THIS IS US: Latent Profile Analysis of Canadian Teachers' Burnout during the COVID-19 Pandemic

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Abstract

During the initial wave of the COVID-19 pandemic, 1,930 Canadian teachers were surveyed about their burnout and resilience levels, as well as their job demands and resources. Latent profile analysis revealed that teachers were responding to their experiences in five distinct patterns, or profiles, of burnout or resilience. Survey data were then used to match each profile group with their salient demands and resources. A continuum model of recommendations is offered to support teacher resilience as they navigate and recover from the pandemic.

Keywords: teacher, burnout, resilience, pandemic, job demands-resources, latent profile analysis

Résumé

Au cours de la vague initiale de la pandémie de COVID-19, 1 930 enseignants canadiens ont été interrogés sur leur degré d'épuisement professionnel et de résilience, ainsi que sur les exigences liées au travail et leurs ressources. L'analyse des profils latents a révélé que les enseignants réagissaient à ces situations selon cinq modèles ou profils distincts d'épuisement ou de résilience. Les données de l'enquête ont ensuite été utilisées pour faire correspondre chaque groupe de profils aux exigences de travail et ressources principales déclarées. Un modèle de continuum de recommandations est proposé pour soutenir la résilience des enseignants alors qu'ils traversent et se remettent de la pandémie.

Mots-clés : professeur, épuisement, résilience, pandémie, exigences professionnelles et ressources, analyse du profil latent

Introduction

An abundance of international research has demonstrated that teaching is a rewarding yet stressful profession (Johnson et al., 2005; Skaalvik & Skaalvik, 2015). Otto (1986) identified work-related stress as a mismatch between internal and external demands and resources of the role. When teachers experience high levels of stress, the results can include poor instruction, negative well-being, ill health, and possible burnout and attrition (Alarcon, 2011; Clunies-Ross et al., 2008; Harmsen et al., 2018). The good news, especially given the current demands on teachers resulting from the COVID-19 pandemic, is that stress management can lead to improved social-emotional competence for teachers, who are then more likely to remain in classrooms for the benefit of their students, despite inherent challenges (Jennings & Greenberg, 2009). Ott and colleagues (2017) defined such ability to cope and grow through adversity as resilience.

Answering the call of Holmes et al. (2020), we focused our study on the psychological aspects of teaching during the challenging time of the COVID-19 pandemic, including an exploration of the relationship between role demands and resources, stress, and potential burnout for teachers. We selected two well-validated theoretical models that were previously used to examine these variables, with an interest in applying the frameworks under pandemic conditions to understand the impacts for teachers more fully. We selec-

ted a newer method of analysis, based on its capacity to represent different patterns of stress responses in teachers statistically. Finally, we synthesized the findings of the current research with a recent model of support for recovery and resilience to generate recommendations for teachers' multiple pathways away from the stressors of the pandemic.

Literature Review

Job Demands and Resources

The job demands-resources (JD-R) model (Bakker & Demerouti, 2007) was developed to identify precursors of work-related burnout due to excessive job demands and insufficient resources. Job demands are "physical, psychological, social or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills" (Baker & Demerouti, 2007, p. 312). Job resources are "physical, psychological, social or organizational aspects of the job that are either functional in achieving work goals, reducing job demands and the associated physiological and psychological costs or [in] stimulating personal growth, learning, and development" (p. 312). In the JD-R model, stress is the appraised mismatch between job demands and resources (Bakker & Demerouti, 2007; McCarthy et al., 2015); a shortage of resources relative to demands results in stress, which could lead to burnout and attrition (Harmsen et al., 2018, Maulana et al., 2015). The JD-R model recognizes 'personal resources' (Bakker & Demerouti, 2007; Taris et al., 2017) in addition to contextual resources, signalling the importance of individual agency and choice in determining which resources would be most effective in relation to specific demands (Taris et al., 2017). Furthermore, this model provides a salient means for examining the changing nature of teaching during a pandemic and is therefore a useful lens for investigating the demands and personal and contextual resources that together predict teacher resilience or burnout.

Burnout

The most accepted model of burnout is offered by Maslach and Jackson (1981). In this model, burnout is described in three dimensions: (1) emotional exhaustion, (2) depersonalization (or cynicism), and (3) reduced personal accomplishment (Maslach & Jackson,

1981; Maslach et al., 1996). Progression along the burnout continuum is often perceived to occur due to sustained periods of occupational stress (World Health Organization, 2018). When investigating teacher stress related to demands and resources, Alarcon (2011) found that job demands most strongly correlated with emotional exhaustion, followed by cynicism, and then reduced levels of accomplishment, while the reverse strength of correlations are associated with resource provision. Collectively, these findings suggest that ameliorating teacher burnout along the continuum requires differential responses dependent on an individual's stage of burnout.

Preventing and responding to teacher stress and burnout. Bakker and de Vries (2021) have recently proposed a multi-level response to burnout along the burnout continuum. In so doing, they not only operationalized theory into highly practical uses, but also captured the understanding that interventions are most effective when they address *structural* causes of burnout (imbalances between job resources and demands), include multiple levels (organizational and individual), and do not treat all individuals in the same way. Their new model conceptualized multiple responses within a range, including supports for teachers who were struggling and needed recovery strategies as well as teachers who were flourishing and needed opportunities to be challenged and grow.

Recovery strategies. Individuals who bring work home, and fail to recharge, may experience higher long-term stress, and depleted personal resources and energy to the point of being unable to access social supports and other resources (Bakker & Oerlemans, 2019). While a sustained focus on unproductive avoidance behaviours (e.g., denial and self-blame) will do little to address the demands-resources imbalance, will result in poorer work performance, and will produce more strain on the employee, a short-term focus on productive recovery strategies can be effective in decreasing job demands and burnout. Avoidant behaviours may be effective in the short term—if an employee uses the time to recharge—in order to have the capacity to reframe the problem and use subsequent approach strategies for coping (Sonnentag, 2012). Moreover, when the stressor cannot be controlled, using strategies to control one's emotional responses to them may be effective (Britt et al., 2016).

While it may seem more intuitive to ask ineffective depleted teachers to lean in to confront their stressors (Shin et al., 2014), focused adherence to such approach responses has drawbacks over the long term. Demerouti and colleagues (2007) showed that for exhausted workers who continue their work tasks at home, the focus and energy they expend to try to fill the gap between job demands and resources may be pulled from usual

recovery responses such as exercise and sleep. This results in a short-term burst of energy but a long-term depletion (Bakker & de Vries, 2021), as well as fatigue at work and lower job performance.

Recovery requires time away from work to reset energy and emotions to baseline, and may include activities such as hobbies, meditation, social activities, sports, and exercise. Sonnentag and Fritz (2007) identified four essential criteria that an activity must satisfy in order to support recovery: it must (1) foster psychological detachment from work, (2) promote relaxation with lower activation levels, (3) promote a sense of mastery by learning something new or achieving a goal, and (4) promote a sense of individual control. In meeting these criteria, recovery activities result in decreased fatigue, increased energy, and increased work performance and engagement.

Other unhealthy results of job strain are self-undermining behaviours (Bakker & de Vries, 2021), which include poor communication, conflicts with others, and careless mistakes. These behaviours in turn lead to greater job stress, again creating a mismatch between the individual and the demands and resources inherent in the situation. Bakker and Wang (2019) showed that such self-undermining behaviours were more common among employees with higher exhaustion and cynicism, and occurred most frequently in periods when the demands were high (Bakker et al., 2020; Bakker & de Vries, 2021). When employees enact a maladaptive cycle of response to job demands in a repeated manner, they are more likely to burn out (Bakker & de Vries, 2021), highlighting the need to provide interventions that yield more healthy ways of coping.

This is where the efforts of an effective administrator can be especially salient. A meta-analysis by Maricuţoiu et al. (2016) showed that most interventions focus on increasing employees' personal resources through social support and relaxation. These resulted in small desirable effects of relieving exhaustion, but had no effects on cynicism or accomplishment. However, workplace leaders who adopt a transformative leadership style have been shown to foster reduced job demands through mentoring and coaching (Bakker & de Vries, 2021), support, feedback and growth opportunities (Breevaart et al., 2014). For example, Dimoff and colleagues (2016) showed that supervisors who underwent professional development in mental health literacy developed more positive attitudes toward mental health and higher intentions of promoting mental health practices, resulting in fewer short-term disability claims by their employees.

Next steps. Once teachers have sufficient energy to adopt "approach" strategies, selecting an effective plan is important. The most effective strategies are at least 10 weeks

in duration and involve regular, weekly practices or meetings of 60 to 90 minutes; strategies that are less frequent or of shorter duration are less effective (Embse et al., 2019). Moreover, while most studies report small to medium effect sizes for burnout interventions (Embse et al., 2019), some research suggests that there may be a lag where effects grow over time after the completion of the intervention (Iancu et al., 2018). Burnout interventions generally aim to develop the internal resources of teachers (Bakker & Demerouti, 2007; Taris et al., 2017), but it is important to ensure that teachers have recovered sufficiently to be able to engage in them, and equally important to recognize that without co-commitment by employers to decrease demands and increase organizational resources, such initiatives will have little effect (Embse et al., 2019; Maricuţoiu et al., 2016).

For teachers demonstrating higher levels of capacity, Bakker and de Vries (2021) suggested that job crafting may be a next step. Job crafting refers to employees' activity of adjusting their work environment, including tasks, relationships, and job demands and resources (Bakker & de Vries, 2021). Research showed that, for teachers, job crafting resulted in increased self-efficacy, optimism (Van Wingerden et al., 2017) and well-being (Oprea et al., 2019). Van Wingerden and her colleagues (2017) conducted research using a 12-hour workshop format that involved: (1) analyzing and ranking current job demands in terms of time requirements, frequency, process (solitary or group), urgency and importance; (2) conducting a personal analysis of strengths, motives, and personal and organizational obstacles; (3) comparing control and intervention groups to recognize that strengths aligned with motives, and challenges with obstacles; (4) crafting their planning to maximize resources, welcome challenges, and decrease obstacles; and (5) enacting the plan through short- and long-term goals. The latter study found that some outcomes demonstrated short-term loss at four weeks, but long-term gains after one year, which is similar to other burnout interventions (Iancu et al., 2018). Additionally, they resulted in more long-term opportunities for feedback and professional development, suggesting that the teachers who participated were open to sustained growth-oriented opportunities. In addition, at the one-year point, the participants demonstrated higher efficacy and in-role performance. Importantly, the intervention did not result in a decrease in the job demands viewed as obstacles, suggesting that the control of demands is an opportunity more likely provided to employers than to employees and highlighting the role of the organization in decreasing work-related barriers.

Bakker and de Vries' (2021) continuum model is a promising approach to address teacher burnout. It is supported by a strong research base, both practically and theoretically.

Moreover, it addresses internal and external demands and supports and recognizes the roles of individuals and organizations. However, this model was generated to respond to work situations in pre-pandemic conditions. It is yet to be seen if it remains viable within the magnitude of the systemic, individual, and sustained stressors provoked by COVID-19.

Burnout and Teaching during a Pandemic

Although the research literature on teacher burnout in general is well established, there is less known about individual variation in responses (Bianchi et al., 2015). In our earlier work reporting on progression of burnout in a national Canadian sample of over 1,600 teachers from April 2020 to June 2020, we (Sokal et al., 2020b) found that while exhaustion and depersonalization increased over time as expected during the period when teachers adjusted to remote teaching in a pandemic, their sense of accomplishment surprisingly and concurrently increased over this same period. Likewise, we observed that some teachers who struggled with job demands during the pandemic accused resilient teachers of eliciting "toxic positivity" (Sokal et al., 2020c, 2020d), suggesting a divide and diversity in teacher coping mechanisms during COVID-19.

Together, these findings run contrary to previous occupational stress models and necessitate further areas of exploration: As the progression of burnout in the Sokal et al. (2020a) study did not follow patterns suggested in the literature, it is possible that the conditions and responses promoted by a global pandemic are not adequately captured by the existing, predominant model of burnout. Given that a range of responses to stress were evident in both studies (Sokal et al., 2020a, 2020c, 2020d), perhaps a different statistical approach to examine teachers' distinct experiences with burnout and stress during a pandemic is required. Ideally, the new analytic approach would enable us to understand different patterns of responses in homogeneous sub-groupings within this population, and perhaps assist in the development of differentiated supports that would be more meaningful and authentic for each group of teachers.

Latent Profile Analysis and Teacher Burnout

Latent profile analysis (LPA), a person-centred approach, is a relatively new cousin to traditional cluster analysis. In 2016, Mäkikangas and Kinnunen showed that LPA had only

become popular within the previous 10 years, based on their review of 24 research studies. Of these 24 studies, three considered teachers (Polish, French, and Swedish) but used traditional cluster analysis, while four used LPA, but did not involve teachers. Mäkikangas and Kinnunen (2016) found that trends identified through person-centred analyses were consistent with those identified using variable-oriented analyses. However, the person-centred approaches, such as LPA, also identified the heterogeneity of burnout responses, including both typical and atypical responses. We believe that LPA is the superior approach for our purposes, as traditional variable-based analyses such as ANOVA and correlations alone would not be as useful in addressing the practical application of our study's findings. For example, a finding of greater or lesser burnout characteristics in older teachers would not be useful, as these findings are based on teacher characteristics that cannot be changed. In contrast, LPA generates distinct contextual profiles as well as statistical criteria for model comparisons, generating distinct groups that allow opportunities to examine differentiated resources and demands that each group deems important (Meyer et al., 2013). Moeller et al. (2018) noted that LPA also allows us to understand patterns of seemingly discordant concurrent characteristics within individuals; an example is the case of Sokal et al.'s (2020b) finding of increased exhaustion and depersonalization alongside increased accomplishment. Researchers have suggested several avenues for further development of burnout research, including: (1) exploring burnout contextually, by considering antecedents as well as individual resources, to generate a more holistic understanding of burnout; and (2) moving away from traditional cluster analysis and toward LPA (Mäkikangas & Kinnunen, 2016). For these reasons, as well as the unique teaching conditions provoked by COVID-19, we chose to use LPA as the method of analysis for our study.

Since the 2016 review by Mäkikangas and Kinnunen, Finnish and Swedish researchers have utilized LPA to examine burnout contextually with teachers, although it has not yet been applied to data generated during the COVID-19 global pandemic. A recent study by Pyhältö et al. (2020) examined burnout in 2,310 Finnish teachers. They identified five distinct profiles: (1) *No burnout risk* (47% of sample), with low levels of exhaustion, cynicism, and loss of accomplishment; (2) *Minor burnout risk* (25%), with moderate levels of exhaustion, cynicism, and loss of accomplishment; (3) *Increased exhaustion* (19%), with a high level of exhaustion and moderate levels of cynicism and loss of accomplishment; (4) *Increased exhaustion and cynicism* (6%), with a high level of exhaustion, moderate levels of cynicism, and low loss of accomplishment; and (5) *High*

burnout risk (4%), with a high level of exhaustion, moderate levels of cynicism, and high loss of accomplishment. They concluded that the percentage of teachers falling within the increased or high risk of burnout categories (latent profiles 4 and 5, representing a total of 10% of the sample) is concerning, given the crucial impact of teachers on student well-being (Herman et al., 2018).

Another recent, smaller Finnish study (Salmela-Aro et al., 2019) was similar in design to our current study but conducted prior to the 2020 global pandemic. In contrast to the five profiles found by Pyhältö et al. (2020), Salmela-Aro et al. (2019) found only two profiles, both consisting of engaged teachers: engaged (30%) and engaged-burnout (70%). While both groups were highly engaged in teaching, the latter group demonstrated higher levels of burnout. The former group had access to greater job resources and personal resources (such as control), whereas the latter group experienced greater work demands. Salmela-Aro et al. (2019) found the latent profile characterized by concurrent high levels of engagement and burnout was a previously unidentified profile of burnout, and they labelled this a "worrying result" (p. 5).

A related study of 816 novice Swedish teachers used traditional cluster analysis to generate seven profiles (Hultell et al., 2013). Although LPA was not used in that study, we mention it for two reasons. First, it explored changes in teacher burnout at four timepoints over the first three years of teaching. Second, in using person-centred analysis as well as a longitudinal design, it was able to investigate previous claims that burnout is a stable state. The seven trajectories identified were: (1) Increase (13%); (2) Decrease (11%); (3) Increase followed by decrease (10%); (4) Decrease followed by increase (9%); (5) Stable low (25%); (6) Stable high (5%); and (7) Stable moderate (27%). These researchers found that burnout trajectories, whether progressing or regressing, were not always stable, but more importantly were related to changes in both resources (e.g., self-efficacy) as well as outcomes (intention to leave the profession). Together, these findings suggest that a more nuanced understanding of the profiles of teacher burnout—within the context of job demands and internal and external resources—would allow us to tailor contexts and suggest ways to minimize or reverse teacher burnout trajectories.

Research Questions

Given the literature on teacher burnout, we developed two focus questions to guide our study:

1. Given that differences in the number and nature of profiles across studies suggest that context is important, which burnout profiles are evident in Canadian teachers during the COVID-19 pandemic?
2. Which job demands and related internal and external resources are associated with each burnout profile?

Method

Design

The study was funded by a grant to the second author from the Social Sciences and Humanities Research Council of Canada and approved by the University of Winnipeg's Human Research Ethics Board. The methods and measures have been described in previous publications based on subsets of the data at different time points (Sokal et al., 2020a, 2020b) and qualitative interviews (Eblie Trudel et al., 2021). The current study has a quantitative design, based on three surveys including the entire sample (N = 1,930) conducted in April (n = 1,163), June (n = 332) and October 2020 (n = 435) and used a novel statistical analytic approach.

Acknowledging the time constraints of the pandemic, teachers from across Canada were recruited by the snowball method, where each participant was requested to pass along the invitation to participate to other eligible contacts. In this case the invitation and online survey link were initially emailed to university professors in faculties of education as well as to teachers' professional organizations across Canada. The request was for Canadian in-service teachers to complete a consent form and survey about their experiences teaching during the initial months of the COVID-19 pandemic. Teachers participated through an online survey housed on Survey Monkey. It took an average of only 15 minutes to complete the 92-question anonymous survey, as many questions used Likert scales.

Measures

Demographics. We collected data about teachers' gender, age, years of teaching experience, and levels of education (see Table 1).

Table 1

Demographic Information

	Number of participants
Province/Territory	
British Columbia	55
Alberta	83
Saskatchewan	121
Manitoba	1,019
Ontario	14
Quebec	7
New Brunswick	95
Nova Scotia	524
Prince Edward Island	6
Newfoundland and Labrador	4
Northwest Territories	1
Gender	
Male	305
Female	1,604
Other	1
Don't wish to say	17
Age	
Under 26	55
26-30	264
31-40	621
41-50	610
Over 50	378
Teaching experience	
Under 1 year	58
1-5 years	391
6-10 years	380
11-15 years	396
Over 15 years	804
Education	
Less than a Bachelor's degree	8
Bachelor's degree	855
Some graduate work	468
Masters	497
PhD	100

Burnout. We used the Maslach Burnout Inventory - Educators Survey (MBI-ES) (Maslach & Jackson, 1981). This is a 22-item instrument that measures the characteristics of burnout, including exhaustion, depersonalization, and personal accomplishment (Maslach et al., 1996). It uses a 7-point Likert scale indicating the frequency with which educators agree with the statements: 0 (never), 1 (a few times since beginning teaching at home), 2 (once a month or less), 3 (a few times a month), 4 (once a week), 5 (a few times a week), or 6 (every day). Three examples of statements are: "I feel emotionally drained from work" (exhaustion); "I don't really care what happens to some students" (depersonalization); and "I have accomplished many worthwhile things in this job" (accomplishment).

Job demands and resources. Based on the literature, we developed a list of five demands and 17 resources, both personal (e.g., self-care such as healthy eating and mindfulness) and external (e.g., support or challenges from parents and administrators). Teachers were asked to indicate the degree to which they perceived each as contributing to their stress or support, respectively. Both resources and demands were measured on a Likert scale ranging from 1 (not at all) to 6 (a great deal).

Participants

In total, almost 2,200 people completed the surveys in April, June, and October collectively. People who were not teachers (e.g., administrators, clinicians, etc.) and those who did not respond to every item of the survey were excluded from the analyses, resulting in 1,930 participants.

Results

Latent profile analysis (LPA) was used to investigate the relationships among the means of three MBI subscales: exhaustion, depersonalization, and (loss of) accomplishment. LPA enabled us to consider variation in MBI-ES subscale scores of individual teachers and to determine distinct profiles (a.k.a. classes) of burnout risk.

For clarity, LPA commands the statistical analysis software to assume a range of statistical parameters (see "Notes" under Table 2 for the four models describing the parameters) and then to determine the best number of profiles under each parameterization, described as "classes." For example, in Table 2, the first model assumes equal variances and covariances fixed to zero, and then generates the goodness of fit based on

the assumption of there being two, three, four, or five groups of teachers ("classes") as the best representation of the data. It generates results for five standards to measure fit (called "information criteria" in Table 2). Based on these findings, it determines which parameterization combined with which number of groups best meet all five standards.

Table 2

Fit Indices for LPA Models with 2-5 Profiles

		Information criterion				
Model	Classes	AIC[a]	BIC[b]	AWE[c]	CLC[d]	KIC[e]
1	2	18,858.31	18,913.97	19,018.21	18,839.72	18,871.31
1	3	18,576.11	18,654.02	18,800.55	18,549.50	18,593.11
1	4	18,548.41	18,648.58	18,837.49	18,513.68	18,569.41
1	5	18,452.80	18,575.24	18,806.28	18,410.19	18,477.80
2	2	18,636.49	18,708.84	18,844.93	18,611.75	18,652.49
2	3	18,433.04	18,544.35	18,754.32	18,394.38	18,456.04
2	4	18,448.16	18,598.43	18,882.46	18,395.39	18,478.16
2	5	18,317.31	18,506.53	18,864.52	18,250.53	18,354.31
3	2	18,682.34	18,754.69	18,890.62	18,657.77	18,698.34
3	3	18,681.31	18,775.92	18,954.50	18,648.35	18,701.31
3	4	18,471.30	18,588.17	18,808.69	18,430.65	18,495.30
3	5	18,479.80	18,618.93	18,881.90	18,430.96	18,507.80
4	2	18,528.04	18,633.78	18,833.52	18,491.04	18,550.04
4	3	18,435.61	18,597.00	18,902.39	18,378.62	18,467.61
4	4	18,344.67	18,561.71	18,972.58	18,267.85	18,386.67
4	5	18,390.80	18,663.50	19,179.99	18,294.00	18,442.80

Notes:

Four LPA models were considered:

Model 1: Equal variances and covariances fixed to zero

Model 2: Varying variances and covariances fixed to zero

Model 3: Equal variances and equal covariances

Model 4: Varying variances and varying covariances

[a]AIC = Akaike's information criterion

[b]AWE = Approximate weight of evidence

[c]131C = Bayesian information criterion

[d]CLC = Classification likelihood criterion

[e]KIC = Kullback information criterion

To conduct these analyses, we implemented the three-step data analytic strategy adopted by Pyhältö and colleagues (2020) in their article on burnout profiles for teachers in Finland:

Step 1: Extract latent burnout profiles without covariates. That is, focusing solely on burnout measure data, conduct an LPA to identify latent profiles.

Step 2: Assign each individual teacher to their most likely class membership.

Step 3: Explore relationships between burnout measures and covariates.

A three-step process for identifying latent profiles and investigating the covariates of latent profile membership was also discussed in an earlier article by Asparouhov and Muthén (2014).

Table 3 lists descriptive statistics (mean, standard deviation, minimum, first quartile, median, third quartile, and maximum) on the MBI subscales for data on 1,930 teachers who participated in our national survey on teacher burnout during the COVID-19 pandemic. The table also lists, for each subscale, the value of the Cronbach alpha measure of reliability; these values were computed using the alpha function available with the R statistical package psych for personality, psychometric, and psychological research (Revelle, 2020).

Given that calculated values of Cronbach alpha values for the MBI scales have ranged widely in the literature and are sample-dependent, Aguayo et al. (2011) recommended that these values be calculated and reported based on the specific data sets from which conclusions will be drawn (see Table 3). Hulin and colleagues (2001) suggested that an alpha value of .60 to .70 indicates an acceptable level of reliability, a threshold met for the current sample. Furthermore, the current study is based on non-probabilistic sampling, which tends to yield slightly lower values for alpha (Aguayo et al., 2011). We may, therefore, conclude that the MBI-ES instrument has yielded acceptable alpha levels in the current study.

Table 3

Descriptive Statistics of the MBI-ES Burnout Inventory Subscales

Subscale	No. of items	Cronbach alpha	*N*	Mean	*SD*	Min	First quartile	Median	Third quartile	Max
Exhaustion	9	0.84	1,930	3.86	1.43	0.00	2.89	4.00	5.00	7.00
Depersonalization	5	0.64	1,930	1.80	1.25	0.00	0.80	1.60	2.60	6.40
Accomplishment	8	0.68	1,930	3.82	1.22	0.00	3.00	3.88	4.75	7.00

We used the R statistical package tidyLPA (Rosenberg et al., 2018) to conduct LPA and to partition the set of respondents into MBI profiles on the basis of their MBI-ES subscale scores. We considered four model parameterizations (see "Notes" under Table 2).

For each model parameterization, we considered the choice of two, three, four, or five latent classes. To compare performance of the 16 combinations of the models and number of classes, we applied an analytic hierarchy process, based on five commonly used information criteria: AIC, AWE, BIC, CLC, and KIC. For each information criterion, a smaller value is indicative of a better model (Akogul & Erisoglu, 2017). The method, developed by Akogul and Erisoglu (2017), was applied to a 16 x 5 decision matrix derived from the AIC, AWE, BIC, CLC and KIC values for the four models, and is available as part of the tidyLPA software package in R (Rosenberg et al., 2018).

The decision matrix for our application of LPA to the MBI subscale data is shown in Table 2. The analytical hierarchy method of Akogul and Erisoglu (2017) suggested that it would be best to use the model 2 parameterization (varying variances and covariances fixed to zero) with five latent classes (profiles). As well, model 2 with five profiles scored best for each of the five information criteria.

After obtaining the five latent profiles, we identified the profile group for each respondent (see Table 4). LPA revealed five profile groups: Engaged (10.8%), Involved (21.6%), Over-extended (40.4%), Detached (18.4%), and Inefficacious (8.8%). The subscale means for each profile are also depicted in Figure 1, which provides a clear representation of the five distinct groups found through LPA.

Table 4

MBI-ES Subscale Means and Standard Deviations for Each Profile

Subscale	Profile 1 $n_1 = 169$			Profile 2 $n_2 = 416$			Profile 3 $n_3 = 780$			Profile 4 $n_4 = 356$			Profile 5 $n_5 = 209$		
	Mean	*SD*	z[b]	Mean	*SD*	z[b]	Mean	*SD*	z[b]	Mean	*SD*	z[b]	Mean	*SD*	z[b]
Exhaustion	2.94	1.15	-0.64	2.74	1.16	-0.78	4.40	0.83	0.38	5.29	0.67	1.00	2.60	1.49	-0.88
Depersonalization	1.78	0.90	-0.02	0.97	0.53	-0.66	1.84	0.85	0.03	3.45	1.00	1.32	0.07	0.10	-1.38
Accomplishment	2.64	0.84	-0.97	4.38	1.07	0.46	3.85	1.12	0.02	3.54	1.20	-0.23	4.39	1.14	0.47

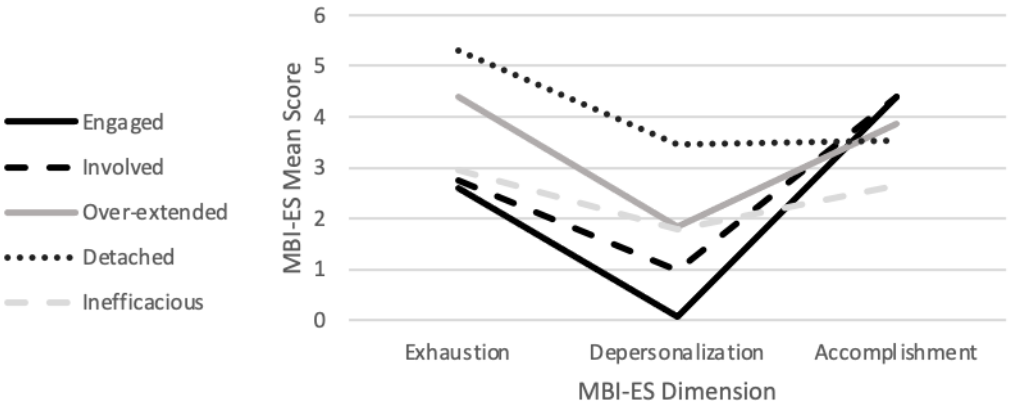
Notes:

[a]Profiles were obtained using a latent profile analysis model with varying variances and covariances fixed to zero.

[b]z = (Profile mean for subscale - Overall mean for subscale)/(Overall SD for subscale)

Figure 1

Five Latent Profiles and MBI-ES Means



After conducting LPA on the MBI-ES subscale data, we explored the relationships between each profile group with 12 covariates: five job demands subscales and seven job resources subscales. We asked survey participants to tell us, on a 6-point Likert scale, how much each item on a list of five demands contributed to the demands of their job and how much each item on a list of 15 resources supported them in their job. Pearson correlation coefficients indicated that each of the five teacher profiles correlated with different job demands and resources. Being as there were 15 resources, we used principal component analysis (conducted on the resources correlation matrix) and average-linkage cluster analysis to group like resources together (Johnson & Wichern, 2007). Given the importance of administrators in the research literature, we analyzed this variable separately; however, the set of the other 14 resource variables partitioned into 6 groups: (1) Colleagues and Parent/Guardian supports; (2) Friends and Family supports; (3) Professional Learning about strategies (instruction in new methods and technology); (4) Physical health activities (sleep, healthy eating, and exercise); (5) Well-being activities (meditation and mindfulness); and (6) Introspective activities (prayer, counselling, and journaling).

For each of the five profiles, Table 5 lists the correlations of the MBI subscales with the subscales for job demands and job resources. When interpreting these profile correlations, we choose to consider only significant correlations at the .05 and .01 level where the coefficient *r* is .10 or larger in absolute value, given that smaller absolute *r* values are indicative of negligible effect sizes (Cohen, 1992). Pearson correlation coefficients indicated that each of the five teacher profiles correlated with different job demands and resources.

Table 5

Correlations of MBI-ES Subscales with Job Demands and Resources Subscales

	Inefficacious Profile 1 (n, = 169)			Involved Profile 2 (n, = 416)			Over-extended Profile 3 (n, = 7801			Detached Profile 4 (n_4 = 356)			Engaged Profile 5 (n, = 209)		
Job Demands and Resources	Exhaust	Deperson	Accomp	Exhaust	Deperson	Accomp	Exhaust	Deperson	Accomp	Exhaust	Deperson	Accomp	Exhaust	Deperson	Accomp
Time management	0.284	-0.108	-0.109	0.375-	-0.081	0.081	0.281-	-0.124-	0.035	0.204-	-0.026	-0.026	0.470-	0.019	0.130
Technology issues	0.143	-0.117	-0.209**	0.207	-0.052	-0.022	0.127	-0.088	0.020	0.108	0.016	-0.084	0.353-	0.060	-0.018
Parents	0.132	-0.066	-0.129	0.052	-0.059	-0.069	0.1167	-0.034	-0.065	0.034	-0.035	-0.084	0.202-	0.049	-0.086
Balancing home obligations and teaching	0.171*	-0.051	-0.064	0.274**	-0.051	-0.077		0.279	0.005	0.201*	-0.049	-0.114*	0.394**	-0.075	-0.077
Lack of resources	0.104	-0.086	-0.267-	0.133-	-0.053	-0.064	0.164-	-0.065	-0.123-	0.091	-0.040	-0.078	0.208-	-0.021	-0.199-
Adm instrator support	-0.087	-0.022	0.073	-0.046	-0.021	0.149**	0.022	-0.041	0.094	-0.164	-0.067	0.015	0.020	-0.015	0.160
Colleagues and parent/ guardian supports	0.114	-0.052	-0.010	0.062	-0.097	0.100*	0.040	-0.040	0.089	0.018	-0.069	0.010	0.089	0.013	0.203*-
Friends and family supports	0.182-	-0.014	0.041	0.161	-0.111	0.072	0.095	-0.035	0.131-	0.112*	-0.062	0.049	0.075	0.145*	0.085
Professional lea rn i ng about strategies	0.147	-0.018	0.074	0.074	-0.060	-0.013	0.027	-0.005	0.116		-0.039	-0.010	0.070	0.071	0.151
Physical health activities	0.115	-0.172*	-0.108	0.021	-0.069	0.127**	-0.003	-0.002	0.158**	-0.051	0.028	-0.061	-0.090	-0.015	0.171*
Well-being activities	0.058	-0.083	0.018	0.092	-0.099	0.109*	0.018	-0.010	0.159	-0.024	-0.027	0.028	0.112	-0.010	0.169*
Introspective activities	0.030	0.017	0.091	0.062	-0.036	0.033	0.047	-0.049	0.082	0.037	-0.019	-0.052	0.034	-0.071	0.101

Notes:

* Correlation is significantly different from zero at the 5% level.
** Correlation is significantly different from zero at the 1% level.
The correlation coefficient, *r*, is an index of effect size. Absolute values of *r* less than 0.10 are indicative of very little effect.

Teacher Profiles

Here we collate the findings of the LPA and correlations to present the five profile groups and the demands and resources that teachers in each group indicated were significant.

1. Engaged teachers. Engaged teachers (n = 209, 10.8%) were characterized by moderate exhaustion, lowest depersonalization, and high accomplishment. The three MBI-ES subscales demonstrated 12 significant correlations, six with job demands and six with resources. Bakker and Demerouti (2014) argued that teachers who perceive both high demands and high resources demonstrated significantly greater engagement in terms of vigour, dedication, and flow. All five job demands (time management, technology issues, students' parents, balancing home and work life, and lack of resources) correlated significantly with exhaustion, while lack of resources correlated negatively with accomplishment. Engaged teachers perceived no supports as being correlated with exhaustion, whereas depersonalization was positively correlated with support from family and friends. A higher level of accomplishment was significantly correlated with support from administrators, support from colleagues and parents/guardians, professional learning about strategies, physical health activities, and well-being activities.

2. Involved teachers. Involved teachers (n = 416, 21.6%) were characterized by moderate exhaustion, second-lowest depersonalization, and high accomplishment. The MBI-ES subscales demonstrated 10 significant correlations, including four with job demands and six with resources. All five demands (time management, technology issues, parents, balancing home and work life, and lack of resources) correlated with exhaustion. Support from family and friends correlated with increased exhaustion and with decreased depersonalization. Support from administrators and support from colleagues and parents/guardians, as well as physical health activities and well-being activities, correlated with greater accomplishment.

3. Over-extended teachers. Over-extended teachers (n = 780, 40.4%) were characterized by second-highest exhaustion, moderate depersonalization, and high accomplishment. The MBI subscales demonstrated 11 significant correlations, including seven with job demands and four with resources. Similar to the engaged group, all five job demands (time management, technology issues, students' parents, balancing home and work life, and lack of resources) correlated significantly with exhaustion, and lack of resources correlated

negatively with accomplishment, but, for the over-extended group only, time management demands correlated negatively with depersonalization. No resources were significantly correlated with exhaustion or depersonalization. That said, several supports were significantly perceived to foster accomplishment, including support from family and friends, professional learning about strategies, physical health activities, and well-being activities.

4. Detached teachers. Detached teachers (n = 356, 18.4%) were characterized by highest exhaustion, highest depersonalization, and second-lowest accomplishment. The MBI-ES subscales demonstrated six significant correlations, including four with job demands and two with resources. In terms of demands, time management and technology issues correlated significantly with exhaustion, and balancing home and work life correlated with increased exhaustion and decreased accomplishment. Support from administrators was negatively correlated with exhaustion, whereas support from family and friends was positively correlated with exhaustion. There were no significant correlations between resources and either depersonalization or accomplishment.

5. Inefficacious teachers. Inefficacious teachers (n = 169, 8.8%) were characterized by moderate exhaustion, moderate depersonalization, and the lowest accomplishment. The three MBI-ES subscales demonstrated six significant correlations, including four with job demands and two with resources. In terms of demands, time management and balancing home and work life correlated significantly with exhaustion, and challenges with technology and having too few resources correlated with low accomplishment. In terms of resources, this grouping of teachers perceived that support from family and friends significantly correlated with increased exhaustion, and physical health activities correlated negatively with depersonalization. No resources correlated significantly with level of accomplishment.

Discussion

While the five distinct profiles are each interesting in their own right, comparisons between them yield further insights about the range of demands and resources that prove significant as we move from higher to lower levels of accomplishment: engaged, involved, over-extended, detached, and inefficacious (see Tables 4 and 5 and Figure 1).

First, comparisons of the profile groups suggest that the number of specific resources used in relation to the number of significant demands provides insights into

teacher accomplishments. Profile groups with the highest accomplishment perceived a greater number of resources (engaged = 6, involved = 6, over-extended = 4) to be significant than did other groups (inefficacious = 2, detached = 2), and the ranking of groups from highest to lowest accomplishment matches the sequence when ranking groups from highest to lowest numbers of significantly correlated resources. That is, the more resources that correlated with the three burnout dimensions, the higher the sense of accomplishment in the teachers. Moreover, even when the numbers of significant demands that correlated with burnout dimensions were identical, a greater number of significant resources predicted greater accomplishment: the involved, detached, and inefficacious groups had the same number of demands (four), but the involved group reported a greater number of significantly correlated resources (six, as compared to two in the other two groups). Thus, even teachers who experience similar challenges may respond differently depending on the number of available resources they access. Together, these findings suggest that not only are the actual number of resources important, but also their ratio to the number of significant demands in each profile group.

Second, a type of support may function differently across profile groups. For example, the two groups with the most desirable findings (involved, engaged) had significant positive correlations between administrative support and accomplishment, whereas the other groups had none. The exception is the detached group, which had a negative correlation between exhaustion and administrative support. This finding suggests that for high-functioning groups, where teachers are demonstrating greater accomplishment, a supportive administrator promotes increased accomplishment, whereas for the less functional detached group, where teachers demonstrate the highest levels of exhaustion and depersonalization, supportive administrators can contribute to reduced exhaustion. Previous research has supported the importance of differentiated responses from supervisors that are contingent on employees' levels of burnout. Employees with higher levels of burnout would benefit from supervisors who support mental health practices (Dimoff et al., 2016), mentoring and coaching (Bakker & de Vries, 2021), support, feedback, and growth opportunities (Breevaart et al., 2014). Likewise, Eblie Trudel et al. (2021) demonstrated that, during the initial stages of the pandemic, teachers who were encouraged by their administrators to turn off their computers and leave their job demands behind at the end of the regular work day reported better coping and less stress in their teaching. In contrast, employees who are coping well would benefit more from the provision of additional

responsibility, decision-making authority, and resources that allow them to experience agency and challenge (Bakker & de Vries, 2021).

Third, the largest group (over-extended, 40.4%) was both fatigued and engaged, as indicted by high scores in both exhaustion and accomplishment. This finding is similar to that of Salmela-Aro et al. (2019), who reported 70% of teachers being both burnt out and engaged. It is concerning that this large group had elevated depersonalization and exhaustion (both second-highest), suggesting that high levels of accomplishment are not sustainable without a change to balance their job demands and resources. The over-extended group appeared to be at the tipping point between resilience and burnout, and it is noteworthy that most of their supports were internal and home-based rather than organizational. This observation does not bode well for this group, as Pyhältö et al. (2020) showed that teachers who enact high levels of self-regulation without concurrent access to co-regulation through support from their employers were more likely to demonstrate increased cynicism.

Finally, insights can be drawn from the resources that were used by teachers in the more accomplished profile groups and their differences from those perceived as supportive by members of less accomplished profile groups. The involved and engaged profile groups had significant correlations between accomplishment and support from colleagues and parents/guardians. This finding concurs with past research that showed that employees under significant stress are more likely to have conflictual relationships at work and therefore perceive less support (Bakker et al., 2020; Bakker & de Vries, 2021; Bakker & Wang, 2019). Interviews conducted with a sub-sample of the teachers from the current study and reported in a previous manuscript (Eblie Trudel et al., 2021) demonstrated that teachers decreased their levels of exhaustion while concurrently building social support by participating in group planning of inquiry-based units. In this way, the work demands were divided while the accomplishment and peer support were maximized.

Moreover, groups with highest levels of accomplishment (involved, engaged, over-extended) took part in both physical health and well-being activities, suggesting that they had resources available after their workday that allowed them to reset so that they were prepared for the next day of work (Sonnentag & Fritz, 2007). Maricuţoiu et al. (2016) have previously demonstrated the importance of relaxation to burnout prevention and recovery. Indeed, the detached and inefficacious groups in our sample utilized resources such as physical health and well-being activities less than the three more highly

accomplished groups, who used both. For the detached profile group, the demands of balancing work life and home also correlated with lower accomplishment.

Recommendations

As the pandemic has affected each level and individual in our school system in different ways, effective interventions should likewise be varied. Bakker and de Vries (2021) suggested that interventions are the most effective when they address *structural* causes of burnout (imbalances between job resources and demands) and include multiple levels (organizational and individual); and recommended that we should not treat all individuals in the same way. Our results concur with the advice of Bakker and De Vries (2021), in that a range of actions by both individuals and organizations is required to maximize teacher success during the current pandemic conditions for the five teacher groups found in our study.

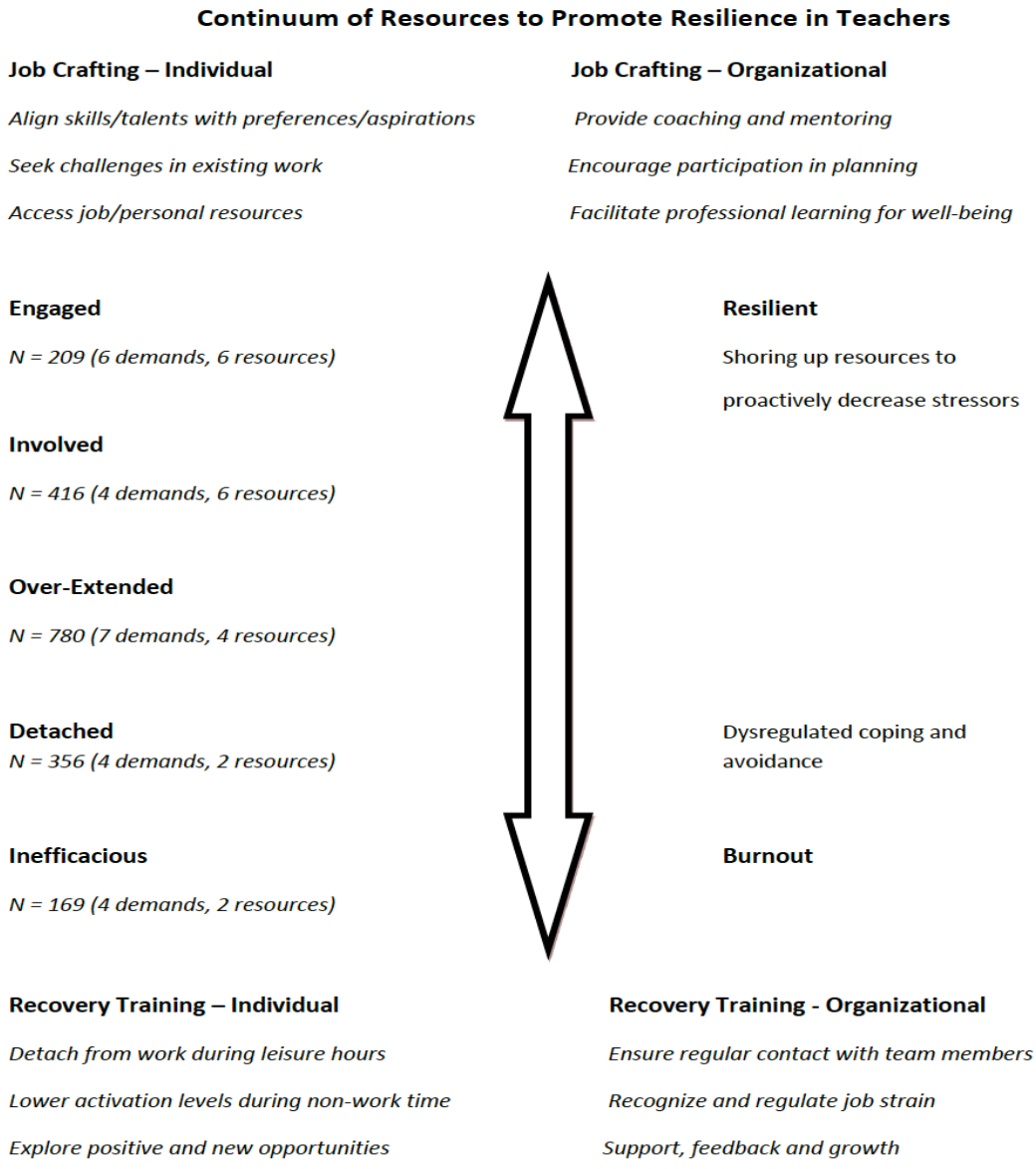
Figure 2 synthesizes the findings of the current research with the range of responses to teachers' stress explored in previous work by Bakker and de Vries (2021). In the figure we have placed the five LPA groups along the continuum, from burnt out to resilient, and outlined both the individual and organizational roles at each end of the continuum. This representation recognizes that while some groups of teachers are demonstrating resilience and would benefit from job crafting, others need to address recovery before this sort of opportunity would be effective. Importantly, different teachers will need and respond to different supports and demands as we recover from the pandemic to underpin the progression from burnout, to recovery, to resilience.

To support teachers within the various profile groups, we recommend that several key guidelines be observed. First, we note that exhaustion is most closely related to job demands, while depersonalization and accomplishment are most closely related to resources (Alarcon, 2011). Although it is intuitive to endeavour to provide copious resources to people who are exhausted, our research shows that, during the COVID-19 pandemic, exhausted teachers viewed this offering as a demand (Eblie Trudel et al., 2021). It is important to note that while the detached and over-extended groups in our study indicated the highest exhaustion, the other three groups were also demonstrating elevated exhaustion levels, suggesting that providing copious resources without attention to demand reductions will not be highly effective. Moreover, there is a consistent relationship in the literature between depersonalization and resources (Demerouti et al., 2001), with higher

depersonalization resulting from lower job resources. Indeed, the three groups in the current study who indicated the highest levels of exhaustion also demonstrated the highest levels of depersonalization. This suggests that while provision of resources is essential, they must be selected judiciously for maximum impact on burnout.

Figure 2

Continuum of Resources to Promote Resilience in Teachers



This raises the second recommendation: While teachers who are provided with opportunities for agency and choice are more resilient (Ford et al., 2019), we caution that the pandemic responses that are most effective are those chosen by a specific teacher at a given time and then modified as the teacher moves toward engagement or away from burnout. In order to foster engaged teachers who are "motivated, proactive, responsible, and involved" (Schaufeli et al., 2009, p. 216), we recommend a flexible repertoire that is responsive to use of resources as needed and as the job demands change (Bakker & de Vries, 2021). Leaders who give employees power through "providing additional decision-making authority, and resources" (Bakker & de Vries, 2021, p. 12) promote more receptiveness to job interventions by their employers (Thun & Bakker, 2018). These recommendations are more important now than in pre-pandemic contexts, as our research shows that the majority of teachers (67.6%) are falling into the groups that need support for recovery (as compared with Herman et al.'s (2018) pre-pandemic finding of 10%), whereas the remainder would benefit from growth opportunities.

Limitations

All research has limitations, and the current study is no exception. The first limitation relates to the sample. Given the unusual circumstances of the pandemic, it is possible that the sample survey failed to represent teachers who were too exhausted to take part, introducing sample bias. Second, the three time points for data collections and the very diverse situations related to delivery of education across provinces at any time point during the pandemic most certainly resulted in representation of a great range of contexts for Canadian teachers participating in our study. While a longitudinal design, such as that of Hultell et al. (2013), would have allowed us to trace the same teachers over time, this was not possible given the urgency of collecting the data *in situ* as well as the anonymous nature of the survey that was required by the research ethics board as a condition of foregoing school board approval for participation of teachers from select school divisions across Canada. In order to capture national data in the early stages of the pandemic, we accepted this limitation. Nonetheless, Hultell et al.'s (2013) longitudinal research also showed that, over time, teachers progress and regress relative to burnout based on their context of demands and resources. This finding somewhat ameliorates concerns about the three time points of data collection and further substantiates our findings of the five teacher groupings, as well as our recommendations for helping teachers move toward recovery and resilience.

The COVID-19 pandemic has challenged and tested our global school system in unprecedented ways and magnitudes. In attempts to support our essential frontline workers in our schools, it is important to build on existing knowledge about teacher burnout mitigation and also to test our prior theorizing with data generated in these new circumstances. In doing so, we will need to garner all of our resources to respond as effectively as possible to the current challenges for teachers and educational organizations.

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