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Research paper

Professional learning of late-career teachers in early childhood education: A matter of (im)balance between personal resources, job resources, and job demands

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ABSTRACT

This study explores late-career teachers' (LCT) engagement in professional learning activities in the context of early childhood education in Belgium. Using the job demands-resources model, this study draws on moderation mixture model to investigate the interaction between LCT' engagement in professional learning activities (EPLA) and their personal resources, job resources, and job demands ($N = 183$). We found four distinct profiles and showed that the profile one belongs to affects the strength and direction of the relation between job demands and EPLA. Results are discussed in relation to limitations, implications for practice, and future research.

1. Introduction

In recent decades, workforces in many countries have aged considerably (Organisation for Economic Co-operation and Development [OECD], 2019) and the retirement of these older workers will challenge organisations' stability as well as national social security systems (Taylor & Earl, 2016). As a result, numerous governments have raised the retirement age to 65 or even 67 years (OECD, 2019). Simultaneously, there has been a parallel trend of early retirement among older workers in certain employment settings, with the teaching profession being no exception (OECD, 2021). This poses a significant challenge for organisations in terms of knowledge loss, given that older teachers are valuable sources of competence and expertise (Cochran et al., 2012). While implementing worker-friendly measures to attract, retain, and retrain older workers (Appannah & Biggs, 2015), organisations in many countries still struggle with retaining experienced late-career teachers (LCT; Admiraal et al., 2021).

Moreover, the teaching profession is well known for its ever-evolving and demanding nature, due to student heterogeneity, technological innovations, and the implementation of multiple educational reforms (Evers et al., 2016; Philipp & Kunter, 2013). This is especially true in the context of early childhood education (ECE), which serves as the primary focus of this study. In addition to the diverse physical demands arising from the child-sized environment, these stressors can generate chronic fatigue and health concerns, lead to burnout, and gradually impact ECE teachers' enthusiasm and motivation over time (Inbar & Shiri, 2021). Lack of professional resources, such as social support in later life, also impacts health, well-being, and engagement in professional activities (Lam, 2019; Mejía et al., 2017). In addition, literature on ageing has highlighted that personal resources are unevenly distributed across aged groups with respect to education, wealth, gender, and race (Holman & Walker, 2021), and that the aging process impacts individuals differently (Kanfer & Ackerman, 2004). The demanding nature of this context can lead to premature attrition of LCT, prompting concerns about the quality of the late career phase in ECE. Additionally, it raises questions about the differences between LCT in personal resources that can help alleviate the challenging demands at play in this profession.

Furthermore, as lifelong learning has become a key issue in educational policies and research agendas (Papadakis & Drakaki, 2023), teachers are requested to continuously adapt their practice and participate in professional learning activities to update their knowledge, and maintain their motivation and work engagement (García & Weiss, 2019). However, the extent to which teachers in general – and LCT in particular – engage in professional learning activities remains a challenge (Jansen in de Wal et al., 2020). Teachers' performance of learning activities has previously been explained in terms of conditions in their work environments as well as their personal and psychological attributes (Admiraal et al., 2019). According to the job demands–resources

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model (JD–R), work-related conditions can be divided into two categories, job demands and job resources (Bakker & Demerouti, 2017). This model suggests that active learning occurs when environments have higher job resources than demands (Evers et al., 2016). While the JD–R model has been particularly predictive of work engagement (Liu et al., 2023) and participation in self-directed learning (Blanco-Donoso et al., 2017), personal resources have also been found to influence the relationship between the two types of work-related conditions and work engagement (Xanthopoulou & Bakker, 2021).

Building upon the aforementioned reasons, this study pursues a twofold objective on the one hand, to identify profiles of late-career ECE teachers based on their personal resources and, on the other hand, to shed light on the differential effects (among the identified profiles) of job resources and demands on these teachers' engagement in professional learning activities. The study uses a person-centred approach that considers the existence of potential subpopulations in the sample that are characterized by differentiated sets of parameters (Meyer & Morin, 2016). It aims to investigate ECE teachers in French-speaking Belgium, a context characterised by a high concentration of LCT and a high rate of early retirement (Fédération Wallonie-Bruxelles [FWB], 2022). The research will explore how late-career teachers with distinct patterns of personal resources respond to job demands and available resources in relation to their engagement in professional learning activities.

2. Theoretical framework

This section is divided into four parts: a definition of late-career teachers; an overview of teachers' professional learning; a comprehensive explanation of the JD–R model, which includes the definition of job resources, job demands, and personal resources that are pivotal to our study; and last, the research questions that guided the study.

2.1. Late-career teachers

The educational literature presents various career stages for teachers, and one notable typology by Huberman (1989, 1995) identifies two phases towards the end of a teaching career. The first phase occurs between 19 and 30 years of job tenure, characterized by a "gradual loss of energy compensated by a greater sense of confidence and acceptance" (Huberman, 1989, p. 35). The second phase, spanning 31–40 years of experience, is marked by either feelings of disappointment and bitterness or a sense of serenity. Day and Gu (2007) also portrayed late-career teachers as those over 40 years of age and with over 24 years of teaching experience, experiencing a potential decrease in personal health and family concerns during their last 10–15 years (Day, 2017). In this study, late-career teachers are defined as individuals aged 40 years and above, who have accumulated a minimum of 19 years of experience in the teaching profession. This definition encompasses the criteria outlined by both Huberman (1995) and Day and Gu (2007).

2.2. Teachers' professional learning

The literature on teacher learning has been characterised by discussions aiming to clearly distinguish or rather unite the notions of teacher professional learning and professional development (Webster-Wright, 2009) the terms have been used interchangeably over the past two decades (Stewart, 2014). Once seen as discrete entities, *professional development* was understood as formal, one-size-fits-all, in-service or conference-style learning opportunities. *Professional learning* was understood as more active, collaborative, inquiry-based activities in the workplace. Following Bleicher's (2014) suggestion that "the field of professional development is moving towards the notion of professional learning, highlighting the active learning role that teachers play in changing their knowledge bases, beliefs, and practice" (p. 802), this study will primarily use the concept of *professional learning*.

From a lifelong learning perspective, pre-service education is only the first necessary step in building teachers' knowledge. Thereafter, teachers are asked to continually engage in professional learning activities, which are all of learning experiences undertaken alone and with others (e.g., Avalos, 2011; Vanblaere & Devos, 2016), such as training, reading, experimenting, reflection, and collaboration (Kwakman, 2003). Buysse et al. (2010) suggested that they consist of "facilitated teaching and learning experiences that are transactional and designed to support the acquisition of professional knowledge, skills, and dispositions as well as the application of this knowledge in practice" (p. 239). While traditional learning took place in formal classroom-based settings, the idea of professional learning has expanded to include (informal) learning in the workplace as well (Cheetham & Chivers, 2001; Eraut, 2004). This study considers both formal and informal professional learning activities and different types (e.g., passive, active, and collaborative) of learning processes LCT can experience.

2.3. Job demands–resources model

The job demands–resources (JD–R) model from organisational psychology explains how work-related and personal characteristics can impact employee well-being and motivation (Schaufeli & Taris, 2014) but can also foster active engagement in learning and professional development activities (Evers et al., 2016). The model suggest that job demands deplete individuals through an impairment process resulting in stress, while job resources (e.g., social support and learning climate) can enhance engagement through a motivational process that reduces job demands and stimulates personal growth, learning, and development (Bakker & Demerouti, 2017). According to the model, *job demands* refer to physical, cognitive, and emotional efforts or skills that are associated with physiological and/or psychological costs (e.g., work overload). *Job resources* refer to physical, psychological, social, or organisational aspects of the work environment that are functional in achieving work goals (Bakker & Demerouti, 2017).

Recent research has indicated the importance of incorporating personal resources in the model, as individuals are recognised as "job crafters" who bring in their own characteristics to cope with their work environment (Grover et al., 2017). *Personal resources* refer to individuals' ability to control and influence their environment successfully (Xanthopoulou et al., 2012). Their integration in the model has been managed in different ways (Schaufeli & Taris, 2014). They have been included as antecedents of stress and motivation (Lorente Prieto et al., 2008), as moderators of the influence of job demands on outcomes (Grover et al., 2017), as a component of a common entity formed with job resources (Mayerl et al., 2016) or as mediators between job characteristics and outcomes (Huang et al., 2016). As the definition implies, the negative effect of high job demands that increase stress should be mitigated by high levels of personal resources (see Grover et al., 2017), whereas the positive effects of high job resources on motivation could be strengthened by high personal resources (Taris & Schaufeli, 2015). In line with Van Den Broeck et al. (2010), we therefore consider personal resources as moderators that influence the relationships between job characteristics and engagement in professional learning activities.

2.4. Teachers' personal resources

Recent research has examined the role of psychological capital (self-efficacy, resilience, hope, and optimism) as a personal resource (Paterson et al., 2014). Grover et al. (2018) found that psychological capital had a direct impact on job perceptions, but did not serve as a coping mechanism. In line with the current literature, which considers teachers as "job creators" and active agents of their own transformation (see Brouhier, März, Van Waes, & Raemdonck, 2021; Van Wingerden et al., 2017), this study considers personal resources such as teachers' ability to self-regulate (Lord et al., 2010), to employ strategies that facilitate resource allocation, and to contribute to successful adaptation to their work environment (Lang et al., 2011). These resources are defined in

terms of resilience and teachers' self-efficacy (two concepts derived from the construct of psychological capital), along with two concepts from developmental psychology that relate to the aging process: occupational future-time perspective and selection, optimisation, and compensation strategies.

First, *resilience* refers to a teacher's ability to maintain commitment across the course of their career, deploying a series of strategies to cope with and overcome unpleasant and stressful situations in their professional and personal life (Brunetti, 2006; Castro et al., 2010).

Second, teachers' self-efficacy corresponds to their beliefs and attitudes regarding their ability to enhance students' learning (Tschannen-Moran & Woolfolk-Hoy, 2001). Extensive psychological literature has described self-efficacy as a key predictor of intentions, choices, persistence, and feelings during task completion (Bandura, 1997). Following Maurer's (2001) hypothesis, the concept of *self-efficacy for learning and development*, or one's confidence in learning and developing new skills, has been identified as a key element in the relationships between attitudes, intentions, and participation in professional development activities (Maurer & Palmer, 1999).

Third, the literature suggests that *selection, optimisation, and compensation (SOC) strategies* are crucial for individuals to increase their resources and maintain high levels of functioning over time (Baltes, 1997). LCT use these strategies to focus on core teaching tasks, reduce administrative tasks, and optimise their time (Philipp & Kunter, 2013). Selection involves prioritising goals or tasks for which resources can be captured (Lang et al., 2011) and channelling teachers' development (Baltes & Heydens-Gahir, 2003). Optimisation refers to refining ways to achieve goals and develop new skills (e.g., a teacher acquires an interactive whiteboard and learns to use it through peer training and instructional videos). Compensation involves using alternatives to maintain a given level of functioning. These strategies become increasingly important as resources become scarce, such as when approaching retirement (Carstensen et al., 2003).

Finally, *occupational future-time perspective* (OFTP) is important in teachers' career decision-making process and motivation. OFTP refers to professionals' perception of their remaining opportunities and time at work (Zacher & Frese, 2009), manifesting itself differently at different career stages. The educational literature has highlighted the significance of OFTP in teachers' beliefs, aspirations, and professional plans (Eren, 2012; Eren & Tezel, 2010), especially in a context with limited career possibilities and opportunities (Schleicher, 2012).

2.5. Teachers' job demands and job resources

The physical and emotional demands of the teaching profession, particularly for ECE teachers, have been well-documented in the literature (see Hélou & Lantheaume, 2008; Tsai et al., 2006). ECE teachers frequently encounter challenging physical work environments (Cassidy et al., 2017). Their daily activities involve constant movement, requiring diverse types of *physical effort* (bending, stooping, squatting, lifting and carrying children). Moreover, working in a child-sized environment can have detrimental effects on their physical well-being (Randall et al., 2023), potentially leading to chronic fatigue or burnout (Inbar & Shiri, 2021). The *emotionally and cognitively demanding nature* of the profession (see Paquette & Rieg, 2016) can also result in lower self-efficacy, especially after 25 years of teaching experience (Day & Gu, 2007).

Research has also highlighted the challenges faced by ECE teacher who work in a child-centred and nurturing classroom setting (Madrid & Dunn-Kenney, 2010). Recent intensification of *changes in teaching* (i.e., expanding responsibilities, teacher assessment, innovations, etc.; Bullough et al., 2014) and raising of educational standards have increased teacher workload (Cassidy et al., 2017 and have made it difficult for ECE teachers to reconcile competing work–life obligations and to manage feelings of frustration and stress (Jena-Crottet, 2017).

Conversely, research has shown that positive aspects of teachers' environment can help balance job demands (Schaufeli & Taris, 2014). *Social* support *from colleagues and principals* constitutes a crucial job resource that has been associated with increased job satisfaction (Viotti et al., 2020) and improved well-being among teachers (Hur et al., 2016). *Autonomy*, another significant aspect, encompasses the freedom to make professional decisions and engage in collaborative decision-making (Vangrieken et al., 2017). This type of autonomy holds great value in teachers' day-to-day lives (Viotti et al., 2020) and has been shown to influence their professional status and job satisfaction (Strong & Yoshida, 2014). Additionally, ongoing professional learning is essential for sustaining teachers' engagement and improving instructional quality (Burchinal, 2018), making the provision of (in)formal *opportunities for professional development* a crucial job resource for teachers.

2.6. Research questions

This study aims to identify and describe the heterogeneity of profiles of LCT based on different personal resources. Moreover, the relationship between the profiles and teachers' engagement in professional learning activities is investigated, along with differences between profiles regarding the relationship between job demands and job resources and teachers' engagement in professional learning activities. This study examines the following three research questions:

RQ1. What profiles emerge for LCT ECE teachers when considering specific combinations of personal resources (i.e., OFTP, SOC, resilience, and self-efficacy for learning and development?

RQ2. To what extent do these profiles predict engagement in professional learning activities?

RQ3. What role do these profiles play in the relationship between job demands/job resources and engagement in professional learning activities?

3. Methods

3.1. Context of the study

The teaching workforce in the French-speaking part of Belgium is predominantly composed of women, with a significant concentration of teachers around the age of 50 (FWB, 2021). This is not without consequence, as research shows that female LCT in ECE may experience more fatigue than men due to work–family management (Illies et al., 2015) and menopause. This fatigue creates a physiological and physical imbalance that can, in turn, impact these women's working life (Cau-Bareille, 2014). However, the support system for teachers in Belgium is not as formalised as in other countries. There are only two official avenues to address difficulties related to the profession: the annual interview with school management, which depends on a good relationship with the principal and occupational medicine, typically consulted when teachers have already been exposed to psychosocial risks.

3.2. Participants and procedure

The study collected responses to a two-part self-report questionnaire from 183 early childhood education teachers (including preschool and primary teachers[1]) with an average age of 55 (range between 49 and 64) and a minimum of 19 years of experience. The first part covered socio-

[1] In the French-speaking part of Belgium, teachers with an ECE diploma are allowed to teach up to the second year of primary school.

demographic information, while the second part contained self-report measures assessing personal resources, job demands, job resources, and teachers' engagement in professional learning activities.[2] With the help of two trained junior researchers, data were collected through online questionnaires via ECE teacher groups on social media and paper-based questionnaires administered by and retrieved from cooperating school secretariats in Brussels, Liège, and Namur. The participants consented to participate in the study after the first author explained relevant details and answered their questions. Demographic information for the participants is given in Table 1.

3.3. Measures

The measurement models and corresponding fit indices for the variables presented in the following sections are shown in Fig. 1. Overall, the 12 variables demonstrated acceptable to good internal consistency following Little's (2013) cut-offs, as shown in Table 2. Extreme values of CFI and TLI ranged from 0.90 (job demands) to 0.97 (job resources). Extreme values of SRMR and RMSEA ranged from 0.074 (personal resources) to 0.05 (job resources).

All subscales used were translated into French for our participants, but are reported in this article in English, in their original version. For every questionnaire used in this study, instructions were added to contextualize the items to schools. When needed, the instruments were translated into French with a classic back-translation approach (Brislin et al., 1973). The instruments are available upon request from the first author.

3.3.1. Personal resources

Resilience was measured with the 12-item Resilience Appraisal Scale (RAS) developed by Johnson et al. (2010). Participants indicated to what extent each statement applied to them using a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5). This scale is made up of three sub-scales measuring individuals' ability to cope with emotions, solve problems, and seek help from someone (e.g., "I can put up with my negative emotions", "I can generally solve problems that occur", "If I were in trouble, I know people who would be willing to help me", respectively).

Teachers' self-efficacy for learning and development (TSELD) was measured using a 6-item instrument originally created by Fletcher et al. (1992) that assesses teachers' efficacy beliefs, confidence, and capacity to learn and engage in learning and development activities in the workplace (Armstrong-Stassen, 2008). Participants answered on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; e.g., "I have the ability to develop new work-related skills").

Occupational future-time perspective (OFTP) was measured with an adapted version of the 11-item scale developed by Carstensen and Lang (1996). The five items used were assessed on a 7-point scale ranging from 1 (*does not apply at all*) to 7 (*applies completely*). Only one of Lang and Carstensen's (2002) two dimensions of OFTP was measured (i.e., remaining opportunities) which we adapted by adding the word "at school" to each item (e.g., "My professional future at school is full of possibilities").

Selection, optimisation, and compensation strategies (SOC) were measured with the scales from Abraham and Hansson (1995, pp. P94–P103). Responses used on a 6-point scale (1 = *not at all*; 6 = *to a very great extent*). Selection was measured with four items, with an example being: "I now delegate low-priority responsibilities to others". Optimisation was measured with four items, for example: "I now try to polish rusty skills and abilities so that my job performance won't suffer". Finally, compensation was measured with four items. An example is: "I am now more careful about how I present myself to others at school".

3.3.2. Job resources

Job resources were operationalised using four variables: autonomy, social support from colleagues, support from principal, and opportunities for development.

Autonomy was measured using a 3-item scale from Bakker et al. (2004; e.g., "In my work, I have the freedom to decide what to do"). Both *social* support *from colleagues* and support *from principal* were measured using 4-item scales translated into French and validated by Lequeurre et al. (2013). Example items include "In your work, can you count on your colleagues when you encounter difficulties?" and "In your work, can you rely on your principal when you encounter difficulties?". Opportunities for development was measured with a 3-item scale, also from Lequeurre et al. (2013; e.g., "My job gives me the opportunity to learn new things"). All of the subscales were rated on a 7-point Likert scale ranging from 1 (*never)* to 7 (*always*).

3.3.3. Job demands

Job demands were operationalised using three concepts: *Physical effort* (4 items, e.g., "In your daily work, are you bothered by carrying or moving loads?"), *mental and emotional demands* (8 items, e.g., "Does your job require a high level of alertness?") and *changes in tasks* (3 items, e.g., "Have the proposed changes in your work activities been well presented?"). Subscales were taken from the questionnaire by Van Veldhoven and Meijman (1994), translated into French, and validated by Lequeurre et al. (2013). All of the subscales were rated on a 7-point Likert scale ranging from 1 (*never)* to 7 (*always*).

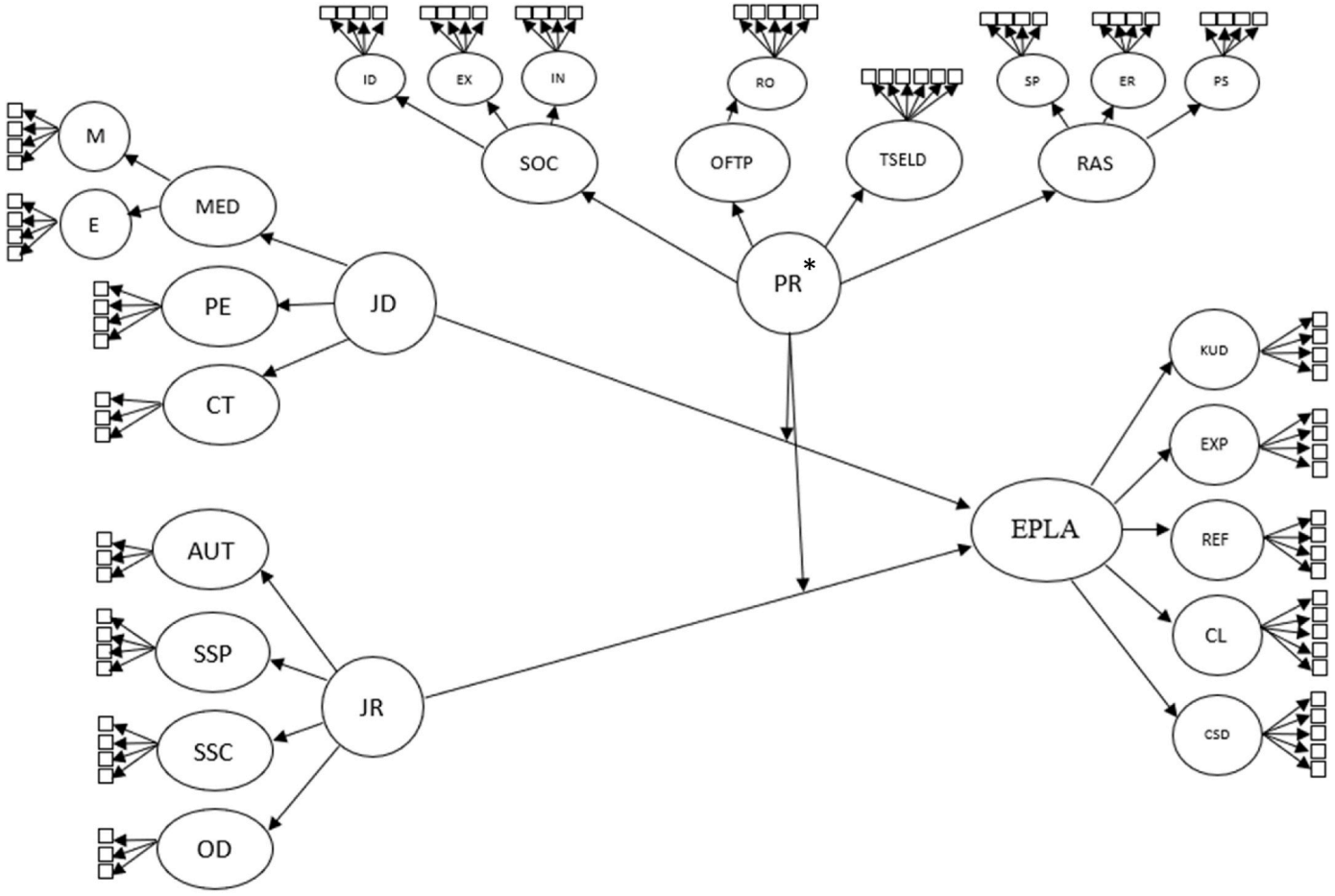
3.3.4. Outcome: engagement in professional learning activities

Engagement in professional learning activities (EPLA) was measured based on an abridged version of the 24-item scale of Evers et al. (2016), with responses ranging from 1 (*hardly ever*) to 4 (*often*), as teachers were asked to indicate how often they participate and engage in professional learning activities. This scale is divided into five dimensions, which are: (1) *keeping up-to-date* (4 items: "Participating in a one-day conference or study day that centres around subject matter pedagogy"), (2) *experimenting* (5 items: "Trying out new teaching methods in my lesson"), (3) *reflecting and asking for feedback* (5 items: "Inviting colleagues to attend my lesson"), (4) *collaborating with colleagues with the aim of improving lessons* (5 items: "I discuss lessons with colleagues in a learning environment with digital tools"), and (5) *collaborating with colleagues with the aim of improving school development* (5 items: "Assembling a school working group or committee with colleagues"; Evers et al., 2016).

Table 1
Demographic information for the participants ($N = 183$).

	Mean (SD)	Range
Chronological age (in years)	55.1 (6.28)	49–64
Job tenure (in years)	28.79 (6.64)	19–42
	Frequency (%)	
Gender	159 (86.9)	
Female		
Male	24 (13.1)	
Educational level		
Kindergarten/Pre-school	63 (34.4)	
Primary school	120 (65.6)	

[2] According to Administrative Circular 8742, teachers in French-speaking Belgium are required to participate in 6 half-days of training each year. These trainings can be provided by various organisations related to the education system and must cover topics related to focal concerns of the Belgian education system or those identified in the schools' training plan. Teachers can attend voluntary courses for up to 10 half-days per school year.



Indices of Fit

Personal Resources	Job Demands	Job Resources	EPLA
$\chi^2 = 538.929$ (.000)	$\chi^2 = 177.516$ (.000)	$\chi^2 = 126.940$ (.003)	$\chi^2 = 123.991$ (.000)
RMSEA = 0.06	RMSEA = 0.065	RMSEA = 0.05	RMSEA = 0.061
CFI = 0.914	CFI = 0.916	CFI = 0.970	CFI = 0.920
TLI = 0.904	TLI = 0.900	TLI = 0.963	TLI = 0.90
SRMR = 0.074	SRMR = 0.063	SRMR = 0.068	SRMR = 0.066

Fig. 1. Path diagram: The relationship between job demands, job resources, and engagement in professional learning activities, moderated by personal resources latent profiles

* PR refers to personal resources profiles. Fit indices reported for personal resources refer to a four-factor first-order model allowing estimation of a profile solution with four indicators.

3.4. Analytical procedure

Before presenting our analytical routine, we briefly present a description of mixture modelling. These models are common when choosing a person-centred approach, but may be less well-known for readers familiar with variable-centred approaches.

3.4.1. Mixture modelling: LPA and mixture moderation

Mixture modelling is a widely utilised statistical method in social science research used to identify unobserved subgroups within a population (i.e., latent groups). Latent profile analysis (LPA), a type of mixture model, uses a set of indicators to estimate the model and identify subgroups or "profiles". The primary purpose of LPA is to find the number and patterns of heterogeneous subgroups within a population based on the response patterns for several indicators. For a more comprehensive look at LPA, see Spurk et al. (2020).

Latent profile models can be extended to include auxiliary variables, including covariates, predictors, and distal outcomes, which consequently allows the exploration of the moderation effects of such variables. With a latent class variable, moderation allows for estimating regression parameters freely across the different latent classes in order to test the differential effects across profiles between antecedents and outcomes (McLarnon & O'Neill, 2018). Latent profile models can be understood as multigroup freely estimated models.[3] Put differently, in the moderation mixture model, latent class membership (and its uncertainty) is used as a categorical moderator between the independent and dependent variables.

[3] With the distinction that LPA considers the probabilities of profile membership.

Table 2
Cronbach alphas, means, and standard deviations for all measures.

$N = 183$	α	Mean (SD)
Personal resources		
Resilience (12 items)	.865	46.69 (5.38)
OFTP (5 items)	.891	18.18 (3.95)
SOC strategies (12 items)		14.60 (2.57)
Selection	.720	
Optimisation	.830	
Compensation	.830	
TSELD (6 items)	.829	23.09 (3.88)
Job Resources		
Autonomy (3 items)	.889	17.77 (2.45)
Social support from colleagues (4 items)	.882	23.78 (3.29)
Social support from principal (4 items)	.917	22.21 (5.56)
Opportunities for development (3 items)	.836	15.90 (3.53)
Job Demands		
Mental and emotional demands (8 items)	.817	42.50 (6.28)
Changes in task (3 items)	.813	11.11 (2.99)
Physical efforts (4 items)	.860	13.05 (6.01)
Engagement in professional learning activities (24 items)	.889	35.39 (7.51)

3.4.2. Data analysis

First, we extracted factor scores for the latent profile indicators (RAS, SOC, OFTP, TSELD); for the two predictors (JR, JD), given our interest in the main JD and JR constructs and not in their subdimensions; and for engagement in professional learning activities as the outcome. These factor scores were extracted from the CFA models reported in the measurement section and shown in Fig. 1. Using factor scores is recommended for latent profile analysis and more complex mixture models (such as latent profile moderation models), as factor scores control partially for measurement errors and are a stronger alternative than traditional mean scores (see Morin et al., 2016, for a discussion on the use of factor scores).

Second, to answer our first research question, we performed latent profile analysis to generate and choose the best latent profile solution. We extracted 1 to 8 profile solutions, shown in Table 3. These analyses were performed without any auxiliary variables, as recommended for the generation and choice of the best profile solution (Nylund-Gibson & Choi, 2018). We allowed means and variances to vary between profiles, as recommended (Morin et al., 2011). We used multiple fit indices to evaluate and choose the best profile solution: consistent Akaike's information criterion (CAIC), Bayesian information criterion (BIC), sample-size adjusted BIC (SABIC), adjusted Lo-Mendell-Rubin likelihood ratio test (aLMR), bootstrap likelihood ratio test (BLRT), and entropy. For CAIC, BIC, and SABIC, lower values indicate a better fitting model (Masyn, 2013). For aLMR and BLRT, a significant p-value (<.05) indicates that this solution with k profiles is not better than the k-1 profiles solution (Nylund et al., 2007). In addition to these fit indices, the choice of the best profile solution must be driven by the meaning of the profiles (Marsh et al., 2009). Therefore, we combined multiple fit index approaches and qualitative interpretation of the meanings of the profiles to choose the best solution (highlighted in Table 3).

Third, we also tested the predictive relationship between the profiles and the teachers' engagement in professional learning activities. For that, we ran Wald chi-square tests of mean comparisons between profiles. This test is similar to ANOVA, but considers the profile membership probabilities (DU3STEP command in Mplus).

Fourth, to test for moderation and to answer our third research question, we freely estimated the paths between the antecedents (JD/JR) and the outcomes (engagement in professional learning activities) across the different profiles. This can be understood simply as using profile membership (and its uncertainty) as a categorical moderator between JD and JR and the outcome variable engagement in learning activities. The omnibus Wald chi-square allows for testing the (non-) equivalence between the regression coefficients of the slopes across the different profiles. If this test is significant, there is evidence that at least one slope is significantly different from the others. To further evaluate which slopes were significantly different, we conducted pairwise difference tests. These pairwise tests of differences can be understood as post-hoc tests of differences between two profiles' slopes. Additionally, we tested the (non-)equivalence of the regression intercepts, which in this context represents the mean of the distal outcome, using the Wald chi-square test. For this test, we checked for significant differences in the intercept across the latent classes. If there is evidence of a difference, then pairwise comparisons of the intercepts are performed.

4. Results

The presentation of the results begins with the profile identification results for the LPA models (RQ1), followed by the predictive models (RQ2), and the mixture moderation model (RQ3). Then, the different linear estimations (i.e., slopes) of the relation between antecedents and distal outcomes across profiles are visually presented to show the results for the mixture moderation model.

4.1. Identification of the profiles

The fit indices and class sizes (number of profiles) can be found in Table 3. The aLMR and BLRT were significant for the model with four profiles. The AIC and BIC tended to stabilize in the four-profile model. Based on these results, the three- or four-profile solution could be selected. Marsh et al. (2009) recommended opting for a meaningful interpretive model before looking at the fit indices. In line with this recommendation, we also reflected upon the qualitative richness of the solutions and concluded that the four-profile solution was the best choice. A representation of the four profiles based on the latent factor scores for the four dimensions used for the profiling is given in Fig. 2. The profiles are described in the following paragraphs.

Profile 1 was the majority profile in the sample. We labelled this as the "Neutral stance profile"; about 40.4% of the participants were assigned to this profile. LCT belonging to profile 1 were characterised by factor scores close to 0 on every variable of the personal resources construct: SOC (0.09), OFTP (−0.01), RAS (−0.06), and TSELD (−0.06). Teachers in this profile showed scores near the sample mean on each dimension used in the profiling. As such, they represent a subpopulation without predominance or lack of any particular personal resource.

The second most often presented profile in our sample was *Profile 2*.

Table 3
Fit indices and class sizes (one to eight profiles).

k	LL	fp	SC	CAIC	BIC	SABIC	aLMR	BLRT	Entropy	SPF
1 profile	−791.54	8	1.28	1599.08	1419.68	1599.42	/	/	/	/
2 profiles	−692.84	17	1.14	1624.76	1474.24	1420.39	0.00	0.00	0.80	0.40
3 profiles	−646.83	26	1.06	1345.66	1429.10	1346.76	0.00	0.00	0.81	0.23
4 profiles	**−614.05**	**35**	**1.29**	**1299.57**	**1410.43**	**1299.57**	**0.44**	**0.00**	**0.86**	**0.10**
5 profiles	−590.98	44	1.06	1269.96	1411.18	1271.82	0.02	0.00	0.87	0.01
6 profiles	−579.41	53	1.02	1264.82	1434.92	1258.87	0.39	0.00	0.85	0.01
7 profiles	−560.27	62	0.92	1244.54	1443.53	1247.16	0.09	0.00	0.85	0.01
8 profiles	−546.22	71	0.97	1234.43	1462.30	1237.43	0.03	0.05	0.86	0.01

Note: LL = model log likelihood; fp = number of free parameters; SPF = smallest profile frequency.

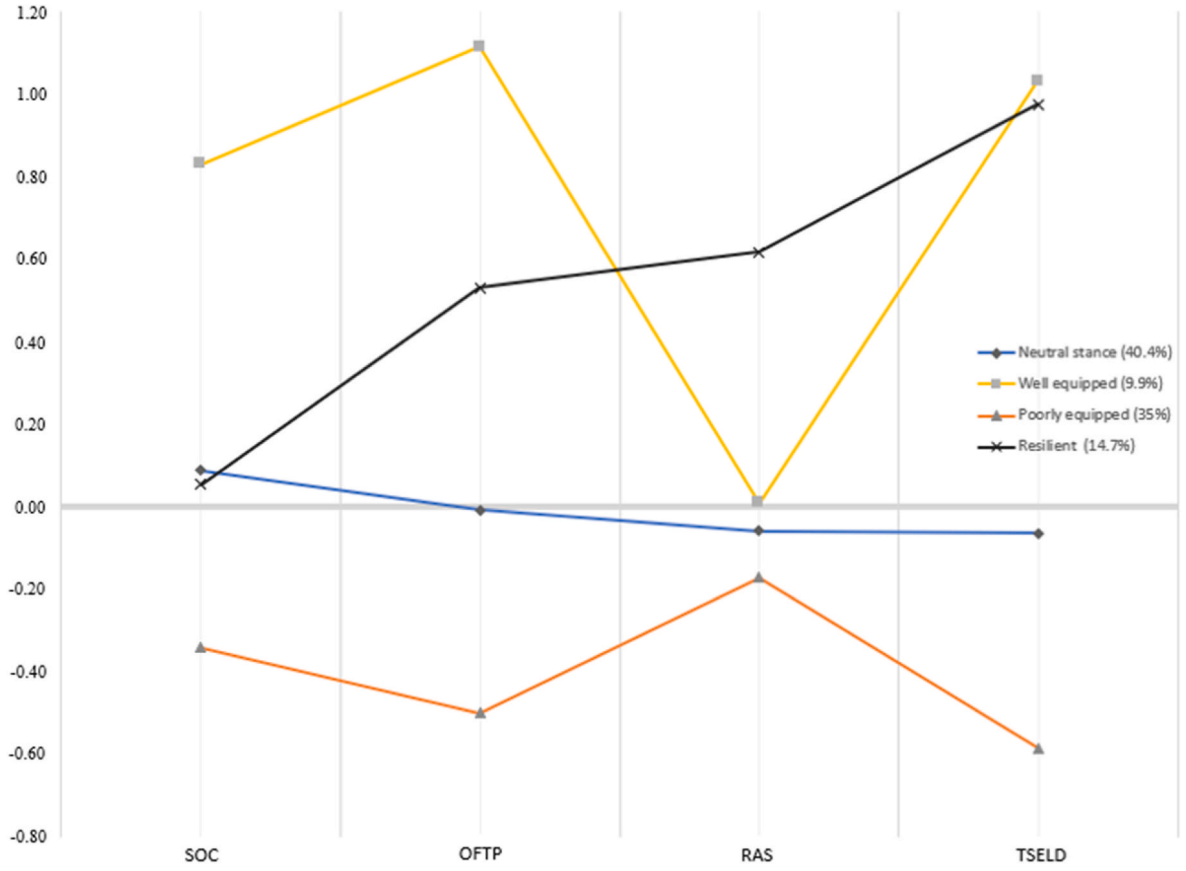


Fig. 2. Model with four profiles (latent factor scores).

We decided to call it the "Poorly equipped" profile. This profile included 35% of our sample, and LCT belonging to this profile were characterised by having the most negative factor score on each variable: SOC (−0.34), OFTP (−0.50), RAS (−0.17), and TSELD (−0.58). This means that teachers in this profile reported lower scores for each dimension of personal resources than the mean of the entire sample.

Profile 3 included 14.7% of the sample, and we labelled it the "Resilient" profile. Teachers assigned to this profile showed an average factor score for SOC (0.06), the highest factor score in terms of resilience (RAS, 0.62), and positive factor scores for OFTP (0.53) and self-efficacy (0.98). In other words, they showed an average ability to select, optimise, and compensate for their teaching tasks, they had higher expectations regarding their future opportunities as teachers, and they were the most resilient teachers in the sample.

Finally, *Profile 4*, called the "Well-equipped profile", included 10% of the sample. Teachers in this profile showed an average factor score for resilience (0.01) and the highest factor scores in terms of SOC (0.83), OFTP (1.12), and self-efficacy (1.03). These LCT showed a sense of resilience close to the mean in the sample; on the other hand, they showed self-confidence in learning and developing their skills, showed the ability to optimise their performance of their teaching tasks, and perceived more opportunities as they gain experience in the profession.

4.2. Differences in terms of engagement in professional learning activities

Looking at the relationship between the four profiles and teachers' engagement in professional learning activities, significant differences were found (Wald $\chi^2(2) = 90.08$; $p < .001$) with a meaningful latent means classification: $M_1 = -0.045$, $M_2 = -0.12$, $M_3 = 0.137$, $M_4 = 0.366$ for profiles 1 to 4, respectively. Regarding the profile-to-profile differences (detailed in Table 4), we can conclude that the Neutral stance profile was significantly different from the Well-equipped profile ($p < .001$), that the Poorly equipped profile was also significantly different from the Well-equipped profile ($p < .001$), and that the Poorly equipped profile was marginally significantly different from the Resilient profile. However, the Resilient and Well-equipped profiles were not significantly different ($p > .05$) in terms of engagement in professional learning activities. These results make sense in relation to the identification of our profiles. Indeed, this supports the assumption that the way LCT experience their personal resources in their late-career phase differs. Some generate strategies and have personal resources that are more in line with engagement in professional learning activities, while others with fewer personal resources do not engage in such activities.

4.3. Exploring the moderating role of LCT profiles

Finally, we were interested in examining the differential

Table 4
Means and pairwise comparisons of differences in engagement in professional learning activities for the four profiles.

	P1	P2	P3	P4	Wald Chi-Square (DU3STEP)					
					1 vs 2	1 vs 3	1 vs 4	2 vs 3	2 vs 4	3 vs 4
EPLA	−0.045	−0.12	0.137	0.366	0.41	0.125	.000***	.037*	.00***	.066

*$p < .05$; **$p < .01$, ***$p < .0001$.

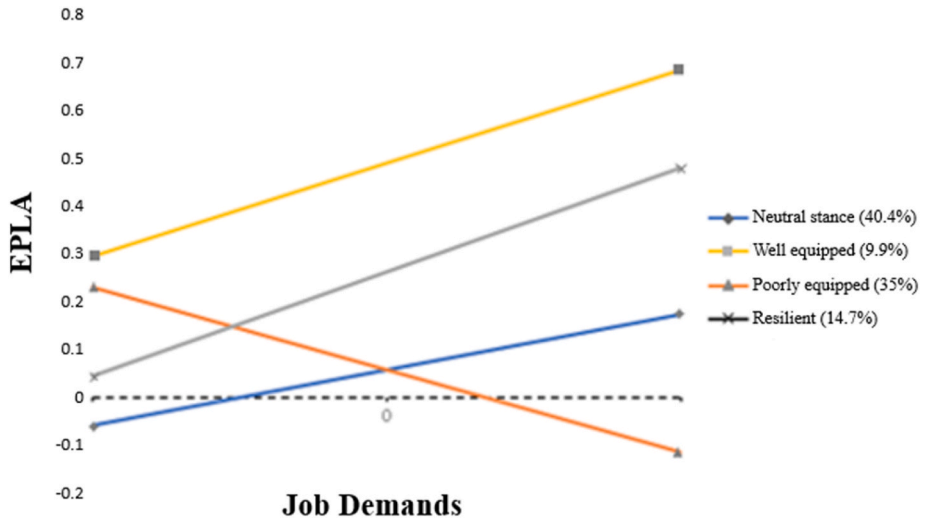


Fig. 3. Simple slopes graph of job demands predicted by engagement in professional learning activities.

relationships between the antecedents and engagement in professional learning activities across the four profiles identified. The next step of the analysis was to carry out an overall test of equivalence of the regression (omnibus Wald test, slopes freely estimated across the profiles) of job demands and job resources on EPLA across the latent profiles. We ran two separate models: the first with the interaction effects on job demands, controlling for job resources; the second with the interaction effects on job resources, controlling for job demands. First, an overall difference between the regression coefficients of the slopes across the latent profiles was identified as significant (Wald Chi-square test p = .006) for the relationship between job demands and engagement in professional learning activities. As there was evidence of this moderation (e.g., significant Wald test), pairwise comparisons of the regression slopes across profiles were justified. Next, a second omnibus test was used to explore differences in the intercepts of the distal outcome (EPLA) across profiles. As the second Wald Chi-square test was significant (p = .000), pairwise intercept comparisons across classes were warranted. Fig. 3 presents the relationships between the slope and intercept parameters estimated independently for each latent profile with regard to job demands. In this graph, the x-axis is fixed to be uncentred and unscaled. In addition, Table 5 presents an organised table of the slope values across each latent profile and pairwise comparisons of slope differences.

A closer look at Table 5 shows that the differential effect of job demands on engagement in professional learning activities was only evident for the Poorly equipped profile, which differed from all of the other profiles. Teachers belonging to the Poorly equipped profile tended to engage less in professional learning activities as job demands increased. The R^2 value ($R^2 = 0.17$) indicates that 17% of the variation in the EPLA values was accounted for by the job demands values for this specific profile. However, teachers belonging to the Resilient profile had the tendency to engage more in these learning activities when job demands increased. The R^2 value ($R^2 = 0.17$) also indicates that the job demands values accounted for 17% of the variation in the EPLA values. Findings also indicated that the Well-equipped profile had a marginally significant (p = .06) positive relationship between job demands and engagement in professional learning activities.

Moreover, no evidence of a moderating role of the profiles was found in the relationship between job resources and EPLA (see Table 6). Job resources had a positive effect on professional learning activities independent of the personal resources of individuals. A significant p-value (p = .013) for the Poorly equipped profile (p = .013) indicates that these teachers seized upon job resources to engage more in professional learning activities. Eight percent of the variation in EPLA for these teachers was explained by job resources ($R^2 = 0.08$). In the same vein, teachers belonging to the Resilient profile also took advantage of job resources to engage more in professional learning activities (p = .031). Eighteen percent of the variation in EPLA values for these teachers was explained by job resources.

Table 5
Regression coefficient values across personal resources profiles (job demands → engagement in professional learning activities), and differences between coefficients across profiles.

		Regression coefficient		
Omnibus Wald Test				
k	Profile label	Estimate *(se)*	R^2	Sig. profile differences
P1 $n = 68$	Neutral stance	0.116 (.08) [a]	.06	P2**
P2 $n = 60$	Poorly equipped	−0.173 (.07) *	.17	P1**, P3**, P4**
P3 $n = 26$	Resilient	0.218 (.10) *	.17	P2**
P4 $n = 18$	Well equipped	0.195 (.07) **	.28	P2**

[a] Marginally significant; *$p < .05$; **$p < .01$, ***$p < .0001$.

Table 6
Regression coefficient values across personal resources profiles (job resources → engagement in professional learning activities), and differences between coefficients across profiles.

		Regression coefficient		
Omnibus Wald Test				
k	Profile label	Estimate *(se)*	R^2	Sig. profile differences
P1 $n = 68$	Neutral stance	0.089 (.35)	.03	–
P2 $n = 60$	Poorly equipped	0.156 (.013) *	.08	–
P3 $n = 26$	Resilient	0.269 (.031) *	.18	–
P4 $n = 18$	Well-equipped	0.156 (.35)	.12	–

*$p < .05$; **$p < .01$; ***$p < .0001$.

5. Discussion

With regard to our findings, the discussion will present the theoretical implications of this study, outline its limitations, and propose perspectives for future research and practice.

5.1. Theoretical implications

First, this study has identified the existence of four personal resources profiles within a sample of LCT in early childhood education. This finding contributes to a more nuanced understanding of this specific group of teachers, counteracting the tendency in teacher research to portray a binary view of LCT. On the one hand, they are often perceived from a negative perspective as being at a higher risk of being less effective (Day & Gu, 2007), dissatisfied at work (Ponnock et al., 2018), more likely to be exhausted, burnt-out, and fuelling attrition statistics (Ballantyne & Retell, 2020). On the other hand, from a positive perspective, they are described as outstanding teachers (Lowe et al., 2019), resilient, and highly dedicated to their profession (Carrillo & Flores, 2018). In line with the conclusions of Babic et al. (2022), our study invites other authors to investigate the potential diversity of this category of professionals, given the challenges education faces as a context already known for its falling attractiveness, its shortages, and a workforce that is expected to become increasingly older in the years to come.

Moreover, our findings showed a moderating role of these profiles in the relation between job demands and EPLA, but not between job resources and EPLA. Although this differs from several studies found in the literature (Boyd et al., 2011; Van den Broeck et al., 2010), this result is not surprising, given the fact that teaching is known as a "flat" profession where promotions (almost) do not exist, and vertical step-up does not exist much apart from what teachers consider to be a complete change of profession – taking a position as principal, for example (Kelchtermans, 2017). We would argue that benefiting from job resources is not a matter of being willing to evolve in the career: it is a necessity for survival. Thus, it concerns most teachers, and not only those with more personal resources or a specific pattern of personal resources. Teachers therefore have an interest in seizing upon job resources to overcome hindering job demands. This is true for most teachers, not just those with a specific pattern of personal resources. In that case, development opportunities, peer support, and principal support, as the most accessible sources of job satisfaction, are linked with what happens in their classrooms. These forms of support are well known to be important professional resources that act as a buffer against the negative affect caused by a very demanding profession (Collie & Martin, 2017). In investigating teachers' working conditions, Jeon et al. (2018) also highlighted the importance of a positive perception of working conditions, which acts as a potential reducer of burnout, emotional exhaustion, and occupational stress. It is therefore important to intervene to change teachers' perception of their working environment and, as advocated by Wells (2015), to support their social and emotional skills, in order to diminish their intention to leave the profession.

Furthermore, teachers belonging to two particular personal resources profiles (i.e., the Resilient and the Well-equipped profiles) respond to job demands by engaging in professional learning activities to overcome these demands. This means that LCT with a positive pattern of personal resources can cope with job demands, as these demands push them to evolve and engage in learning activities. However, LCT with a poor pattern of personal resources are more likely to be overwhelmed by the pressure of these demands. With the same conclusions as Van den Broeck et al. (2010), this result also highlights the need to differentiate job demands into two types: challenges, which are associated with a more adaptive posture (Tremblay & Messervey, 2011) when individuals evaluate job demands positively (Li et al., 2020), and hindrances, which create work overload and can ultimately be experienced negatively (Tadić et al., 2015).

5.2. Limitations

Notwithstanding the significant research findings of this study, several limitations need to be considered. First, given its cross-sectional nature, this study was unable to ascertain causal ordering. Employing longitudinal or experimental designs will be important in future research. Second, 183 participants represents quite a small sample size to perform moderation mixture models. A larger sample would be more adequate to guarantee robust analysis and, therefore, guarantee the similarity of profile solutions across subpopulations (see also Spurk et al., 2020). In addition to this, the nature of the sample in this research could be improved, as there was a low percentage of teachers around 65 years old in our sample, who were in the last few years of their career. Future research could consider focusing on those last few years for teachers in early education, taking a look at their emotional and cognitive anticipation of retirement and the transition to a pension, as we know from the literature that these years are critical (Randall et al., 2023).

Despite the less widespread usage of the JD–R in teacher research, the model was indirectly validated through this study, given the observed first-order measures and acceptable-to-good fit indices of the second-order factors, as shown by Fig. 1. The variables used to represent the nature of job resources and demands in the teaching profession seem to measure the reality of LCT well. The combination of personal resources we proposed was selected based on research insights that consider teachers as agents of their own change and having a certain sense of agency. Other personal resources may be at play in the reality of teaching, such as organisation-based self-esteem, optimism or proactivity (e.g., Alonso et al., 2019; Peng et al., 2019). In addition, recent findings about teachers' self-efficacy have emphasized an organisational dimension that takes into account the social-cognitive embeddedness of efficacy beliefs in schools, namely, collective efficacy (see Goddard et al., 2004; Strahan Née Brown et al., 2019). Collective efficacy refers to teachers' beliefs that their school as a whole is capable of carrying out the missions it is pursuing (Bandura, 1997). The self-efficacy construct evaluated in this study did not permit us to consider perceptions of collective efficacy, which could have influenced teachers' individual perceptions of their own effectiveness. Future research might consider examining these other personal resources identified in the literature or investigate other meaningful contextual resources (collective efficacy and other forms of support, for example).

5.3. Implications for future research and practice

Several authors have described the changing nature of working conditions in ECE, because of locally differing socio-political systems and structures (Løvgren, 2016; Schreyer & Krause, 2016). It is by definition difficult to foresee a specific direction for research aiming to support professionals in dealing with the stressors they face and to ensure their positive experience of the job in its final phase (Cumming, 2017). That being said, this study considers the interaction of job demands, job resources, and personal resources, which significantly constitutes the reality of professionals. It would be interesting to continue in this direction. Future research could also, as Hall-Kenyon et al. (2014) suggested, conduct a richer examination of teachers' lives and profiles through qualitative inquiry, to better know how they develop coping strategies and make use of resilience to deal with the challenging aspects of the profession. Furthermore, approaches that tell us what works in this type of environment are not to be left out. Therefore, in line with the suggestions by Jeon and colleagues (2017), a promising starting point would be to promote intervention studies aiming to develop organisation-wide measures, raise awareness, anticipate difficulties, and develop personal resources among teachers through professional development opportunities, and also to better accompany their

transition to retirement. Moreover, from a policy point of view, LCT are an important part of the teaching workforce, whose number will increase in the coming decades (Ingersoll & Merrill, 2013). Over the course of their careers, they have accumulated different skills and competences that could be profitable for other generations of teachers. Considering them as assets in the school organisation can also be an important prerequisite, as enhancing job resources may address the retention issue in teaching. Moreover, keeping them at work in favourable conditions and giving them the opportunity to develop, while making them aware of strategies for adapting to changing job conditions, will also keep them active for longer. As advocated by Ilmarinen (2012), proactive and preventive pension reform could consider the substantial individual differences between LCT by offering a flexible range of retirement dates, with a financial bonus for those who wish to work longer.

In practical terms, principals and educational advisors could set up individual or collective discussions to identify thorny issues specific to LCT, and to reflect on and develop specific resources and strategies to cope with them. Identifying these contextual specificities will also allow better monitoring by the school management to facilitate an age-appropriate work experience for all generations within schools. Individually, LCT could also adopt a self-diagnostic approach towards the resources they possess and the strategies they apply to manage work constraints. This would allow them to develop awareness and to focus specifically on resources that are diminishing or absent, or resources that are essential in order to thrive in the profession. A better understanding of these teachers and their working life calls for a more personalised support and a smooth path to retirement, to ensure that all teachers, late-career teachers in particular, remain motivated in their careers in a healthy and sustainable way. This is even more important after the COVID-19 pandemic, with its major impact on physical and psychological well-being (Kwon et al., 2022).

6. Conclusion

The findings of this study revealed that there are four distinct profiles of LCT in early childhood education, based on their personal resources: occupational future time perspective; resilience; selection, optimisation, and compensation strategies, and self-efficacy for learning and development. Furthermore, these personal resources profiles were found to have a significant moderating role in the relationship between job demands and engagement in professional learning activities.

The study represents an important step towards recognizing the significance of investigating the late-career phase and the context-specific demands and resources present in the teaching profession. It also highlights the potential for teachers to enhance their own career development by strengthening their personal resources, which can be mobilised to help them thrive throughout their career. Further research on LCT is crucial in order to comprehend the challenges and opportunities faced by these professionals, as they possess valuable knowledge and experience. Their career trajectories can provide valuable insights into effective resource management strategies, career planning and job satisfaction. Moreover, this research has the potential to contribute to the improvement of teaching policies and practices by offering a better understanding of the needs of LCT and by providing recommendations for supporting their well-being and engagement.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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