan et al., 2019), which helps explore the similarities and differences of latent class of teacher perceptions of school climate across three countries in our study.

Present study

Under the guidance of the cultural-ecological model of school climate (Salle et al., 2015) and Hofstede's cultural dimensions theory (Hofstede et al., 2005), the present study used data gathered by the Organization for Economic Co-Operation and Development's OECD (2018) Teaching and Learning International Study (TALIS) to explore the latent classes of teacher perceptions of school climate in lower-secondary schools across the U.S., Finland, and Shanghai, China. We then compared the similarities and differences in identified latent classes of teacher perceptions of climate between these three countries. Finally, we examined the predictability of three teacher background factors (gender, teaching experience in current school, and overall teaching experience) on identified latent classes. We used latent class analysis (LCA) to determine the number of latent classes of perceptions of school climate for each teacher subsample and uncover similarities and differences between the identified classes and their relationships with teacher background factors across countries. In addition, we used multigroup latent class analysis (MLCA) to examine measurement invariance across countries (Geiser et al., 2006; Ma, 2021). The following research questions and hypotheses were posed:

1. How many latent classes of teacher perceptions of school climate can be identified in lower-secondary schools in the U.S., Finland, and Shanghai, China?
   (H1). Based on the cultural-ecological model of school climate (Salle et al., 2015) and previous LCA studies (Conderman et al., 2013), at least three latent classes were hypothesized for each country.
2. Are identified latent classes of teacher perceptions of school climate identical across the U.S., Finland, and Shanghai, China?
   (H2). Based on the cultural-ecological model of school climate (Salle et al., 2015), identical latent classes were not expected due to the cultural sensitivity of contextual effects on teacher perceptions.
3. What are the effects of teacher background variables (i.e., teacher gender, gender, teaching experience in current school,

and overall teaching experience) on the probability of being in a particular identified latent class?

(H3). According to the cultural-ecological model of school climate (Salle et al., 2015), teacher-focused school climate model (Capp et al., 2020), and empirical studies (Capp et al., 2021), teacher background factors would reflect the diversity within teachers, which was expected to produce variation in their perceptions of school climate. Specifically, female teachers are more likely to be classified into the latent class of perceiving more positive school climate than male teachers; new teachers tend to be in a latent class of perceiving less favorable climate than their experienced colleagues.

The current study is one of the first to employ a person-centered approach (i.e., LCA) to identify teacher perceptions of school climate and investigate the impact of predictors on latent class membership in a multicultural context. As previous school-climate studies have been mainly student-focused, our study could provide complementary information regarding school climate from the perspective of teachers, which has been largely overlooked in the literature (Grazia and Molinari, 2022). Teachers, who have a closer bond with students than principals and administrators, are especially likely to nurture ideas and opinions regarding school climate. Listening to teachers' voices is vital to realizing the long-term goal of enhancing school performance and student success (Jarl et al., 2021).

In addition, applying LCA to a multicultural context may assist in better classifying teacher perceptions of school climate in different countries, which could contribute toward policy making in educational sector to promote a global, holistic, and standardize measurement on teacher wellbeing. Lastly, the research approaches and processes used in this research are potentially valuable for examining the classification of a variety of other intriguing concepts in addition to school climate (Ma, 2021).

Materials and methods

Sample

This study used data from the Teaching and Learning International Survey (TALIS) conducted by the Organization for Economic Co-operation and Development (OECD) between September 2017 and July 2018. Since 2008, TALIS has been conducted every 5 years, focusing on providing policy-relevant data and analysis of the key aspects of teaching and learning (OECD, 2019a). The latest cycle, conducted in 2018, aimed to investigate teachers' learning environments and working conditions in schools (OECD, 2019b, p. 74). TALIS team used a two-stage stratified sample approach. Within the most of the participating countries and economies, 200 schools were randomly selected and invited to take part in the study, followed by drawing a random sample of 20 teachers from every selected school (Reeves and Hamilton, 2022). For a more detailed sampling procedure, please refer to the TALIS 2018 technical report (OECD, 2018).

Our study first extracted the information of 2,560 American teachers, 2,851 Finnish teachers, and 3,976 Chinese teachers in lower-secondary schools from the teacher public use file (BTGINTT3). The initial sample was filtered to exclude the observations that had any missing values in school-climate items. We run Little's missing completely at random (MCAR) tests for each country to check for the pattern and the number of missing values (Li, 2013; Breunig, 2019). The results shown that (1) the 222 (8.67%) American cases, 306 (10.73%) Finnish cases, and 369 (9.28%) Chinese cases contains missing values and had been removed; (2) the missing patterns for the three subsamples were completely random ($\chi^2 = 215.48$, $df = 216$, $p = 0.497$ for the American subsample, $\chi^2 = 301.98$, $df = 257$, $p = 0.056$ for the Finnish subsample, and $\chi^2 = 219.80$, $df = 217$, $p = 0.434$ for the Chinese subsample).

Consequently, our final analytic sample included 2,338 American teachers, 2,545 Finnish teachers, and 3,607 Chinese teachers. The cluster sizes range from between 2 and 17 teachers per school for the American subsample ($M = 7.56$, SD = 2.93), between 1 and 15 teachers per school for the Finnish subsample ($M = 7.45$, SD = 2.82), and between 3 and 17 teachers per school for the Chinese subsample ($M = 7.96$, SD = 2.45). Note, although TALIS two-stage random sampling approach and our MCAR tests support the statement that our final analytical sample was drawn to be representative of the countries and region, this study cannot claim the representation of the Chinese sample as Shanghai is the largest and most developed city in China (Chen et al., 2022).

Table 1 reported the descriptive statistics of the analytical sample. Two variables were recoded: highest level of formal education (ISCED 2011 Levels < 3, 4, 5, 6, 7, 8), which we recoded into a three-choice item (ISCED 2011 Levels < 5, 6, 7–8), and employment status as a teacher at this school (ISCED 1 = Permanent employment, 2 = Fixed-term contract for a period of more than 1 school year, and 3 = Fixed-term contract for a period of 1 school year or less), which we recoded into a binary item (1 = Permanent employment, 2 = Temporary employment). All three countries had more female teachers (approximately 70%) than male teachers. For each subsample, more than 30% of teachers worked at the current school for more than 10 years, which accounted for the largest group. The distribution of overall teaching experiences (total years of working as a teacher) across three countries had a similar pattern: teachers with 0–2 years of experience accounted for the smallest proportion, whereas teachers with more than 10 years of experience comprised the largest portion. For each country, teachers aged 40–49 made up the largest proportion (30.12% for the U.S. dataset, 32.54% for the Finland dataset, and 35.83% for the China dataset). For teachers' level education, most Finnish teachers (88.38%) pursued the highest level (ISCED 2011 Levels 7–8). Compared to American and Finnish teachers, Chinese teachers more likely treated being a teacher as their first career choice (83.91%). For employment status and teacher experiences in totally, teachers in three countries had similar experience. Generally speaking, American teachers were the most overworked (46.75 h per week) while Finnish teachers had shortest working hours (35.52 h per week). When asked whether they were supported by a mentor, 94.86% of Finnish teachers reported "No," a much higher percentage than teachers in the other two countries. Observations with missing information were not presented as they only accounted for a small share (4.27%).

TABLE 1 Descriptive statistics of three teacher subsamples.

Characteristics (variable name[1])	U.S. ($N = 2,338$)	Finland ($N = 2,545$)	Shanghai, China ($N = 3,607$)
Gender (TT3G01)			
Female	1,566 (66.98%)	1,759 (69.12%)	2,671 (74.06%)
Male	772 (33.02%)	786 (30.92%)	936 (25.94%)
Teaching experience at this school (TT3G11A)			
0–2 years	445 (19.03%)	534 (20.99%)	371 (10.29%)
3–5 years	673 (28.79%)	429 (16.86%)	542 (15.03%)
6–10 years	416 (17.79%)	531 (20.87%)	784 (21.73%)
>10 years	804 (34.39%)	1,051 (41.28%)	1,910 (52.95%)
Teaching experience in jobs (TT3G11B)			
0–2 years	194 (8.30%)	147 (5.76%)	231 (6.39%)
3–5 years	397 (16.98%)	315 (12.39%)	318 (8.82%)
6–10 years	358 (15.31%)	446 (17.54%)	530 (14.69%)
>10 years	1,389 (59.41%)	1,637 (64.31%)	2,528 (70.10%)
Age (TCHAGEGR)			
Under 25	79 (3.38%)	8 (0.33%)	110 (3.06%)
25–29	258 (11.04%)	198 (7.77%)	496 (13.63%)
30–39	670 (28.67%)	644 (25.31%)	1,199 (33.24%)
40–49	704 (30.12%)	828 (32.54%)	1,292 (35.83%)
50–59	454 (19.43%)	670 (26.33%)	495 (13.72%)
>60	172 (7.36%)	197 (7.73%)	19 (0.53%)
Highest level of formal education (TT3G03)[2]			
<5	6 (0.26%)	87 (3.44%)	38 (1.06%)
6	927 (39.65%)	208 (8.17%)	2,993 (82.97%)
7–8	1,405 (60.09%)	2,249 (88.38%)	576 (15.97%)
Teaching is first career choice (TT3G08)			
Yes	1,314 (56.20%)	1,065 (41.84%)	3,027 (83.91%)
No	1,024 (43.80%)	1,480 (58.16%)	580 (16.09%)
Employment status as a teacher at this school (TT3G09)			
Permanent	1,511 (64.63%)	1,657 (67.77%)	1,291 (35.80%)
Temporary	827 (35.37%)	788 (32.23%)	2,316 (64.20%)
Total working hours per week* (TT3G16)	46.75 (16.65)	35.52 (12.54)	45.51 (14.44)
Support by a mentor (TT3G21A)	366 (15.65%)	131 (5.15%)	981 (27.19%)
	1,972 (84.35%)	2,414 (94.85%)	2,626 (72.81%)

[1]Names in TALIS 2018 and TALIS Starting Strong 2018 User Guide.
[2]Highest level of formal education was measured by ISCED 2011 Levels.

School-climate measures

Teaching and Learning International Study 2018 used 13 items in three subscales to investigate three domains of school climate: (1) teachers' perceived disciplinary climate, (2) teacher-student relations, and (3) participation among stakeholders (OECD, 2019b, p. 332). All items shared the same question stem: "How strongly do you agree or disagree with the following statements?" Responses were rated on a four-point Likert scale (1 = strongly disagree; 4 = strongly agree). Higher values indicated better school climate. Table 2 presents the descriptive statistics for each school climate item.

Construct reliability and validity testing

We assessed the construct composite reliability (CR), McDonald's omega, and convergent validity for each single subscale. CR is a measure of internal consistency in items (Fornell and Larcker, 1981). A CR value more than 0.7 was deemed acceptable (Nunnally and Bernstein, 1994). Like Cronbach alpha, McDonald's omega is often used to assess reliability. However,

TABLE 2 School climate items from TALIS 2018 questionnaire.

Items (variable name[1])	U.S.	Finland	Shanghai (China)
Teachers' perceived disciplinary climate (TT3G41A-D)			
When the lesson begins, I have to wait quite a long time for students to quieten down[2]	2.985 (0.812)	2.804 (0.825)	3.363 (0.657)
Students in this class take care to create a pleasant learning atmosphere	2.806 (0.758)	2.636 (0.752)	3.178 (0.616)
I lose quite a lot of time because of students interrupting the lesson[2]	2.920 (0.839)	2.851 (0.854)	3.256 (0.664)
There is much disruptive noise in this classroom[2]	2.988 (0.831)	2.808 (0.861)	3.359 (0.648)
Teacher-student relations (TT3G49A-D)			
Teachers and students usually get on well with each other	3.218 (0.552)	3.202 (0.486)	3.347 (0.531)
Most teachers believe that the students' wellbeing is important	3.520 (0.556)	3.407 (0.528)	3.467 (0.531)
Most teachers are interested in what student have to say	3.248 (0.590)	3.236 (0.543)	3.339 (0.550)
If a student needs extra assistance, the school provides it	3.357 (0.597)	3.383 (0.560)	3.268 (0.567)
Participation among stakeholders (TT3G48A-E)			
School provides staff with opportunities to actively participate in school decisions	2.846 (0.736)	2.887 (0.649)	2.967 (0.729)
School provides parents or guardians with opportunities to actively participate in school decisions	2.849 (0.684)	2.738 (0.627)	3.022 (0.658)
School provides students with opportunities to actively participate in school decisions	2.662 (0.718)	2.871 (0.573)	2.938 (0.703)
School has a culture of shared responsibility for school issues	2.775 (0.713)	2.914 (0.605)	3.077 (0.632)
There is a collaborative school culture characterized by mutual support	2.866 (0.731)	2.939 (0.664)	3.113 (0.610)

Table displays the descriptive statistics of thirteen school-climate items in TALIS 2018 questionnaire. Item responses were rated on a four-point Likert scale (1 = strongly disagree; 4 = strongly agree).
[1]Name in TALIS 2018 and TALIS starting strong 2018 user guide; [2]Items were reverse coded.

compared to Cronbach alpha, omega requires less restrictive assumptions, and is a more accurate measure of reliability index than the Cronbach alpha (Zinbarg, 2005; Dunn et al., 2014). The coefficient omega ranges from 0 to 1, and its values greater than or equal 0.80 are popularly considered appropriate for a good reliability index of a measure (Mikkonen et al., 2022). Moreover, we conducted confirmatory factor analysis (CFA) for each subscale. A set of goodness of fit (GOF) indices was used to evaluate the mode fit, including the comparative fit index (CFI) and Tucker-Lewis index (TLI) with acceptable fit $> = 0.90$ (Tucker and Lewis, 1973; Hu and Bentler, 1999), and standardized root mean residual (SRMR) and root mean square error of approximation (RMSEA) with acceptable fit $= <$ 0.08 (MacCallum et al., 1996; Hu and Bentler, 1999; Steiger, 2016). A significant factor loading of an item greater than 0.5 could be considered strongly related to the latent construct (Fornell and Larcker, 1981).

Table 3 showed eight of nine CRs exceeded the threshold value of 0.7. Teacher-student relations in Chinese subsample (0.685) was very close to the threshold value although not exceed it. All omega values were larger than the recommended value of 0.8, indicating that all domains have acceptable internal reliability. In addition, the results of CFA showed all CFIs $\geq$ 0.90, TLIs $\geq$ 0.95, RMSEAs $<$ 0.06, and SRMRs $\leq$ 0.08, indicating unidimensional factor structure of the measurement model for each school climate subscale was supported with sound model fit. All individual items load strongly, which are higher than the threshold value of 0.5 and they are statistically significant. Hence, the results show good convergent validity of concept items.

Further, discriminant validity was assessed by comparing the square root of the average variance extracted (AVE) of a given construct and the correlations between the construct and the other constructs (Fornell and Larcker, 1981). AVE measured the amount of variance in the items explained by each subscale compared to the variance explained by measurement error (Bagozzi and Yi, 1988). An AVE of greater than 0.50 are considered acceptable (Fornell and Larcker, 1981). If the former is greater than the latter, it implies the items are more closely related to the construct than the others.

Table 4 showed all AVEs ranging from 0.521 to 0.736, exceed the suggested threshold values of 0.5. Also, all the values in the diagonal direction (bold numbers) are larger than the off-diagonal values in the corresponding rows and columns, indicating discriminant validity was satisfactory for all subconstructs in school climate. Overall, the reliability and validity assessments documented the good psychological quality of school-climate measurement.

Analytic process

First, to explore research question one, we conducted (single-group) LCA for each teacher subsample to identify the appropriate number of classes for teacher perceptions of school climate. Model selection was based on the following statistical criteria (Weller et al., 2020; Sinha et al., 2021): (1) Bayesian information criterion (BIC), with lower values indicating a better model-data fit, (2) Lo-Mendell-Robin Likelihood Ratio Test (LMR-LRT), with significant values indicating that the current model was better than previous one, (3) entropy, with greater values suggesting lower classification uncertainty of individuals to latent classes (Wang et al., 2017), (4) parsimony property, where a model with fewer parameters was better than a more complex model with all else being equal, and (5) theoretical interpretation, which required researchers to

TABLE 3 Reliability and convergent validity.

Country	School climate domains	CR	Omega	Factor loading	CFA			
					CFI	TLI	RMSEA	SRMR
U.S.	Teachers' perceived disciplinary climate	0.867	0.912	0.514–0.714	0.996	0.992	0.033	0.007
	Teacher-student relations	0.771	0.838	0.528–0.771	0.985	0.987	0.045	0.037
	Participation among stakeholders	0.723	0.823	0.532–0.734	0.964	0.973	0.041	0.013
Finland	Teachers' perceived disciplinary climate	0.753	0.902	0.598–0.798	0.998	0.997	0.026	0.004
	Teacher-student relations	0.784	0.842	0.619–0.752	0.957	0.951	0.043	0.021
	Participation among stakeholders	0.75	0.804	0.601–0.768	0.982	0.986	0.051	0.025
China	Teachers' perceived disciplinary climate	0.791	0.843	0.536–0.712	0.999	0.995	0.012	0.009
	Teacher-student relations	0.685	0.901	0.531–0.801	0.981	0.928	0.045	0.034
	Participation among stakeholders	0.731	0.905	0.621–0.798	0.973	0.924	0.044	0.039

Table illustrates a summary of composite reliability (CR), McDonald's Omega, the range of standardized factor loadings, and confirmatory factor analysis (CFA) of the measurement model for each school-climate domain. CFA was assessed by comparative fit index (CFI), Tucker-Lewis index (TLI), standardized root mean residual (SRMR), and root mean square error of approximation (RMSEA). Names in TALIS 2018 and TALIS Starting Strong 2018 User Guide. Highest level of formal education was measured by ISCED 2011 Levels.

TABLE 4 Discriminant validity of school-climate measures.

Country	Domains	AVE	Perceived disciplinary climate	Teacher-student relations	Participation among stakeholders
U.S.	Perceived disciplinary climate	0.714	**0.845**		
	Teacher-student relations	0.538	0.486	**0.733**	
	Participation among stakeholders	0.582	0.439	0.505	**0.763**
Finland	Perceived disciplinary climate	0.698	**0.835**		
	Teacher-student relations	0.521	0.390	**0.722**	
	Participation among stakeholders	0.531	0.545	0.465	**0.729**
China	Perceived disciplinary climate	0.736	0.858		
	Teacher-student relations	0.601	0.439	**0.775**	
	Participation among stakeholders	0.541	0.447	0.398	**0.736**

The bold values on the diagonal represent the square roots of the average variance extracted (AVE); off-diagonal values are the correlation estimates.

interpret identified classes theoretically and explain the implication for practice (Weller et al., 2020).

Second, for research question two, we assess measurement invariance across teacher samples (Lanza et al., 2007). Measurement invariance required the conditional response probabilities (within class) for school climate items equal for teacher samples in different countries. Only if this assumption holds, the identified LCA models with the same number of latent classes (if present) could be regarded as the same for different teacher subsamples; subsequently, meaningful comparisons of the class sizes could be derived (Kankaraš et al., 2018). Measurement invariance assumption was tested by comparing the model fit of fully constrained, semi-constrained, and unconstrained MLCA for the identified LCA of each teacher subsample (Parnes and Schwartz, 2022). Specifically, in a fully constrained model, both class sizes and conditional response probabilities were constrained to be the same across teacher subsamples. In contrast, the semi-constrained model allowed the class sizes to differ across subsamples, whereas the unconstrained model further allowed the variance of condition-al response probabilities across subsamples. As these three models were nested, and the distribution of the likelihood-ratio difference test was asymptotically chi-square, the model selection could be determined by comparing G^2, BIC, and Akaike's Bayesian information criterion (ABIC) differences among models. A non-significant G^2 value and lower BIC and ABIC indicate a better model fit. If the semi-constrained model had better fitness than both fully constrained and unconstrained models, we could argue that the measurement invariance assumption was retained.

Finally, after teachers were assigned to specific school-climate categories based on their response patterns on 13 school-climate items (regardless of measurement invariance holding across countries), three teacher demographic variables were used to predict category membership: gender, teaching experience in current school, and overall teaching experience, which aims to address research question three. The specific impacts of demographic variables were interpreted for the three countries. Sampling weights were used to compensate for the disproportional selection probabilities among institutions and people and improve the generalizability of our results. We did not use multilevel modeling, as the number of participating teachers within each school (approximately 20) was too small to fulfill the sample size requirements for multilevel models (OECD, 2019a).

Latent class analysis were conducted using Mplus 8.8 (Muthén and Muthén, 2017). To assess the impact of teacher background variables (i.e., teacher gender, teaching experience in current school, and overall teaching experience) on the probability of being in a particular identified latent classes, we used the R3STEP command in Mplus 8.8 (Asparouhov and Muthén, 2014). The comparison of the models for measurement invariance used the Mplus Automation package in R software (Hallquist and Wiley, 2018). Data cleaning and other analysis procedures (e.g., CFA, McDonald's omega) were conducted using R version 4.0.3 (R Core Team, 2020).

Results

Latent classes exploration (for research question one)

The optimal number of latent classes for teacher perceptions of school climate was determined by running a series of LCA for each teacher subsample, in which latent classes gradually increased from two to seven classes for the American subsample and two to five classes for the Finnish and Chinese subsamples. **Table 5** details the model fit indices of all tested LCAs.

For the American subsample, although BIC and ABIC values decreased with the increase in latent classes, LMR-LRT indicated that a six-class model fit the model better than a five-class model ($p < 0.001$), but a seven-class model did not outperform the six-class model. However, the entropy of the six-class model (0.868) was slightly less than that of the four-class model (0.869). Considering the balance between model fitness and parsimony, the four-class model was preferable to the six-class one. In Finland and Shanghai datasets, although the five-class solutions had slightly lower AIC, BIC, and ABIC than the four-class solutions, we retained the latter as LMT-LRT was non-significant and its entropy value (almost) reached the peak (0.844 and 0.942, respectively). Therefore, our results support the hypothesis 1.

TABLE 5 Fit statistics for LCAs modeling teacher perceptions of school climate.

Number of profiles	AIC	BIC	ABIC	*P*-value (LMR-LRT)	Entropy
U.S.					
2	54709.810	55167.054	54916.053	<0.001	0.841
3	51859.498	52548.252	52170.161	<0.001	0.857
4	50358.171	51278.431	50773.264	<0.001	0.869
5	49169.372	50321.143	49688.876	<0.001	0.867
6	48384.655	49767.938	49008.581	<0.001	0.868
7	47686.943	49301.738	48415.292	0.703	0.863
Finland					
2	61453.725	61202.715	61453.725	<0.001	0.848
3	58942.963	58564.858	58942.963	<0.001	0.834
4	57750.203	57245.005	57750.201	<0.001	0.844
5	56954.878	56322.587	56954.878	0.5361	0.839
Shanghai (China)					
2	70040.610	70537.245	70286.219	<0.001	0.945
3	64894.775	65642.871	65264.742	<0.001	0.945
4	60448.050	61447.607	60942.376	<0.001	0.942
5	58941.364	60192.382	59560.050	0.743	0.948

BIC, Bayesian information criterion; ABIC, adjusted Bayesian information criterion; LMR-LRT, Lo-Mendell-Rubin likelihood ratio test, and Entropy value testing classification quality.

Measurement invariance (for research question two)

After determining the optimal solution (i.e., four-class models) for each country, we compared three models (fully constrained, semi-constrained, and unconstrained models) to examine measurement invariance assumption. The results demonstrated that measurement invariance was not maintained hold across three countries, as the chi-square test between the first two models (fully constrained vs. semi-constrained) and the latter two models were both significant ($\Delta G\hat{}2 = 98.17$, $\Delta df = 25$, $p < 0.01$; $\Delta G\hat{}2 = 85.43$, $\Delta df = 33$, $p < 0.01$). We further assessed the measurement invariance assumptions for any two teacher subsamples. Again, this assumption was violated. Therefore, hypothesis 2 was supported and the following analysis conducted unconstrained models separately for each subsample.

Naming of identified latent classes (research question two)

Table 6 and Figures 1–3 show latent class membership and conditional probability distribution diagrams of each identified class on the 13 items for each teacher subsample.

The four identified groups of American and Chinese subsamples presented similar response patterns, although the membership sizes varied (see Figures 1, 2). Class 1 reported relatively high ratings for items in the domains of participation among stakeholders and teacher-student relationships. Class 2 tended to report high perceptions of school disciplinary climate and teacher-student relationships. Class 3 comprised the largest proportion of teachers (39.5% for American data and 41.4% for Chinese data) and was characterized by moderate rates for each item. On average, teachers in class 4 had fewer opportunities to participate in school decisions. Therefore, these four classes were labeled as positive participation and teacher-student (TS) relationships, positive discipline and TS relationships, moderate, and low participation.

In contrast, based on Finnish data (Figure 3 and Table 6), Class 1 strongly agreed with items regarding teacher-student relationships and responded moderately (i.e., agree or disagree) to items in the other two domains. Thus, they were labeled as the positive TS relationships category. Class 2, labeled as moderate, tended to report a moderate attitude on each item. Classes 3 and 4 had a negative experience with disciplinary climate and participation among stakeholders, respectively. Thus, class 3 was labeled as negative discipline, and class 4 as low participation.

TABLE 6 Latent class membership by country.

Name of latent class	U.S.	Finland	Shanghai (China)
Positive participation and TS relation	12.5% (C1)		18.5% (C1)
Positive TS relation	21.2% (C2)	27.8% (C1)	22.1% (C2)
Moderate	46.5% (C3)	34.7% (C2)	41.4% (C3)
Negative discipline		25.3% (C3)	
Low participation	22.5% (C4)	12.1% (C4)	18.1% (C4)

Table displays the latent classes and endorsement frequencies of three teacher subsamples according to teacher perceptions of school climate. TS, teacher-student relation; C1–4, Classes 1–4.

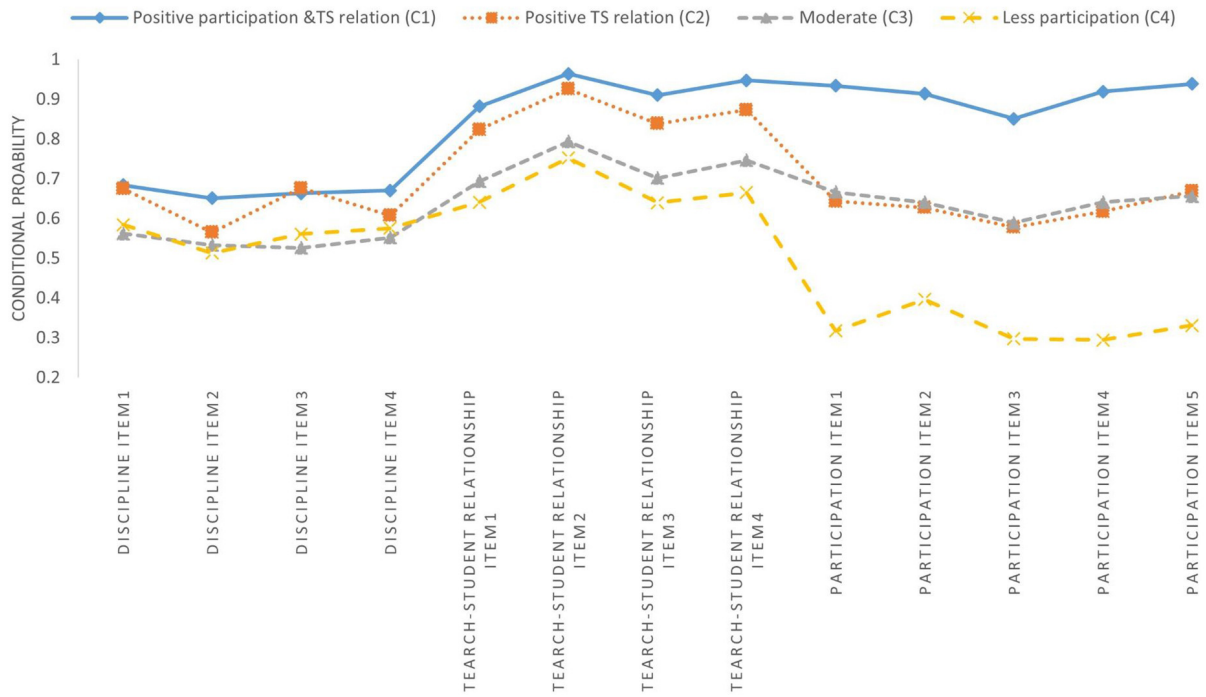

FIGURE 1
Latent classes of the U.S. subsample.

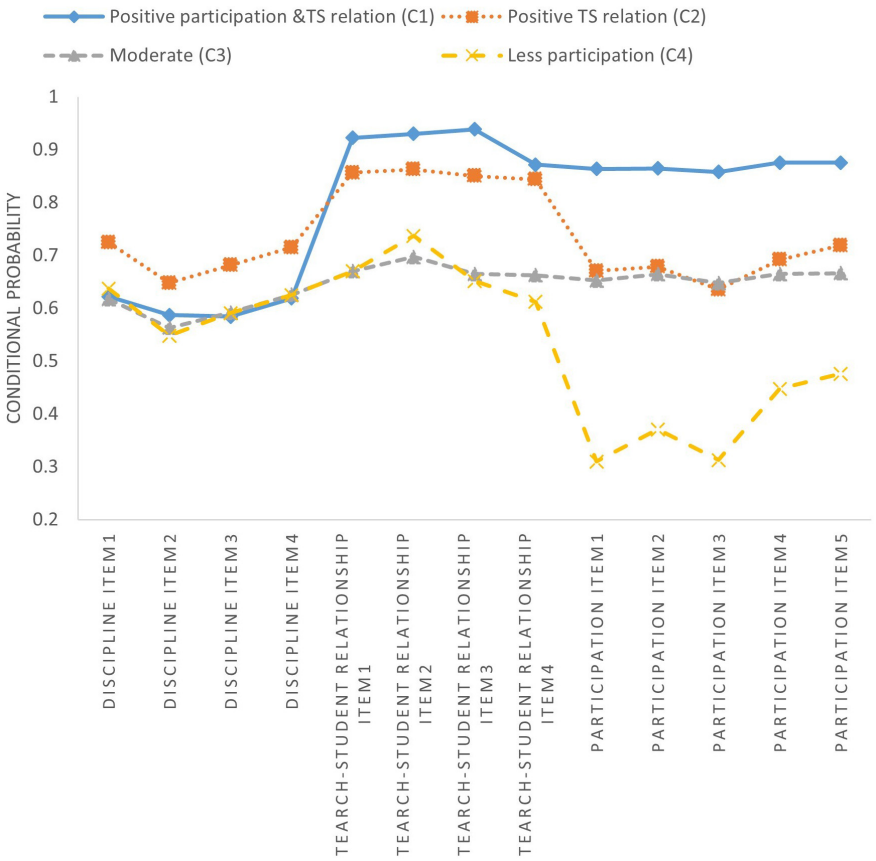

FIGURE 2
Latent classes of the China subsample.

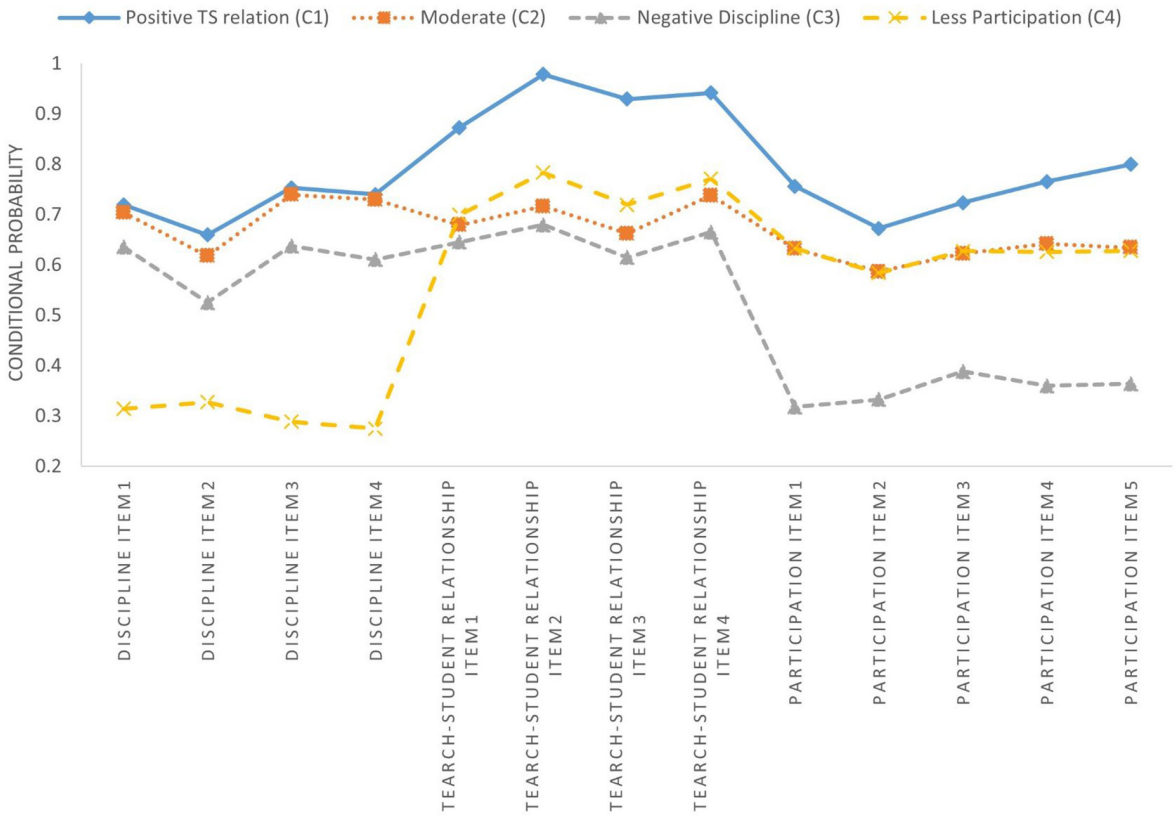

FIGURE 3
Latent classes of the Finland subsample.

Predictors of latent class membership (for research question three)

Table 7 reports the results of multinomial logistic regression using teacher gender and teaching experience as predictors of class membership. The most positive class was used as the reference class, meaning positive participation and TS relationships for the American and Chinese subsamples, and positive TS relationships for the Finish subsample.

For the American data, female teachers had 42.0% (OR = 0.580) lower odds of being in the low participation class than male teachers. Teachers working in the current school for 6–10 years were 2.428 times more likely to be in the low participation class than teachers working in the current school for more than 10 years. Moreover, the odds of being in the low participation class compared with positive participation and TS relationships was 1.277 times higher for teachers with 0–2 years of teaching experience.

The results for the Finnish subsample revealed that teachers with less than 10 years of teaching experience were more likely to be in the low participation class (OR = 1.478) or negative discipline class (OR = 2.267, 2.213, 2.659 for teachers with 0–2, 3–5, 6–10 years of experience, respectively).

In the Chinese sample, the odds of being in the moderate class were 0.568 and 0.454 times higher for teachers working in the same school for 0–2 and 6–10 years, respectively. The odds that teachers with 0–2 and 3–5 years of experience would experience low participation were 1.954 and 1.799 times higher, respectively, than those of teachers with more than 10 years of experience.

In sum, for teacher gender, only the American subsample supports hypothesis 3 that assumes female teachers had a more positive feeling of school climate than male teachers. For teaching experience, although the patterns are not the same across three countries, all significant coefficients of teaching experience were positive. This means teachers in all three countries with less than 10 years of experience were more likely to be in the less positive class than those with more than 10 years; thus, hypothesis 3 about teaching experience was supported.

Discussion

The impact of school climate on student and teacher outcomes has received increasing attention (Konishi et al., 2022; Yang et al., 2022; Zacharia and Yablon, 2022; Finch et al., 2023, p. 20). However, most previous studies have focused on students' perceptions of school climate and ignored teachers' perceptions (Wang and Degol, 2016; Gonzálvez et al., 2022; Grazia and Molinari, 2022). Furthermore, most studies on school climate and its predictors were conducted in a single context (Oder and Eisenschmidt, 2018; Sanchez et al., 2020; Marchante et al., 2022), lacking the exploration of cultural and contextual differences.

This study represents one of the first attempts to investigate the cross-cultural differences in teacher perceptions of school climate.

TABLE 7 Multinomial logistic regression results (compared to most positive class).

	Positive participation and TS relation		Positive TS relation		Negative discipline		Low participation	
	β (SE)	OR	β (SE)	OR	β (SE)	OR	β (SE)	OR
U.S.								
Gender[1]	−0.034 (0.234)	0.966	−0.081 (0.262)	0.922			**−0.544* (0.228)**	**0.580**
Experience at school[2]								
0–2 years	0.048 (0.349)	1.049	0.013 (0.419)	1.013			0.383 (0.397)	1.467
3–5 years	0.344 (0.368)	1.411	−0.063 (0.401)	0.939			0.434 (0.358)	1.543
6–10 years	0.350 (0.285)	1.419	0.323 (0.364)	1.381			**0.887** (0.294)**	**2.428**
Experience in job[2]								
0–2 years	0.822 (0.524)	2.275	0.881 (0.483)	2.412			**1.277* (0.545)**	**3.585**
3–5 years	−0.008 (0.426)	0.992	0.726 (0.470)	2.067			0.534 (0.458)	1.706
6–10 years	0.468 (0.377)	1.597	0.263 (0.357)	1.301			0.458 (0.349)	1.580
Finland								
Gender			−0.055 (0.174)	0.947	0.171 (0.138)	1.186	0.152 (0.128)	1.164
Experience at school								
0–2 years			0.338 (0.285)	1.402	−0.088 (0.218)	0.916	−0.028 (0.195)	0.972
3–5 years			0.367 (0.271)	1.443	−0.268 (0.212)	0.765	−0.362 (0.199)	0.697
6–10 years			0.226 (0.226)	1.254	−0.233 (0.190)	0.792	−0.181 (0.169)	0.834
Experience in jobs								
0–2 years			0.350 (0.422)	1.419	**0.819** (0.320)**	**2.267**	0.171 (0.309)	1.186
3–5 years			−0.168 (0.332)	0.846	**0.794*** (0.240)**	**2.213**	0.320 (0.234)	1.378
6–10 years			−0.278 (0.272)	0.757	**0.978*** (0.194)**	**2.659**	**0.391* (0.187)**	**1.478**
Shanghai (China)								
Gender	−0.217 (0.113)	0.805	−0.121 (0.109)	0.886			−0.002 (0.109)	0.998
Experience at school								
0–2 years	−0.192 (0.265)	0.825	**0.568* (0.227)**	**1.765**			−0.212 (0.232)	0.809
3–5 years	−0.159 (0.192)	0.853	0.212 (0.197)	1.236			0.047 (0.177)	1.048
6–10 years	0.011 (0.170)	1.011	**0.454** (0.147)**	**1.575**			0.126 (0.149)	1.135
Experience in jobs								
0–2 years	0.169 (0.317)	1.184	−0.124 (0.279)	0.884			**0.670* (0.267)**	**1.954**
3–5 years	0.145 (0.237)	1.156	−0.140 (0.242)	0.869			**0.587** (0.205)**	**1.799**
6–10 years	−0.071 (0.192)	0.932	−0.204 (0.167)	0.815			0.267 (0.165)	1.306

Table reports the results of multinomial logistic regression using teacher gender and teaching experience as predictors of latent class membership. The most positive class was used as the reference class, meaning positive participation and TS (teacher-student) relationships for the American and Chinese subsamples, and positive TS relationships for the Finish subsample. Bold estimates indicate significant differences. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. Reference groups for gender[1] and teaching experience at school/in jobs[2] are male and >10 years, respectively.

We explored the latent classes of teacher perceptions of climate in lower secondary schools in the U.S., Finland, and Shanghai, China (Table 5) and the impact of predictors on latent class memberships. We found that: (1) A four-class solution was determined to be the optimal model for each teacher subsample; (2) Three teacher subsamples presented extremely heterogenous response patterns for 13 school climate items, and identified four classes of each teacher subsample as quantitatively different from each other (Figures 1–3 and Table 6); (3) The impacts of three predictors (gender, teaching experience at current school, and overall teaching experience) on teacher classification varied significantly across countries (Table 7).

The identified latent class differences in teacher perceptions of school climate and predictor differences of latent class membership indicated that culture played a critical role in impacting teacher perceptions of school climate (Gonzálvez et al., 2022), which aligns with the cultural-ecological model of school climate (Salle et al., 2015). Although the cross-country disparities in how students and parents perceive school climate have been documented in the literature (Yang et al., 2013, 2021; Larson et al., 2020), this cross-cultural study advanced the understanding of differences in school climate across countries and could inform the design and development of school climate initiatives and programs from teacher perspectives.

Latent classes comparison

For research question one, LCAs identified four classes for each country (**Figures 1–3** and **Tables 5–6**), supporting hypothesis 1. School climate, which is a complex concept, cannot be simply dichotomized as positive or negative. The four classes identified for each subsample were crucial, as they presented a comprehensive description of the ways in which teachers perceived school climate differently (Rosato and Baer, 2012; Capp et al., 2021; Herman et al., 2023). Three universal classes were identified across three countries: positive TS relationships (high rates of teacher-student relationships), moderate (moderate rates of each domain of school climate), and low participation (low participation rates among stakeholders) class. The three countries had similar proportions of teachers in the positive TS relationship class (U.S., 21.2%; Finland, 25.8%; China, 22.1%). Unsurprisingly, teachers in the moderate class accounted for the largest groups in each country (U.S., 46.5%; Finland, 38.1%; China, 41.4%). It would be meaningful and informative to promote this class to shift toward other classes with more positive views on school climate.

For the low participation class (few opportunities to participate in school decisions), only 12.1% of Finnish teachers were assigned to this class, and 18.1% of Chinese teachers; however, the U.S. indicated a nearly double rate (22.5%). As documented by previous studies (Elo and Nygren-Landgärds, 2021), compared to Chinese and American counterparts, Finnish teachers reported higher rates of autonomy and decision-making power on school policies and management (Xia et al., 2017; Hemphill, 2018). Consequently, they are more active in school management and engagement. In contrast, college entrance examinations is the core concern of Chinese primary and secondary education systems as it is almost the only one avenue for most students to change their fate (Lo, 2019; He et al., 2022). Therefore, teaching for Chinese teachers are heavily textbook-dependent and primarily exam-focused so that teachers lose their autonomy and become subservient (Day, 2019). Different from Finland and China, performance-based accountability policies (e.g., No Child Left Behind, Every Student Succeed) strongly shape and frame at all levels of American education system (Mehta, 2014; Maaranen and Afdal, 2022). Under these policies, each state and school district require teachers to mandate the implementation of particular standards for classroom teaching and management, which have been undermining teacher autonomy (Maaranen and Afdal, 2022; Levatino et al., 2023).

In addition to moderate and low participation classes, one unique class was identified for each country. American and Chinese datasets disclosed a positive participation and TS relationship class (i.e., high rates of participation among stakeholders and positive teacher-student relationships); however, the Finnish subsample consisted of a negative discipline class (low level of disciplinary climate). The different attitudes toward student academic performance and class management across countries may help explain the disparities. Teachers in Finland were far less worried about the grade level of their students, the quality of assigned homework, and standardized tests than their counterparts in the U.S. and China. Consequently, students in Finnish schools have greater freedom for introspection and experimentation (Partanen, 2011). However, this may come at the price of school discipline and regulations. As such, 23.4% of all Finnish educators were considered to experience poor school discipline. In contrast, under the high stresses of college entrance examination and accountability policies for Chinese and American teachers, respectively, they is more likely to maintain positive classroom discipline as it often benefits students their academic performance (Rodriguez and Welsh, 2022).

Finally, in terms of the positive TS relationship class and more inclusive classes (i.e., positive participation and TS relationship class), 40.6% of Chinese teachers were assigned to these classes, which was significantly higher than American (33.7%) and Finnish (27.8%) teachers (**Table 4**). Compared to their counterparts in the U.S. and Finland, Chinese students have a more optimistic perspective of the teacher-student connection (Yang et al., 2013). A high degree of respect for teachers is valued in China due to Confucian virtue, which guides children to strive for perfection (including self-discipline) and honor their parents (Hui et al., 2011). Chinese students' commitment to studying, desire for self-improvement, and respect for their teachers are likely major contributors to the country's high levels of student-teacher attachment, low rates of disruptive behavior, and impressive academic achievements. Undoubtedly, many students in the U.S. and Finland have these traits. However, American and Finnish student populations, particularly those beyond the primary school level, are less likely to exhibit these traits than their Chinese counterparts (Culpeper et al., 2010; Qu and Pomerantz, 2015; Qu et al., 2016). Moreover, compared to American and Finnish teachers, Chinese teachers tend to use praise and reward prosocial behaviors (Teddlie and Liu, 2008; Bear et al., 2016). In sum, Confucian values and student behavior management in Chinese schools help promote positive teacher-student relationships.

Measurement non-invariance

Research question two aimed to explore whether the identified four latent classes of teacher perceptions of school climate for each country are identical. As the four latent classes of American and Chinese subsamples were named identically and that for Finnish subsample was different, it was obvious that the identified latent classes across three countries were different, supporting hypothesis 2. In addition, caution should be taken regarding the present findings, as measurement invariance was violated. Theoretically, identified classes were not directly comparable across countries, supporting the idea of school climate being a culturally and contextually sensitive construct (Salle et al., 2015; Chen et al., 2020; Del Toro and Wang, 2021; Yang et al., 2021; Na'imah et al., 2022). Making meaningful cross-cultural comparisons requires avoiding three types of biases: construct, method, and item (Schmidt et al., 2020). Construct bias occurs when teachers from different countries have different understandings of definitions, concept-related aspects, or behaviors. Currently, we cannot exclude the possibility that the conceptualization of school climate for teachers across countries was different (Salle et al., 2015).

Method bias indicates that nuisance arises due to inappropriate sampling, instrument design, and administration process. One example of administration bias is that miscommunication is almost certain to occur between testers and testees from different cultural backgrounds (van de Vijver, 2002; Quesque et al., 2022). Item bias

is possible when an item has different meanings across cultures (Benítez et al., 2022). To avoid item bias, valid and reliable measures are recommended. However, the significant differences in response patterns on school climate items across countries in the present study indicated that item bias might occur and a more valid and reliable tool for assessing teacher perceptions of school climate is necessary to explore cross-cultural variation.

Association of latent class and teacher background

Regarding the impact of predictors on latent classes of teacher perceptions of school climate, varied patterns of cross-cultural differences were found. Our results partly supported hypothesis 3.

Teacher gender

As shown in **Table 5**, only female teachers in the U.S. had a lower probability of being categorized into the low participation class. This partly validated the findings of previous studies (Drugli, 2013; Capp et al., 2021), which indicated that female teachers connected with students with higher levels of affinities and less conflict, contributing to positive teacher-student relationships and school climate. However, this was not the case in the Finnish and Chinese subsamples. The present data did not reveal reasons for this disparity; however, they highlighted diverse patterns of experiences for female and male teachers across countries and indicated the importance of exploring cultural differences (Salle, 2018; Enkhtur et al., 2022).

Years of teaching

As shown in **Table 5**, although the patterns are not the same in different countries, all significant coefficients of teaching experience were positive, indicating that teachers in all countries with less than 10 years of experience were more likely to be in the less positive class than those with more than 10 years of experience. Previous studies have suggested that less experienced teachers are often busy just attempting to survive under the disadvantages of less collegial support and decision-making authority (Murray-Orr and Mitton-Kukner, 2017; Thomas et al., 2021). Thus, they are more likely to experience emotional weariness (Grayson and Alvarez, 2008) and quit their jobs (Djonko-Moore, 2016). Those combinations of stressors might account for a more unpleasant climate experience (Capp et al., 2021). However, our research cannot explain why years of teaching experience impact different groups in three countries, which is a gap for future research.

Limitations and future research

Although the current study is one of the first to investigate cross-cultural differences and similarities in teacher perceptions of school climate, it has several limitations. First, TALIS 2018 used 13 items to measure three domains of school climate. Thus, it may not comprehensively reflect teachers' perceived school climate, as a systematic review revealed that school climate consists of four domains: school safety, academic climate, community, and institutional environment (Wang and Degol, 2016). Further research could design a more comprehensive scale to measure teacher perceptions of school climate. Second, due to the cross-section nature of the TALIS data, it was not possible to determine causal links between the perceptions of school climate and teacher gender and teaching experience in this study although it does not rule out the potential. Future research with experimental or longitudinal designs is required. Third, the results of this study were inferred from an examination of the U.S., Finland, and Shanghai, China. It may not be applicable to other countries and economies.

Fourth, although self-reported measures are beneficial for evaluating teachers' subjective opinions of the school climate, it may be impacted by social desirability bias (Fisher and Katz, 2000), which is particularly pronounced in the Chinese sample. For instance, due to the cultural difference, Chinese respondents are more likely to choose moderate and extremely positive responses compared to their American and Finnish counterparts (Harzing, 2006; Kjærnsli and Lie, 2011), which could threaten our conclusions. Finally, to more holistically assess the disparities in how schools are seen and perceived by their communities throughout the world, researchers may use multi-method techniques to examine school climate from multi-stakeholders (e.g., students, parents, and principals) in multicultural contexts (Yang et al., 2021).

Practical implications

In the contemporary context of growing international educational initiatives and programs, the present findings have several significant implications for measuring, comprehending, and comparing school climate internationally and building a healthy school climate in various countries. First, this study reveals that LCA is a useful method for classifying the teacher perceptions of school climate (or various other constructs of interest). Using arbitrary threshold values or the more conventional cluster analysis may not provide as rigorous or trustworthy classification findings as the data-driven LCA (DiStefano and Kamphaus, 2006; Loades et al., 2022).

Second, our results suggest that more than half of teachers were classified in the moderate or less desired (i.e., low participation, negative discipline) class. Thus, tailored strategies and programs are necessary to foster a positive school climate. As teacher perceptions of school climate are entangled with student behaviors (e.g., teacher-student relationships, school discipline and order, bullying) (O'Brennan et al., 2014), school climate interventions must simultaneously consider teacher and student reactions. Teachers always play a critical role in successfully implementing student outcome interventions (e.g., anti-bullying intervention) (Fischer and Bilz, 2019), which could foster not only student perceptions of school climate but also those of teachers (Acosta et al., 2019). The process of improving the school climate for teachers may influence the kinds of interventions that are necessary to support students. That is, if teachers sense a gradually improving school climate, it is quite likely that the experiences of the students and their outcomes will also improve (Capp et al., 2021).

Third, this study revealed that the TALIS 2018 school climate measure might not be psychometrically sound in terms of measurement invariance. Previous studies have indicated this kind of measurement problem is very common for international assessments (Schleicher, 2019). The Program of International

Student Assessment, a study investigating the performance of 15-year-old students from more than 75 countries, presented differential item functioning when analyzing various language versions of the same scales (Hopfenbeck et al., 2018). In addition, it has been shown that PISA scales are more comparable across countries in the Western hemisphere than they are across countries in the Middle East or Asia due to the linguistic and cultural variations between those regions (Grisay et al., 2007; Khan et al., 2022). Although without direct evidence for TALIS scales, we believe TALIS scales may meet similar challenges as both of them are released under the supervision of OECD. Thus, it is necessary to consider cultural factors and design a more reliable and valid scale for cross-country comparison.

Finally, consistent with the cultural-ecological model of school climate (Salle et al., 2015), the current results emphasize that the variant impacts of several predictors (i.e., gender, teaching experience) on school climate classes across the countries, indicating educators should consider cultural differences when drawing on the experiences from other countries (Ma, 2021; Wang et al., 2022). For example, our results found that female teachers in the U.S. are more likely to feel positive school climate than male teachers, while it is not the case for Finnish and Chinese teachers. Therefore, compared to Finland and China, educators and policy-makers in the U.S. need to consider more gender differences in teacher perceptions of school climate when designing prevention and intervention programs.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://www.oecd.org/pisa/data/2018database/.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the patients/participants or patients/participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

RJ developed the ideas. MZ and RJ wrote the manuscript. Both authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The occupational anxiety of teachers caused by China's 'double reduction' policy—a study based on the grounded theory

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Teachers' occupational anxiety is a kind of negative emotional state of teachers, which is prevalent in Chinese teachers. Unfortunately, in the existing research, teachers' occupational anxiety caused by China's 'double reduction' policy has not been paid attention to. Based on the grounded theory, this study conducted in-depth interviews with 45 in-service primary and junior high school teachers, and used NVivo 12 to process recording materials. Through a series of steps such as open coding, axial coding and selective coding, we found that the core feature of teachers' occupational anxiety caused by the 'double reduction' policy was that the implementation of the 'double reduction' policy was incomplete matching the actual educational ecology. Then we constructed a theoretical model of the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy. The study showed that due to the influence of teachers' own personality characteristics and incomplete match between external factors, although teachers insisted on self-adjustment, it was difficult to fundamentally solve the teachers' occupational anxiety caused by the 'double reduction' policy.

KEYWORDS

the 'double reduction' policy, teachers' occupational anxiety, the grounded theory, the implementation of policy, actual educational ecology

1. Introduction

In the 21st century, anxiety has become the central issue of human existence and an important theme in many aspects of modern life (Sinclair and Ryan, 1987). With the continuous development of society, teachers are faced with fast-paced changes in educational practice and expectations, and this rate of change to some extent may contribute to an increase in anxiety (Henderson and Corry, 2021).

1.1. Anxiety and teachers' occupational anxiety

Anxiety is an unpleasant and complex emotional state of tension, uneasiness, worry, and annoyance that an individual experiences in response to an impending and potentially dangerous or threatening situation. Spielberger (1966) made the important distinction between anxiety as a transitory state (A-State) and as a relatively stable personality trait (A-Trait). He suggested that state anxiety was situational and involved fear following autonomic nervous system activity, whereas trait anxiety was an acquired behavioral tendency. As one of the groups prone to anxiety, occupational anxiety in teachers is a risk factor that develops under the effect

of long periods of chronic stress, i.e., reduced job satisfaction, burnout and poor performance due to excessive job stress that affects their daily functioning and emotional balance (Agyapong et al., 2022). At the same time, teachers' excessive occupational anxiety will also seriously affect students' motivation and performance, thus causing students' anxiety, which in turn may maintain or even increase teachers' anxiety (Sinclair and Ryan, 1987). Therefore, focusing on teachers' occupational anxiety and exploring strategies to address it has received high attention from relevant research and practice.

1.2. Teachers' occupational anxiety

Regarding teachers' occupational anxiety, studies had found that the types were mainly related to subject anxiety, such as mathematics (Peker and Ertekin, 2011; Ganley et al., 2019; Bosica, 2022), English (Liu and Wu, 2021), and science (Novak et al., 2022). For example, Bosica (2022) investigated mathematics teaching anxiety and mathematics anxiety among in-service elementary school teachers in Ontario. By collecting data from 185 questionnaires from pre-service elementary school teachers in six teacher education programs in Ontario and interviewing 16 of them, the researchers found that mathematics teaching anxiety and teachers' mathematics anxiety were both significantly related and interacted with each other. Liu and Wu (2021) found that anxiety affects teachers' work and life by analyzing data collected from mixed-form questionnaires. Ganley et al. (2019) used Rasch analysis to conclude that science teaching anxiety and science interest were significant predictors of teaching self-efficacy in preservice elementary teachers. However, different from previous studies, this study does not focus on a single discipline to analyze teachers' occupational anxiety, but intends to study teachers' occupational anxiety from the perspective of the whole discipline.

It was precisely because of the concern about the widespread existence of teachers' occupational anxiety that researchers gradually turned their focus to explore the source of teachers' occupational anxiety. Some studies suggested that teachers' occupational anxiety was not only related to internal factors such as teachers' negative experiences or behaviors in the classroom (Bekdemir, 2010), low physical activity (Biernat et al., 2022), teachers' psychosocial burden (Umiastowska and Gdaniec, 2016; Nazaruk and Marchel, 2019), fear of language and negative results, and lack of confidence in their own abilities (Liu and Wu, 2021), but also affected by external factors such as district (Cheung and Hui, 2011), COVID-19 (Pressley et al., 2021; Alhazmi et al., 2022; Koestner et al., 2022), social and professional conditions (Alasheev and Bykov, 2002), and the incompatible relationships between supervisors and teachers (Youngs, 1978). In addition, some researchers pointed out that teachers' occupational anxiety was the result of multiple factors, that was, the main source of anxiety was related to time demands, pupils' difficulties, large class enrollments, financial constraints and lack of educational resources (Coates and Thoresen, 1976). In fact, from a causal perspective, teachers' occupational anxiety as a negative emotional state, it was not only aggravated teachers' job burnout (Genoud and Waroux, 2021), but also seriously affected students' learning results or effectiveness (Stanton, 1974; Youngs, 1978). Therefore, the researchers believed that teachers' occupational anxiety should be alleviated and the conflict between work and life should be resolved through systematic desensitization and teaching technology guidance (Coates and Thoresen, 1976), periodical medical evaluation of teachers (Desouky and Allam, 2017), and parenting intervention (Haslam et al., 2013). Meanwhile, some researchers pointed out that in the context of the COVID-19, teachers needed to actively communicate with the community and found targeted activities to deal with occupational anxiety caused by the epidemic while complying with quarantine requirements (Talidong and Toquero, 2020).

Although the above research has analyzed teachers' occupational anxiety from different dimensions, there is no research to explore teachers' occupational anxiety against the background of national education policies. In the application of research methods, more research has been done using cross-sectional questionnaire surveys, anxiety scales and tests, and less research has been done using qualitative methods to analyze teachers' occupational anxiety. In addition, previous studies have mostly interpreted the negative impact of teachers' occupational anxiety on students' learning, and less and difficult to focus on the negative impact on teachers' own development. Therefore, this research takes China's 'double reduction' policy as the background, and uses grounded theory to deeply explore the main characteristics, root causes and teachers' self-adjustment of teachers' occupational anxiety, in order to further clarify the internal mechanism of teachers' occupational anxiety, which will be of great significance to how to effectively alleviate teachers' occupational anxiety and promote teachers' professional development.

1.3. China's 'double reduction' policy

Since 'double reduction' is an education policy with Chinese characteristics, it is also extremely necessary to understand the existing research on 'double reduction'. The so-called 'double reduction' means that on July 24, 2021, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the Opinions on Further to Ease the Burden of Excessive Homework and Off-campus Tutoring for Students undergoing Compulsory Education. In this context, all sectors of society focus on how to effectively reduce the burden on students, how to effectively rectify off-campus training institutions, and continue to observe the effectiveness of 'double reduction'. Educational researchers have thought about the implementation of the 'double reduction' strategy from multiple perspectives, such as innovating after-school service mode, enhancing after-school service guarantee, improving primary and secondary school homework to meet students' personalized homework needs (Yang, 2021), and improving public education psychology (Zhang et al., 2022). At the same time, some scholars noticed that the excessive burden of schoolwork not only reflected the fatigue of students, but also reflected the anxiety of parents. They proposed to reshape the educational ecology of students' healthy growth by formulating scientific growth standards, strengthening the cooperative education of family-school-society, and believed that the problem of parents' group anxiety had become an increasingly serious social problem. Among them, the core of parental anxiety was whether children could achieve upward mobility of social class through education (Zhou and Fu, 2021). In a word, the research on 'double reduction' is extremely rich. However, scholars mostly analyze the implementation strategies and effects of 'double reduction' from the perspective of students and parents, but ignore the important role and status of 'teachers' as 'double reduction'

participants, which makes the research inevitably have certain limitations. Although some studies also point out that teachers need to 'teach as much as they can', grasp the key links and important nodes, build a bridge of knowledge and experience (Ke et al., 2022), and rely on digital education resources to improve the efficiency and quality of the classroom, they all point to teachers' development as it should be, without considering the actual state of teachers during the implementation of 'double reduction', especially the occupational anxiety of teachers. To sum up, whether from the existing research on teachers' occupational anxiety or the current research progress on China's 'double reduction' policy, it is necessary and innovative to study teachers' occupational anxiety against the background of the 'double reduction' policy.

2. Materials and methods

This study adopts the grounded theory method invented by Glaser and Strauss (1967), aiming to explore teachers' occupational anxiety caused by the 'double reduction' policy and the complex factors behind it, and then generate the corresponding substantive theoretical model. The main steps of the grounded theory include open coding, axial coding and selective coding (the specific process is shown in Figure 1). The grounded theory opposes the deductive paradigm of using experience to yield to theory, and advocates finding theory from experience, and then using theory to reflect experience and serve the understanding of experience. The main goal of the grounded theory is to generate a theory from empirical materials to explain a behavior pattern, which is related to participants or the problems involved by participants (Glaser, 1978).

We use the grounded theory method in qualitative research to systematically collect and analyze data, mainly for the following reasons. First, since the purpose of this research is to explore the internal formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy, the deductive method does not apply to such research. As a method based on inductive reasoning, the grounded theory is conducive to generating a theory based on data and formed by the views of participants, to really go beyond description and toward a theoretical interpretation of processes or phenomena (Turner and Astin, 2021). Second, the use of grounded theory can further tap teachers' real ideas about occupational anxiety and some hidden information. At some stages of the theoretical development process, the use of existing theories can not only enlighten research, but also further add new theoretical content to enrich the theoretical basis (Goldkuhl and Cronholm, 2010).

2.1. Participants

Since China's 'double reduction' policy was mainly aimed at the compulsory education stage (primary and junior high schools), the researchers recruited 45 qualified in-service primary and junior high school teachers by issuing electronic recruitment leaflets, and took them as the research objects. In order to improve the representativeness of the sample, the researcher also comprehensively considered various factors such as teacher's gender, length of service as a teacher, region, difference in schooling stages and disciplinary differences during recruitment. Specifically, considering the different length of service as a teacher, their occupational anxiety would also be different. Therefore, the researchers divided the teaching experience of teachers into three growth stages: novice teacher, proficient teacher and expert teacher. The research showed that the teachers with teaching experience of 1–3 years and relatively high level of pre-class teaching strategies, but lack of flexibility in teaching process, belonged to novice teachers, the teachers with teaching experience of 4–14 years and higher level of in-class teaching strategies, and were familiar with the content and procedures related to the class, belonged to proficient teachers, while the teachers with teaching experience of 15 years or more, who had stronger innovation and reflection consciousness than proficient teachers, belonged to expert teachers (Luo, 2006; Dong and Dong, 2022). As many novice teachers just had the education and teaching experience before and after the 'double reduction' policy was issued, the teachers' occupational anxiety caused by the 'double reduction' policy was more obvious to them. While proficient teachers were in a critical period of growth, their probability of producing occupational anxiety was far greater than that of expert teachers with relatively complete literacy in all aspects. According to the information received in the electronic recruitment leaflets, the researcher selected a certain number of qualified novice teachers and proficient teachers. At the same time, in order to ensure the rigorous nature of the research, the researcher also selected some expert teachers for interviews. Therefore, the sampling of this study focused more on novice teachers and proficient teachers. At the same time, as far as the region was concerned, it was mainly divided into urban and rural areas. When sampling, the researchers fully considered the comprehensive development level of the region. Therefore, the urban and rural areas selected in this study were regions with moderate development level, which could represent the basic situation of the whole China to a certain extent, and were highly representative. Specific sample information is shown in Table 1.

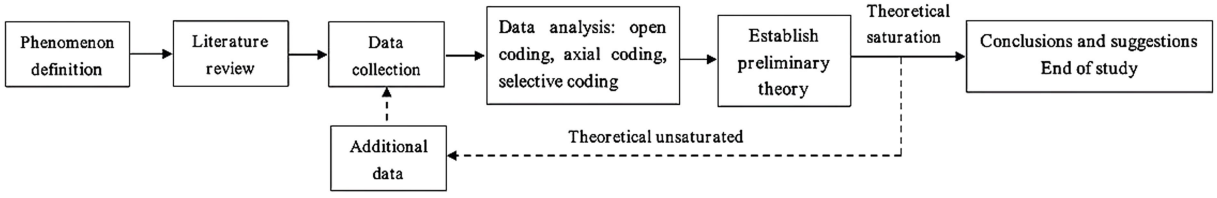

FIGURE 1
Flow chart of grounded theory.

2.2. Procedure

The grounded theory is not only a methodology, but also a method for exploratory research (Turner and Astin, 2021). There are three basic elements of grounded theory: concept, category and proposition. Among them, concept is the basic unit of analysis, because theory is developed from the conceptualization of data rather than the actual data itself (Pandit, 1996). Therefore, this study conducted data collection in three stages based on the principle of theoretical sampling. Semi-structured interviews were used in each stage, and samples were timely increased according to the actual development of the theory until the categories in the data reached theoretical saturation. In addition, this study always adhered to the ethical and moral principles in education research, fully respected the personal privacy and willingness of the interviewees, and only after obtaining the permission of the interviewees in advance, could the interview be recorded in the whole process. The duration of each interview was between 30 and 60 min. At the same time, when sorting out the data, the names of relevant schools and people were also anonymized (see Figure 2 for details).

TABLE 1 Sample distribution (total=45).

Characteristic	Classification	Numbers	Percentage
Gender	Male	19	42.22%
	Female	26	57.78%
Length of service as a teacher	Novice teacher	11	24.44%
	Proficient teacher	25	55.56%
	Expert teacher	9	20.00%
Region	Urban area	27	60.00%
	Rural area	18	40.00%
Schooling stage	Primary school	24	53.33%
	Junior high school	21	46.67%
Discipline	Chinese	7	15.56%
	Math	7	15.56%
	English	6	13.33%
	Politics	3	6.67%
	History	5	11.11%
	Geography	4	8.89%
	Physics	3	6.67%
	Chemistry	4	8.89%
	Biology	2	4.44%
	Music	2	4.44%
	Art	1	2.22%
	PE	1	2.22%

2.2.1. Stage 1

This stage was to initially construct the interview system and coding system. First of all, the researchers worked out an interview outline around the theme and purpose of the study (see Table 2). Due to the impact of the COVID-19, the researchers chose to flexibly adopt online interviews. Subsequently, the researcher selected 20 subjects as the preliminary sample, including 11 primary school teachers and 9 junior high school teachers. The subjects involved include Chinese, math, English, politics, history, geography, physics, chemistry, biology, music, art and PE. Based on the proposed interview outline, the researcher conducted one-to-one semi-structured interviews with these in-service teachers. Although the interview outline was designed around the overall logic of the main representations of teachers' occupational anxiety caused by the 'double reduction' policy, the causes of anxiety and the countermeasures to deal with anxiety, in the actual interview process, when researchers found some new key points, they would also ask questions at appropriate times. Finally, at the end of all interviews, three researchers transcribed the interview recordings word for word in time, and further coded and analyzed the interview text.

2.2.2. Stage 2

In this stage, the coding system developed in the first stage was further confirmed and improved. The researcher chose 15 in-service primary and junior high school teachers as the subjects of this round of research, and still adopted the online one-to-one semi-structured interview method, aiming to enrich the attributes and dimensions of the emerged categories and further explore the underlying reasons behind teachers' occupational anxiety caused by the 'double reduction' policy. After this round of interviews, the researcher continued to code the interview texts in the same way as in the first stage. At this stage,

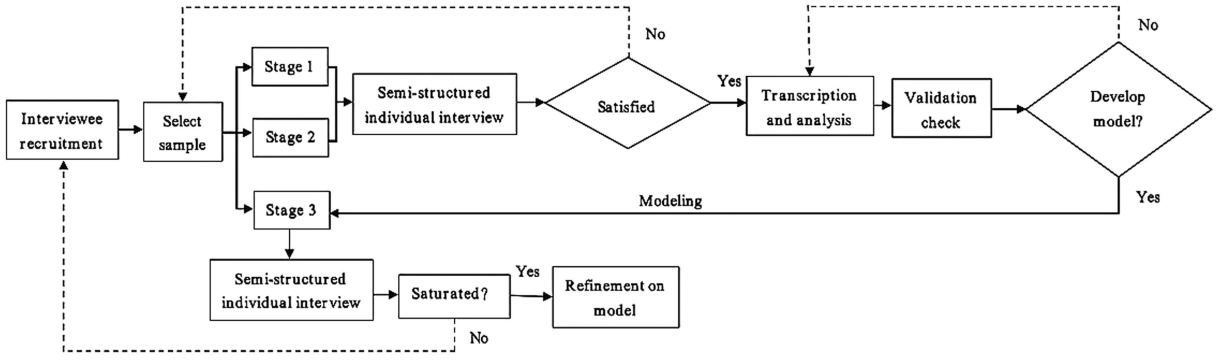

FIGURE 2
Flow chart of data collection and analysis based on grounded theory.

TABLE 2 Interview outline.

Number	Questions
1	The 'double reduction' policy has been implemented for more than a year. How do you think it works?
2	Do you feel anxious in the process of implementing the 'double reduction' policy? Why?
3	What do you think is the main source of anxiety?
4	What impact do you think anxiety has on your work, life, body and psychology? How do you adjust yourself?
5	If you were given the choice now, would you still choose the profession of teachers? Please explain the reason.
6	How do you think to deal with the anxiety caused by 'double reduction' policy?

the existing categories were further enriched. The relationships among the categories were also clarified through the paradigmatic model of axial coding. Based on this, the researcher established the core category through selective coding and developed a theoretical model of the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy.

2.2.3. Stage 3

This stage was mainly to confirm or revise the theoretical model formed in the second stage. The researcher continued to select 10 subjects for a new round of online one-to-one semi-structured interview. After this round of interviews, the researchers found that there were no new categories or attributes, and the theoretical model of the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy formed in the second round was further confirmed here. This meant that the study achieved theoretical saturation so far, and no new data need to be collected.

2.3. Data analysis

Coding is a necessary step for empirical data to gradually form a theory. This study was based on the three-level coding strategy of 'open coding-axial coding-selective coding' invented by Corbin and Strauss (1990), and analyzed the collected interview data layer by layer with the help of Nvivo12 software.

The first stage of data collection and analysis was open coding, which aimed to disassemble, compare, label, conceptualize, and categorize the data. For example, the label 'teacher growth' was given to 'the introduction of the policy of double reduction has forced some teachers to change the old and conservative teaching methods, which can force teachers to grow'. As the new label 'richer curriculum' emerged in the supplementary interviews, a new correlational concept 'positive effect' could be created based on the existing labels, and further categorized into the category 'teachers' policy cognition'. Through the use of induction and in-depth comparison, five major categories were created at this stage (see Table 3). For the axial coding, it was primarily located in the second phase of data collection and analysis, which centered on the establishment of a paradigm model and the determination of the relationships among categories. After analyzing the relationship of the five categories, the study clarified the status of 'teachers' occupational anxiety' as a major category (see Figure 3). In addition, the third stage of data collection and analysis was the selective coding, the core of which was to write a story line to construct a theoretical model of the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy through the selection of core category (see Table 4; Figures 4, 5).

2.4. Theoretical saturation test

Using the grounded theory approach, the researcher needs to continuously collect and analyze data and selectively code them until saturation is achieved, resulting in a comprehensive and parsimonious theory based on the data (Urquhart et al., 2010). In order to confirm the possibility of generating new categories and concepts, after completing the first phase, we organized a second phase of data collection and analysis, which indeed revealed the generation of new categories and concepts. Based on this, we organized a third phase of collection and analysis, but no new information was found, indicating that the constructed theoretical model was saturated. At the same time, we fed back the category and model formed after coding to the interviewees, who confirmed that they were fully compatible with the reality and that no new category needed to be added. Given the clarity and robustness of the extracted major category, initial category and relationship descriptions, we then stopped collecting new data.

2.5. Rigor

Because qualitative research values the depth of the study and has a more complex research process, for sample size, qualitative research is not like quantitative research that selects a large sample, but rather the sample is generally more appropriately controlled at 30 or less (Burns and Schneider, 2019). This study strictly followed the principles of theoretical sampling to ensure a rich sample size and research data. In addition, the researcher also attached great importance to the continuous reflection on the research process, and after each interview and analysis of phased data, they timely recorded the research content that needed to be further improved or updated, making the research at each stage more rigorous.

2.6. Ethical considerations

The need for ethical approval was waived by the university. No personal identifiable information was gathered, such as name, living address, ID, and telephone number. The study adopted one-to-one semi-structured interviews. The duration of each interview was between 30 and 60 min.

TABLE 3 Open coding table of teachers' occupational anxiety caused by the 'double reduction' policy.

Original statements (partially listed)	Labeling	Initial categories	Major categories
T2: The introduction of the policy of 'double reduction' has forced some teachers to change the old and conservative teaching methods, which can force teachers to grow.	Teacher growth	Positive effect	Teachers' policy cognition
T37: From the perspective of students, their homework is really less now, and their sleep time and after-school time are relatively increased.	Reduce students' pressure		
T24: The school will offer different activity curriculums, and we will buy books and teaching aids specially, so that students can have more activities.	Richer curriculum		
T14: The 'double reduction' does not reduce the burden of teachers, although on the surface, the amount of homework reduced, the teacher needs to correct the amount of homework will be reduced, but the policy has been implemented, the school's requirements have never been reduced.	Teachers' burden	Negative influence	
T4: It only temporarily relieves students' pressure, but when students reach the third grade, you will find that the gap between the academic levels of children in the class is too large, which is actually just a pseudo behavior of the first and second grades.	Pseudo learning behavior		
T8: In fact, most families do not lower their learning requirements for their children, but still try to improve their children's performance through tutoring and other ways. Therefore, the pressure on students has not been reduced.	Students' pressure		
T1: The school attaches great importance to the quality of students, that is, students' achievements are actually linked to the stability of teachers' work. Before I came, some teachers were dismissed because they did not achieve positive results.	Post stability	Self-development	Anxiety performances
T16: When I am anxious, I will doubt myself and wonder whether my ability can make these children accept my teaching.	Teaching ability		
T40: It is totally unequal to effort and reward. For example, after 2 months of after-school service last semester, the final reward may be only 200 yuan.	Effort and reward		
T10: In the limited time, if students want to achieve the same or even better results, the efficiency of the classroom must be improved.	Learning effect	Student learning	
T13: I usually go to work very early and go home very late, which does not correspond to the school time of my children. It's really contradictory. The anxiety of not having time to accompany my children is actually a guilt for them.	Internal of individual family	Role conflict	
T31: To tell the truth, teachers in our grade are very competitive. They sacrifice lunch time to help students.	Teacher colleague		
T20: My anxiety comes from the handling of some conflicts between family and school. I really get a call from parents of students at zero o'clock and swear at you.	Family and school communication		
T43: I think my anxiety is also related to 'double reduction', because students really have many ways to acquire knowledge, but now their only approach is to study at school. Therefore, teachers are bound to be anxious under greater pressure.	Approach narrowing	The 'double reduction' policy	Anxiety sources
T5: I think the source is our sense of responsibility as teachers. If we want to teach students well, we will bear a lot of pressure and it is easy for us to be anxious.	Inner sense of responsibility	Teachers' individual factors	
T42: I do not think I have a good time arrangement, or I have not formed the habit of making full use of fragmented time to improve myself, so it is difficult to balance work and life, and eventually I will have anxiety.	Time planning		
T11: The pressure exerted by parents on teachers is also great.	Parents exert pressure	Parents' weak coordination	
T26: When I feed back my children's learning to parents, some parents are indifferent and do not cooperate, so I will be anxious.	Incompatibility of parents		
T17: Because I am good at adjusting my mentality, I will not bring anxiety into my life, but also try to turn anxiety into motivation in my work.	Mentality	Internal adjustment	Self-adjustment
T19: Because I need to digest my negative emotions after work, I will eat a lot, which leads to my weight gain of about 10 kg last year.	Diet		
T6: I am very busy from Monday to Friday, and I work overtime for work. Therefore, as long as I have time on Saturday and Sunday, I just want to rest and sleep until I wake up naturally.	Sleep		
T18: I always try to improve my work efficiency, so that when I go home, I will not spend so much time on work.	Reasonable planning		
T33: At home, my mother helps to take care of the children, so it lightens my burden.	Family support	External support	
T21: Our school has a good humanistic environment, and the overall working atmosphere is very comfortable.	Humanistic care of schools		
T15: For example, our lesson preparation group, I think, is a united family, and we will solve problems together.	Collaborate with colleagues		
T28: First of all, as teachers, we should be able to adjust our mentality in time.	Adjust mentality	Subjective level	Coping suggestions
T34: We should improve our work efficiency and allocate tasks reasonably, so that we will not pile things up in 1 day or one node to complete.	Improve work efficiency		
T22: Teachers should have the courage to speak out. When they are under great pressure and facing difficulties in their work, they should communicate with leaders and learn to reduce their responsibilities appropriately.	Appropriate reduction of responsibility		
T3: Teachers should learn more and improve their professional quality.	Persevere in study		
T7: We should recognize the rationality of the 'double reduction' policy and actively cooperate in our work.	Actively adapt to policy		
T9: I think 'double reduction' really needs to be implemented from top to bottom. Teachers have paid their time and their salaries must be in place.	Improve policy	Objective condition	
T12: What I feel deeply is the mutual support and help between schools, leaders and teachers. It is a very good way to establish a united and cooperative relationship.	Building collaboration		

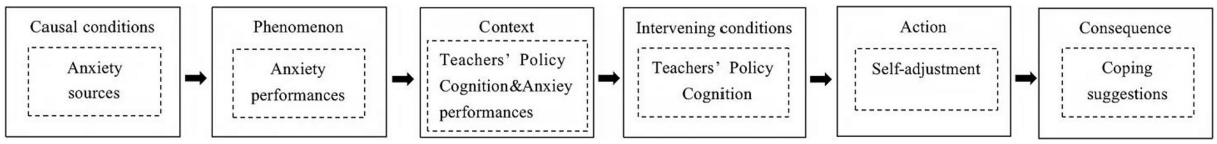

FIGURE 3
Schematic diagram of the axial coding of teachers' occupational anxiety.

TABLE 4 Core category and refinement analysis.

Core category	Attribute	Dimension
The incomplete match between the implementation of the 'double reduction' policy and the actual educational ecology	The implementation of the 'double reduction' policy	Valid-Invalid
	Actual education ecology	Good-Bad

3. Results and theory

Through theoretical sampling and a rigorous three-level coding procedure, this study clarified the basic representations of teachers' occupational anxiety induced by the 'double reduction' policy, teachers' objective perceptions of the policy and anxiety, and their personal perceptions of how to cope with anxiety. The responses to these questions formed a solid theoretical foundation for teachers' occupational anxiety caused by the 'double reduction' policy. This part will take the three-level coding as the clue to promote the data analysis layer by layer until the theory comes into being.

3.1. Open coding

Through fine coding of all interview texts, in the open coding stage, this study summarized all the data into 12 initial concepts: positive effect, negative influence, self-development, student learning, role conflict, the 'double reduction' policy, teachers' individual factors, parents' weak coordination, internal adjustment, external support, subjective level and objective condition. After further comparative analysis, five categories were extracted: teachers' policy cognition, anxiety performances, anxiety sources, self-adjustment and coping suggestions (see Table 3). With regard to the detailed information of these categories and concepts, this study will make a specific description in the subsequent selective coding part.

3.2. Axial coding

On the basis of the open coding, according to the paradigm model of Corbin and Strauss (1990), this study recombined the category and attribute of teachers' occupational anxiety caused by the 'double reduction' policy, and distinguished the main category from the sub category by analyzing the causal conditions, context, intervening conditions, action and consequence of the phenomenon.

It can be seen from Figure 3 that teachers' occupational anxiety caused by the 'double reduction' policy is the main category of the study, and teachers' policy cognition, anxiety performances, anxiety sources, self-adjustment and coping suggestions in the open code are the sub categories of the main category. Based on this, the story of teachers' occupational anxiety caused by the 'double reduction' policy is gradually clear: under the trigger of anxiety sources (causal conditions) such as the 'double reduction' policy narrowing the path of students' knowledge acquisition, unreasonable teachers' own work planning and parents' inability to coordinate, primary and junior high school teachers gradually showed anxiety (phenomenon) such as doubting their own teaching ability, worrying about students' learning effects and role conflicts due to the 'double reduction' policy. Furthermore, under the influence of the external environment such as unreasonable school management, lack of adequate humanistic care, implicit pressure exerted by teachers' peers, families and society (context), teachers gradually chose to seek self-adjustment (action) through diet, sleep, mentality and other ways based on their different subjective perceptions of the 'double reduction' policy (intervening conditions). But ultimately, teachers' anxiety could only be temporarily alleviated, and it would still recur later, and they were confused about how to deal with it effectively (consequence).

3.3. Selective coding

The selective coding is a process of finding the internal relationship between the main categories and systematically selecting the categories to find the core category. This study used selective coding to describe the relationship of each sequence, focusing on the story of 'the causes of teacher' occupational anxiety caused by the double reduction policy'. This part first explains the meaning of each category and its sub categories in detail.

3.3.1. Teachers' policy cognition

Teachers' policy cognition referred to teachers' understanding of the implementation effect of the 'double reduction' policy, mainly including positive effect and negative influence.

Positive effect. Teachers, based on their own education and teaching experience, believed that for teachers themselves, the introduction and implementation of the 'double reduction' policy would help teachers break through the old educational concepts and methods, as a whole could 'force teachers to grow' (T2, T11, T26, T38), and teachers would also be more active or conscious 'to improve the teaching efficiency in the classroom' (T1, T9, T25, T36). For students, under the 'double reduction', the more obvious changes were 'the

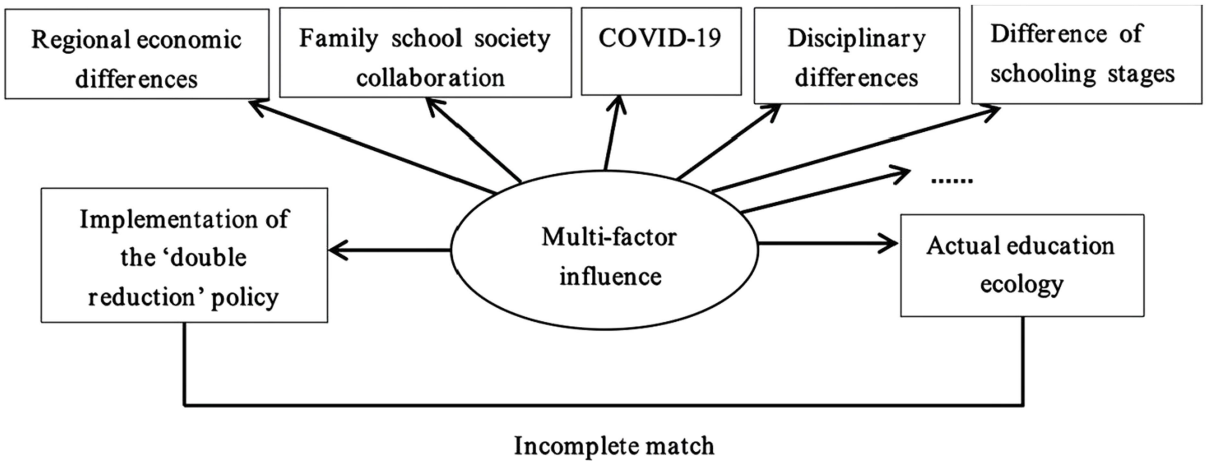

FIGURE 4
The relationship between the implementation of the 'double reduction' policy and actual education ecology.

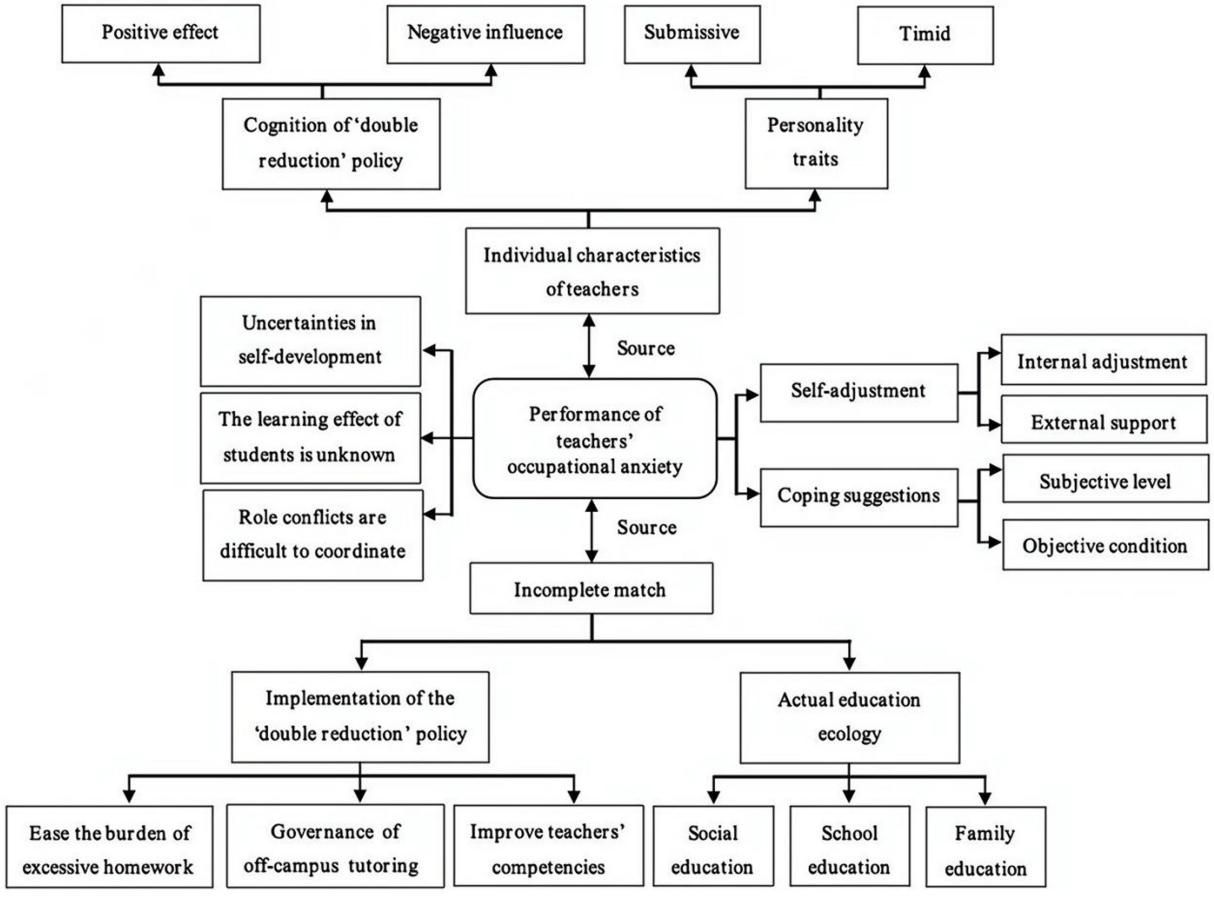

FIGURE 5
Theoretical model of the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy.

reduction of students' homework' (T7, T15, T17, T23), 'the increase of students' after-school time and rest time' (T4, T6, T13, T30, T37, T41). At the same time, the overall school curriculum was also more abundant, and 'students' activities have become more' (T24, T33).

Negative influence. Due to different schooling stages and disciplines, some teachers believed that the implementation of 'double reduction' had 'seriously increased the burden on teachers' (T2, T10, T14, T37), 'increased the workload of teachers' (T5, T19,

T32), and 'significantly extended the working hours' (T1, T12, T35) when reducing the burden on students and parents. When it came to the lower grades of primary school and the first grade of junior high school, the 'double reduction' in reducing the pressure on students, on the contrary, 'the test of students' consciousness was very big' (T14). Some teachers even thought that the relevant requirements of the 'double reduction' had affected the students in the first and second grades of primary school to lay a solid foundation to a certain extent. By the third grade, there would be a 'big gap in academic level' (T4, T8, T27) and 'pseudo behavior' (T4, T11, T29). In addition, although the number of after-school training institutions had decreased, parents' attention to the quality of education and the objective impact of the pressure to enter higher education, such as 'tutoring' (T3, T8, T18, T25), 'secretly coaching' (T16, T21, T39), still existed, which had not really reduced the pressure on students.

> Even though students may have to finish after-school services at five or six o'clock in school, parents will still choose tutors for their children, because some parents don't care how much their children gain in school, they only care how much better their children are than others. Therefore, students just have less homework, but there is always pressure from exams and grades. It can be said that students' original pressure has not decreased, and some even greater. (T3)

3.3.2. Anxiety performances

Anxiety performances were specific states of teachers when they were anxious, which mainly included three aspects: self-development, students' learning and role conflict.

Self-development. During the implementation of 'double reduction', teachers had to improve their own teaching quality, because 'students' performance was actually linked to the stability of teachers' work' (T1, T22), especially for teachers who were not authorized, they faced the risk of being dismissed at any time. The 'double reduction' policy not only alleviated students' homework burden, but also put forward higher requirements for teachers' teaching and homework design. Some teachers 'feared that they could not do well and complete the task' (T3, T20, T27, T44) and 'doubted their teaching ability' (T6, T16, T28). In addition, due to the impact of the COVID-19 and regional economic development, many teachers said that 'the salaries for after-school services could not be paid' (T1, T4, T17, T22), 'teachers' pay and income were not equal' (T3, T9, T32, T40), and even for the moonlight clan, 'it might be difficult to guarantee even basic life' (T5, T13).

Student learning. Whether the teaching effect was good or not was also one of the teachers' occupational anxiety caused by the 'double reduction' policy. Therefore, the 'uncertainty and unknown' (T1, T2, T7, T10, T45) of students' learning had been bothering in-service teachers.

> With the implementation of the 'double reduction' policy, I am not particularly sure whether students' knowledge is solid or not, and whether it will affect their knowledge acquisition in the future. That is to say, I cannot guarantee that they will be able to learn well under this background. Therefore, on the whole, I am not very sure about students' learning effectiveness. (T2)

Role conflict. The role of teachers was diverse, and the implementation of 'double reduction' had led to many role conflicts for teachers to some extent. As far as students were concerned, they were 'educators and helpers'. As far as families were concerned, they were children and parents. Some teachers found that many parents tried to find better resources, and they would also have the idea of 'finding ways to narrow the gap between their children and other children' (T8, T23). At the same time, due to the increase of after-school services, homework design and other tasks, many teachers said that 'they had no time to accompany their children and feel sorry for them' (T13, T19, T35). In addition, teachers also played the role of colleagues or peers. Some believed that the implementation of 'double reduction' made teachers 'more involved and competitive' (T31, T39), and all competed for time to train students at different levels. Between family and school, teachers also played the role of 'communicators', but in reality, many in-service primary and junior high school teachers faced serious problems, because the continuous existence of family-school conflicts had led to teachers' anxiety. (T4，T20，T26).

3.3.3. Anxiety sources

Anxiety sources referred to the root causes of teachers' occupational anxiety. The interview and analysis results showed that teachers' anxiety mainly came from the 'double reduction' policy, teachers' individual factors and parents' weak coordination.

The 'double reduction' policy. During the implementation of the policy, some in-service teachers found that the 'double reduction' policy triggered teachers' occupational anxiety.

> I think my anxiety is also related to 'double reduction', because students really have many ways to acquire knowledge, but now their only approach is to study at school. Therefore, teachers are bound to be anxious under greater pressure. (T43)

Teachers' individual factors. Many in-service teachers said that on the one hand, occupational anxiety was caused by their own 'sense of responsibility' (T1, T2, T5, T11, T44), which wanted to teach students well and let them learn more under the 'double reduction'. Especially for junior high schools, the reality of 'general-vocational separation' was the trend. Teachers who were in junior high school wanted to make students go to general high schools as much as possible (T15, T24, T36), so teachers would bear more pressure and generate anxiety. On the other hand, 'double reduction' put forward higher requirements for teachers. Some teachers adapted slowly, which led to difficulty in coordinating time and task planning, 'imbalance between life and work', 'chaos when busy' and other situations were appeared. (T6，T7，T9，T12，T34，T42).

Parents' weak coordination. As a key participant in the education process, many parents believed that the implementation of 'double reduction' was a unilateral task of teachers. They blindly 'exerted pressure on teachers' and 'did not cooperate with teachers' (T3, T11, T19, T26, T38), which undoubtedly brought a lot of inconvenience to teachers' work, and was one of the root cause of teachers' occupational anxiety.

3.3.4. Self-adjustment

Self-adjustment was a personal adjustment mode that teachers chose when facing anxiety, mainly involving internal adjustment and external support.

Internal adjustment. Through the interview, it was found that the in-service primary and junior high school teachers mentioned the importance of self psychological adjustment, and believed that a good attitude could transform anxiety into work motivation to a certain extent (T7, T10, T17, T31, T45). In addition, some teachers also chose to adjust themselves through 'eating delicious food' (T1, T12, T19, T27), 'supplementing sleep' (T6, T33) and 'reasonably planning teaching work and time' (T18, T25, T34).

External support. In addition to the necessary internal self-adjustment, in-service primary and junior high school teachers said that external support was very important. For teachers with children, having someone at home to help with childcare could reduce the pressure of busy teaching work (T14, T15, T33, T40). At the same time, under the 'double reduction' policy, schools could provide necessary humanistic care, create a good working atmosphere and a united colleague relationship, which were also effective ways to alleviate teachers' occupational anxiety. (T8，T15，T21，T32).

3.3.5. Coping suggestions

Coping suggestions referred to the specific strategies proposed by teachers to alleviate anxiety based on their own experience, including subjective level and objective condition.

Subjective level. When talking about solving anxiety problems, in-service primary and junior high school teachers thought that teachers needed to learn to adapt to the 'double reduction' policy and actively support the implementation of the policy (T5, T7, T18, T23), and needed to 'adjust their mentality' in time (T1, T3, T10, T13, T25, T28, T36, T45) to improve their psychological building ability. At the same time, teachers also needed to constantly improve their work efficiency (T2, T9, T14, T34), adhere to active learning (T3, T10, T21, T37), and learn to speak out or reduce responsibility appropriately (T22, T40). Anxiety could be gradually alleviated only if teachers' professional quality continued to improve.

Objective condition. Based on the consideration of the problems such as unequal pay and return, heavy burden and so on, many teachers said that the 'double reduction' policy needed to be further improved and 'implemented from top to bottom' (T4, T9, T11, T16, T35, T42). In addition, in-service teachers also believed that society should give more tolerance to teachers, schools should create a harmonious and democratic environment, and teachers also needed to actively cooperate (T5, T7, T8, T12, T17, T20, T26, T39), which would help teachers break through the dilemma of occupational anxiety.

To sum up, the implementation of the 'double reduction' policy was affected by many factors, which led to the gradual exposure of social, school, family and other contradictions in the education system, thus affecting the orderly teaching of in-service primary and junior high school teachers and causing their anxiety. As a result, the core category of research emerged, that is, the implementation of the 'double reduction' policy was incomplete matching the actual education ecology. Based on this, the researchers further clarified the attributes and dimensions of the core category (see Table 4).

Through an in-depth analysis of core category, this study found that the implementation of the 'double reduction' policy and actual education ecology were affected by many factors, and there was a complex relationship (see Figure 4).

3.4. A theoretical model of the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy

In order to deeply explain the generation mechanism of teachers' occupational anxiety, this study constructed a theoretical model of the formation mechanism of teachers' occupational anxiety with the core of 'the implementation of the double reduction policy was incomplete match actual education ecology' (see Figure 5). Focusing on teachers' occupational anxiety performances, on the one hand, it stemmed from the fact that the implementation of the 'double reduction' policy did not fully match actual education ecology, that was, the implementation of the 'double reduction' policy at multiple levels, such as reducing students' homework burden, managing after-school training, and improving teachers' professional quality, was affected by many factors, such as the economy, family-school-community, the COVID-19, which led to deviation between the actual educational ecology and the preset, causing teachers' occupational anxiety. At the same time, teachers in primary and junior high schools had different understanding of the 'double reduction' policy, and some teachers were timid and submissive, which, to a certain extent, had also become the cause of their own anxiety.

However, focusing on teachers' occupational anxiety itself, it could mainly be summarized as three manifestations: perplexed by the uncertainty of their own development, panic about the unknown learning effect of students, and helplessness in coordinating role conflicts. Specifically, in terms of their own development, teachers felt more confused about their career development due to the instability of their posts, insufficient teaching ability and unequal pay and return. For students' learning, teachers always worried about whether students could achieve effective learning under the 'double subtraction' policy. At the same time, teachers' occupational anxiety was also aggravated by the conflicts of multiple roles such as 'educators', 'peers' and 'communicators'. In fact, in the face of the objective existence of anxiety, in-service primary and junior high school teachers had always insisted on making efforts to self adjust, but the effect was often poor. Therefore, they sincerely hoped that external help could be provided to better help them alleviate anxiety. However, in reality, external support was obviously insufficient. It was obvious that the occupational anxiety of teachers caused by the 'double reduction' policy was the result of multiple factors, among which, those factor influence and restrict each other. In a word, although teachers were affected by the mismatch between their own personality characteristics and external factors, they could relieve their anxiety in a timely manner through active self-adjustment, which was actually conducive to further promoting the smooth implementation of the 'double reduction' policy and the construction of a good educational ecology.

4. Discussion and conclusion

4.1. Summary and discussion

With the help of the grounded theory, this study analyzed the formation mechanism of teachers' occupational anxiety caused by the

'double reduction' policy. The main findings of this study would be further discussed in depth in comparison with existing relevant studies.

First of all, this study found that in-service primary and junior high school teachers had different understanding of the 'double reduction' policy, which affected the development of their anxiety state to a certain extent. Faced with the rapid and complex educational reform, teachers were easy to have occupational anxiety. This anxiety was not only caused by the objective factors of the uncertainty and fuzziness of educational reform itself, but also mainly depended on the subjective understanding of different individual teachers on educational reform. Therefore, teachers' beliefs and state always played an important role in educational reform (Ham and Dekkers, 2019). In essence, 'double reduction' was a process of educational reform. In this context, teachers' occupational anxiety affected the smooth implementation of the policy, which was mutually confirmed by existing research. At the same time, through the analysis of the interview text, when asked, 'If you were given the choice now, would you still choose the profession of teachers? Please explain the reason.' Some teachers replied that they were 'uncertain' and worried about their teaching ability and job stability. This showed that the resilience of teachers was affected by many internal and external factors (Phillips, 2021), that was, many in-service primary and junior high school teachers had shaken their original teaching intentions to a certain extent, and even some teachers had doubts and resistance to the 'double reduction' policy.

Secondly, during the interview, this study also found that there was widespread 'role anxiety' among in-service primary and junior high school teachers. Especially for in-service primary school teachers, in addition to being teachers, they also acted as 'nurseries', 'security officers' in afternoon care and after-school care, 'activity planners' before carrying out activities, 'grid members' who collected various health codes or itinerary codes during the COVID-19, and 'accountant' to assist school leaders in accounting statistics. Outside the school, teachers also played the role of 'parents' and 'children'. As a result, in the face of the heavy teaching tasks under the 'double reduction' policy and the multiple role conflicts, teachers' occupational anxiety arose spontaneously, which became the dominant force hidden behind the teachers' role and constituted the psychological motivation for teachers to complain, resist and escape. At the same time, through interviews, this study verified the view that 'teachers had role conflicts between work and family' (Cinamon and Rich, 2005; Li et al., 2021) from an empirical perspective. On the other hand, teachers' multiple roles in the school were all symbols of non-educational teaching tasks that teachers undertake. These matters that had no close relationship with teachers' own work led to teachers' lack of enough time and energy to devote to their own work, thus resulting in heavier work pressure. Therefore, teachers' occupational anxiety should not be ignored.

Finally, through in-depth interviews, many in-service primary and junior high school teachers reported that their contributions and rewards were completely unequal, and they believed that their sense of teaching achievement and work enthusiasm had been eroded year by year. Especially in after-school services, some teachers said that they had worked hard to design courses and implement activities, and finally they might only receive a few yuan for each class. For young teachers, some said that it was difficult to maintain their basic salary and they often needed help from their parents. This was the same as the view put forward in the existing research that teachers' pay and return were unbalanced in their work (Unterbrink et al., 2007; Hinz et al., 2016; Ren et al., 2019; Guo et al., 2022).

In addition to many similarities with previous studies, this study also highlighted some new factors. For example, different from previous studies on teachers' occupational anxiety, this study was based on the new era background, that was, to explore teachers' occupational anxiety caused by the 'double reduction' policy, the perspectives or information of 'students' pseudo learning behavior', 'teachers' anxiety about after-school services' and 'worried about students' narrow access to study' were innovative. At the same time, focused on teachers themselves, although teachers generally had anxiety caused by the 'double reduction' policy, they were still driven by their educational conscience and sense of responsibility. On the one hand, they always insisted on passing on what they knew to students in a positive way, on the other hand, they actively adjusted themselves through diet, sleep and other ways to digest their negative emotions promptly. In addition, through in-depth interviews, this study also obtained teachers' heartfelt coping suggestions on alleviating anxiety, which to some extent provided strong support for the follow-up in-depth research.

4.2. Limitations

Of course, limited by the research data and materials, we had not yet used quantitative research methods to verify the conclusions of this study. We will conduct statistical tests on the conclusions in the next study. At the same time, as the 'double reduction' is still in the process of dynamic development, it is worth continuing to think about whether the problem of incomplete match between the policy implementation and the actual education ecology will ease with the development of time. Although this research has constructed the formation mechanism of teachers' occupational anxiety caused by the 'double reduction' policy, it is still open to the possibility of its development, which is also the continuous motivation for us to continue our research.

5. Conclusion

In order to deeply explore the problem of teachers' occupational anxiety caused by the 'double reduction' policy, this study conducted in-depth interviews and data coding analysis on 45 in-service primary and junior high school teachers using the method of grounded theory. The study found that during the implementation of the 'double reduction' policy, teachers had occupational anxiety, which had a negative impact on their work and life. Although this finding has verified the relevant conclusions of existing studies to some extent (see Section 4.1 for details), the main contributions and highlights of this study, in addition to clarifying the objective existence of the phenomenon, have also built a theoretical model of the formation mechanism of teacher' professional anxiety caused by the 'double reduction' policy with the help of grounded theoretical methods. Among them, teachers' occupational anxiety is mainly manifested in their concern about their uncertain development,

students' learning effectiveness and multiple role conflicts, which is not only the result of the incomplete match between the implementation of the 'double reduction' policy and the actual education ecology, but also affected by teachers' personality characteristics. In addition, this study has also produced some new insights, that is, teachers are not passively exposed to occupational anxiety, but can actively alleviate anxiety through self-adjustment. At the same time, teachers also expressed their own aspirations, and further put forward suggestions on the subjective level, including actively adapting to policies, adjusting mentality, improving their own work efficiency, as well as on the objective level, such as improving policies and building collaborative relationships. However, it is far from enough to rely on the efforts of teachers alone, because the improvement of the 'double reduction' policy and the implementation of teachers' after-school service pay all need the help of the relevant national departments. To create a harmonious, democratic and cooperative working atmosphere in the school, reasonably arrange teachers' work tasks and other urgent needs the effective management of the school departments at all levels, and the comprehensive development of students also requires family education to bear the natural responsibility. Therefore, only when all parts and members perform their own duties, can the 'double reduction' policy be truly implemented, teachers' anxiety will gradually ease, and then return to the true role of 'teaching'.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

WY, LY, and YY contributed to the ideas of educational research. WY contributed to the contacting participant and collection of data. LY, YY, and WY contributed to the data analysis, design of research methods, and tables. WY, LY, and YY participated in writing and revision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Self-efficacy, reflection, and resilience as predictors of work engagement among English teachers

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Introduction: Given the significant role of work engagement of teachers in educational contexts, some scholarly attention has been directed to exploring the predictors of this construct. Against this backdrop, this study aimed to investigate the predictors of teacher work engagement among Chinese English as a foreign language (EFL) teachers by testing a model that includes teacher self-efficacy, teacher reflection, and teacher resilience.

Methods: To achieve this goal, 512 EFL teachers were invited to participate in an online survey, which consisted of four questionnaires. The construct validity of the measures was confirmed through confirmatory factor analysis. Then, structural equation modeling was utilized to examine the relationships between the variables.

Results: The findings indicated that teacher self-efficacy, teacher reflection, and teacher resilience were direct predictors of work engagement, and teacher self-efficacy had an indirect effect on work engagement via teacher reflection and resilience. Similarly, teacher reflection also had an indirect impact on work engagement through teacher resilience.

Discussion: These results have important implications for teacher education programs. The significance of these predictors of work engagement among EFL teachers highlights the importance of fostering self-efficacy, reflection, and resilience among teachers in order to promote their work engagement. Further research can explore ways to enhance these predictors through training and support programs for teachers.

KEYWORDS

work engagement, self-efficacy, reflection, resilience, EFL teachers, teacher education programs

Introduction

Teacher work engagement has been identified as a crucial aspect in determining the success of educational outcomes (Timms and Brough, 2013; Perera et al., 2018). Given its significance, there is growing interest in examining the factors that predict teacher work engagement (Eldor and Shoshani, 2016; Greenier et al., 2021). Work engagement is described as a state characterized by passion, energy, and motivation toward work and has been linked to physical and psychological wellbeing at work as well as a pleasing and satisfying state of mind (Rothmann, 2008; Bakker et al., 2011; Greenier et al., 2021). This concept has gained recognition as a key indicator in evaluating the quality of teachers' professional lives and its influence on various work-related consequences including instruction quality, problem-solving skills, organizational commitment,

and work satisfaction (Field and Buitendach, 2012). Furthermore, studies have found that engagement is positively associated with teacher efficacy and can act as a bridge between social support and efficacy (Bresó et al., 2011; Høigaard et al., 2012; Han and Wang, 2021; Namaziandost et al., 2022). According to Schaufeli et al. (2002), individuals who are dedicated and passionate about their work tend to be more engaged in their profession. Cardwell (2011) also emphasized that heightened work engagement can positively impact instruction effectiveness. As a result, there has been a growing body of research exploring the factors that impact EFL/ESL teachers' work engagement (Burić and Macuka, 2018; Greenier et al., 2021; Xie, 2021).

Self-efficacy, as the second construct under research in the study, refers to a person's beliefs and perceptions about their capability to attain specific outcomes in particular settings (Bandura, 1997). Bandura (1993) proposed that a person's view of their abilities influences their confidence or proficiency in handling demanding and challenging circumstances, which in turn influences their psychological wellbeing. Specifically, teacher efficacy is concerned with a teacher's self-evaluation of their instructional capabilities in achieving desired outcomes in an educational setting (Zee et al., 2018; Thompson and Dooley, 2019; Liu et al., 2021; Samfira and Paloș, 2021). It is acknowledged as a crucial factor that affects both students' motivational beliefs and the quality of a teacher's instruction (Xiyun et al., 2022). Self-efficacious teachers are more inclined to utilize advanced instructional methods and persistently work with struggling students (Gibson and Dembo, 1984). According to Bandura (1997), self-efficacy stems from four main sources: verbal persuasion, vicarious experience, mastery experience, and emotional arousal. Among these sources, mastery experience is considered the most crucial in forming self-efficacy as it involves a teacher's previous knowledge of their students' success, which increases their sense of efficacy, and their students' experience of failure, which decreases their sense of efficacy.

Resilience is another critical factor that can lead to greater teacher engagement in their careers, as indicated by previous studies (Wang et al., 2022). According to Mansfield et al. (2016), resilience is defined as a personal attribute that allows teachers to effectively cope with the challenges and difficulties of teaching rather than simply endure them. Resilient instructors are argued to be more motivated, dedicated to professional development, and focused on improving their instruction, thus serving as a "quality retention" factor (Day and Gu, 2010; Zhang, 2021). These teachers possess the requisite competencies to succeed in difficult situations, excel at instructional leadership, have positive relationships with students, feel satisfied, are dedicated to their profession, and derive personal enjoyment and fulfillment from their work (Howard and Johnson, 2004; Polat and İskender, 2018; Chu and Liu, 2022; Liu and Chu, 2022). Moreover, students of resilient teachers are more likely to achieve their desired learning outcomes (Day and Gu, 2014; Derakhshan et al., 2022a). In addition to self-efficacy and resilience, teacher reflection has proved to play a significant role in a teacher's professional growth, wellbeing, and effectiveness (Wright, 2010). Reflection allows teachers to better understand themselves and their practice and serves as a means of knowledge generation based on their experiences. Farrell (2019) emphasizes the importance of reflection in second language teacher education programs as a means of bridging the gap between theoretical abstractions and practical applications. By reflecting on their teaching practices, teachers can gain a clearer understanding of situational factors in the classroom and improve their awareness of language instruction pragmatics and the ability to apply theoretical concepts in practical settings (Wallace and Bau, 1991; Griffiths, 2000).

Although several investigations have been carried out on various factors influencing teachers' work engagement (e.g., Hultell and Gustavsson, 2011; Burić and Macuka, 2018; Greenier et al., 2021; Xie, 2021), it is still in its infancy and less researched especially in EFL context. Both researchers and educators should devote more attention to teacher factors such as self-efficacy, reflection, and resilience since these constructs can influence teacher work engagement. Also, to our best knowledge, no study has ever probed the concurrent antecedents of teacher self-efficacy, teacher reflection, and teacher resilience on impacting teachers' work engagement. As such, the current study tried to delve into the role of teacher self-efficacy, teacher reflection, resilience, in affecting work engagement among EFL teachers. This study aims to contribute to the existing body of knowledge by providing new insights into the predictors of teacher work engagement in the Chinese EFL context and has implications for teacher education programs.

Literature review

Work engagement

Work engagement has gained significant attention in various fields in recent years, and there is a growing body of literature exploring its definition, antecedents, and outcomes (Liu et al., 2020; Han and Wang, 2021; Oberländer and Bipp, 2022). Schaufeli et al. (2002) introduced the most accepted and widespread definition of work engagement, which includes three components: absorption, vigor, and dedication. Work engagement is a positive mindset that demonstrates one's professional career, achievement, fulfillment, and efficiency (Schaufeli and Bakker, 2004; Field and Buitendach, 2012). It is not a temporary mental state but rather a more ubiquitous and lasting cognitive state that is unrelated to a single event, individual, activity, or item (Schaufeli et al., 2002; Azari Noughabi et al., 2022). This positive work-related variable is based on the philosophy of work engagement, which emphasizes the role of passion, energy, and personal satisfaction in propelling workers ahead in their job performance (Han and Wang, 2021). This construct developed from burnout research, with the goal of focusing on employees' wellbeing and strategies to improve it rather than their level of burnout (Zeng et al., 2019; Fathi et al., 2021).

Recent research has shown that work engagement has an inverse relation with burnout and employee desire to quit (Schaufeli and Bakker, 2004; Faskhodi and Siyyari, 2018; Ahmad et al., 2021; Juliana et al., 2021; Dong and Xu, 2022) and it varies from workaholism since engagement is a positive attribute that provides beneficial results, whereas workaholism causes more harm than good and leads to burnout (Han and Wang, 2021). The literature suggests that work engagement is associated with positive feelings toward teaching (Zeng et al., 2019) and can lead to a decline in job burnout (Juliana et al., 2021). Studies exploring teacher engagement have also been done from the viewpoints of gender, teaching status, and teaching experience (Faskhodi and Siyyari, 2018; Topchyan and Woehler, 2021). In addition, perceived learner engagement and motivation are key factors in determining teacher engagement, especially in the context of online learning (Obrad and Circa, 2021). Further, engaged teachers in FL/L2 environments are more energetic, devote a significant amount of their cognitive repertoire to their work, and maintain their resilience despite obstacles (Brackett et al., 2010; Burić and Macuka, 2018; Greenier et al., 2021; Xiao et al., 2022; Derakhshan et al., 2022b). Psychological

wellbeing, emotion regulation, resilience, and emotional intelligence have been identified as significant factors contributing to work engagement among teachers (Butakor et al., 2021; Greenier et al., 2021; Xie, 2021). Therefore, understanding the antecedents and outcomes of work engagement is crucial for promoting teacher wellbeing and improving job performance. Overall, a critical review of the literature suggests that work engagement is an important construct that has gained significant attention in various fields in recent years. While work engagement is associated with positive outcomes such as employee wellbeing and job performance, workaholism is associated with negative outcomes such as burnout. However, there is a need for further research to identify gaps in the literature and develop effective interventions to promote work engagement among teachers.

Teacher self-efficacy

The concept of self-efficacy, or an individual's belief in their ability to perform a specific task effectively, has significant implications for how people approach challenges, handle stress, and solve problems (Bandura, 1997, 2011). In the realm of education, teacher self-efficacy specifically refers to a teacher's confidence in their ability to carry out teaching duties to a particular standard under specific circumstances (Skaalvik and Skaalvik, 2014), as outlined by Bandura (1997) social cognitive theory. Numerous studies have investigated the relationship between teacher self-efficacy and other constructs, including job satisfaction, work engagement, and organizational commitment (e.g., Skaalvik and Skaalvik, 2014; Minghui et al., 2018; Granziera and Perera, 2019; Demir, 2020; Doo et al., 2020; Han and Wang, 2021). The results indicate that teachers with greater self-efficacy tend to have higher job satisfaction, less emotional exhaustion, and lower levels of job burnout (e.g., Skaalvik and Skaalvik, 2014; Fathi et al., 2021). They are also better able to manage student behavior and collaborate effectively with colleagues to achieve common educational goals (Tsouloupas et al., 2010; Goddard and Kim, 2018; Poulou et al., 2019; Lazarides et al., 2020).

Research suggests that effective teachers foster a high-quality learning context by designing lessons that challenge students' abilities, by handling student misbehavior skillfully, and by making an effort to engage students meaningfully (Tschannen-Moran and Barr, 2004; Tsouloupas et al., 2010). It is generally accepted that teachers who have higher levels of self-efficacy establish the atmosphere for developing stronger bonds with their students and interacting in ways that support behavioral operating in students (Hamre et al., 2008; Poulou, 2017). In another study, Burić and Macuka (2018) used a sample of Croatian instructors to demonstrate that teachers with high self-efficacy revealed greater engagement in their jobs, more confidence, love, and excitement, and less exhaustion, despair, and frustration toward their students. Language teachers' self-efficacy is a growing area of study that has been assessed in a few East Asian settings (e.g., Phan and Locke, 2015). Furthermore, Hoang and Wyatt (2021) emphasized the critical influence of culture and context in forming the self-efficacy perceptions, instructional strategies, classroom management, and student misbehavior management of Vietnamese pre-service teachers. Additionally, self-efficacy was the best predictor of job performance among EFL teachers out of all the variables used by Soodmand Afshar and Moradifar (2021), including institutional identity, critical cultural awareness, reflective teaching, and self-efficacy. In addition, the results of the study by Greenier et al. (2021) revealed a negative connection between teacher self-efficacy and burnout. Teachers' perceptions of their unique teaching context, the requirements of their instructional practices, and evaluations of the support and resources that are available to them all have a significant impact on how effective they are as teachers (Bandura, 1997).

According to Tschannen-Moran and Hoy (2001), teachers with higher levels of teacher self-efficacy motivate and encourage their students to succeed more than teachers with lower levels of self-efficacy. They also tend to use more constructive feedback with students who consistently make mistakes. Hajovsky et al. (2020) also found that across all grade levels, teachers with higher self-efficacy beliefs usually have higher levels of nearness and lower levels of conflict with their pupils. They thought that teachers who felt confident in their abilities to instruct and control classroom behavior were more likely to engage in behaviors that helped them build dependable relationships with their students. According to other studies (Federici and Skaalvik, 2011; Yakın and Erdil, 2012), self-efficacy has an impact on internal motivation, job satisfaction, and engagement. The more self-efficacy instructors have, the more it aids in keeping them aware in an organized working state. According to other researchers (e.g., Llorens et al., 2007), self-efficacy is an important predictor variable affecting employees' work engagement. Simbula et al. (2011) conducted a research on teachers' work engagement and self-efficacy using Italian teachers as the research subjects. The study demonstrated a strong relationship between teachers' self-efficacy and work engagement. Furthermore, instructors with high self-efficacy may put in more effort and have superior organizational and planning abilities (Pajares, 1992).

In another investigation, Safari et al. (2020) discovered that EFL teacher self-efficacy is a good predictor of professional growth. It is worth noting that self-efficacy outperformed reflective thinking and work satisfaction in predicting professional progress. Furthermore, teacher self-efficacy was found to be adversely related to burnout. Von Muenchhausen et al. (2021) discovered that teacher self-efficacy and mental health were substantially and modestly connected when they examined the relationship between mental health and teacher self-efficacy among 742 instructors. Besides, positive emotions and work-related psychological barriers were associated with teacher self-efficacy. Similarly, the greater the development in life satisfaction and distancing ability, the better the teacher's self-efficacy, and lower social support experience was associated with lower teacher self-efficacy. Furthermore, Ventura et al. (2015) found that professional self-efficacy was a strong predictor of teachers' psychosocial wellbeing, which is technically referred to as burnout. It was also found that both burnout and engagement were significantly correlated with professional self-efficacy. Specifically, professional self-efficacy was positively correlated with engagement and self-efficacy was inversely related to burnout. In another study, Høigaard et al. (2012) discovered that engagement and efficacy perceptions are correlated with job satisfaction and inversely associated with burnout and the intention to quit among newly qualified teachers in Norway.

Burić et al. (2022) also conducted a three-wave longitudinal study among 3,010 teachers and found that stable parts of teacher self-efficacy (TSE) and work engagement have a positive correlation, TSE is positively associated with work engagement at a given time point, and work engagement has spill-over effects on TSE, but there is no reciprocal relationship. In another study, Gratacós et al. (2021) conducted a study with Spanish beginning teachers and found a strong positive correlation between transformational leadership (TR) and self-perceived efficacy, and the motivational and social dimensions of TR could be a determining

factor in enhancing the adaptative skills of beginning teachers, leading to self-efficacy. Taken together, as reviewed above, teacher self-efficacy has been widely researched and has been shown to have a positive relationship with various constructs such as job satisfaction, work engagement, and organizational commitment. Research has also documented that self-efficacy is an important predictor of job performance, internal motivation, and professional growth and is also negatively correlated with burnout. While the existing literature provides an extensive overview of the studies related to teacher self-efficacy and its relationship with work engagement, the literature has yet to address further investigation of self-efficacy in language teachers. Additionally, the existing bulk of the literature does not explore the potential factors that may moderate the relationship between teacher self-efficacy and work engagement. Therefore, future research may benefit from addressing these gaps to better understand the complex relationship between teacher self-efficacy and work engagement.

Teacher reflection

Teacher reflection is a critical component of professional growth, efficiency, and wellbeing for teachers (Akbari et al., 2010; Aleandri and Russo, 2015). Reflective teachers assess their teaching methods and adapt them as needed to enhance learning quality (Xu et al., 2015; Han and Wang, 2021). In second language (L2) teacher education, which places a strong emphasis on producing high-quality teachers, teacher reflection is crucial for bridging the gap between theory and practice (Hua, 2008; Farrell and Kennedy, 2019). Dewey (1933) and Schön (1983) were the first to use the term "reflection" to describe systematic, thoughtful, and purposeful actions that followed logical reasoning. Schön (1983) further developed the concept by defining three components: reflection-in-action, reflection-on-action, and reflection-for-action, all of which are intended to enhance learning and teaching. Reflection-in-action takes place as part of an instructional practice, reflection-on-action takes place as a consequence of the practice, and reflection-for-action improves or changes future actions.

Reflective teaching is a dynamic process that evolves over time with proper training (Yalcin Arslan, 2019). As a result, there is a burgeoning interest in the educational community to enhance teachers' ability to reflect, as it has been linked to various factors, including engagement, autonomy, burnout, self-efficacy, perfectionism, and teaching-learning beliefs (Moradkhani et al., 2017; Korucu-Kis and Demir, 2019; Loan, 2019; Xiaojing et al., 2022). Akbari et al. (2010) proposed a framework for teacher reflection that classifies it into five categories: affective, practical, cognitive, meta-cognitive, and critical. The practical category involves the techniques and tools that teachers use in reflective teaching, the affective component relates to teachers' reflection on their students' difficulties, the cognitive aspect deals with teachers' efforts at professional growth, and the meta-cognitive component involves teachers' evaluation of their activities. The critical component encompasses teachers' perspectives on the sociopolitical impact of their actions.

Researchers have demonstrated the significance of reflective teaching in various contexts (Cimermanová, 2013; Cabaroglu, 2014; Košir et al., 2015; Moradkhani et al., 2017; Motallebzadeh et al., 2018; Shirazizadeh and Moradkhani, 2018; Walshe and Driver, 2019; Gorski and Dalton, 2020). As far as L2 context is concerned, Moradkhani et al. (2017) conducted a study to investigate the relationship between EFL teachers' reflection and their self-efficacy. The findings showed that all elements of reflection, except for critical reflection, were significantly linked to self-efficacy. The meta-cognitive component was found to be the only indicator of self-efficacy. Qualitative data analysis revealed that the components of reflection improved self-efficacy through four primary sources: mastery experience, vicarious experience, verbal persuasion, and physiological/emotional arousal. Košir et al. (2015) also found that rumination was a significant contributor to burnout and stress among schoolteachers, while reflection acted as a mediator between teachers' career qualities and stress. Cimermanová (2013) suggested that self-reflection was effective in reducing burnout among school and university teachers. In another study, Shirazizadeh and Moradkhani (2018) investigated the relationship between reflective practices of EFL teachers and burnout. The results showed that participation in reflective practice was negatively correlated with burnout, indicating that engaging in reflective practices was linked to a reduction in burnout. Likewise, Motallebzadeh et al. (2018) also found a positive relationship between reflection and teaching efficacy among EFL instructors. Cabaroglu (2014) evaluated the impact of action research on the self-efficacy beliefs of pre-service EFL teachers and found that it contributed to the improvement of their self-efficacy, self-awareness, problem-solving skills, and learning autonomy. These studies might suggest that reflective practices, such as action research, can contribute to the improvement of EFL teachers' self-efficacy and reduce burnout.

Overall, although the literature review provides a comprehensive understanding of the relationship between teacher reflection and various aspects of teaching, including burnout, self-efficacy, and teaching efficacy, there appears to be a gap in terms of investigating the role of resilience in this relationship. Resilience is an important aspect of teacher wellbeing, particularly in challenging educational contexts, and can potentially impact teacher engagement (Chen and Chi-Kin Lee, 2022). Therefore, the current study aims to fill this gap by examining the relationship between teacher self-efficacy, reflection, resilience, and work engagement among English language teachers.

Teacher resilience

Teacher resilience is the ability to adapt to a variety of settings and strengthen abilities in overcoming difficulties (Bobek, 2002; Mansfield et al., 2016; Liu and Han, 2022). Resilient teachers consistently demonstrate agency, moral purpose, strong support groups, a sense of achievement, and enthusiasm (Stanford, 2001; Howard and Johnson, 2004). Resilience is a dynamic process that is impacted by various psychological, biochemical, and environmental-contextual processes in addition to individual features, familial factors, and the social context (Kostoulas and Lämmerer, 2018) and it occurs when people integrate their personal and contextual resources and utilize effective techniques to overcome problems and preserve their wellbeing (Liu et al., 2021; Zhang, 2021). Resilient teachers enjoy greater job satisfaction, positive self-belief, general wellbeing, and a greater sense of commitment to their fields (Richards et al., 2016). Day (2008) argued that resilient teachers are those who demonstrate the ability to succeed in difficult situations, are excellent at classroom management, and develop strong bonds with their students. Chen and Chi-Kin Lee (2022) found that decision latitude and school support influenced the professional and emotional dimensions of teacher resilience, respectively, and predicted teacher wellbeing. The motivational and social dimensions of teacher resilience positively impacted teacher job performance and suggested that teacher resilience can mitigate

negative job demands and enhance positive job resources, leading to improved wellbeing and performance. Van Wingerden and Poell (2019) found that work engagement and job crafting completely mediated the relationship between meaningful work and teacher resilience, emphasizing the significance of fostering teachers' resilience to maintain enthusiasm in their demanding but meaningful profession. Yada et al. (2021) found a three-factor structure for self-efficacy, which was highly correlated with resilience. These studies suggest that promoting teacher resilience is crucial for maintaining teacher wellbeing, job satisfaction, and performance, and that it is influenced by various factors in the individual, organizational, and contextual levels. Further research is needed to identify effective interventions and strategies for fostering teacher resilience.

Also, some recent studies carried out by Liu et al. (2021) and Chu and Liu (2022) investigated teacher self-efficacy and teacher resilience among Chinese EFL teachers. Liu et al. (2021) found that EFL teachers had moderate-to-high levels of self-efficacy in general, with higher levels of technological self-efficacy than instructional self-efficacy. Chu and Liu (2022) reported that resilience in Chinese senior high school EFL teachers was moderate to high, with a tri-factorial structure of tenacity, optimism, and coping style. Personal and contextual factors influencing teacher resilience were discussed. Liu and Chu (2022) further explored EFL teacher resilience and discovered a tri-factorial structure of TR involving tenacity, optimism, and coping style. The study also highlighted the moderate-to-high levels of EFL teacher resilience and offered implications for sustaining and developing EFL teacher resilience. These findings offer suggestions for enhancing teacher self-efficacy and developing teacher resilience in the EFL context.

While there is considerable research on teacher resilience, there remains a gap in understanding how teacher self-efficacy and reflection contribute to teachers' work engagement. While some studies have explored the impact of teacher resilience on wellbeing and job performance, the present study aims to investigate the interplay between teacher self-efficacy, teacher reflection, and resilience as predictors of teachers' work engagement among English language teachers. This study will contribute to the literature by identifying specific factors that can enhance teachers' work engagement and by highlighting the importance of promoting these factors in teacher training and professional development programs.

The present study

The present research aims to examine the complex relationships between teacher self-efficacy, teacher reflection, teacher resilience, and work engagement among English language teachers. The four variables are logically connected and can be put together into a model based on previous research findings (as explained in the hypotheses below). Based on prior research, the researchers hypothesize that teacher self-efficacy positively affects teacher reflection, teacher reflection positively affects teacher resilience, and both teacher self-efficacy and teacher reflection positively affect teacher work engagement. Additionally, the researchers suggest that teacher resilience positively affects teacher work engagement. By examining these predictors of work engagement, the study aims to identify key factors that can help promote teacher engagement and wellbeing in EFL educational contexts. By exploring the relationships among the four constructs, the present research offers a more thorough understanding of the constructs that influence teachers' work engagement. This could be beneficial in terms of providing insights into how to support teachers in their professional development, and to enhance the effectiveness of their instruction in EFL contexts.

Against this backdrop, this study set out to test a model of teacher work engagement and its predictors (see the hypothesized model in Figure 1), including teacher self-efficacy, teacher reflection, and teacher resilience among Chinese EFL teachers. The following hypotheses were also developed to guide the study:

> *H1*: Teacher self-efficacy positively affects teacher reflection. This hypothesis is based on the premise that teachers who have a high level of self-efficacy are more likely to reflect on their practices, as they believe in their abilities to influence the outcomes of their teaching (Bandura, 1977). Empirical studies have consistently shown that teacher self-efficacy is positively related to various

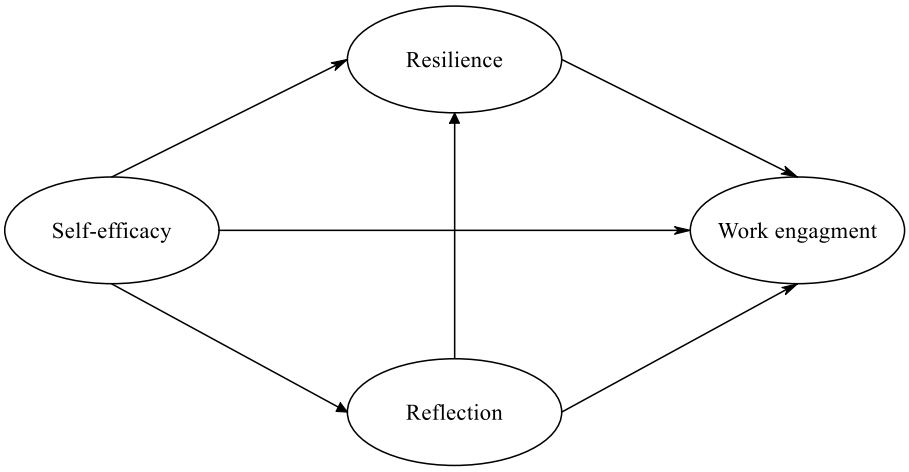

FIGURE 1
The hypothesized model.

aspects of teacher reflection (Babaei and Abednia, 2016; Moradkhani et al., 2017).

H2: Teacher reflection positively affects teacher resilience. This hypothesis builds upon the notion that reflective practices can help teachers deal with stress and uncertainty in their work, leading to their heightened resilience (Schön, 1983; Ebersöhn, 2014; Chen and Chi-Kin Lee, 2022). By reflecting on their experiences, teachers are able to gain a deeper understanding of the challenges they face, and identify potential solutions to mitigate stress and increase resilience (Zeichner and Liston, 2013; Zulfikar and Mujiburrahman, 2018).

H3: Teacher self-efficacy positively affects teacher resilience. Following social cognitive theory of self-efficacy (Bandura, 1997, 2011), which posits that self-efficacy plays a crucial role in individuals' ability to cope with adverse circumstances, it is hypothesized that teachers with high levels of self-efficacy are better equipped to bounce back from setbacks and remain engaged in their work (Yada et al., 2021).

H4: Teacher self-efficacy affects teacher work engagement. Based on the theory of work engagement (Schaufeli et al., 2006), which suggests that work engagement is positively related to various antecedent variables, including self-efficacy, teachers who feel confident in their abilities are more likely to be engaged in their work and motivated to continue their professional development (Simbula et al., 2011; Burić and Macuka, 2018).

H5: Teacher reflection affects teacher work engagement. This hypothesis builds upon the notion that reflection contributes to teacher development, which in turn leads to increased work engagement (Schön, 1983). Teachers who reflect on their practices are better able to identify areas for improvement and adopt new strategies, which enhances their sense of engagement and motivation (Han and Wang, 2021).

H6: Teacher resilience affects teacher work engagement. In light of some previous studies (e.g., Van Wingerden and Poell, 2019; Xie, 2021), it is suggested that individuals who are resilient are better able to manage stress and remain engaged in their work. Teachers with high levels of resilience are less likely to be affected by stress and burnout, and are therefore more likely to remain engaged in their work (Perera et al., 2018). In light of these hypotheses, the present study aims to explore the relationships among the four latent variables, and to identify the key predictors of work engagement among Chinese EFL teachers.

Method

Participants

The participants in this study were a convenient sample of 526 English teachers working in mainland China. The sample was composed of 218 male English teachers (41.2%) and 308 female English teachers (58.8%). The average age of the participants was 33.16 years ($SD = 6.38$ years), and the mean number of years of experience as English teachers was 10.18 ($SD = 7.02$). The participants were selected from various English language schools in mainland China, with the aim of obtaining a diverse sample of English teachers to participate in the study. The data gathered from these participants provided valuable insights into the experiences and perspectives of English teachers working in mainland China. Due to the outbreak of COVID-19 in 2020, online teaching became the predominant mode of instruction for a large number of schools in mainland China. As a result, the majority of participants in this study (84.3%) reported that they had been involved in online teaching during the past 2 years. The remaining participants reported that they had primarily engaged in offline teaching during the same period. However, it is worth noting that some of the participants who reported primarily engaging in offline teaching had also engaged in online teaching to some extent during the pandemic. Thus, the sample included a mixture of teachers who had taught exclusively online, in a mixed model (online and offline), or exclusively offline.

Instruments

Teacher self-efficacy scale

The level of teacher self-efficacy was evaluated through the use of the short version of the Teachers' Sense of Self-Efficacy Scale (TSES) created by Tschannen-Moran and Hoy (2001). The TSES aims to assess the teacher's self-efficacy in three distinct areas: instructional strategies, student engagement, and classroom management. The scale is comprised of 12 questions, which are rated on a nine-point Likert scale that ranges from 1 (Nothing) to 9 (A great deal). Each of the self-efficacy dimensions is represented by four items.

Utrecht work engagement scale (UWES)

The Utrecht Work Engagement Scale which was validated by Schaufeli et al. (2002) was used to measure teachers' work engagement. The scale is comprised of 17 questions rated on a 7-point Likert scale, and measures three sub-domains: vigor, dedication, and absorption. Vigor reflects a person's energy, resilience, and determination even in the face of challenges. Dedication refers to a feeling of inspiration and excitement. Absorption signifies a full focus on teaching activities.

Teacher reflection scale

The English Language Teaching Reflection Inventory (Akbari et al., 2010) was used to measure teacher reflection. It consists of 29 items that assess teachers' views on five different areas: practical, cognitive, affective, metacognitive, and critical. The assessment uses a 5-point Likert scale, ranging from 1 (never) to 5 (always). The overall score of the inventory reflects the level of teacher reflection across all five dimensions.

Teacher resilience scale

The study utilized the 10-item Connor-Davidson Resilience Scale (CD-RISC) developed by Campbell-Sills and Stein (2007). This shortened version was based on the original 25-item CD-RISC, which was developed and validated by Connor and Davidson (2003) as a multidimensional measurement tool for resilience. The questionnaire consists of Likert-type items, with responses ranging from 0 (not true at all) to 4 (true nearly all the time).

Procedure

This cross-sectional study was carried out in mainland China, targeting teachers working in English language schools. Participants

were informed of the details and purpose of the study and were given a battery of questionnaires, including those assessing socio-demographic information and the four constructs being investigated: teacher self-efficacy, work engagement, teacher reflection, and resilience. Online surveys were administered in March and April 2022 using a popular online survey platform called Questionnaire Star. The survey was sent to a sample of EFL teachers in Chinese language schools who voluntarily agreed to participate in the study. To ensure a diverse sample, the participants were also encouraged to share the survey with their colleagues via commonly used social media apps, such as WeChat and QQ, as well as through emails. Confidentiality was ensured for the questionnaire data to preserve the anonymity of the teachers. Participation was voluntary and without monetary compensation, and all participants provided written informed consent to participate in the study. The data collection process lasted approximately 2 months.

Data analysis

The statistical analysis was performed using the SPSS 22.0 for descriptive statistics and data input and the AMOS 20 software for Confirmatory Factor Analyses (CFAs) and Structural Equation Modeling (SEM). The data was screened to evaluate missing data, outliers, and normality. The expectation–maximization algorithm was used to address missing data, in which missing scores were substituted with a predictive distribution (Kline, 2011). Both univariate and multivariate outliers were examined using standard scores and Mahalanobis D^2, respectively. A case was considered a multivariate outlier if its D^2 probability was 0.001 or lower, and outliers were subsequently removed, resulting in 512 valid cases for SEM analysis. The skewness and kurtosis values were within the acceptable range of −1 to +1, which indicated a normal distribution of the data (Tabachnick et al., 2013). The descriptive statistics and correlation matrix for all variables are presented in Table 1.

CFA was applied to assess the validity of the four latent variables in the study. To evaluate the goodness of the measurement models, various fit indices were used, including χ^2/df, goodness-of-fit index (GFI), Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) (Kline, 2011). The validity of the models was evaluated based on established criteria, with a χ^2/df value of less than 3 considered acceptable (Tseng and Schmitt, 2008) and fit indices of ≥0.90 considered acceptable (Hu and Bentler, 1999). For RMSEA, values of ≤0.06 were considered indicative of good fit and values of ≤0.08 were considered fair fit (Hu and Bentler, 1999; Kline, 2011). Due to low loadings, modifications were made to the models by removing some items from the questionnaires of teacher reflection, work engagement, and teacher self-efficacy. After the revisions, all models showed acceptable fit to the data as shown in Table 2. The reliability of the questionnaires was confirmed by their coefficient alphas, which were all higher than 0.70 (Hair et al., 2010; Table 2).

TABLE 1 Descriptive statistics and correlations.

	M (*SD*)	1	2	3	4
(1) Self-efficacy	4.03 (0.93)	1.00			
(2) Reflection	3.95 (1.08)	0.26*	1.00		
(3) Resilience	3.59 (0.96)	0.32*	0.35*	1.00	
(4) Work engagement	4.12 (1.12)	0.53**	0.41**	0.34*	1.00

*$p < 0.05$, **$p < 0.01$. Asterisks denote statistical significance based on a two-tailed test (Cumming, 2014).

Model testing

The proposed model was analyzed using AMOS 23.0, which utilized the maximum likelihood procedure and variance–covariance matrices. However, the initial assessment of the model revealed that it did not fit the data well, as indicated by the low values of GFI, TLI, and CFI, which were all below the recommended threshold of 0.90 (Hu and Bentler, 1999). To improve the model fit, modifications were made, leading to the final model depicted in Figure 2. The modifications resulted in substantial improvement in the goodness-of-fit of the model, as evidenced by the values in Table 3. Additionally, the regression coefficients for the paths in the final model were found to be significant at the level of 0.05 or lower ($p < 0.05$) (Hair et al., 2010).

As can be seen in Figure 2, self-efficacy, reflection, and resilience were the three direct significant predictors of work engagement. Self-efficacy was the strongest direct predictor of work engagement ($\beta = 0.52$, $R^2 = 0.27$). Reflection ($\beta = 0.43$, $R^2 = 0.18$) and resilience ($\beta = 0.31$, $R^2 = 0.09$) also directly predicted work engagement. Furthermore, reflection influenced work engagement indirectly through resilience ($\beta = 0.34 \times 0.31$, $R^2 = 0.011$). Likewise, self-efficacy influenced work engagement indirectly through reflection and resilience ($\beta = 0.28 \times 0.43 + 0.28 \times 0.34 \times 0.31 = 0.14$, $R^2 = 0.019$).

Discussion

The aim of the researchers was to examine the association between teacher self-efficacy, reflection, resilience, and work engagement among Chinese EFL teachers with the aim of expanding the research into teacher-related factors. The findings indicated that self-efficacy directly predicted work engagement, as confirmed by several prior studies (Skaalvik and Skaalvik, 2014; Burić and Macuka, 2018;

TABLE 2 Measurement model of the latent variables.

	χ^2	Df	χ^2/df	CFI	TLI	RMSEA	Cronbach's α
Self-efficacy	202.35	99	2.04	0.92	0.91	0.06	0.83
Reflection	136.71	69	1.98	0.95	0.94	0.05	0.79
Resilience	84.39	46	1.83	0.98	0.97	0.03	0.86
Work engagement	68.09	33	2.06	0.93	0.93	0.06	0.80

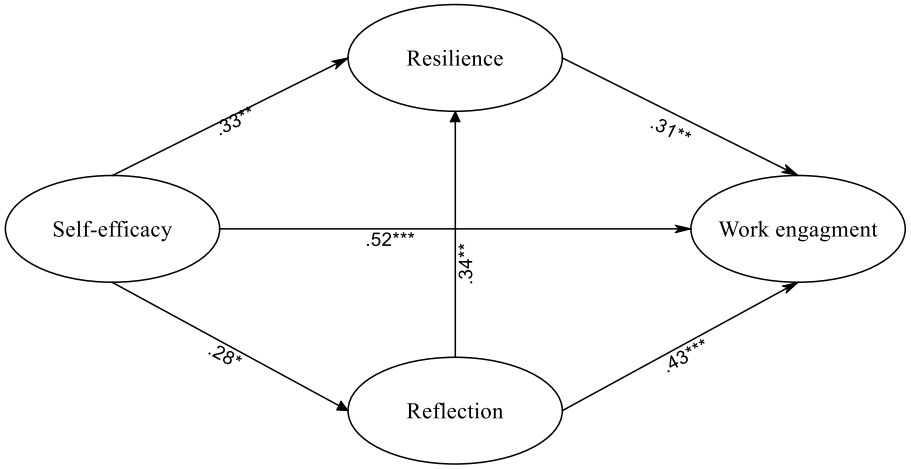

FIGURE 2
The final model. *p <0.05. ** p <0.01. ***p <0.001. Asterisks denote statistical significance based on a two-tailed test (Cumming, 2014).

TABLE 3 Fit indices for the initial and revised models.

	χ^2	Df	χ^2/df	CFI	TLI	RMSEA
Initial model	594.68	255	2.33	0.89	0.88	0.08
Revised model	476.80	253	1.89	0.97	0.96	0.04

Minghui et al., 2018; Han and Wang, 2021; Topchyan and Woehler, 2021). These studies found that teachers with higher self-efficacy tend to have a higher level of work engagement and are more persistent and diligent, with reduced levels of anxiety. This is in line with Bandura (1997) social cognitive theory, which suggests that individuals with high self-efficacy are motivated to perform better at work. EFL teachers who are confident in their skills and abilities to meet their students' needs and run an effective course may become more motivated and invested in their teaching activities. According to Tschannen-Moran and Hoy (2001), teacher competence affects ambition, perception, and efficiency, and this was supported by Burić and Macuka (2018), who found a positive relationship between self-efficacy and work engagement. This result suggests that when teachers are confident in their ability to induce learning, they allocate more time and effort to their job and become more engaged in it.

The second finding of this study was that teachers' level of reflection is positively associated with their level of engagement. Work engagement is defined as the opposite of burnout, therefore this finding is partially in line with several studies which indicated adverse link between teacher reflection and burnout (e.g., Cimermanová, 2013; Shirazizadeh and Moradkhani, 2018). Teacher reflection was negatively correlated with burnout, suggesting that reflective teachers are less probable to burnout, therefore they become more engaged in classroom. It can be contended that these two factors are interconnected in the sense that when a teacher constantly reflects his/her action, he/she becomes more involved in his/her work and achieves more favorable results. The opposite is also true, in that a highly involved teacher continuously reflects on his or her own practice in order to enhance its quality. Furthermore, it could be argued that teachers who demonstrate higher levels of reflection, are constantly thinking about their teaching practice and are thoroughly focused on enhancing their teaching standards. These instructors appreciate their jobs and are more deeply invested in them. As a matter of fact, they are better at managing and guiding both positive and negative emotions, and as a consequence, they can deal with stressful situations more efficiently. Put simply, instructors' reflection can assist them to better control their feelings and feel more confident in the face of burnout. In other words, reflective teachers seem to be more dedicated and emotionally connected to their profession because they are fully engaged in thinking about their students and attempting to find solutions to issues they face. As a result, such teachers see classroom obstacles as catalysts for further learning and clarification of their classroom instruction (Uştuk and De Costa, 2021).

The last result of the current study showed a high relationship between teacher resilience and work engagement. The connection between teacher resilience and work engagement is smoothly demonstrated by the fact that teachers who can deal with the challenges of teaching get a lot out of their job. This, in turn, encourages instructors to become more engaged in their profession (Mansfield et al., 2016; Polat and İskender, 2018). This finding is partially in line with Polat and İskender (2018) discovery of an inverse interplay between teacher resilience and burnout. It is also asserted that teachers with higher stages of resilience experience less stress, resulting in a more potent feeling of belonging and greater faith in their abilities to live up to classroom expectations. In other words, teachers who exhibit greater levels of resilience are less tired and exhausted, have a greater level of job satisfaction, and are more able to maintain good collaboration with others. Instructors who are more resilient experience less occupational stress, which reduces the likelihood of burnout (Howard and Johnson, 2004). Furthermore, it was discovered that resilience could significantly predict EFL teachers' teaching burnout. This finding is in line with the results of Richards et al. (2016)'s study that demonstrated a negative connection between teacher resilience and burnout. Another finding of this study was that teacher self-efficacy affected work engagement via the mediation of teacher resilience. Instructors with a higher sense of self-efficacy are much more dedicated to their instruction, develop a positive attitude, and are less likely to burnout. Instructors with reduced efficacy

perceptions may maintain negative views of their instructional competences and the academic milieu, which increases the likelihood of feeling more psychological stress and detachment, as teacher self-efficacy deals with teachers' views and beliefs of their own expertise in teaching and their efficiency in enhancing their students' academic achievement.

Also, SEM results evinced that self-efficacy had an indirect effect on work engagement, which was mediated by teacher reflection and resilience. This finding suggests that the positive impact of teacher self-efficacy on work engagement is not only direct but also indirect. This is important because it highlights the role of teacher reflection and resilience as mediators in the relationship between teacher self-efficacy and work engagement. Concerning the mediating role of teacher reflection in the relation between work engagement and teacher efficacy, it can be argued that teachers with higher self-efficacy are more likely to enhance the overall learning environment in which they work, and thus are more likely to overcome obstacles and may have a higher job performance. It was discovered that teachers' self-efficacy and reflection are positively associated. This is in line with the results of Cabaroglu (2014), who discovered a positive connection between teachers' reflectivity and efficacy. Consequently, it can be asserted that highly reflective educators continuously consider their instructional practices in order to enhance its quality. This causes them to enjoy their work, become more efficient, and have faith in themselves. In addition, according to Fathi et al. (2021), self-efficacy and reflection can both be direct and negative predictors of burnout. As previously stated, work engagement is regarded as the opposite of burnout, therefore, positive correlations were thus not unexpected, lending credence to Schaufeli and Bakker (2004), Faskhodi and Siyyari (2018), and Ahmad et al. (2021) claim. There was also a negative relationship between teacher self-efficacy and burnout. This finding is consistent with the findings of several studies that highlight the crucial connection between these variables (Skaalvik and Skaalvik, 2014; Ventura et al., 2015). Such research has shown that teachers' perspectives of their own qualities in handling teaching activities influence their job satisfaction and burnout. Teachers who have a greater sense of self-efficacy would be less likely to experience anxiety and burnout (Ventura et al., 2015). Thus, one could argue that because the EFL teachers in this study had more favorable attitudes about their own qualities in handling their classes, utilizing appropriate instructional strategies, and applying effective student engagement strategies, they felt less exhaustion.

Concerning the mediating role of teacher resilience, it was found teachers with greater self-efficacy perceptions are also more resilient, which in turn enhances their work engagement. These findings add to the growing body of literature on the interplay between various teacher individual and environmental factors that contribute to teacher wellbeing and job satisfaction. Self-efficacy, or the belief in one's ability to successfully complete tasks, has been associated with positive outcomes in various domains, including education. Teachers with higher levels of self-efficacy tend to experience greater job satisfaction, higher levels of motivation, and lower levels of burnout (Bandura, 1977). The present finding highlights the importance of considering other factors, such as resilience, that may further amplify the impact of self-efficacy on work engagement (Luthar et al., 2000; Perera et al., 2018; Xie, 2021). Resilience, or the capacity to recover from setbacks and maintain wellbeing despite challenges, has been found to be a key factor in promoting positive outcomes for teachers (Van Wingerden and Poell, 2019). This finding that teacher resilience mediates the relationship between teacher self-efficacy and work engagement supports the idea that resilience acts as a protective factor that enhances the impact of self-efficacy on wellbeing (Tam et al., 2020).

Moreover, it was indicated that teacher reflection also had an indirect impact on work engagement, which was mediated by teacher resilience. This finding suggests that teacher resilience is a key factor in the relationship between teacher reflection and work engagement. The link between teacher reflection and teacher resilience has been empirically and theoretically supported in the literature (e.g., Beltman et al., 2011; Leroux and Théorêt, 2014). More particularly, teacher resilience enables teachers to better manage challenges and difficulties in their work environment, which in turn can enhance their ability to reflect on their practices and improve their work engagement. This highlights the importance of resilience as a mediator in the relationship between teacher reflection and work engagement, as well as its role in supporting teachers' wellbeing and job satisfaction.

Conclusion

To summarize the findings of this study, the connection among psychological constructs of teacher self-efficacy, resilience, reflection, and work engagement was revealed. The results of this study indicate that teacher self-efficacy, teacher reflection, and teacher resilience were significant direct predictors of work engagement. Furthermore, the study found that teacher self-efficacy had both direct and indirect effects on work engagement through the mediating roles of teacher reflection and resilience. Teacher reflection was also found to have an indirect effect on work engagement, which was mediated by teacher resilience. The constructs of self-efficacy, reflection, and resilience should receive more attention by researchers and educators as these constructs can affect teacher work engagement significantly. From the theoretical viewpoint, this study adds to the existing knowledge on work engagement by boldfacing the roles of self-efficacy, reflection, and resilience as predictors of work engagement among Chinese EFL teachers. By demonstrating the mediating effects of teacher reflection and resilience, the findings offered empirical support for the significant role that these constructs play in the development and maintenance of work engagement. However, because the numerous causes and qualifications associated with teacher resilience are less well-defined, more research is needed to carefully investigate the construct of resilience and to cultivate an all-encompassing foundation for teacher resilience that is both reasonable and empirically authenticated. Although it could be argued that the variables that enhance teacher resilience are primarily influenced by individuals' experience and job status, it is also acknowledged that educator preparation programs can play an important role in enhancing teachers' resilience. As Day and Gu (2014) correctly stated, improving teachers' instructional quality and raising their students' accomplishments and norms would necessitate the development of teachers' resilience through early teacher preparation courses.

The results of this study might have significant implications for various stakeholders, including instructors, teaching staff, teacher training programs, school administrators, policymakers, and second language researchers. To support teachers' work engagement, it is crucial for faculty members to educate both English teachers in coping

with teaching challenges. Additionally, administrators should provide emotional, perceptual, and financial support, as well as ensure job stability, which are external factors that can impact teacher engagement. The outcomes can help EFL teachers understand the relationship between their self-efficacy beliefs, work engagement, and reflectivity. As a result, they can allocate more time and energy toward their profession and enhance their pedagogical skills through reflective practices, recognizing the impact of both intrapersonal and interpersonal factors on their job effectiveness. The findings highlight the importance of incorporating personality development in teacher training courses, in addition to practical teaching techniques. Teacher training programs can use these results to design and offer courses that cater to the emotional and psychological needs of EFL teachers and provide appropriate methods to increase their self-efficacy and work engagement. Professional development opportunities tailored to teachers' job levels can enhance their skills and self-efficacy, reducing job stress and increasing job satisfaction. Enhancing teachers' sense of self-efficacy leads to a higher commitment and engagement in teaching, resulting in a more fulfilled and satisfied profession. Language schools and institutions can contribute to improving their teachers' self-efficacy by creating a supportive community, giving teachers autonomy, and fostering a sense of belonging. Bandura's theory of self-efficacy highlights the importance of promoting both student and teacher self-efficacy, with school administrators playing a crucial role in supporting new teachers in their early professional years. This can be achieved through informal assistance and guidelines, as well as formal tutoring or peer-based support. Reducing the workload and increasing systematic emphasis and reflection on their teacher training and instructional role can also help newly qualified teachers avoid burnout and maintain their engagement in their work.

The outcomes of our study also have implications for instruction and the retention of teachers in the EFL educational system. Firstly, our findings suggest that fostering teachers' self-efficacy, reflection, and resilience can contribute to increasing their work engagement. Therefore, teacher education programs and professional development initiatives should focus on improving these predictors of work engagement to enhance teacher effectiveness and satisfaction in the profession. Specifically, teacher education programs should integrate reflective practices and resilience-building strategies into their curriculum to provide future teachers with the necessary skills to cope with the challenges of the profession. Furthermore, as work engagement has been shown to be negatively associated with intention to leave the teaching profession (Høigaard et al., 2012), our study underscores the significance of promoting teacher work engagement as a means to retain teachers in the educational system. Improving teacher self-efficacy, reflection, and resilience can not only enhance work engagement but also reduce the likelihood of teachers leaving the profession due to burnout or low job satisfaction (Hong, 2012; Perera et al., 2018). Therefore, policymakers and school administrators should prioritize creating a supportive work environment that promotes these predictors of work engagement to improve teacher retention rates.

The current study has several limitations that should be acknowledged. One of the main limitations is that it relies only on self-reported data, which may impact the consistency and validity of the findings. In the future, researchers may choose to supplement self-reported data with qualitative methodologies such as semi-structured interviews or observations. Additionally, a mixed-methods approach could provide deeper insight into the relationship between the study variables. Moreover, the data was gathered only from EFL teachers in China, which may undermine the generalizability of the outcomes to other cultural contexts. Further research is needed to investigate if the findings can be extended to other cultures by collecting data from a diverse range of settings. Additionally, future studies could investigate the impact of socioeconomic factors, age, gender, and education level on the relationship between the study variables. Furthermore, as teachers' attitudes can change over time, longitudinal research methods could be used to investigate and anticipate patterns of change in these instructor constructs.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation. Requests to access these datasets should be directed to QH, 18409308@masu.edu.cn.

Ethics statement

The studies involving human participants were reviewed and approved by the Department of Basic Education, Chongqing Creation Vocational College, Yongchuan 402160, Chongqing, China. The patients/participants provided their written informed consent to participate in this study.

Author contributions

QH and LC were equally involved in designing the research, topic development, data collection, data analysis, writing drafts, and final editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Modeling the effect of loving pedagogy dispositions and teacher self-efficacy on teacher burnout

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Introduction: Foreign language teaching is a demanding and challenging profession, and teacher burnout is a common issue in this field. There is a growing research interest in exploring the factors that can protect teachers from burnout and promote their well-being, as well as their effectiveness in the classroom. One such factor might be loving pedagogy, which refers to a teacher's positive and compassionate attitudes and behaviors toward their students. This study aimed to examine the association between Dispositions toward Loving Pedagogy (DTLP), teacher self-efficacy, and teacher burnout among a sample of Chinese English as a foreign language (EFL) teachers.

Methods: The participants included 428 English teachers from various parts of China. Data on the three constructs were gathered using an electronic survey which comprised three valid questionnaires for these variables. Structural equation modeling (SEM) was used to test the hypothesized relations among the latent constructs.

Results: The results indicated that loving pedagogy dispositions negatively affected teacher burnout and that teacher self-efficacy mediated the effect of loving pedagogy on burnout. More precisely, higher levels of loving pedagogy were associated with greater levels of teacher self-efficacy, which is in turn negatively affected teacher burnout.

Discussion: These outcomes shed more light on the importance of loving pedagogy dispositions for teachers' mental health and well-being. The findings have implications for theory and practice, as they suggest that fostering loving pedagogy dispositions among teachers can help prevent burnout and promote their well-being. Teacher training programs could integrate this construct into their curricula to support teachers in developing these attitudes and behaviors. Additionally, future research could explore ways to enhance loving pedagogy and self-efficacy among teachers and assess their impact on teacher well-being and effectiveness.

KEYWORDS

loving pedagogy, teacher burnout, teacher self-efficacy, EFL, SEM

1. Introduction

Burnout is conceptualized as "a psychological syndrome emerging as a prolonged response to chronic interpersonal stressors on the job" (Maslach and Leiter, 2016, p. 103). The concept of burnout is usually shaped when one finds work unsatisfactory, frustrating, and unrewarding and is reflected by three facets, namely exhaustion, lack of personal accomplishment and effectiveness, and feelings of cynicism toward and detachment from work (Janssen et al., 1999; Maslach et al., 2001). Recognized as the core aspect of burnout (Taris et al., 2005), emotional

exhaustion is a physical depletion or the feeling of being emotionally worn-out that results from inordinate job demands (i.e., work overload, and cognitive demands) and constant exposure to stress (Wright and Cropanzano, 1998; Wullur and Werang, 2020). It is worth pointing out that a person who is regularly exposed to stressors, fatigue, aggressiveness, discouragement, inefficacy, discomfort, and restriction is more inclined to experience burnout (Park and Shin, 2020). Moving to burnout among teachers, research in the past two decades has always indicated that teaching is one of the most inherently stressful occupations and that stress brought about by work-related demands can be a predictive factor of teachers' emotional exhaustion and burnout (Alarcon, 2011; Xu, 2019; Schaack et al., 2020; Skaalvik and Skaalvik, 2020). Teacher burnout is often a result of job strain and considering the demands of the occupation, those teachers with less coping competencies are more likely to fall prey to burnout (Taris et al., 2001; Santavirta et al., 2007; Zhang et al., 2019). As Madigan and Kim (2021a) asserted, given that burnout is often the cause behind teacher attrition, it is of critical significance in teacher preparation programs. Indeed, previous research has shown that burnout can be a prime contributor to teacher attrition and turnover (Rumschlag, 2017; Lee, 2019; Boamah et al., 2022; Räsänen et al., 2022). As demonstrated by previous research, teacher burnout can have adverse effects not only on teachers' well-being and mental health, such as lower engagement (Hakanen et al., 2006; Salmela-Aro et al., 2019), higher levels of depression (Steinhardt et al., 2011; Capone et al., 2019), low levels of job satisfaction (Smetackova et al., 2019; Capone and Petrillo, 2020), but also on learners' achievement (Madigan and Kim, 2021b), and motivation (Zhang and Sapp, 2008; Shen et al., 2015).

Given the fact that teacher burnout has negative personal and interpersonal implications for both teachers and students, research on this concept requires more attention. In addition, since teaching is a critical occupation which can significantly contribute to society, it is essential to find ways to retain teachers and stop them from leaving the profession. Recognized as one of the significant causes of teachers' turnover, burnout has been, to a greater to a lesser degree, subject to a number of investigations in various educational settings, namely second/foreign language (L2) context (e.g., Javadi, 2014; Shirazizadeh and Karimpour, 2019; Roloff et al., 2022). Nevertheless, empirical evidence on this concept is still fairly limited in educational settings, particularly in EFL contexts. Therefore, care should be exercised to explore teacher burnout and its potential precursors to alleviate this concept in EFL classrooms. Consequently, researchers have tried to addressed burnout among teachers and antecedents leading to this negative concept (e.g., Castillo-Gualda et al., 2019; Ismail et al., 2020; Maor and Hemi, 2021). Their findings indicated that there are a number of reasons involved in causing teachers to experience burnout while teaching, namely self-efficacy beliefs (Fathi et al., 2021).

In the last decade there has been a growing interest among researchers, particularly L2 researchers to investigate the self-efficacy of teachers. The empirical research being undertaken so far highlights the fact that teacher self-efficacy has a significant role in predicting both teacher performance and student learning. Teacher self-efficacy has been found to have a positive influence on learner achievement (Wang L., 2022), learners' self-efficacy (Corkett et al., 2011), teachers' job stress (Skaalvik and Skaalvik, 2017; Samfira and Paloș, 2021), and teachers' commitment to the profession (Chesnut and Burley, 2015). Additionally, empirical evidence shows that teacher self-efficacy is negatively associated with teacher burnout (e.g., Skaalvik and Skaalvik, 2010; Bing et al., 2022). As it is obvious, teachers' level of self-efficacy can be a significant determinant of teacher burnout. Hence, in the current study, I south to explore teacher self-efficacy as a potential predictor of teacher burnout.

According to Maslach et al. (2001), previous research on burnout has mainly focused on organizational factors as the predictors of this concept. Nevertheless, researchers have failed to give proper attention to affective and personality factors like loving pedagogy in burnout studies, particularly in the EFL context. Dispositions toward loving pedagogy (DTLP) pertains to teachers' concern, sensibility, and empathy toward their learners' growth, needs, and experiences (Zhao and Li, 2021). It has been indicated by literature that DTLP can be conducive to learners' motivation, autonomy, and achievement, as well as to teacher engagement and well-being (Derakhshan et al., 2022; Wang et al., 2022). Consequently, given its significance in educational system, specifically L2 learning and teaching, DTLP is another variable examined in the current study.

Taken together, despite the growing number of studies examining teacher burnout, there is still a need for research exploring this construct in the EFL context. Regarding the construct of loving pedagogy, scant attention has been paid to this teacher characteristic in educational settings (i.e., EFL context). Given the limited understanding of the relationship between loving pedagogy, teacher self-efficacy, and teacher burnout in EFL contexts, there is a need to examine these relationships in greater detail. The investigation of this specific group of teachers (i.e., EFL instructors) is crucial as teaching EFL is unique and requires specific competencies and pedagogical approaches (Broughton et al., 2002). Furthermore, the study context (China) is significant because it has one of the largest populations of English learners globally, and Chinese EFL teachers often face unique challenges and experiences (Fan et al., 2021). Also, to the best of our knowledge, so far, no study has explored the effect of loving pedagogy on teachers' burnout. As an attempt to fill the identified lacuna, the current research examines the predictability of loving pedagogy dispositions and teacher self-efficacy on EFL teachers' burnout. Indeed, the current study examines for the very first time how EFL teachers' self-efficacy, DTLP, and burnout are simultaneously correlated. This research is of significance as it sheds light on the importance of DTLP for promoting teacher well-being and effectiveness, and provides a deeper understanding of the mechanisms through which DTLP can impact teacher burnout.

2. Literature review

2.1. Teacher burnout

Emerged as a psychological construct in 1970s, Freudenberger (1974) first introduced burnout in 1974 to talk about the psychological condition of employees at drug addicted clinic to show how they were no longer committed to their job after working a year. Moreover, Freudenberger (1980) examined the employees' psychological and physical status and demonstrated that they were experiencing a "state of fatigue or frustration brought about by devotion to a cause, way of life, or relationship that failed to produce the expected reward," p. 13. As mentioned earlier, burnout is often characterized with three dimensions, namely emotional exhaustion, cynicism or

depersonalization, and low efficacy or personal accomplishment (Maslach et al., 2001). *Emotional exhaustion* has to do with to the stress dimension of burnout, and is accompanied by reduced level of energy, and fatigue. Accompanied by one's decreased emotional resources, *Depersonalization* pertains to a person's development of the cynical and negative attitudes, and being detached from various aspects of his job. This dimension o burnout refers to the interpersonal relationship, and points to one's emotional and cognitive alienation from himself and his colleagues. *Low efficacy/personal accomplishment* is conceived as an individual's sense of depression, demoralization, low self-efficacy and interpersonal relationships, and a lack of achievement and productivity while working (Maslach, 2003; Taris et al., 2005; Kim et al., 2009; Maslach, 2015; Akin, 2019). According to Llorens-Gumbau and Salanova-Soria (2014), burnout is likely to develop when employees experience chronic job demands or stressors, which eventually can lead to their reduced energy resources and result in to burnout. Burnout has found its ways into various occupations and fields, such as teaching profession. As Kyriacou (2015) asserted, teacher burnout refers to "a syndrome of physical, emotional, and attitudinal exhaustion toward one's work, which results from experiencing teacher stress over a long period" (p. 72). Teachers who experience burnout are inclined to perceive themselves negatively, hold the belief that they are not able to effectively do an important job, and have negative feelings about their learners and or peers (Chang, 2009; Gómez-Domínguez et al., 2022; Zhang et al., 2022).

Research evidence reveals that teacher burnout can predict both learner and teacher health, as well as teachers' well-being and job satisfaction. For example, Sabancı (2009) showed that teacher burnout and its dimensions (i.e., emotional exhaustion, personal accomplishment and depersonalization) correlated negatively with organizational health. In another study, Hakanen et al. (2006) teacher burnout was negatively associated with teachers' health and work ability. Collecting data from a sample of 313 Finish teachers, Räsänen et al. (2022) demonstrated that teacher burnout was negatively related with teacher commitment and positively with their turnover intention. In an EFL context, Wang Z. (2022) investigated the relationship between teacher burnout and learner outcomes. Their findings demonstrated that burnout of L2 teachers had a negative effect on students' academic achievement.

Empirical evidence indicates that teachers experience burnout not only due to setbacks within the educational context, like demanding class management (Friedman, 2013), discipline problems (Chang, 2013), work-related stress (Burke et al., 1996), but also because of teachers' own psychological factors (Talmor et al., 2005; Tsang et al., 2022). Moreover, it has been revealed that teachers' positive psychological tendencies can reduce the negative effects of burnout and prevent it from happening in the realm of education in general and EFL context in particular (Richards et al., 2016). One such factor that can act as a defense mechanism against EFL teachers' burnout is self-efficacy.

2.2. Teacher self-efficacy

It is argued that compared to objective realities, attitudes and beliefs of individuals have more significant impact on their life (Bandura, 1977; Schunk, 1984). As Bandura (1986) asserted, self-efficacy has to do with a person's belief in his abilities and pertains to "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances," p. 391. Self-efficacy refers to one's belief toward what he/she is capable of doing rather than the judgments about his/her attributes, which are the aspects of self-concept (Schunk, 1994; Schwarzer and Fuchs, 1996). Conceptualized as a multidimensional and context-specific construct (Bong and Skaalvik, 2003), self-efficacy beliefs are skill/domain specific and there is no all-purpose measure of this concept (Pajares, 2003; Chao et al., 2019). According to Bandura (1977, 1986), self-efficacy is grounded in the social-cognitive theory and can be influenced by an individuals' behavioral, social, affective, and psychological characteristics. Based on this theory, self-efficacy shapes individuals' objectives and behaviors and is affected by the surrounding environment (Mughal et al., 2022). Moreover, self-efficacy is viewed to be rooted in the concept of human agency (Bandura, 2001) and can exert a strong influence on an individual's continuous effort toward accomplishing his objectives (Zimmerman, 1995). Self-efficacy is commonly viewed as a person's positive self-evaluation regarding his capacity to effectively control his surrounding environment and successfully have an impact upon it (Welch and West, 1995; Schyns and Von Collani, 2002). As Pintrich et al. (1993) demonstrated, carrying out a task is significantly influenced by one's level of self-efficacy rather than his actual skills. According to Bandura (1977), there are four prime causes of self-efficacy, namely enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological responses. Among which, enactive mastery experiences are often regarded as the central cause of individuals' self-efficacy, particularly of teachers (Gale et al., 2021). Moving to the self-efficacy of teachers, teacher self-efficacy relates to teachers' believing in their capabilities in order to bring about desired results, such as promoting students' engagement and academic achievement (Friedman and Kass, 2002; Marschall and Watson, 2022; Yoon and Kim, 2022). Teacher self-efficacy is recognized as an instructor's confidence in his own abilities to successfully execute teaching practices. Conceived as context-specific construct, teacher self-efficacy is concerned with teachers' beliefs regarding their capacities to provide learners with varying amounts of help and support and have a significant effect on their and engagement (Dellinger et al., 2008; Klassen and Chiu, 2010; Tschannen-Moran and Johnson, 2011; Xiyun et al., 2022). Teachers' beliefs toward their level of expertise, skills and mastery can help them to effectively deal with teaching-related setbacks and challenges (Sela-Shayovitz and Finkelstein, 2020). As Cherniss (1993) maintained, teacher self-efficacy contains accomplishing professional goals, improving professional development, developing well-organized teaching practices, applying approaches and procedures, having the commitment to school and teaching, being able to identify school-specific needs, and enhancing the well-being of learners (Althauser, 2015; Lauermann and König, 2016; Ford et al., 2017; Schwab et al., 2022). Jerrim et al. (2023), however, challenged the widely held belief that teachers with high self-efficacy are more effective at enhancing learner achievement by reporting that there was no evidence of a relationship between the two variables. As Tschannen-Moran and Hoy (2001) indicated, teacher self-efficacy consists of three sub-categories: teachers' efficacy in classroom management which has to do with teachers believing in their own capacities in order to manage the classroom and control the behaviors of students, teachers' efficacy in student engagement which is conceived as teachers' beliefs regarding their capabilities to engage their students in the class activities, and

teachers' efficacy in instructional strategies which is about teachers' perceptions in their abilities to plan successful teaching strategies in order to address the learning requirements.

Literature on teacher self-efficacy has constantly demonstrated that it has positive effect on both teachers' well-being and learners' positive outcomes (Skaalvik and Skaalvik, 2010; Burić and Macuka, 2018; Kasalak and Dagyar, 2020; Kim and Burić, 2020; Wray et al., 2022), specifically in the context of EFL (e.g., Ghonsooly and Ghanizadeh, 2013; Zonoubi et al., 2017; Fathi et al., 2021; Gao et al., 2022). Gathering data among a sample of 2,249 Norwegian teachers, Skaalvik and Skaalvik (2010) tested a relationship between burnout and self-efficacy of teachers. Analyzing the data by means of structural equation modeling, their findings demonstrated that teachers' level of self-efficacy was negatively related to their burnout. By the same token, in the context of Norway, Skaalvik and Skaalvik (2007) examined the correlation between teacher self-efficacy and burnout. The results revealed that teachers' self-efficacy was significantly and negatively associated with teachers' burnout. Hassan and Ibourk (2021) investigated the association between self-efficacy, burnout and job satisfaction of teachers. Collecting data among 404 teachers, the authors revealed that there was a negative correlation between burnout and self-efficacy. Moreover, it was found that teacher self-efficacy had a positive relationship with teachers' job satisfaction. Utilizing "Maslach Burnout Inventory" and "Teacher Sense of Efficacy Scale," Savas et al. (2014) investigated the correlation between teacher self-efficacy and burnout among 163 teachers. Employing hierarchical multiple regression analysis, it was found that self-efficacy of teachers negatively correlated with their burnout experiences. In an EFL context, in Iran, Fathi et al. (2021) explored a structural model of teacher reflection, self-efficacy, burnout, and emotion regulation of EFL teachers. Employing confirmatory factor analysis, their findings indicted that teacher self-efficacy and teacher reflection negatively predicted the burnout of EFL teachers via the meditating role of emotion regulation. In another study, Bing et al. (2022) conducted a research to examine the predictive role of emotion regulation and self-efficacy in affecting EFL teachers' burnout. Their results indicated both variables predicted teacher burnout significantly. Khani and Mirzaee (2015) explored the correlation among stressors, contextual variables, self-efficacy and burnout o EFL teachers in an Iranian context. Collecting data from a sample of 216 teacher, it was indicted that teacher self-efficacy was negatively related with burnout and reduced its negative effects. In another study, using structural equation modeling.

2.3. DTLP

Given the fact that love is intertwined and attached to humans' nature and need for belongingness, giving a common definition for this concept has not an been easy task. However, some have tried to describe it. For instance, according to Berscheid (2006), "the word love is used in an astounding array of situations to describe an enormous range of attitudes, emotions, feelings, and behavior toward objects and people" (p. 172). As Loreman (2011) maintained, love is not merely limited to one's private life and can be extended to his professional life, nature, and several more domains as well. As pointed out by Määttä and Uusiautti (2011), there are various categories of love, such as maternal and paternal love, romantic love, love for one another, the feeling of love toward an individual's country, and pedagogical love. Despite its complicity and paradoxicality, pedagogical love is regarded as a vital construct of teaching (Maatta and Uusiautti, 2012). Teachers employing pedagogical love in their classrooms indicate that they love their students and have confidence in learners' talent. Moreover, Pedagogical love does not merely focus on learners' characteristics, rather it constantly tries to help them learn and develop as unique individuals (Hatt, 2005; Maatta and Uusiautti, 2012; Wilkinson and Kaukko, 2020). Pedagogical love pertains to teachers' love toward their learners without expecting any rewards or favor in return (Skinnari, 2004; Johnson et al., 2019). It is worth noticing that pedagogical love not only facilitates students' learning process but also help teachers to bond with their students in the classroom, motivating students to address their drawbacks while learning (Luguetti et al., 2019; Yin et al., 2019). The role of love in education can be traced back to early 16th century as various scholars and philosophers (e.g., Roger Ascham, John Locke and Martti Haavio) focused on this concept and discussed it. Martti Haavio's perception was that it is better for teachers' loving attitude can help develop learners' personalities and promote their academic achievement (Määttä and Uusiautti, 2011). According to Loreman (2011), DTLP refers to the *passion, kindness, empathy, intimacy, bonding, sacrifice, forgiveness, acceptance, and community* between teacher and pupils and its theoretical framework is based on three categories, namely religious, psychological, and philosophical domains. As a well-known thinker on love in education, Paulo Freire indicates that it is not possible for teachers to teach without the courage to love, and that the existence of strong love for the world and for people is a necessity for education (McLaren, 1999; Madero, 2015; Freire et al., 2018). In line with the mainstream of positive psychology (Seligman, 2010), and the affective approaches in pedagogy, Barcelos and Coelho (2016) introduced the basic elements of DTLP, namely ethics, growth, care, respect, freedom, and dialog. It is worth pointing out that loving pedagogy can significantly contribute to learners' emotional status, autonomy, motivation, academic achievement, and mental health (Darder, 2017; Ye et al., 2022). Extending this construct into the realm of SLA, Zhao and Li (2021) indicated loving pedagogy pertains to the kindness, affection, empathy, and care that teachers hold regarding the learners' outcomes, feelings, needs, and learning process.

A review of the literature reveals that DTLP can play a vital role in affecting not only learners' positive outcomes but also teachers' well-being (e.g., Atmaca et al., 2020; Wilkinson and Kaukko, 2020; Kaukko et al., 2021; Derakhshan et al., 2022; Li and Miao, 2022; Wang et al., 2022). For instance, the results of the stud of Kaukko et al. (2021) indicated that teachers' DTLP can be particularly conducive to refugee learners' academic achievement and mental health. In this study, Barcelos (2020) demonstrated that DTLP in curriculum can lead to promoted motivation, achievement, well-being, autonomy, joy communication skills, engagement, resilience, and creativity of teachers and learners. In another study, Atmaca et al. (2020) investigated the association between teachers' emotional, burnout and job satisfaction. To this end, 564 Turkish teachers participated in the study. Employing confirmatory factor analysis, their findings revealed that the love dimension positively predicted teachers' job satisfaction.

In addition, it was found that teachers' feeling of love negatively predicted their burnout. By investigating the psychometric scales of Disposition toward Loving Pedagogy (DTLP), Teaching for Creativity Scale (TCS), and Utrecht Work Engagement Scale (UWES), Derakhshan et al. (2022) aimed at testing the relationship between teachers' loving pedagogy, work engagement and teaching for creativity. Collecting data from a sample of 773 EFL teacher, their findings demonstrated that teaching for creativity and DTLP of teachers significantly predicted their work engagement.

2.4. The purpose of this study

The current study aimed to examine the relationship between DTLP, teacher self-efficacy, and teacher burnout among Chinese EFL teachers. Loving pedagogy, teacher self-efficacy, and teacher burnout are crucial factors for teacher well-being and effectiveness in the classroom. The above-mentioned studies can provide a groundwork for the investigation of the relationships between the variables, namely loving pedagogy disposition, self-efficacy and teacher burnout. Furthermore, given the fact that burnout can have a bearing on L2 learners' academic achievement (Roohani and Dayeri, 2019), its role cannot be ignored in the field of EFL. however, what remains vague is the interplay of loving pedagogy, self-efficacy and teacher burnout. More specifically, to the best of our knowledge, there is no other study that has examined the association between these variables in a single study, particularly in L2 learning and teaching. Hence, as an attempt to fill this research lacuna, the current study advances the research on EFL teachers' burnout by examining its potential relationships with loving pedagogy dispositions and teacher self-efficacy. According to the theoretical and empirical evidence mentioned above, a structural model regarding the correlations between the constructs (i.e., loving pedagogy dispositions, self-efficacy, and teacher burnout) was hypothesized (see Figure 1).

Based on extant empirical evidence (e.g., Skaalvik and Skaalvik, 2007, 2010; Fathi et al., 2021; Hassan and Ibourk, 2021; Bing et al., 2022) in which teacher self-efficacy negatively predicted burnout, it is hypothesized that teacher self-efficacy affects burnout negatively. Teacher self-efficacy, which refers to a teacher's confidence in their ability to effectively perform their role and make a difference in the lives of their students, is a critical factor for teacher well-being and effectiveness. High levels of self-efficacy are associated with lower levels of stress and burnout, as well as improved job satisfaction and better performance. Also, loving pedagogy has been linked to positive outcomes in education, such as enhanced motivation, engagement, and academic achievement among students (Derakhshan et al., 2022; Wang et al., 2022). At the same time, loving pedagogy can also benefit teachers in terms of reducing stress and burnout. A teacher who adopts a loving pedagogy style is likely to feel more confident in their abilities and less stressed, as they are able to build positive and supportive relationships with their students (Atmaca et al., 2020; Zhao and Li, 2021). Accordingly, loving pedagogy is hypothesized to affect teacher burnout in a negative way.

Finally, following Seligman's (2010) theoretical framework of positive psychology, it is hypothesized that loving pedagogy positively affects teacher self-efficacy. Although the literature linking DTLP and teacher self-efficacy is relatively scarce, there is a theoretical basis to suggest a potential link between the two constructs. The concept of loving pedagogy is concerned with a caring and supportive relationship between the teacher and the students (Noddings, 2012; Yin et al., 2019), which is expected to enhance teachers' confidence in their ability to foster positive outcomes in their students. As a result,

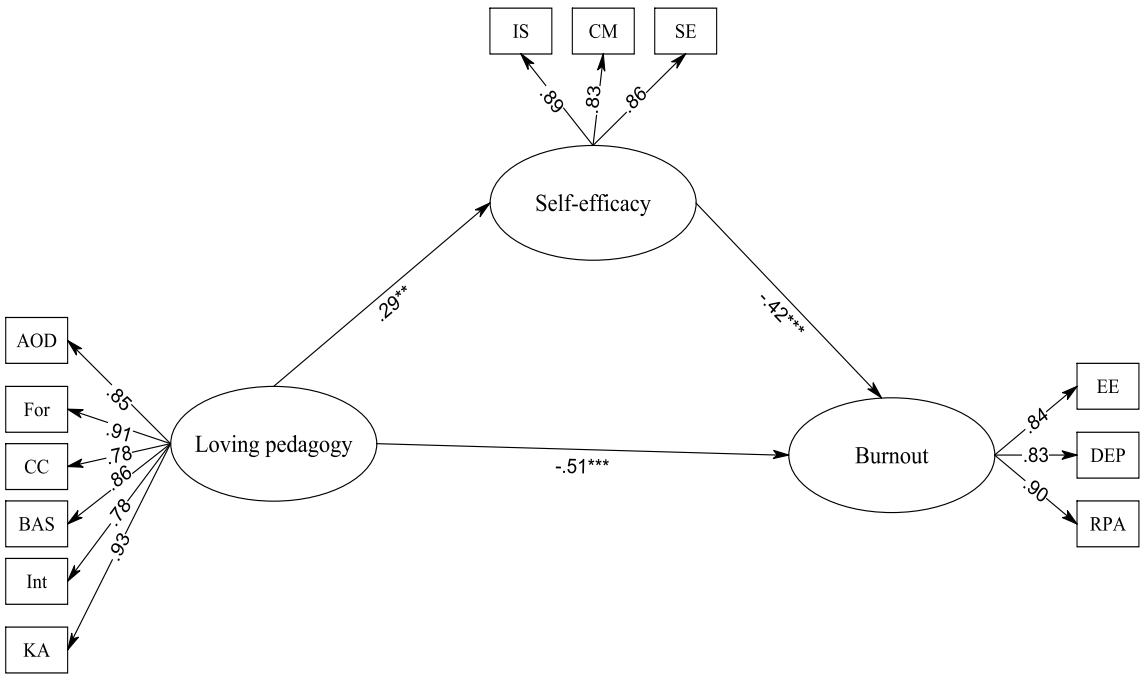

FIGURE 1
The final model of loving pedagogy, teacher self-efficacy, and burnout. *p<0.05; **p<0.01; ***p<0.001.

teachers who embrace loving pedagogy may feel more self-assured in their teaching abilities, leading to increased self-efficacy (Pekrun, 2021). In fact, previous studies have shown that teacher-student relationships characterized by care and trust are positively associated with teacher self-efficacy (Zhou et al., 2020; Cai and Tang, 2021). Therefore, it is plausible that DTLP could have a direct effect on teacher self-efficacy, although further empirical evidence is needed to establish this relationship more definitively.

Furthermore, it is hypothesized that teacher self-efficacy mediates the relationship between loving pedagogy and teacher burnout, such that higher levels of loving pedagogy lead to higher levels of self-efficacy, which in turn leads to lower levels of burnout. The mediating role of self-efficacy is justified on some grounds. First, empirical studies have found support for the mediating role of teacher self-efficacy in the relationship between instructional approaches and burnout. For example, a study by Yu et al. (2015) found that self-efficacy mediated the relationship between work stress and burnout. Similarly, a study by Cai et al. (2022) found that teacher self-efficacy mediated the relationship between professional community and teachers' work engagement. Also, based on Bandura's (1977) theory of self-efficacy, it is possible that loving pedagogy may be connected with mastery experiences, which could influence a teacher's self-efficacy over time. A teacher who adopts a loving pedagogy style may feel more confident in their abilities and more likely to take on challenging tasks, leading to a sense of mastery and increased self-efficacy. Furthermore, research has shown that teacher self-efficacy is positively associated with teacher performance, job satisfaction, and well-being (Tschannen-Moran and Hoy, 2001; Klassen and Chiu, 2010). Teachers who believe in their ability to effectively manage their classrooms and promote student learning are more likely to experience lower levels of burnout and greater job satisfaction.

3. Materials and methods

The research design used in this research is quantitative research. Specifically, the researcher used a cross-sectional design to examine the relationships among the variables of interest, and collected data through an electronic survey comprised of valid questionnaires for the constructs of loving pedagogy, teacher self-efficacy, and teacher burnout. The study also used structural equation modeling (SEM) to test the hypothesized relationships among the variables.

3.1. Participants and setting

This online survey recruited 428 EFL teachers from various language academies and schools in China, including both private and public institutions. The institutions included primary, secondary and tertiary level schools. Convenience sampling was used to select participants, who were male ($n = 196$) and female ($n = 232$). The average age of participants was 26.32 years (SD = 6.94), and the average teaching experience was 6.83 years (SD = 3.04). The participants were distributed across different provinces in China, including both urban and rural areas. Specifically, 43% of the participants were from large cities, 28% were from medium-sized cities, and 29% were from smaller towns or rural areas. All participants had completed teacher training courses before participating in the study.

This research focused on EFL teachers in China, who face unique challenges in their teaching practice (Wu, 2001). EFL teachers work in a multicultural and diverse setting, where students may have varying levels of proficiency in the target language. They are required to create engaging and effective lesson plans while also ensuring that students meet language proficiency standards. Furthermore, EFL teachers often have large class sizes, limited resources, and little support from administration, which can contribute to their stress levels (Chen and Goh, 2011). Also, research evidence has suggested that EFL teachers are at a higher risk for burnout due to the demands of their job (Ghasemi, 2023), and the impact of burnout can be particularly concerning for EFL teachers, as it can affect their motivation, teaching effectiveness, and ultimately, student learning outcomes (Wang L., 2022; Wang Z., 2022).

3.2. Instruments

The scales (TSES, MBI-ES, and DTLP) used in this study were all administered in English. Although the participants were EFL teachers in China, the items on the scales were understandable for them as they were all trained in English language teaching and had to demonstrate a certain level of proficiency in English in order to teach in their respective institutions/schools. Therefore, no translation was necessary for the administration of the scales in this study.

3.2.1. Teacher self-efficacy scale

Chinese EFL teachers' self-efficacy perceptions were assessed using Teachers' Sense of Efficacy Scale (TSES) designed by Tschannen-Moran and Hoy (2001). TSES constitutes 24 statements, rated on a Likert scale, which measure three underlying components including self-efficacy in instructional strategies (IS), classroom management (CM), and student engagement (SE). The respondents indicated their agreement level with each statement from1 (nothing) to 5 (a great deal). A sample item was "How much can you do to help your students think critically?" In this study, ω was 0.86 for this scale, showing its high reliability.

3.2.2. Teacher burnout scale

Participants' degree of burnout was gauged using Maslach burnout scale (MBI-ES), developed by Maslach et al. (1996). This self-report questionnaire consists of 22 statements assessing three facets of teacher burnout: emotional exhaustion (EE, 9 items), depersonalization (DEP, 5 items), and reduced personal accomplishment (RPA, 8 items). Every item is measured on 7-point Likert scale from 0 (never) to 6 (every day). MBI-ES proved to have acceptable reliability and validity indices (Maslach et al., 1996). A sample item of the scale is "I feel frustrated by my job." The calculated ω for this scale was 0.82 in this study.

3.2.3. Loving pedagogy scale

In order to measure EFL teachers' loving pedagogy, Disposition toward Loving Pedagogy (DTLP) scale initially developed by Yin et al. (2019) was administered to the participants in this research. DTLP scale includes 29 statements which evaluate six dimensions of the construct: *acceptance of Diversity (AOD), Forgiveness (For), Classroom Community (CC), Bonding and Sacrifice (BAS), Intimacy (Int), and Kind Acts (KA)*. The statements are rated on a 4-point Likert-scale

from 1 (Strongly Disagree) to 4 (Strongly Agree). A sample item was "I make specific efforts to bond with students." The reliability of this scale, as estimated with ω, was 0.85 in this research.

3.3. Procedure

The participants in this study were senior high school EFL teachers in China who were willing to participate in the study. The researcher initially reached out to a group of EFL teachers through professional networks and social media channels and invited them to complete the online survey. The teachers were also requested to forward the survey link to their colleagues via social apps such as WeChat and QQ, as well as through email, in order to cover a diverse range of participants. The online survey was hosted on a Chinese survey website[1] and included three questionnaires on teacher self-efficacy, DTLP, and burnout. Prior to completing the survey, participants were provided with an explanation of the study's purpose and instructions on how to fill out the survey and respond to the items. Participants were required to tick a box to indicate their voluntary participation and provide informed consent to take part in the survey. Additionally, the confidentiality of their collected information was emphasized to ensure the privacy and anonymity of their responses. The sample consisted of English teachers from various provinces and cities in China.

3.4. Data analysis

Descriptive statistics and correlations among the constructs were computed employing SPSS 21.0. The hypothesized model was tested with SEM using Mplus 7.0 program. I also used aggregated items for the observed indicators of each variable using a parceling approach procedure in SEM (Little et al., 2002). The advantage of using this approach instead of treating all items as indicators is the fact that parceling approach decreases the number of observed constructs in the model and enhances the parsimony of the model, leading to increased accuracy in testing the associations among the constructs (Little et al., 2002). As for estimating the latent constructs of teacher self-efficacy, burnout, and DTLP, the composite scores of their underlying components were parceled and considered as observed indicators (Joeng and Turner, 2015). More precisely, based on item-to-construct balance technique (Little et al., 2002), three parcels were created for each construct of teacher self-efficacy and burnout since each construct comprised three components. Accordingly, six parcels were also created for loving pedagogy construct. Concerning the reliability estimation of the used scales, McDonald's Omega (ω) Coefficient (McDonald, 1999) was calculated. The single-common-method-factor approach (Podsakoff et al., 2003) was used to address the common method bias. As for evaluating the adequacy of the model fit, a number of goodness-of-fit indices were used: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). A model was considered to have good fit if CFI and TLI > 0.90, RMSEA < 0.06, and SRMR < 0.08 (Hu and Bentler, 1999). The power as well as significance of indirect effect of teacher self-efficacy was estimated using boot-strap procedure in which the sample under investigation was randomly resampled and replaced 1,000 times and then the indirect effect of 1,000 estimations was measured. In this approach, if the 95% confidence interval (CI) for an indirect effect fails to contain 0, the significance of the indirect effect is approved (MacKinnon et al., 2004).

4. Results

First, a single-common-method-factor technique was employed to test whether the three self-reported constructs (i.e., teacher self-efficacy, burnout, and DTLP) were influenced with common method bias (Podsakoff et al., 2003). To this end, the hypothesized three-factor model was compared against other alternative models (see Table 1). The comparisons demonstrated that the suggested three-factor model had a more satisfactory fit [$\chi^2(25) = 46.379$, CFI = 0.981, TLI = 0.980, RMSEA = 0.015, SRMR = 0.024]. As indicated in Table 1, the fit of the bifactor model (hypothesized three-factor + un-estimated common factor model) did not enhance substantially [$|\Delta\chi^2|(3) = 4.815$, $p = 0.57$, ΔCFI = −0.001, ΔTLI = −0.001, ΔRMSEA = 0.008, ΔSRMR = −0.004]. Moreover, the hypothesized three-factor model demonstrated a substantially better fit than the other alternative models, highlighting that the common method bias influence was not significant in this research.

Table 2 indicates the descriptive statistics as well as the correlations among the constructs. As expected, loving pedagogy was positively correlated with teacher self-efficacy and was negatively associated with teacher burnout. Additionally, teacher self-efficacy was negatively correlated with teacher burnout. Then, the structural model was tested with loving pedagogy as a predictor, teacher self-efficacy as a mediator, and teacher burnout as the criterion variable. It is noteworthy that gender, age, and teaching experience were controlled in this model testing. The results of model evaluation indicated that the model had a good fit to the data: $\chi^2(63) = 118.28$, $p < 0.001$, CFI = 0.972, TLI = 0.65, RMSEA = 0.039, SRMR = 0.032. The path coefficients of the fit model are shown in Figure 1. As it was hypothesized, the direct effect of loving pedagogy on teacher burnout was significant ($\beta = -0.51$, $p < 0.001$). Loving pedagogy also had a positive effect on teacher self-efficacy ($\beta = 0.29$, $p < 0.001$), and teacher self-efficacy negatively affected teacher burnout ($\beta = -0.42$, $p < 0.001$). In addition, the indirect, mediating effect of teacher self-efficacy on burnout was also significant, although it should be noted that this was a partial effect ($\beta = -0.12$, $p = 0.021$, 95% CI [−0.06, −0.20]). While this effect was statistically significant at the $p < 0.05$ level, it was not a very strong path. Overall, the model explained 56.22% of the variance in teacher burnout based on the independent variables of loving pedagogy disposition and teacher self-efficacy.

5. Discussion

The present research sought to examine the associations between DTLP, teacher self-efficacy, and teacher burnout among a sample of Chinese EFL teachers. The results of the SEM analysis indicated a significant negative effect of DTLP on teacher burnout, and teacher

1 https://www.wjx.cn

TABLE 1 Results of model fit for the common method bias test.

Models	$\chi 2$	*df*	$\Delta\chi^2(\Delta df)$	CFI	TLI	RMSEA	SRMR
M1: single-factor model	274.124	28	227.745 (3)***	0.712	0.636	0.142	0.097
M2: two-factor model 1	193.719	27	147.340 (2)***	0.783	0.701	0.165	0.089
M3: two-factor model 2	137.271	27	90.892 (2)***	0.923	0.891	0.079	0.061
M4: two-factor model 3	162.576	27	110.704 (2)***	0.895	0.875	0.089	0.072
M5: hypothesized three-factor model	46.379	25	116.197	0.981	0.980	0.015	0.024
M6: bifactor model	41.564	22	−4.815(−3)	0.980	0.979	0.023	0.020

The hypothesized three-factor model was compared with all the alternative models. M2, two-factor model (loving pedagogy and burnout are combined); M3, two-factor model (teacher self-efficacy and burnout are combined); M4, two-factor model (loving pedagogy and teacher self-efficacy are combined); M6, Hypothesized three-factor + un-estimated common factor model
***$p < 0.001$.

TABLE 2 Descriptive statistics and correlations.

	M (SD)	1	2	3
(1) Teacher self-efficacy	3.76 (1.11)	1.00		
(2) Loving pedagogy	4.06 (0.91)	0.26*	1.00	
(3) Burnout	3.68 (0.92)	−0.36**	−0.48**	1.00

*$p < 0.05$; **$p < 0.01$.

self-efficacy acted as a mediator in this relationship. These findings suggest that higher levels of DTLP are associated with greater levels of teacher self-efficacy, which in turn can reduce the risk of teacher burnout.

More specifically, firstly, it was revealed that the teachers' self-efficacy beliefs significantly and negatively predicted burnout among EFL teachers. This finding accords with the findings of studies indicating that there is a strongly negative correlation between teacher self-efficacy and teacher burnout (e.g., Skaalvik and Skaalvik, 2007, 2010; Savas et al., 2014; Khani and Mirzaee, 2015; Ghasemzadeh et al., 2019; Fathi et al., 2021; Hassan and Ibourk, 2021; Bing et al., 2022). According to these studies, teachers believing in their own abilities in successfully completing particular teaching activities may have a strong effect on reducing their burnout. As Leiter and Schaufeli (1996) asserted, teachers with increased sense self-efficacy are more likely to be protected from feelings of apprehension and emotional exhaustion. Hence, it is postulated that teachers who are more confident in their capacities and competencies in conducting effective teaching strategies, managing their classrooms, and engaging the students, had less tendencies to feel reduced personal accomplishment, depersonalization, and emotional exhaustion. In addition, it can be argued that teachers with low level of perceptions of competence in classroom management are more likely to experience work-related stress, which in turn can give rise to both emotional exhaustion and depersonalization (Büssing and Glaser, 2000; Lloyd et al., 2017). Since work engagement is the exact opposite of burnout (Demerouti et al., 2010), this result is partly in accordance with that of Burić and Macuka (2018) who revealed that self-efficacy positively predicted work engagement off teachers.

Secondly, loving pedagogy was found to be a more powerful predictor of teacher burnout. This finding agrees with an earlier study that confirmed a significant positive impact of teacher love on teacher burnout (Atmaca et al., 2020). Put another way, it was found that teachers who subscribe to the pedagogy of love may feel less reduced personal accomplishment, depersonalization, and emotional exhaustion while teaching. These teachers often establish a sense of intimacy, create emotional bond with pupils, promote empathy in the classroom, and acknowledge the uniqueness of each learner (Derakhshan et al., 2022). One possible explanation for this finding is that loving pedagogy may enhance teacher self-efficacy and job satisfaction (Yin et al., 2019). When teachers establish emotional connections with their students, they may feel more effective in their teaching and experience a sense of fulfillment in their work (Grimmer, 2021). Moreover, by acknowledging the uniqueness of each learner, teachers may be more motivated to develop innovative and effective teaching strategies that meet the diverse needs of their students, resulting in their heightened job satisfaction (Loreman, 2011). Also, it is worth noting that passion, as a core component of a pedagogy of love can negatively predict all three components of burnout (i.e., emotional exhaustion, lack of personal accomplishment, and feelings of cynicism toward and detachment from work; Fernet et al., 2014). Furthermore, according to Vallerand et al. (2010), work passion is negatively correlated with one's burnout. Therefore, one can argue that teachers who support DTLP are less prone to burnout while teaching. Another possible mechanism by which DTLP may reduce burnout is by fostering positive teacher-student relationships. Research has shown that positive relationships between teachers and students are associated with better academic and social–emotional outcomes for students (Roorda et al., 2011; Li et al., 2022). Moreover, positive teacher-student relationships can contribute to a positive school climate, which is associated with lower levels of teacher burnout (Roeser et al., 2013). Therefore, by promoting positive relationships with students, loving pedagogy may create a more supportive and positive work environment for teachers.

Finally, it was revealed that teacher self-efficacy mediated the relationship between loving pedagogy and teacher burnout. In other words, teachers who were equipped with DTLP were more likely to hold positive perceptions toward their abilities to teach in the class, which in turn helped them to have less probability of experiencing burnout. One explanation in this regard can be that the love that one has for something (i.e., his/her work) might be made use of to promote his interpersonal coping strategies and self-esteem (Newark et al., 2016). To further support this interpretation, it is worth noting that previous research has suggested that love is linked to greater levels of life satisfaction and psychological well-being (Kim and Hatfield, 2004; Lavy and Littman-Ovadia, 2011). Additionally, self-efficacy, or one's belief in their ability to succeed in specific tasks or situations, has been shown to be positively correlated with well-being among teachers (Zee and Koomen, 2016; Ortan et al., 2021). Therefore, it is reasonable to hypothesize that

teachers who practice loving pedagogy may also experience increased self-efficacy, which in turn could lead to greater work engagement. This idea is supported by the work of Newark et al. (2016), who found that one's ability to love can have a positive impact on their self-efficacy.

6. Conclusions and implications

As demonstrated by the results, DTLP and self-efficacy of EFL teachers can lead to the alleviation of the probability of experiencing burnout among EFL teachers. The findings provide empirical evidence for the negative effect of loving pedagogy on teacher burnout and the mediating role of teacher self-efficacy. The outcomes emphasize the importance of promoting positive teacher dispositions, such as loving pedagogy, in order to support the well-being and effectiveness of foreign language teachers.

In the reviewed literature above, it was shown that DTLP can results in academic contexts, specifically in the context of EFL. As an attempt to propose a research agenda on the construct of loving pedagogy, the current study is innovative in that it sheds more light on this line of inquiry. Therefore, the findings of this study can have significant implications for L2 policy makers, teachers, and researchers. Additionally, given the fact that DTLP and self-efficacy are rooted in the domains of positive psychology (Costello and Stone, 2012; Derakhshan et al., 2022), EFL teacher education programs and practitioners should give proper attention to train pre-service teachers based on positive psychology framework which includes love, and self-efficacy as well as other psychological factors in order to promote the as wellbeing, leadership, and mental health of teachers. More specifically, EFL teacher education programs can emphasize the development of loving pedagogy dispositions and provide teachers with training in effective self-reflection and self-efficacy building strategies. For example, teacher education programs can encourage pre-service teachers to reflect on their personal beliefs and values, and how they can incorporate these into their teaching practice. They can also provide opportunities for pre-service teachers to observe and learn from experienced teachers who model loving pedagogy in their classrooms (Loreman, 2011). Furthermore, professional development programs can offer opportunities for practicing teachers to reflect on their own pedagogical practices and work on developing a positive and compassionate approach to teaching.

Workplace policies can also play a role in promoting a supportive work environment that values teacher well-being and encourages the development of positive teacher dispositions. Schools and educational institutions can create a culture that values and rewards positive teacher dispositions, such as loving pedagogy, and prioritize teacher well-being in their policies and practices (Yin et al., 2019). This can include providing resources for teachers to manage their workload and stress, as well as creating opportunities for teachers to collaborate and support each other in their professional development.

Although the findings of this study provided valuable insights into the interplay between DTLP, teacher self-efficacy, and teacher burnout, some limitations should be considered. First, the research was conducted with a sample of Chinese EFL teachers, and the results may not generalize to other populations of foreign language teachers. Moreover, multi-dimensional measures, such as the loving pedagogy scale, provide a more comprehensive assessment of the various dimensions of a construct as each dimension may have unique predictive value and could impact the overall relationship between constructs in the model. However, given the scope, purpose, and the sample size, the present researcher treated the measures as global constructs. Since the sample size was not sufficient to conduct analyses on multiple dimensions, analyzing a large number of dimensions with a small sample size could lead to issues with statistical power, which might have produced unreliable outcomes. As such, future researchers are invited to employ larger sample sizes and consider distinct dimensions of the used measures to identify which dimensions have the highest predictive value and can provide a more in-depth understanding of the associations between loving pedagogy, teacher self-efficacy, and burnout.

Furthermore, the researcher relied only on self-reported data, which may be subject to response bias and social desirability effects. Also, it is worth noting that while our findings suggest a positive impact of loving pedagogy on teacher burnout, it is important to acknowledge the potential bidirectional relationship between these constructs. It is possible that teachers who are experiencing burnout may be less likely to adopt a loving pedagogy approach, or that the stress of teaching may make it more challenging to maintain a loving disposition. Likewise, there may be a reciprocal interconnection between DTLP and teacher self-efficacy, where each concept positively influences the other. For instance, a teacher who has high levels of self-efficacy may be more likely to adopt a loving pedagogy style, as they feel confident in their ability to positively impact their students. Therefore, it is possible that the relationship between DTLP, teacher self-efficacy, and burnout is more complex than what is currently hypothesized, and future researcher might probe the potential bidirectional and reciprocal effects of these constructs.

In the same vein, in terms of the causality issue, it is important to note that the model tested in this study was a correlational model and could not imply causality. However, the theoretical framework underlying the study provided a logical basis for the hypothesized relationships between the constructs. It should be noted that the focus of this study was on the specific associations between DTLP, teacher self-efficacy, and teacher burnout. Future researchers could build on this study by considering additional constructs, such as social support, that could influence the relationships in the model.

Also, concerning the partial nature of the indirect effect through teacher self-efficacy as a mediator, it is important to note that although the indirect effect was significant at the $p < 0.05$ level, the effect size was relatively small. This suggests that while teacher self-efficacy does play a role in mediating the relationship between loving pedagogy disposition and teacher burnout, there may be other factors at play that also contribute to the development of burnout in teachers. In addition, it is possible that the effect size of the indirect effect was attenuated due to the fact that other variables were controlled in the structural model, such as gender, age, and teaching experience. As such, it might have been useful to conduct additional analyses to explore the role of these variables in the relationship between DTLP, teacher self-efficacy, and burnout. However, the present researcher acknowledges that the relatively weak correlation between DTLP and self-efficacy, particularly as compared to the stronger correlation between DTLP and burnout, deserves further exploration in future studies. Finally, the cross-sectional design of the study does not allow for causal inferences to

be made, and further research is needed to establish the directionality of the relationships between the constructs.

Data availability statement

The data analyzed in this study is subject to the following licenses/restrictions: the raw data supporting the conclusions of this article will be made available by the author, without undue reservation. Requests to access these datasets should be directed to SC, 154543459@qq.com.

Ethics statement

The studies involving human participants were reviewed and approved by Basic Courses Teaching Department, Henan Judicial Police Vocational College, Zhengzhou. The patients/participants provided their written informed consent to participate in this study.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Influence of servant leadership on the life satisfaction of basic education teachers: the mediating role of satisfaction with job resources

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Background: Life satisfaction is essential for teachers' work performance and student learning. Additionally, servant leadership has been shown to be one of the best leadership practices as it promotes employee well-being and satisfaction. Moreover, satisfaction with job resources acts as a mediator in the relationship between servant leadership and life satisfaction by influencing individual and collective performance in the organization.

Objective: This research aimed to evaluate the mediating role of satisfaction with job resources in the relationship between servant leadership and life satisfaction.

Methods: The study was cross-sectional and explanatory. 620 teachers aged between 20 and 62years (M=35 and SD=9.49) participated in the study. Structural Equation Modeling (SEM) was used to measure life satisfaction, service leadership, and job resource satisfaction through the use of questionnaires.

Results: The results indicated that the model obtained an adequate fit, χ^2=2,658, df=551, p<0.001, CFI=0.941, TLI=0.936, RMSEA=0.079, SRMR=0.070. The results confirm the positive influence of leadership on satisfaction with resources and life satisfaction. Additionally, a positive influence of satisfaction with job resources on life satisfaction was observed. Moreover, the mediation of job resources in servant leadership and life satisfaction was confirmed.

Conclusion: Servant leadership, supported by satisfaction with job resources, can reduce effort and associated costs, stimulate personal growth and learning, and improve the well-being of teachers.

KEYWORDS

servant leadership, life satisfaction, resources, education, teachers

1. Introduction

Life satisfaction is a critical factor for both job performance and student learning. Teachers who experience a high level of life satisfaction are more motivated and committed to their work, resulting in better performance in the classroom (Nagarajan et al., 2022). This also enables greater empathy, control of their classes, and the creation of a positive learning environment, improving the relationship between teachers and their students (Guess and McCane-Bowling, 2016; Nie et al., 2019; Braun et al., 2020). As a result, teachers can better resolve conflicts and deal with stressful situations in the classroom (Moore, 2008). Additionally, they are less likely to suffer from mental and physical health problems, allowing them to stay healthy and energized to fulfill their daily tasks (Randall et al., 2021). This helps them to achieve a better balance between their work and personal life (Carroll et al., 2021).

Well-being is defined as a combination of feeling good and functioning well. It includes positive emotional experiences, potential development, autonomy, purpose, and healthy relationships (Huppert, 2009). It is a sustainable state that promotes personal and collective development and prosperity (Holck et al., 2001). Well-being is associated with success in various areas, such as work, personal and interpersonal, and is related to positive outcomes in health, life satisfaction, and economic performance (Oishi et al., 2007; Diener, 2012). Furthermore, it improves academic performance (Crippen and Willows, 2019; Shen et al., 2020). Life satisfaction is associated with leadership, as an organization that practices service-oriented leadership will have an improved perception of satisfaction (Kroumova's, 2020). Therefore, it is recommended that leaders adopt a service-oriented style and that organizations hire personnel with these qualities (Li et al., 2018). Leader-member Exchange (LMX) focuses on the relationship between leaders and followers and their influence on job satisfaction. Employees with high-quality LMX have greater information exchange with their leaders, as well as higher levels of trust and support (Tu and Lu, 2016; Fu et al., 2019; Pan et al., 2021). Due to its people-centered approach, followers are expected to have greater well-being and satisfaction, making service-oriented leadership a significant factor for individual life satisfaction (Van Dierendonck et al., 2014; Li et al., 2018; Latif et al., 2022).

In the educational field, several studies emphasize the importance of exercising servant leadership by teachers (Poobalan and Talip, 2020). This is one of the best leadership practices for addressing unexpected challenges, such as the coronavirus pandemic, as it focuses on empowerment, engagement, and collaboration (Eva et al., 2019). Servant leadership is based on a holistic approach encompassing ethical, rational, emotional, relational, and spiritual dimensions (Sendjaya and Sarros, 2002). Therefore, it is a people-oriented leadership approach that prioritizes the needs and interests of subordinates and redirects personal care toward them in organizations and communities. This creates a positive work environment that increases subordinates' commitment to their roles and organizations (Newman et al., 2017; Eva et al., 2019). Additionally, servant leadership helps improve teacher professionalism (Poobalan and Talip, 2020). These leaders see their subordinates as their top priorities and work for their benefit, creating an environment in which they foster positive relationships, provide empowerment, help them grow and succeed, act ethically, and possess cognitive skills, generating value outside the organization (Greenleaf, 1977b).

Servant leadership has significantly impacted employees' life satisfaction, as servant leaders focus on surpassing their own interests and on the growth and development of their environment. These actions allow them to achieve professional goals and perform at their best, which in turn makes them happier and more satisfied with their lives (Chughtai, 2018). Several previous studies used different variables as mediators to better explain the mechanism by which servant leadership influences followers' outcomes (Chughtai, 2019; Latif et al., 2021; Dami et al., 2022b). For example, life goals and psychological needs acted as mediators in the relationship between servant leadership and teachers' life satisfaction (Liaqat et al., 2022). Furthermore, job satisfaction has been shown to be a significant mediator between service leadership and life satisfaction at the higher education level (Latif et al., 2021). The mediating role of satisfaction of autonomy, competence, and relatedness needs at work is also discussed (Chiniara and Bentein, 2016). Organizational-level studies suggest that there are characteristics of the work environment that influence workers' perception of satisfaction (Lee and Park, 2021). These characteristics relate to the job resources that workers have in an organization. According to the Job Demands-Resources (JD-R) theory (Demerouti et al., 2001; Bakker and Demerouti, 2018), satisfaction with job resources encompasses people's well-being in relation to different factors, which favor individual and collective performance. These factors or resources can be found at different levels: leader, considering the boss-supervisor relationship, clarity of instructions, feedback, and recognition for achievements; tasks, which involve the job characteristics, availability of time and materials to meet objectives; team, which involves the relationship with co-workers in terms of cooperation, coordination, efficiency, and creativity; and finally, organization, which refers to job conditions such as salary, reward system, benefits, development opportunities, training, and learning (Chughtai, 2018; Spontón et al., 2019).

1.1. Theoretical framework

1.1.1. Constructive development theory

Kegan's theory of constructive development focuses on how individuals construct meaning and epistemological knowledge throughout different stages of development. Each stage represents a set of common organizational principles used to construct experiences, not differing by the content of experiences or how things are done, but rather by the principles by which thinking, feeling, and social relationships are constructed and organized. The transition from one stage to another involves a change in subject and object and represents an increase in the responsibility individuals have over the meaning they construct. There are six stages or "equilibria" of development that affect both emotional and relational function (incorporative, impulsive, imperial, interpersonal, institutional, and interindividual). To support individuals in their transition toward more complex stages, an environment that attends to the dominant stage of the individual and challenges them to access the next stage is necessary. Professionals working with individuals at different stages must adapt their approaches to adequately support and challenge their clients in their path toward psychological maturity. Teachers can build a supportive and challenging environment for interindividuals to help promote their ongoing growth and development (Eriksen, 2006).

1.1.2. Maslow's hierarchy of needs

Maslow's Hierarchy of Needs (HON) provides a framework for understanding human motivation that has been widely applied in the educational context. This theory suggests that individuals move through a series of hierarchical motivations, starting with physiological needs, safety, love, and belongingness, before moving on to higher-order needs such as self-esteem, self-actualization, and self-transcendence. According to Maslow, if lower-level needs are not met, individuals will experience negative physiological and psychological consequences. In the educational context, this implies that students' basic needs must be met before they can engage in higher-level thinking and learning. Therefore, the HON can inform teaching strategies and approaches to support students' physiological and psychological well-being, allowing them to reach their full potential (Maslow, 1954; Soni, 2016).

1.1.3. Motivation-hygiene theory

The Motivation-Hygiene Theory, developed by Frederick Herzberg, has been proposed as an alternative method for measuring job satisfaction and its determinants. This theory suggests that satisfaction and dissatisfaction are completely separate issues, and there are two factors: motivator or satisfier factors and hygiene or dissatisfier factors. Motivator factors are job factors that enhance satisfaction or motivation, such as the work itself, responsibility, recognition, achievement, and growth. In contrast, hygiene factors, such as company policy, salary, working conditions, and supervision, decrease dissatisfaction. Both satisfaction and dissatisfaction at work are crucial for organizations to manage because they ultimately impact productivity and effectiveness (Herzberg et al., 1959; Herzberg and Hamlin, 1961; Triandis and Herzberg, 1967). For this reason, it is essential that organizations understand the factors that create satisfaction and contribute to improved morale, which in turn will bring greater happiness and self-fulfillment. The discussion about job satisfaction and dissatisfaction is mainly developed from Herzberg's theory, and employee morale is a crucial factor associated with their motivation, reflecting their perception regarding their job, managers, and the organization itself (Brenner et al., 1971; Sachau, 2007). The role of teachers in achieving educational goals and objectives cannot be ignored. Therefore, it is important to improve employees' effectiveness and understand the factors that can create satisfaction, as satisfied employees can contribute to improved morale and productivity.

1.1.4. Job characteristics model

The Job Characteristics Model (JCM) suggests that enriched or complex jobs lead to higher job satisfaction, motivation, and job performance (Hackman and Oldham, 1975, 1976, 1980). The model postulates that five core job characteristics: skill variety, task identity, task significance, autonomy, and feedback, influence three critical psychological states: experienced meaningfulness of the work, experienced responsibility for the outcomes of the work, and knowledge of the actual results of the work activities. These psychological states, in turn, affect job outcomes such as internal work motivation, growth satisfaction, general job satisfaction, job effectiveness, and absenteeism. Hackman and Oldham also proposed three moderators of the relationships between job characteristics, psychological states, and job outcomes: growth need strength, knowledge and skill, and context satisfaction. They also emphasized the importance of task identity, autonomy, and feedback in fostering motivation, learning, and skill development for teachers (Coelho and Augusto, 2010). Thus, the JCM provides a useful framework for understanding how job design can influence teacher motivation and performance.

1.1.5. The dispositional approach

The dispositional approach involves the measurement of personal characteristics and the assumption that such measures can aid in explaining individual attitudes and behavior (Funder and Ozer, 1983). Although distinctions are sometimes made between the concepts of personal dispositions, traits, personality, and individual characteristics, these terms are used almost interchangeably in the literature (Bem and Allen, 1974), Each of these terms is based on a set of common assumptions: that it is possible to characterize people on certain dimensions, that these dimensions have some stability over time, and that these dimensions are useful in predicting individual behavior across situations (Staw and Ross, 1985).

1.1.6. The job demands-resources (JD-R) theory

The Job Demands-Resources (JD-R) Theory (Demerouti et al., 2001; Chughtai, 2016) provides a useful framework to examine how satisfaction with job resources influences the relationship between service leadership and life satisfaction among teachers. This is because the JD-R theory argues that job demands, and job resources influence employees' well-being and performance. Job demands are physical, psychological, social, or organizational aspects that require sustained effort and may lead to exhaustion and stress (Demerouti et al., 2001). On the other hand, job resources are aspects that help employees cope with job demands, achieve their goals, and develop personally and professionally (Bakker and Demerouti, 2018).

In the educational context, service leadership can be considered as a job resource that influences teachers' life satisfaction. Servant leaders, by focusing on the well-being and development of their subordinates, can provide a work environment where teachers' needs are met, and job demands are reduced (Greenleaf, 1977a; Van Dierendonck et al., 2014). Moreover, by providing emotional, instrumental, and social support to teachers, servant leaders can improve satisfaction with job resources, and ultimately, teachers' life satisfaction (Chughtai, 2018; Eva et al., 2019).

The JD-R theory suggests that job resources act as mediators in the relationship between job demands and employees' well-being and performance outcomes (Bakker and Demerouti, 2017). In this sense, satisfaction with job resources can play a mediating role in the relationship between service leadership and teachers' life satisfaction. For instance, the support and guidance provided by servant leaders can enhance empowerment and satisfaction with job resources related to leadership, tasks, team, and organization (Lin et al., 2020). In turn, higher satisfaction with these job resources can lead to higher satisfaction with teachers' life (Kaur, 2018; Marcionetti and Castelli, 2022; Dami et al., 2022a).

In this sense, it is important to explore how different job resources, such as leader support, quality of relationships with colleagues, access to materials and development opportunities, and job conditions, can affect the relationship between service leadership and teachers' life satisfaction. This will allow a better understanding of the underlying mechanisms in this relationship and provide valuable information for

interventions and policies aimed at improving life satisfaction and well-being of teachers in specific educational contexts such as Peru.

1.2. Literature review

1.2.1. Life satisfaction

Life satisfaction plays a fundamental role in subjective well-being, referring to how individuals evaluate their life and experience their emotions (Diener, 1984; Diener et al., 1999). Life satisfaction is a crucial aspect of human life, as it is considered an indicator of an individual's overall well-being. It is a cognitive measure that addresses a person's evaluation of their life in terms of achievements and expectations (Pavot and Diener, 1993). Placing greater emphasis on life satisfaction means paying special attention to how an individual's perception of their overall life influences their emotional and psychological well-being. High levels of life satisfaction are associated with various positive outcomes such as better job performance, stronger interpersonal relationships, greater resilience in difficult situations, and better physical and mental health (Ferguson, 2011; Diener, 2013). This variable is defined as a cognitive process where individuals evaluate the quality of their lives based on their own criteria, comparing their standards with their current condition (Calderón-De la Cruz et al., 2018). Therefore, it is an essential indicator of people's subjective well-being (Schnettler et al., 2014). Studies indicate that it is related to having a better quality of life (Dolan et al., 2013), a better perception of family satisfaction (Ni et al., 2021), better interpersonal relationships (Ruvalcaba-Romero et al., 2017), and a better economic situation (Mikucka et al., 2017). However, the socioeconomic level influences the relationship between income or resources and individual well-being (Salinas-Jiménez et al., 2010), and being more negative in developing countries (Tasiemski et al., 2021).

1.2.2. Servant leadership

Servant leadership refers to a leader's tendency to guide and motivate followers to provide hope and establish quality relationships (Greenleaf, 1977a). This begins when someone adopts a position of servant to promote growth in others (Mittal and Dorfman, 2012). In this way, leadership is authentic when there is a desire to help others and not to benefit oneself or exert power (Greenleaf, 1977b; Johnson, 1997). Therefore, the primary goal of a servant leader is to ensure that subordinates develop and grow into servant leaders (Amah, 2018). This leadership style is considered appropriate for the educational environment, as leadership in this context requires specific skills and abilities (Latif et al., 2021). Scientific literature has confirmed the positive influence of applying servant leadership in various organizational areas, as it significantly improves job satisfaction, perception of culture and commitment, and creativity (Hsiao et al., 2015; Harwiki, 2016; Neubert et al., 2016; Ozturk et al., 2021).

1.2.3. Satisfaction with work resources

Satisfaction with work resources encompasses individual, leadership, group, and organizational levels. This allows for improvement in: (1) task-related resources (performance feedback), (2) implementation of new work resources (peer support), and (3) improvement of social resources in the workplace (supervisory coaching) (Schaufeli and Bakker, 2004; Spontón et al., 2019). Therefore, work resources include the physical, psychological, social, and organizational aspects of work, such as social support and job control, with three main objectives: (1) to help achieve work goals; (2) to reduce work demands and costs; and (3) to stimulate personal development, learning, and growth. In other words, work resources are important for coping with work demands and have intrinsic value (Schaufeli and Bakker, 2004).

In the educational sector, the applied leadership style influences not only productivity and profit outcomes but also the perception of teachers' well-being and quality of life. However, it has not yet been explored in depth what factors in the work environment influence the relationship between leadership styles and life satisfaction, especially in the Peruvian context where most basic education teachers are forced to continue working with insufficient work resources and to experience an increase in emotional exhaustion, burnout, and low job satisfaction, these alterations can negatively affect teachers' perception of their quality of life (Monsalve Mera et al., 2020; Celio, 2021; Guevara and Huyhua, 2021).

In Peru and Latin America, teacher's life satisfaction is a relevant topic since it can affect their performance and retention in the profession. Satisfaction with job resources such as administrative support, training, and professional development can also play an important role in teacher's life satisfaction (Nanjundeswaraswamy, 2021). With the aim of obtaining a better understanding, we seek to analyze satisfaction with job resources to evaluate the relationship between servant leadership style and life satisfaction of teachers, for a better understanding of the dynamics of the determinants of subjective well-being in the population of regular primary education teachers.

Based on the theoretical review, the following hypotheses are indicated (Figure 1):

> *Hypothesis 1*: Servant leadership will have an effect on satisfaction with resources and satisfaction with life.
>
> *Hypothesis 2*: Satisfaction with resources will have an effect on satisfaction with life.
>
> *Hypothesis 3*: Satisfaction with resources will mediate the relationship between servant leadership and satisfaction with life.

2. Methods

2.1. Design and study population

A cross-sectional and explanatory study was designed considering latent variables represented by a system of structural equations (Ato et al., 2013). The effect size was analyzed considering the number of observed and latent variables in the model, the anticipated effect size ($\lambda = 0.3$), the desired statistical significance ($\alpha = 0.05$), and the level of statistical power ($1\text{-}\beta = 0.95$), which considers a recommended minimum sample size of 207 (Soper, 2022). The data was obtained through a request for participation to the directors of four institutions. Prior to this, permission was sought from the corresponding educational authorities to conduct the research. After informing the participants about the anonymity of the research and obtaining their informed consent, the selection of participants was carried out. For participant selection, a convenience sampling was applied, choosing those who were available and willing to participate in the research. A total of 620 teachers participated, with ages ranging from 20 to 62 years ($M = 35$ and SD = 9.49). Most of the participants were female

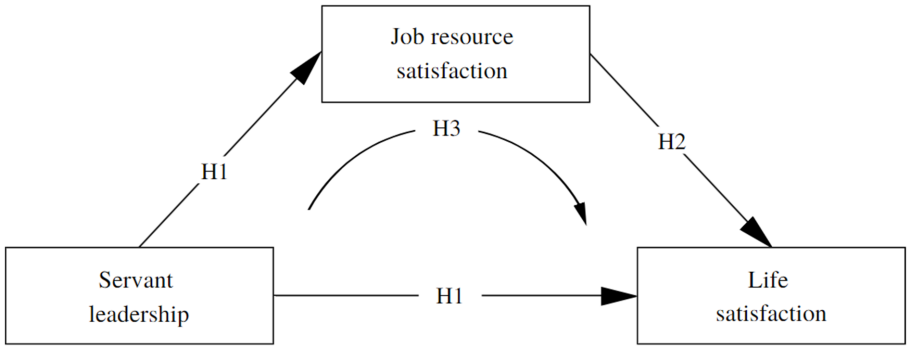

FIGURE 1
Theoretical model.

TABLE 1 Sociodemographic characteristics.

Characteristics		*n*	%
Gender	Female	391	63.1
	Male	229	36.9
Region of origin	Coast	230	37.1
	Jungle	278	44.8
	Sierra	112	18.1
Level of education	High school	192	31.0
	Doctorate	11	1.8
	Bachelor's degree	342	55.2
	Master's degree	75	12.1
Type of contract	Contract	195	31.5
	Full-time contract	339	54.7
	Part-time contract	86	13.9

(63.1%), from the jungle region (44.8%), with a bachelor's degree level of education (55.2%), and with a full-time contract (54.7%) (Table 1).

2.2. Procedure

The research was approved by the Ethics Committee of a Peruvian University (2022-CEUPeU-026). Subsequently, during the period between July and August 2022, participants were invited to complete an online questionnaire through Google Forms. Prior to data collection, confidentiality rules and the principles of the Helsinki Declaration were followed, informing participants about the purpose of the research and obtaining their informed consent (Table 1).

2.3. Measures

Servant Leadership. The Spanish-adapted version (Rivera et al., 2017) of The Servant Leadership Short Scale (SLSS) was used to evaluate an important leadership model that prioritizes service to peers and subordinates as the main objective rather than seeking personal well-being or benefits for the organization, a cause, or a group of people. The scale consists of 14 items with 7 response options ranging from 1 ('completely disagree') to 7 ('completely agree'). The internal consistency of the scale was good ($\alpha = 0.85$).

Job Resource Satisfaction. The Spanish version of the Job Resources Satisfaction Questionnaire (CSRL_16) (Spontón et al., 2019) was used to evaluate the positive influence of job resources on workers' well-being and performance. It has 16 items that respond to a five-category Likert scale: (1) completely disagree, (2) disagree, (3) neither disagree nor agree, (4) agree, and (5) completely agree. It also presents four dimensions with adequate internal consistency: Leader Resources (4 items, $\alpha = 0.91$), Task Resources (4 items, $\alpha = 0.71$), Team Resources (4 items, $\alpha = 0.88$), and Organizational Resources (4 items, $\alpha = 0.81$).

Life Satisfaction. The Spanish version of the Satisfaction with Life Scale (SWLS) (Calderón-De la Cruz et al., 2018) was used. It is a self-report measure that evaluates unidimensional life satisfaction with a total of five items scaled as an ordinal measure of five response options ranging from 1 = strongly disagree to 5 = strongly agree. The internal consistency was adequate, evaluated by McDonald's Omega ($\omega = 0.90$).

2.4. Data analysis

Initially, due to the fact that the questionnaires used belong to the category of self-administered and may lead to a common method bias, which refers to the measurement error that arises because of the specific method utilized in a study for the scale utilized, data collection techniques and analysis techniques (Podsakoff et al., 2003; Saris and Gallhofer, 2007). To correct this bias, there are both procedural and statistical solutions. In some cases, a research design that minimizes the effect of the common method bias can be used, such as using multiple sources of data or using different measures for the same construct. In other cases, statistical techniques can be applied to correct the common method bias. One statistical technique used in this study was the evaluation of the common method variance (CMV) through Harman's single-factor test, which involves extracting a single factor and is expected to account for less than 50% of the total variance explained by the first factor in principal components analysis (Podsakoff et al., 2003).

Subsequently, descriptive statistics and correlations between study variables were calculated. Subsequently, the theoretical model of the study was analyzed using Structural Equation Modeling with the WLSMV (Weighted Least Squares Mean and Variance adjusted) estimator, used to analyze relationships

between latent and observable variables. In these models, observed values can be biased or have measurement errors, affecting the accuracy of estimated parameters. WLSMV is used to mitigate this problem by providing a solution for estimating parameters in the presence of missing or biased data, as it is robust to inferential normality deviations (Little and Rubin, 2014). The fit evaluation was performed using the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). CFI and TLI values >0.90 (Bentler, 1990), RMSEA <0.080 (MacCallum et al., 1996), and SRMR <0.080 (Browne and Cudeck, 1992) were used. To analyze mediation in the model, the bootstrapping method with 5,000 iterations and a 95% confidence interval was employed (Yzerbyt et al., 2018). Regarding reliability analysis, the alpha (α) coefficient was used to evaluate the internal consistency of the scales used in the study (Figure 1).

The structural equation modeling analysis was conducted using R software version 4.0.5 and the *lavaan* package (66).

3. Results

3.1. Common method variance (CMV)

The results showed that the variance value was 38% through the Harman's single factor test, which is below the threshold of 50% of variance explained (Table 2). Therefore, it was concluded that the dataset was free from common method bias (Podsakoff et al., 2003).

3.2. Preliminary analysis

Descriptive statistics and correlations of the study variables are presented in Table 3. The analyses between the studied variables yielded highly significant correlation coefficients ($p < 0.01$). Bivariate analysis shows that service leadership is positively correlated with job resource satisfaction ($r = 0.36$, $p < 0.01$) and life satisfaction ($r = 0.33$, $p < 0.01$). Also, job resource satisfaction was positively correlated with life satisfaction ($r = 0.48$, $p < 0.01$).

3.3. Structural model

In the analysis of the theoretical model, an adequate fit was obtained, $\chi^2 = 2{,}658$, df = 551, $p < 0.001$, CFI = 0.941, TLI = 0.936, RMSEA = 0.079, SRMR = 0.070 (Figure 2). The results confirm H1 regarding the positive influence of leadership on job resource satisfaction ($\chi^2 = 0.436$, $p < 0.001$) and life satisfaction ($\chi^2 = 0.222$, $p < 0.001$). Likewise, H2 was confirmed regarding the positive influence of job resource satisfaction on life satisfaction ($\chi^2 = 0.436$, $p < 0.001$).

3.4. Mediation model

For the mediation analysis, 5,000 iterations of bootstrapping were used. Thus, with respect to H3, the indirect effect is confirmed in which job resource satisfaction mediates the effect of servant leadership and life satisfaction, $\beta = 0.100$, $p < 0.001$, 95% CI [0.053, 0.161], and a total effect $\beta = 0.224$, $p < 0.001$, 95% CI [0.142, 0.318].

4. Discussion

This study evaluated the relationship between servant leadership and life satisfaction, considering the mediation of job resource satisfaction. This contributes to the literature on life satisfaction by investigating the effects of servant leadership on this critical indicator of happiness and well-being. Furthermore, the importance of human resource management in improving productivity and educational outcomes is understood (Firdaus et al., 2019). Therefore, servant leadership is critical for successfully leading and positively impacting organizations. Job resource satisfaction favors better performance, which fosters the achievement of work goals and more significant personal development and growth, which in turn contributes to life satisfaction (Table 3).

The results indicated that servant leadership had a positive effect on teachers' life satisfaction. Previous studies support our findings, as servant leadership has been identified as an important indicator of happiness and well-being, finding that it is likely to play a critical role in increasing teachers' life satisfaction (Chughtai, 2018; Li et al., 2018). This is because it promotes a positive and motivating work environment, as servant leadership has a person-centered attitude and tends to lead to stronger and more secure relationships in the school organization (van Dierendonck, 2010; Mittal and Dorfman, 2012; Eva et al., 2019). Servant leadership belongs to the holistic leadership approach, which seeks to develop capabilities based on altruistic and ethical orientations, prioritizing employees' well-being and growth so that they are more committed and effective in their work (Eva et al., 2019). Therefore, teachers who are more satisfied with their lives create a conducive classroom environment for team success and the achievement of excellent work (Nagarajan et al., 2022). Our results extend the empirical evidence on the influence of servant leadership on life satisfaction. Other studies show that servant leadership did not have a significant impact on life satisfaction, which contradicts previous assumptions. However, this contradiction may be due to the presence of individual or collaborative work that weakens the direct effect of servant leadership on life satisfaction (Latif and Marimon, 2019; Pan et al., 2021).

The results indicated that job resource satisfaction has a positive effect on life satisfaction, as previously reported in which job resources predict employee well-being (Lyubomirsky et al., 2005; Salanova et al., 2012). This relationship is due to job resources being closely linked to employees' work activity and being motivating due to their association with task characteristics such as clarity, autonomy, and feedback. This contributes to the construction of feelings of pride and enjoyment at work. Employees also interact with their peers, supervisors, and customers at work, which strengthens connections between employees and others. Therefore, the promotion of these resources through careful planning and implementation of activities and human resources contributes to the achievement of organizational goals (Schaufeli and Bakker, 2004; Salanova et al., 2012).

The results confirmed the mediating role of job resource satisfaction between servant leadership and life satisfaction. This is because leaders indirectly influence employee well-being by shaping their work environment and reinforcing their job resources (Chughtai, 2018). Therefore, the behavior of servant leaders would improve

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TABLE 2 Harman single factor test total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% var	Cumulative %	Total	% var	Cumulative %
1	13.41	0.38	0.38	13.41	0.38	0.38
2	5.54	0.16	0.54			
3	2.7	0.08	0.62			
4	1.32	0.04	0.66			
5	1.12	0.03	0.69			
6	1.04	0.03	0.72			
7	0.85	0.02	0.74			
8	0.72	0.02	0.76			
9	0.68	0.02	0.78			
10	0.61	0.02	0.8			
11	0.56	0.02	0.82			
12	0.51	0.01	0.83			
13	0.45	0.01	0.84			
14	0.43	0.01	0.86			
15	0.41	0.01	0.87			
16	0.4	0.01	0.88			
17	0.38	0.01	0.89			
18	0.34	0.01	0.9			
19	0.34	0.01	0.91			
20	0.3	0.01	0.92			
21	0.29	0.01	0.93			
22	0.27	0.01	0.93			
23	0.26	0.01	0.94			
24	0.24	0.01	0.95			
25	0.23	0.01	0.95			
26	0.22	0.01	0.96			
27	0.21	0.01	0.97			
28	0.2	0.01	0.97			
29	0.17	0.00	0.98			
30	0.16	0.00	0.98			
31	0.15	0.00	0.99			
32	0.14	0.00	0.99			
33	0.13	0.00	0.99			
34	0.12	0.00	1.00			
35	0.1	0.0	1.0			

TABLE 3 Descriptive statistics and correlations of the study variables.

Variable	*M*	SD	α	A	1	2	3
Servant leadership	70.34	12.25	0.96	−1.62	–		
Job resource satisfaction	48.43	6.89	0.93	−1.14	0.36**	–	
Life satisfaction	22.30	3.51	0.91	−2.25	0.33**	0.48**	–

SD, standard deviation; A, asymmetry; ** indicates $p < 0.01$.

well-being by satisfying job resources. This relationship between job resources and life satisfaction is particularly relevant for teachers, as their work is crucial for the development and success of students as well as for society as a whole. It is concluded that servant leadership indirectly influences teacher well-being through the mediating mechanism of job resource satisfaction.

Under servant leadership, teachers can be ensured of having the resources they need to perform their job. This will allow them to have access to fundamental elements such as: (1) good communication and relationship with their superiors, clarification of information, constant

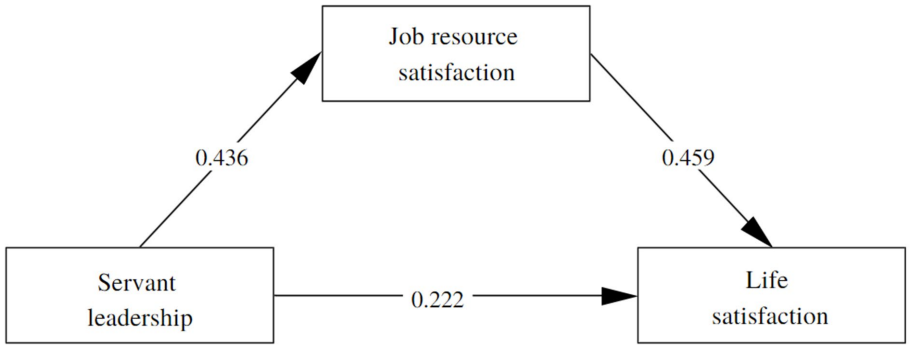

FIGURE 2
Results of the structural model.

feedback and recognition for their work; (2) intrinsic job characteristics that provide work challenges, sufficient time and resources to complete tasks, and the opportunity to use their skills; (3) a positive social work environment, with good relationships with their coworkers, and cooperation, coordination, productivity, and creativity in problem-solving; and (4) fair working conditions and appropriate organizational practices, including equitable salaries, non-monetary rewards, rest, opportunities for advancement, and continuous training (Spontón et al., 2019). This will make teachers feel satisfied and fulfilled with their work.

Teachers who lack adequate job resources are likely to experience a higher level of stress and workload, which can negatively affect their job and personal satisfaction (Chiniara and Bentein, 2016; Chughtai, 2018). Additionally, more resources will be needed to ensure teachers' ability to provide quality education to their students, which in turn will adversely affect student performance and success.

4.1. Implications

This research expands the body of knowledge on the relationship between job resource satisfaction and servant leadership under the Job Demands-Resources (JD-R) theory. To improve quality of life, institutions must develop strategies to enhance job resources and improve organizational practices and resources. Additionally, it is essential to understand the importance of servant leadership for educational organizations. Therefore, it is crucial to implement interventions that foster servant leaders in organizations over time. This model can also be applied in other contexts, such as different countries and occupational sectors, using different qualitative and quantitative instruments to evaluate the organization as a whole.

4.2. Limitations

Regarding limitations, the cross-sectional design employed in this study precludes establishing causal relationships between variables. Therefore, it would be useful to conduct longitudinal research to evaluate the evolution of the relationships between variables over time. Likewise, the sample is composed mainly of teachers from Peru, which limits the generalizability of the results to other cultural and educational contexts. Thus, it is necessary to replicate the study in different regions and educational settings, in order to verify the consistency of the results in different situations. Although the scales used have demonstrated to be valid and reliable, there is always the possibility of bias in self-assessment. To obtain a more objective perspective, future research could include evaluations from multiple informants. The non-probabilistic sampling type and the online data collection may generate biases in the results, as some participants may not adequately complete the survey. In addition, only teachers with access to technology and who were interested in participating were included in the sample. To address this issue, it is important to replicate these results with data collected in other regions and through different sampling methods. Participants were assured that their responses would be anonymous and confidential, which helps reduce social desirability bias by allowing participants to feel more comfortable in responding truthfully.

5. Conclusion

In recent decades, leadership has become a research topic that has generated a lot of expectation, especially in developing countries that still need to improve the quality of teaching and learning experiences to inspire, communicate, and motivate students to achieve their academic goals. Through the mediation of job resource satisfaction, which includes physical, psychological, social, and organizational aspects, supported by servant leadership, job effort and the physiological and psychological costs associated with it are reduced, allowing for job goals to be achieved by stimulating personal growth and learning and having a significant impact on teacher well-being. The results confirm the mediation of job resource satisfaction between servant leadership and life satisfaction. Therefore, it is important for educational institutions to provide adequate resources to enhance job and life satisfaction for teachers.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee of the Universidad Peruana Unión (2022-CEUPeU-026). The patients/participants provided their written informed consent to participate in this study.

Author contributions

RQ-D, WCM-G, and OM-B participated in the conceptualization of the idea. LP-Q, JS, and WCM-G were in charge of the methodology and software. WCM-G, RS-S, AAR-C, and JS performed validation, formal analysis, and research. WCM-G, AAR-C, and RQ-D were commissioned data curation and resources. LZS-S, WCM-G, RQ-D, AAR-C, and OM-B were carried out the writing of the first draft, review, editing, visualization, and supervision. All authors have read and approved the final version of the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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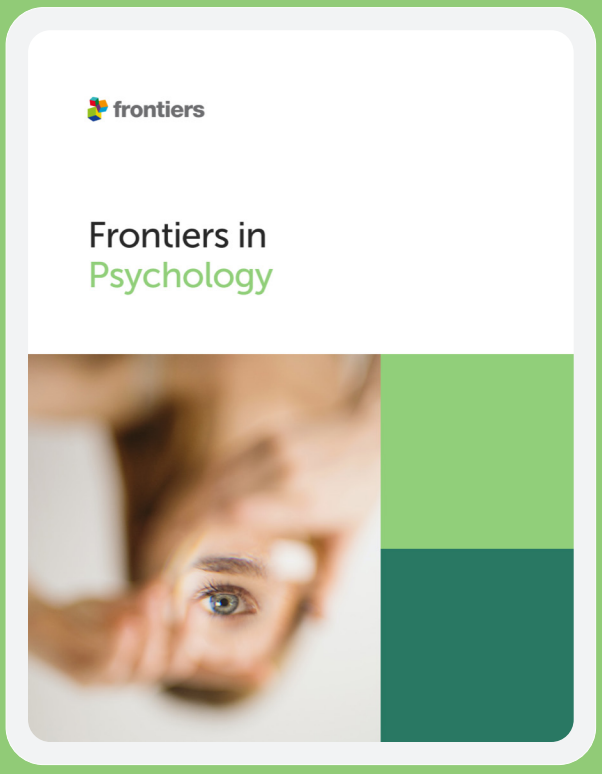

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