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Predicting Teaching Efficacy through Occupational Stress and Job Satisfaction in the Canadian Context: A Multiple Group Analysis Based on Career Stage

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Abstract

Teachers' perceptions of their occupational stress, job satisfaction, and teaching efficacy may vary over stages of their careers. Using a subsample of teachers from the 2018 Teaching and Learning International Survey (n = 982), we used a multiple group structural regression model to test perceptions of occupational stress and job satisfaction as predictors of teaching efficacy and to examine differences among early-, mid-, and late-career teachers. Results indicated that while both occupational stress and job satisfaction predicted teaching efficacy in the early-career group, only job satisfaction predicted teaching efficacy in the mid-career group, and neither occupational stress nor job satisfaction predicted teaching efficacy in the late-career group. Tests for moderation revealed only that the link between job satisfaction and teaching efficacy was significantly stronger in the early-career group compared to the other groups. Early-career teachers also reported lower efficacy and higher stress compared to later-career teachers. Limitations and implications for research and intervention are discussed.

Keywords: job satisfaction; occupational stress; self-efficacy; structural equation modelling; teachers; teaching efficacy

1. Introduction

On the heels of the COVID-19 pandemic, occupational stress has never been higher for teachers and job satisfaction has never been lower (Redding & Nguyen, 2023); these issues are occurring in the midst of a universal shortage of teachers (Sutcher et al., 2016), in which researchers are turning to teaching efficacy as a construct that could help mitigate this shortage. Attention to occupational stress and job satisfaction as related to teachers' efficacy is not new. Researchers have shown that perceived stress causes low teaching efficacy, negative emotions, and burnout; whereas, perceived job satisfaction is associated with well-being and increased efficacy (Brouwers & Tomic, 1999; Dworkin, 2001; Han et al., 2021; Klassen & Chiu, 2010; Klassen et al., 2009; Kyriacou, 2001; Vaezi & Fallah, 2011; Weiss, 2002). These associations matter because low teaching efficacy, which is defined as a teacher's belief in their ability to effectively teach (Bandura, 1993), is a major predictor of attrition from the teaching profession–a profession that nearly universally faces a shortage in qualified professionals (Ingersoll & Marlow, 2004; Sutcher et al., 2016). As a case in point, nearly half of all new teachers leave the profession within five years (Ingersoll & Marlow, 2004; Sutcher et al., 2016). Part of this staggeringly high early attrition rate could be due to the elevated perceptions of stress and lower teaching efficacy of novice teachers as compared to experienced teachers (Lam et al., 2023). Thus, in the present study, we examine how perceived occupational stress and job satisfaction predict teaching efficacy among teachers at different stages of their careers (see Figure 1 for a conceptual model of the present study).

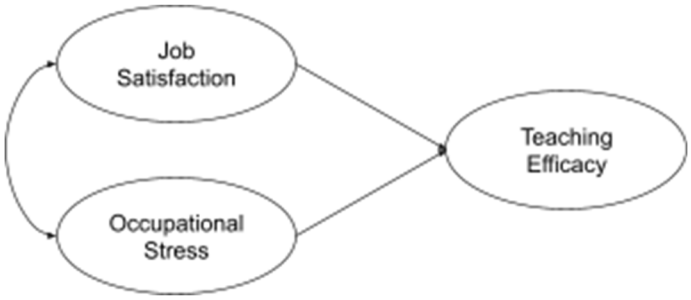

Figure 1. Conceptual Model in the Present Study

2. Literature Review

2.1 Teaching Efficacy

Teaching efficacy is developed through successful experiences, verbal support, and observing successful colleagues (Bandura, 1993). It has important implications for both students and teachers. For example, low teaching efficacy is associated with reduced student achievement (Taylor et al., 2014) and student motivation (Caprara, 2006). Moreover, less efficacious teachers show lower commitment to the profession, poorer work-life balance, and poorer psychological well-being than more efficacious teachers (Klassen & Chiu, 2011; Taylor et al., 2014).

Efficacy changes throughout a person's career (Taormina, 1997). Early-career teachers can have a discrepancy between their expectations and the reality of teaching (Hebert & Worthy, 2001), which is known as *praxis shock* and is linked to low teaching efficacy (Ballantyne & Retell, 2020). Praxis shock lessens over time as teachers align expectations and reality (Sfard & Prusak, 2005). Experienced teachers might have less praxis shock because they have had time to align their expectations with reality leading them to feel more efficacious due to accumulated successes (Woolfolk Hoy et al., 2009). Indeed, research shows that early-career teachers generally have lower teaching efficacy than more experienced teachers (e.g. Wolters & Daugherty, 2007; Taht et al., 2023).

We conceptualised teaching efficacy as an outcome of occupational stress and job satisfaction. Occupational stress is a negative predictor of teaching efficacy (Vaezi & Fallah, 2011; Han et al., 2021) and job satisfaction is a positive predictor (Klassen et al., 2009).

2.2 Perceptions of Occupational Health

According to van Horn and colleagues (2004), occupational health refers to a person's evaluations of aspects of their job. Braun and colleagues (2022) describe that an absence of negative occupational health does not necessarily represent the presence of positive occupational health, so occupational health research must account for both negative experiences of distress such as occupational stress and positive experiences of well-being such as job satisfaction. Both occupational stress and job satisfaction are influenced by external environmental factors such as class sizes, student behaviour, administrative support, and access to professional development (Bakker & Demerouti, 2007; Sandilos et al., 2023; Taylor et al., 2014) and internal factors such as coping strategies for stress, social support, emotional intelligence, and commitment to the organisation (Amzat et al., 2021; Ferguson et al., 2012; Khan et al., 2014). Because of individual differences that exist between teachers, the external environment can be perceived in varying ways. It is this perception of the environment rather than the characteristics of the environment itself that impacts teaching efficacy (Cocorada et al., 2015; Skaalvik & Skaalvik, 2015). In keeping with this perspective, we measured perceived occupational stress and perceived job satisfaction in the present study.

2.2.1 Perceived Occupational Stress

Occupational stress, a negative response to work pressures that exceed coping abilities (Kyriacou, 1987), is ubiquitous in teaching. Because a teacher's perception of a stressor depends in part on internal factors, two teachers in the same environment might experience stress differently. For instance, a teacher using maladaptive coping strategies in a large class may feel more stress than one using adaptive strategies in a similarly sized class.

Additionally, although occupational stress and efficacy are generally inversely related in teaching (Betoret, 2009; Collie et al., 2012; Jennings & Greenberg, 2009; Klassen & Chiu, 2010; Lam et al., 2022; Skaalvik & Skaalvik, 2017), the impact of a stressor on teaching efficacy depends on how a teacher perceives that stressor. For

example, LePine and colleagues (2005) explain that stressors can impede job performance and lead to negative outcomes, but they could also promote personal and professional growth. This is in keeping with a self-efficacy theory perspective, because, for example, teachers may experience stress en route to mastery experiences or while observing other teachers. Indeed, a challenging situation in the classroom could become a mastery experience, as Bandura (1997) explained as a source of self-efficacy, when the teacher overcomes the challenge. Thus, stress in these situations of growth could be seen as contributing to efficacy because it resulted in a mastery experience.

Occupational stress might impact efficacy differently at various career stages. Skaalvik and Skaalvik (2015) found that teachers in different career stages have the same sources of stress, but have different coping strategies and consequences of stress. Loss of self-efficacy was noted, especially among late-career teachers (2015). Gu and Day (2007) reported that early-career teachers had worse stress outcomes than experienced teachers. Indeed, there is the most research on early-career or novice teacher stress (e.g. Whalen et al., 2019; Mosley & McCarthy, 2023).

Early-career teachers often face higher stress, particularly in under-resourced schools (Garcia & Weiss, 2019; Mosley et al., 2022). Despite mid-career burnout being more detrimental than early-career burnout (Cherniss, 1992), less research focuses on stress at this career stage. In the present study we considered occupational stress in combination with job satisfaction to predict teaching efficacy.

2.2.2 Perceived Job Satisfaction

Although stress is unavoidable, many teachers report job satisfaction, which is a perception of fulfilment associated with work activities (Klassen & Chiu, 2010). Job satisfaction is associated with positive outcomes, including instructional quality (Harrison et al., 2023) and teaching efficacy (Buric & Kim, 2021; Soto & Rojas, 2019). In some instances, efficacy has been shown to predict job satisfaction (e.g. Wang et al., 2015). However, other researchers have found a reciprocal relationship between the two constructs (e.g., Avanzi et al., 2013)). In determining the ordering for this study, we agree with self-efficacy theory (Bandura, 1993) and broaden-and-build theory (Fredrickson, 2004) which both suggest that satisfaction is most appropriately treated as a predictor of efficacy. Empirically this matches the findings from, Buric and Kim (2021) who tested these associations longitudinally and found that job satisfaction positively predicted teaching efficacy (2021).

As was the case with occupational stress, previous research has shown that levels of perceived job satisfaction differ between career stage subgroups, but the direction of this difference is not generally agreed upon.

First, Cocorada and colleagues (2015) found that job satisfaction is highest in early-career teachers, lowest in mid-career teachers, and intermediate in late-career teachers. Second, Admiraal and Roberg (2023) examined data from 25 countries in the 2018 TALIS dataset and found slightly higher job satisfaction in early-career teachers compared to mid- and late-career teachers. Finally, other studies (e.g. Ferguson et al., 2012; Taht et al., 2023; Guarino et al., 2006) report a linear positive relationship with early-career teachers having lower job satisfaction. These findings also lead to the possibility that the relationship between job satisfaction and teaching efficacy might differ based on career stage. Neither Zee and Koomen (2016) nor Buric and Kim (2021) found evidence of moderation between job satisfaction and teaching efficacy. However, based on the unknown state of the linear nature of teaching efficacy through the career, and similar conflicting findings about the linearity of job satisfaction through the career, there could be variation in the relationship between job satisfaction and teaching efficacy depending on career stage, even though the theory behind this potential moderation is undeveloped.

2.3 The Canadian Context of Teaching

Based on TALIS 2018 data, Canadian teachers' occupational well-being is unique as compared to teachers in other countries. For example, various indicators of job satisfaction for teachers are higher in Canada than they are on average for all countries surveyed by OECD (OECD, 2020). At the same time, several apparent stressors are more prevalent in the Canadian context than they are across other OECD countries. For example, 26% of Canadian teachers report experiencing stress in their work "a lot", which is higher than the OECD average of 14% (2020).

Furthermore, only 75% of Canadian teachers have permanent teaching contracts, whereas the OECD average is 82% (2020). Teachers who do not have permanent contracts tend to have lower teaching efficacy (2020). These contextual factors that set Canadian teachers apart from other OECD countries is the primary reason we have chosen to focus solely on them in the present study.

2.4 The Present Study

Specifically, we investigate: (1) How do occupational stress and job satisfaction predict teaching efficacy among junior high teachers? (2) Are the associations moderated by early-career, mid-career, and late-career subgroups of teachers? (3) Do career stage groups differ from each other on mean levels of occupational stress, job satisfaction, and teaching efficacy? To answer these questions, we used a subsample of teachers from Alberta, Canada in the 2018 Teaching and Learning International Survey (TALIS; OECD, 2018b) to compute a multiple group structural regression model that tested occupational stress and job satisfaction as predictors of teaching efficacy, and examined differences among early-, mid-, and late-career teachers. Figure 1 outlines the conceptual model that we employed in the present study.

3. Method

3.1 Procedures and Sample

The present study undertook secondary analysis of data from a subset of the 2018 Teaching and Learning International Survey (TALIS; OECD, 2018b), which surveyed teachers from 48 countries between January and May 2018. At the time of this study, this was the most recent TALIS dataset that was publicly available. These data were collected through a questionnaire developed by the Organisation for Economic Co-operation and Development (OECD) in partnership with Statistics Canada. Participants did not receive remuneration for completing the survey. Across all countries, 84% of the randomly sampled individual teachers completed the survey. Most (91%) participants completed the survey online. The survey took about 45-60 minutes to complete. The complete survey addressed 11 themes and priorities, and the present study focuses on two of these: (1) teacher self-efficacy and (2) job satisfaction, which includes occupational stress in the theme.

The target sample size for TALIS (n = 4000 teachers per country) was determined by Statistics Canada and OECD. They examined the response rates and design effects of previous iterations of TALIS (OECD, 2018b) to determine this size. The overarching objective was to have a broad enough sample of teachers from which to draw system-wide conclusions (OECD, 2018b). Their plan accounted for non-response of schools or individual teachers and accepted participation rates of 75% or greater after attempting to replace non-responding schools or teachers (OECD, 2018b).

The present study filters the dataset to include only the Canadian subsample. It contains responses from 1,077 different teachers of which we retained 982 who answered at least one item included in the present study. The TALIS survey used canonical sampling, where 122 schools within Alberta were randomly sampled proportional to school size, and then approximately 20 teachers from each of these schools were randomly sampled. The teachers in this sample had a mean age of 40 years old (SD = 10.10), as compared to the OECD average, which was 44 years old (SD = 10.5). In addition, 64% (SE = 2.30) of the sample identified as women, which is lower than the OECD average of 68% (SE = .20). Teachers in this sample had 13.1 (SE = .40) years of teaching experience on average, as compared to the OECD average, which was 17.1 (SE = .10) years of experience. In Canada, teachers' average class size was 24 (SD = 8.00) students, which is on par with the OECD average of 24 (SD = 8.5) students per class.

3.2 Measures

3.2.1 Teaching Efficacy

Teaching efficacy was measured using the established Teachers' Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001). The items were preceded with the stem: "In your teaching, to what extent can you do the following?" Participants rated items on a 4-point Likert scale (1=not at all, 2=to some extent, 3=quite a bit, 4=a lot). The full teaching efficacy scale consists of three subscales. The first subscale, efficacy in classroom management, contains four items about managing student behaviour. A sample item is: "Calm a student who is disruptive or noisy." The second subscale, efficacy in instructional strategies, contains four items about flexible pedagogy. A sample item is: "Use a variety of assessment strategies." The third subscale, efficacy in student engagement, contains four items about engaging students during lessons. A sample item is: "Help students value learning." All teaching efficacy scale items are available in Appendix A. Reliability coefficients for each subscale (a = .85, .78, and .82, respectively) were acceptable to good. Reliability for the overall composite scale (α = .88) was excellent. In this study, we computed each participant's mean score for each subscale. Each subscale score became the observed variables in the structural equation model.

3.2.2 Occupational Stress

Occupational stress was measured using a scale developed by OECD for this iteration of TALIS (OECD, 2018b).

This scale was developed to assess the stress from teachers' workloads. The items were preceded with the stem: "Thinking about your job at this school, to what extent are the following sources of stress in your work?" Participants rated items on a 4-point Likert scale (1=not at all, 2=to some extent, 3=quite a bit, 4=a lot). The occupational stress scale originally consisted of five items. However, we opted to omit two items, "Having too much administrative work to do (e.g. filling out forms)" and "Having extra duties due to absent teachers" because (a) they statistically had significantly lower correlations with the other three items than the other items have with one another and (b) conceptually the items represent stressors that exist outside of what might be considered regular teaching duties. Therefore, this scale consists of three items about sources of stress due to a heavy workload. A sample item is: "Having too much marking." All occupational stress scale items are in Appendix A. Reliability for this composite scale (α=.78) was acceptable.

3.2.3 Job Satisfaction

Job satisfaction was measured using the job satisfaction scale from TALIS 2013, which also aligns with the same scale in the Programme for International Student Assessment (PISA; OECD, 2018a). The items were preceded with the stem: "We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?" Participants rated items on a 4-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree). The full job satisfaction scale consists of two subscales. The first subscale, job satisfaction with work environment, contains four items about the school that the teacher works at. A sample item is: "I enjoy working at this school." The second subscale, job satisfaction with profession, contains four items about the teaching profession. A sample item is: "If I could decide again, I would still choose to work as a teacher." All job satisfaction items are in Appendix A. Reliability coefficients for each subscale (a = .80 and .83, respectively) were good. Reliability for the overall composite scale (α = .85) was good. In this study, we computed each participant's mean score for each subscale. Each subscale score became the observed variables in the structural equation model.

3.2.4 Career Stage

Career stage was measured using a single continuous scale item, which we recoded to create three groups: early-, mid-, and late-career teachers. The item was preceded with the stem: "How many years of work experience do you have, regardless of whether you worked full- time or part-time? Do not include any extended periods of leave such as maternity/paternity leave. Please write a number in each row. Write 0 (zero) if none. Please round up to whole years." The item wording was: "Year(s) working as a teacher in total." There is some disagreement among researchers about the number of years of teaching experience that mark a career stage. For example, Hargreaves (2005) categorised teachers with 6-19 years of experience as mid-career, whereas Day and Gu (2010) define

mid-career teachers as those with 8-24 years of experience, and Marso and Pigge (1994) marked 20-29 years of experience as mid-career. In taking all of these studies with quite a broad range of years into account, we opted to define early-career teachers as having eight or less years of experience (n = 232). Teachers with nine to 19 years of experience were categorised as mid-career teachers (n = 504). Teachers with 20 or more years of experience were categorised as late-career teachers (n = 246). We opted to err on the later side of the early-career definition, and on the earlier side of the late-career definition. By doing so, we minimised the n of the mid-career group and maintained relatively equally-sized groups to ensure adequate statistical power.

3.3 Plan for Analysis and Missing Data

Data management and descriptive analyses were conducted in Jeffrey's Amazing Statistics Program (JASP; JASP Team, 2022) and the confirmatory factor analysis and multiple group structural regression model were computed in Mplus (Muthén & Muthén, 2017). Overall, missing data were quite low, ranging from 0 to 4% and were handled with full information maximum likelihood (FIML) estimation to use all of the available information in the variance/covariance matrix when computing the analyses.

Prior to conducting our main analyses, we screened the data for normality and multicollinearity. To screen the data, we created composite mean sum scores that included all scale items for each study variable. The descriptive statistics of these composite variables both for the full sample and by career stage group (see Table 1) show that the data were normally distributed. We used Pearson's correlations (see Table 2) for both the whole sample and split by career stage group to screen the composite variables for multicollinearity, which was not an issue in these data.

Based on this data screening, the data do not substantively violate the assumptions of maximum likelihood estimation.

Table 1. Descriptive statistics for all composite study variables, both for the full sample and split by career stage (n=982)

Career Stage	Group	Valid	Missing	Mean	Upper 95% CI	Lower 95% CI	Standard Deviation	Skewness	SE Skewness	Kurtosis	SE Kurtosis	Range
Teaching Efficacy	All	977	5	3.30	3.32	3.27	.45	-.24	.08	-.15	.16	1-4
	Early	231	1	3.15	3.21	3.08	.44	.11	.18	-.21	.35	
	Mid	500	4	3.33	3.36	3.30	.44	-.19	.09	-.45	.19	
	Late	246	0	3.38	3.44	3.27	.45	-.62	.23	.29	.46	
Occupational Stress	All	962	20	2.27	2.32	2.22	.79	.33	.08	-.55	.16	1-4
	Early	229	3	2.42	2.53	2.28	.84	.13	.18	-.89	.36	
	Mid	493	11	2.27	2.32	2.20	.78	.32	.10	-.50	.19	
	Late	240	6	2.12	2.21	1.95	.71	.63	.23	.26	.46	
Job Satisfaction	All	955	28	3.22	3.25	3.19	.49	-.36	.08	.04	.16	1-4
	Early	228	5	3.20	3.26	3.10	.50	-.31	.18	-.21	.36	
	Mid	491	13	3.21	3.26	3.12	.47	-.40	.10	.46	.19	
	Late	236	10	3.30	3.38	3.22	.43	-.10	.23	-.57	.46	

Note. CI = Confidence Interval; SE = Standard Error.

Table 2. Pearson's correlations for all study variables, both in the full sample and split by career stage group (n=982)

Career Stage		**Teaching Efficacy/ Occ. Stress**	**Teaching Efficacy/ Job Sat.**	**Occ. Stress/ Job Sat.**
Full sample;	Pearson's r	**-.06**	**.22**	**-.28**
all career stage groups	p-value (two-tailed)	.052	< .001	< .001
(*n*=982)	Upper 95% CI	.00	.28	-.23
	Lower 95% CI	-.13	.16	-.34
Early-	Pearson's r	**-.07**	**.38**	**-.36**
Career	p-value (two-tailed)	.27	< .001	< .001
(*n*=232)	Upper 95% CI	.06	.49	-.24
	Lower 95% CI	-.20	.26	-.47
Mid-	Pearson's r	**-.03**	**.20**	**-.25**
Career	p-value (two-tailed)	.47	<.001	<.001
(*n*=504)	Upper 95% CI	.06	.29	-.17
	Lower 95% CI	-.12	.12	-.33
Late-	Pearson's r	**-.03**	**.07**	**-.28**
Career	p-value (two-tailed)	.66	.29	<.001
(*n*=246)	Upper 95% CI	.10	.20	-.16
	Lower 95% CI	-.15	-.06	-.40

We computed a Monte Carlo simulation (Mooney, 1997) to determine power for the smallest group in the multiple group analysis (n = 232). This analysis showed appropriate power at approximately 80% to detect standardised path coefficients greater than .17 (a small effect). Therefore, even the smallest group yields enough power to detect small effects in this model.

The main analysis was a multiple group structural regression model that reflects the conceptual model in Figure 1. We used the following indices to evaluate global fit of the model: chi-squared, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR). We used the chi-squared difference test to examine moderation in RQ2. We undertook model respecification as needed to improve model fit while aligning with theory. No variables from outside the model were used as auxiliary variables. The data are open-access.

We also calculated the measurement invariance in this sample. Since some researchers (e.g. Kline, 2023; Little, 2013) believe that a chi-square difference test is overpowered in measurement invariance testing, we used **Δ**RMSEA to evaluate the nested invariance models. With **Δ**RMSEA=.011 between the weak and strong invariance models, we concluded that this sample exhibits strong measurement invariance. Therefore, it is appropriate to test mean differences between the career stage groups to answer RQ3.

4. Results

4.1 Pearson's Correlations

The Pearson's correlations (see Table 2) showed that job satisfaction and teaching efficacy were positively correlated; higher levels of job satisfaction were associated with slightly higher levels of teaching efficacy in the full sample and in the early- and mid-career groups, but this association was not significant in the late-career group. In addition, job satisfaction and occupational stress were negatively correlated; more job satisfaction was associated with slightly lower levels of occupational stress in the full sample and in all three career stage groups. There were no significant zero-order associations between occupational stress and teaching efficacy.

4.2 Confirmatory Factor Analysis Results

Before computing the three-factor CFA, we computed a one-factor CFA as proposed by Kline (2023) to determine if our theorised model has better fit than a model with a single latent variable. The theorised model fit the data better than the one-factor model: $\Delta\chi 2\ (18) = 22.27$, $p < .001$. The multiple group three-factor CFA (see Figure 2 displays overall adequate global fit (Table 3). Although chi-square is significant, other global fit indices indicate that the CFA has an adequate to close fit to the data. Inspection of the normalised residuals revealed no localised areas of misfit.

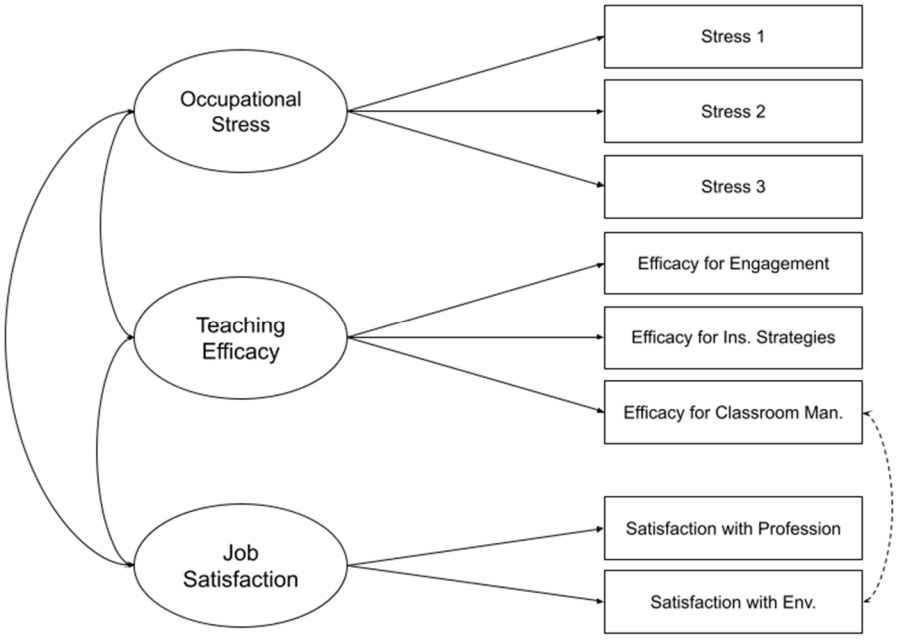

Figure 2. Three-factor CFA model

Note. Dotted lines indicate paths that exist only in the mid-career group; Ins. Strategies = Instructional Strategies; Classroom Man. = Classroom Management; Satisfaction with Env. = Satisfaction with Environment. Estimates are in Table 4.

Table 3. Model fit for CFA model and SEM model (n=982)

	CFA Value	CFA model fit	SEM value	SEM model fit
Chi-square (df)	114.30(70)	Poor	114.30(70)	Poor
Chi-square *p*-value	< .001		<.001	
RMSEA	.04	Close	.04	Close
SRMR	.07	Acceptable	.07	Acceptable
TLI	.97	Close	.97	Close
CFI	.98	Close	.98	Close

Note. Model fit thresholds are from Little (2013).

Table 4. Parameter estimates for CFA model and SEM model (n=982)

		Unstandardised Estimates			**Standardised Estimates**		
Career Stage Group	**Parameter**	**Estimate**	**Lower 95% CI**	**Upper 95% CI**	**Estimate**	**Lower 95% CI**	**Upper 95% CI**
CFA Model							
Early-career	Occ. Stress <--> Efficacy	-.04	-.09	.01	-.11	-.25	.03
	Job Sat. <--> Efficacy	.11	.08	.14	.54	.42	.66
	Occ. Stress <--> Job Sat.	-.19	-.25	-.13	-.49	-.62	-.37
Mid-career	Occ. Stress <--> Efficacy	-.02	-.05	.02	-.04	-.14	.05
	Job Sat. <--> Efficacy	.05	.03	.07	.26	.16	.37
	Occ. Stress <--> Job Sat.	-.13	-.17	-.09	-.36	-.46	-.27
	Sat. Env. <--> Efficacy Man.	.03	.01	.05	.17	.07	.26
Late-career	Occ. Stress <--> Efficacy	-.01	-.05	.03	-.03	-.16	.11
	Job Sat. <--> Efficacy	.02	-.01	.05	.11	-.04	.27
	Occ. Stress <--> Job Sat.	-.11	-.16	-.06	-.40	-.54	-.26
SEM Model							
Early-career	Occ. Stress --> Efficacy	-.11	.02	.21	.21	.04	.38
	Job Sat. --> Efficacy	.59	.40	.78	.64	.48	.81
	Occ. Stress <--> Job Sat.	-.19	-.25	-.13	-.49	-.62	-.37
Mid-career	Occ. Stress --> Efficacy	-.03	-.03	.09	.06	-.04	.17
	Job Sat. --> Efficacy	.28	.15	.41	.28	.17	.40
	Occ. Stress <--> Job Sat.	-.13	-.17	-.09	-.36	-.46	-.27
	Sat. Env. <--> Efficacy Man.	.03	.01	.05	.17	.07	.26
Late-career	Occ. Stress --> Efficacy	.01	-.08	.11	.02	-.14	.18
	Job Sat. --> Efficacy	.13	-.06	.32	.12	-.06	.30
	Occ. Stress <--> Job Sat.	-.11	-.16	-.06	-.40	-.54	-.26

Note. SE = Standard Error; CI = Confidence Interval; Efficacy = Teaching Efficacy; Occ. Stress = Occupational Stress; Job Sat. = Job Satisfaction; Sat. Env. = Satisfaction with classroom environment; Efficacy Man. = Teaching efficacy for classroom management.

In the early- and late-career groups, the CFA functioned as expected. Standardised factor loadings for all three latent variables were between .60 and .86 (unstandardised between .76 and 1.00) for the early-career group, and between .60 and .84 (unstandardised between .76 and 1.00) for the late-career group. The estimates between the latent variables (see Table 4) demonstrated that an increase in teaching efficacy was associated with a moderate increase in job satisfaction in the early-career group; an increase in occupational stress was associated with a moderate decrease in job satisfaction in the early- and late-career groups; and teaching efficacy was statistically independent from occupational stress and job satisfaction in the late-career group.

In the mid-career group, the CFA required one change from the theorised model. For this group, the error term of job satisfaction with school environment correlated with the error term of efficacy for classroom management (standardised: $r = .17$, $p < .01$; unstandardised: $r = .03$, $p < .01$). We chose to free this parameter for this group because the normalised residual for this cell in the covariance matrix indicated poor fit ($z = 2.342$) in the mid-career group. Additionally, this change is grounded conceptually; behaviour in the classroom is arguably an aspect of the job environment, and the efficacy scale measures teachers' confidence in managing this aspect of their job environment. Based on the rules for identification of models with correlated errors (Kline, 2023), this model is identified. Upon respecifying this model, the normalised residuals revealed no localised areas of misfit. Standardised factor loadings in the mid-career group were between .59 and .88 (unstandardised between .76 and 1.00). The estimates between the latent variables in the mid-career group CFA (see Table 4) demonstrate that an increase in teaching efficacy was associated with a small to moderate increase in job satisfaction, and an increase in occupational stress was associated with a moderate decrease in job satisfaction. With the results of the CFA model signifying adequate to close fit to the data (see Table 3), we proceeded to compute the structural regression model.

4.1 Multiple Group Structural Regression Modelling Results

Our theorised multiple group structural model, in which occupational stress and job satisfaction predicted teaching efficacy, displayed overall adequate global fit (see Table 3). Although chi-square was significant, other global fit indices indicate that this structural model was an adequate to close fit to the data. Local fit was acceptable in all cells in the normalised variance-covariance matrix.

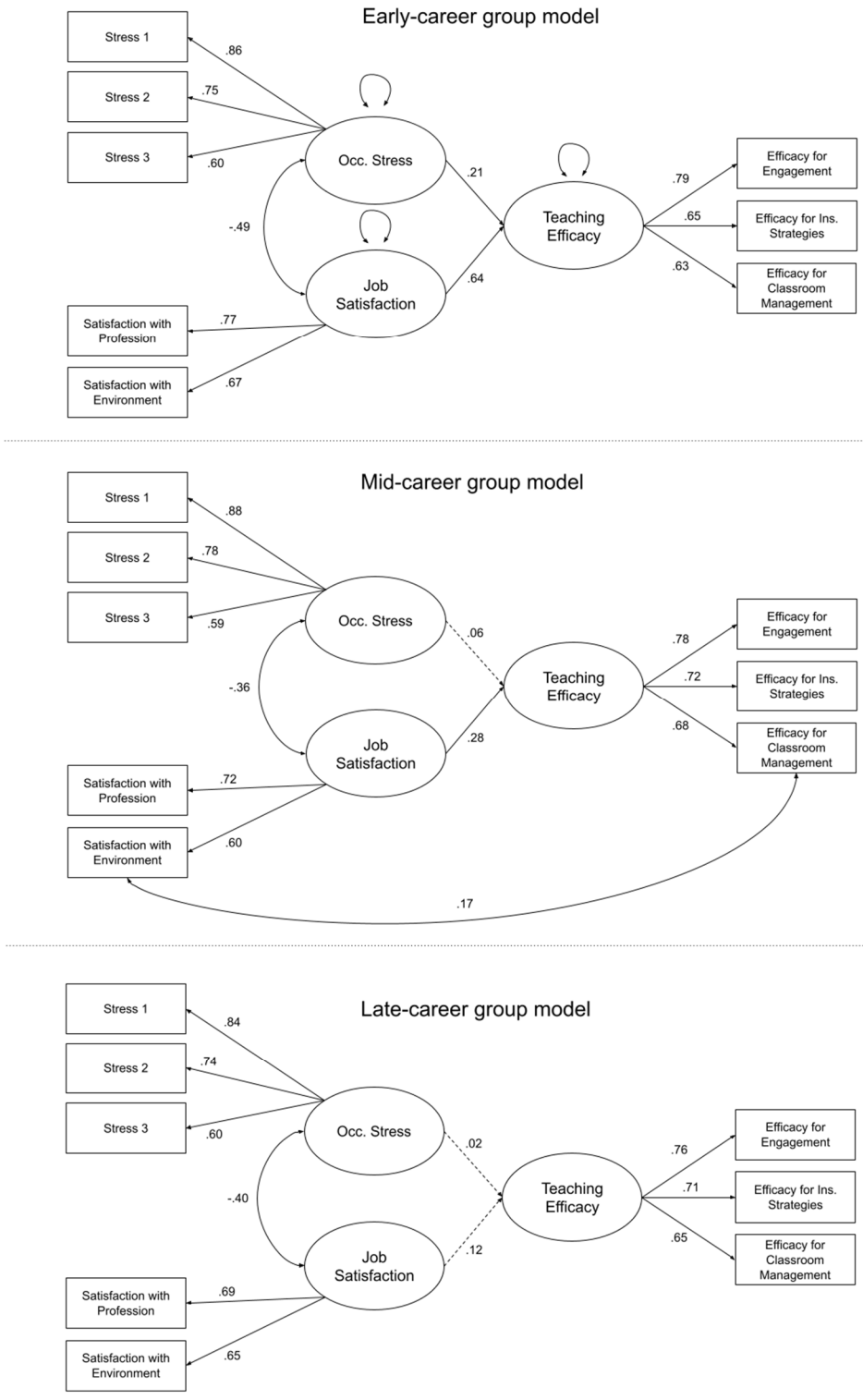

Figure 3. Path models with standardised estimates for all groups (n=982)

Note. Occ. Stress = occupational stress; Ins. Strategies = instructional strategies. Dotted lines represent nonsignificant paths.

The significant paths (see Table 4) between the latent variables in the early-career group model (see Figure 3)

indicate that an increase in occupational stress predicted a small increase in teaching efficacy; an increase in job satisfaction predicted a moderate to high increase in teaching efficacy; and an increase in occupational stress was associated with a moderate decrease in job satisfaction. The significant paths (see Table 4) between the latent variables in the mid-career group model (see Figure 3) indicate that an increase in job satisfaction led to a small to moderate increase in teaching efficacy, and an increase in occupational stress was associated with a moderate decrease in job satisfaction. The significant paths (see Table 4) between the latent variables in the late-career group model (see Figure 3) indicate that an increase in occupational stress was associated with a moderate decrease in job satisfaction; neither occupational stress nor job satisfaction significantly predicted teaching efficacy in the late-career group.

4.2 Moderation by Career Stage

We used chi-square difference tests to examine moderation on each path between pairs of career groups (see Table 5). These tests revealed that differences between groups existed between job satisfaction and teaching efficacy, only between early- and mid-career teachers, and between early- and late-career teachers. This means that the link between job satisfaction and teaching efficacy was stronger in the early-career group compared to the mid- and late-career groups. All other paths in the model were not moderated by career stage.

Table 5. Chi-square difference tests for moderation and mean differences by career stage (n=982)

Career Stage Groups under Comparison	**Parameter**	**$\Delta\chi^2(\Delta df)$**	**p-value**	**Interpretation**
Early-career and mid-career	Occ. Stress --> Efficacy	1.39(1)	>.05	No moderation
	Job Sat. --> Efficacy	5.93(1)	<.05	Moderation
	Occ. Stress <--> Job Sat.	2.36(1)	>.05	No moderation
	Occupational Stress	5.75(1)	<.05	Mean difference
	Job Satisfaction	.12(1)	>.05	No mean difference
	Teaching Efficacy	7.05(1)	<.01	Mean difference
Mid-career and late-career	Occ. Stress --> Efficacy	.09(1)	>.05	No moderation
	Job Sat. --> Efficacy	1.22(1)	>.05	No moderation
	Occ. Stress <--> Job Sat.	.17(1)	>.05	No moderation
	Occupational Stress	6.62(1)	<.05	Mean difference
	Job Satisfaction	1.49(1)	>.05	No mean difference
	Teaching Efficacy	1.19(1)	>.05	No mean difference
Early-career and late-career	Occ. Stress --> Efficacy	1.46(1)	>.05	No moderation
	Job Sat. --> Efficacy	8.36(1)	<.01	Moderation
	Occ. Stress <--> Job Sat.	3.06(1)	>.05	No moderation
	Occupational Stress	18.05(1)	<.001	Mean difference
	Job Satisfaction	1.76(1)	>.05	No mean difference
	Teaching Efficacy	9.24(1)	<.01	Mean difference

Note. Efficacy = Teaching Efficacy; Occ. Stress = Occupational Stress; Job Sat. = Job Satisfaction.

4.3 Mean Differences by Career Stage

We used chi-square difference tests to examine mean differences on each variable between pairs of career stage groups (see Table 5). These tests revealed that differences between groups existed on occupational stress such that all three groups were statistically different from one another. More specifically, early-career teachers had the highest mean level of occupational stress, late-career teachers had the lowest, and mid-career teachers fell in between. Differences between groups also existed on teaching efficacy, where early-career teachers had a significantly lower mean level of teaching efficacy than both mid- and late-career teachers. No mean differences were found on job satisfaction between career stage groups.

5. Discussion

The purpose of this study was to examine how occupational stress, job satisfaction, and teaching efficacy are related to one another, and how these relationships differ by career stage. To do so, we used structural equation modelling to analyse the Canadian subset of the TALIS (OECD, 2018b) data. First, we discuss the impact of teachers' career stage on the relationship between their job satisfaction and teaching efficacy. Next, we discuss the mean differences that exist in the data between career groups. Finally, we turn our attention to the implications and limitations of the study.

5.1 Antecedents of Teaching Efficacy Differed by Career Stage

In the present study, early-career teachers' efficacy was more strongly predicted by their job satisfaction than mid-, and late-career career teachers' efficacy were. Although this finding is contrary to prior research (Buric & Kim, 2021; Zee & Koomen, 2016), it shows that efficacy is being actively formed in early-career teachers (Beijaard et al., 2004) and thus is more susceptible to environmental factors such as job satisfaction and stress. This idea extends from Bandura's (1993) self-efficacy theory which states that efficacy develops primarily through one's own successful past experiences and through observing others' successful experiences. New teachers have not had much time to encounter challenges to overcome, and the ones they have encountered were in preparation for their career e.g., teaching practicums. New teachers likely experience some level of satisfaction in securing a teaching position and settling into a long-awaited career before having to face the difficulties of teaching year after year. In Canada, it takes four to six years to get a teaching degree representing a major investment of time, energy, and the development of a professional identity. In addition, new teachers have had fewer opportunities to be exposed to competent teacher models, whereas more experienced teachers have likely gained efficacy from their colleagues' experiences (Wolters & Daugherty, 2007). As early-career teachers develop their repertoire of past teaching experiences and vicarious experiences, an early sense of job satisfaction could be foundational to developing professional identity (Day & Gu, 2014), which includes teaching efficacy.

Although moderation results were nonsignificant for stress, stress was surprisingly a positive predictor of efficacy in only the early-career group, indicating that these teachers might interpret stress as a challenge that is part of their new career (LePine et al., 2005). Interestingly, this could mean that early-career teachers are willing to feel some stress or pressure in their occupation in a way that is in keeping with job satisfaction.

In the mid-career group, teaching efficacy was predicted by job satisfaction to a small extent. This pattern was to be anticipated for this group, where these teachers have settled into their careers, have a perspective of job satisfaction beyond just beginning their careers, and have by now experienced many of the stressors associated with teaching. Therefore, their professional identity is more established (Levin, 2003) and their efficacy is less susceptible to the day-to-day changes in job satisfaction and occupational stress than early-career teachers.

In the late-career group, neither job satisfaction nor occupational stress significantly predicted teaching efficacy, which could reflect that teachers' efficacy in the late-career stage is more stable than in earlier stages (Levin, 2003). Bandura (1993) explains that efficacy is established primarily through successful past experiences, and late-career teachers presumably have a myriad of successful teaching experiences from which to draw their efficacy from. By this point in their careers, their professional identity is established and may be less influenced by day-to-day changes in their job environment, especially as compared to early-career teachers. Teachers in the late-career stage still perceive job satisfaction and stressors still arise for them, but these discrete experiences contribute to an overall established professional identity rather than fundamentally shaping it, an idea which was established in a study by Tschannen-Moran and Woolfolk Hoy (2007).

5.2 Early-Career Teachers: Lots of Stress and Little Efficacy Compared to Experienced Teachers

The present study found that early-career teachers have higher occupational stress and lower teaching efficacy in comparison to mid- and late-career teachers, which is supported by prior literature (Tschannen-Moran & Woolfolk Hoy, 2007). This is exactly the type of finding that points to the statistics that teachers leave the profession within the first five years (Sutcher et al., 2016) when stress is high and efficacy is low. Furthermore, researchers have shown that stress and efficacy function differently in new teachers compared to more experienced teachers. For example, a qualitative study by McCann and Johannessen (2004) found that new teachers are faced with stressors that do not exist beyond the early-career phase, such as probationary contracts, an emergent teaching identity, and praxis shock (Ballantyne & Retell, 2020). Along with different stressors, new teachers have had less time to develop mastery experiences to bolster their self-efficacy, which is the most potent source of efficacy according to Bandura (1997). Therefore, at this stage, it makes sense that other sources of efficacy contribute more. In addition to the stress and efficacy coming from different sources in each group, there

could also be a selection effect because less efficacious teachers tend to leave the career early on (Glickman & Tamashiro, 1982), meaning that more experienced teachers who chose to stay in the profession are likely to have a higher mean level of efficacy.

Occupational stress was not a significant predictor of teaching efficacy in the mid- or late-career groups. Considering Bandura's (1997) sources of efficacy, mastery experiences are the strongest sources, followed by vicarious experiences, social persuasion, and physiological and emotional states. In contrast to early-career teachers, later-career teachers have had years of experience to establish mastery experiences, so this source of efficacy would be most prominent for them, rendering the more day-to-day experiences of occupational stress less important to their efficacy.

5.3 Implications

The findings of this study provide two main implications. First, the results of this study show that interventions targeting teaching efficacy through reducing occupational stress (e.g. Mackay et al., 2012, Ugwuanyi et al., 2021) might not be successful for teachers at any career stage. Rather, administrators should turn their attention to job satisfaction as a more viable option for intervention. The results of this study imply that administrators should focus on improving teaching efficacy through job satisfaction for early-career teachers to a larger extent, and mid-career teachers to a lesser extent. It is beyond the scope of the present study to provide new empirical evidence on ways to enhance job satisfaction and instead we draw on previous research. Job satisfaction can be linked to objective classroom criteria - smaller class sizes, teaching in correct content area, quick resolution of probationary contracts (Song & Wang, 2007), which all seem like viable ways to help new and mid-career teachers experience the most job satisfaction.

Second, this study opens avenues for future research into the antecedents of teaching efficacy. Specifically, research should be done on the factors that impact mid- and late-career teachers' efficacy, since occupational stress and job satisfaction were not the answers in this particular study. Research in this area should be approached using an existing theory, such as self-efficacy theory (Bandura, 1993) to situate the findings in the broader context of theory. Perhaps Bandura's (1993) sources of efficacy–mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states–in combination with occupational health variables will shed some light on the antecedents of mid- and late-career teachers' efficacy. By the mid- and late-career stages, teachers likely have many mastery experiences behind them, including successful lessons taught and increased ease of planning lessons. They will likely have had many vicarious experiences too, such as hearing successful stories from their colleagues about teaching or watching other teachers gain leadership roles. By this point in their careers, teachers likely would have experienced verbal persuasion, which could include recognition from administrators, colleagues, and students.

Finally, by the mid- and late-career stages, teachers might have learned to regulate their affective states while teaching (Sutton, 2004) which could help contribute to efficacy. Therefore, considering occupational health in combination with the sources of efficacy could shed some light on mid- and late-career teachers' efficacy.

5.4 Limitations

The results must be considered in light of three limitations. First, the cross-sectional design of this study prevents causal inferences. Although our methodology was based on prior research and theory, a longitudinal approach could provide more insight about how teaching efficacy is influenced by job satisfaction and occupational stress over time. This could be further enhanced by incorporating multiple reporting methods, such as daily diaries or direct observation, to triangulate self-report data.

Second, the boundaries between early-, mid-, and late-career teachers are unclear in prior literature, with early-career teachers having less than between six to 20 years of experience, and with late-career teachers having more than anywhere from 19 to 29 years of experience (Hargreaves, 2005; Day & Gu, 2010). Additionally, age data at the individual level is unavailable in the TALIS dataset, meaning that our interpretation of career stage was based solely on a continuous single-item variable: years of teaching experience. Because the distinctions between career stages are ambiguous in prior literature, further research is needed to determine meaningful cutoff points for each career stage, whether based on years of experience, professional life phases, age, or a combination therein.

Third, we chose one country from the TALIS dataset for this study because teaching efficacy has been found to have considerable measurement variance between countries. Although some researchers have found evidence of strong measurement invariance (e.g. Klassen et al., 2009), more recent research has found weak measurement invariance between countries, limiting the comparisons that can be made (Ruan et al., 2015; Scherer et al., 2016).

Therefore, we limited the present study to a single country to enable the types of comparisons that we wanted to explore. Thus, this study is relevant in the Canadian education context but similar research should be conducted in other countries.

5.5 Directions for Future Research

Future research in this field could explore occupational stress, job satisfaction, and teaching efficacy with larger groups of teachers and more diverse samples. Because this sample of teachers were exclusively Canadian, the results of this study might not be consistent with results done on teachers in other educational contexts; future research can examine these diverse populations to determine any potential practical applications of research in this field outside of Canada. In addition, longitudinal studies that measure these factors over time could provide more nuanced insight of the relationships between these constructs.

6. Conclusion

In this study of TALIS 2018 data (OECD, 2018b), we used a multiple group structural regression model to illustrate the relationships between occupational stress, job satisfaction, and teaching efficacy of junior high teachers, and how those relationships differ between career stages. Results showed that the relationship between job satisfaction and teaching efficacy was moderated by career stage, with all three career stage levels exhibiting different results. Early-career teachers had a strong positive predictive relationship between job satisfaction and teaching efficacy; mid-career teachers had a weak positive predictive relationship; and late-career teachers' efficacy was independent from their job satisfaction. Occupational stress predicting teaching efficacy was not moderated by career stage. The results of this study provide implications for administrators to target interventions on teaching efficacy through job satisfaction in the early-career stage, and implications for researchers to further explore the antecedents of teaching efficacy in the mid- and late-career stages.

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The data that support the findings of this study are available on request.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Appendix A

All scale items used in the present study

Scale/Subscale Name	**Stem/Item Wording**	**Scale**
Teacher Sense of Efficacy Scale Self-efficacy in Classroom Management (subscale)	**In your teaching, to what extent can you dothe following?** Control disruptive behaviour in the classroom Make my expectations about student behaviour clear Get students to follow classroom rules Calm a student who is disruptive or noisy	1 (not at all) 2 (to some extent) 3 (quite a bit) 4 (a lot)
Self-efficacy in instruction (subscale)	Craft good questions for students Use a variety of assessment strategies Provide an alternative explanation, for example when students are confused Vary instructional strategies in my classroom	
Self-efficacy in student engagement (subscale)	Get students to believe they can do well in school work Help students value learning Motivate students who show low interest in school work Help students think critically	
Occupational Stress	Thinking about your job at this school, to what extent are the following sources of stress in your work?	
	Having too much lesson preparation Having too many lessons to teach Having too much marking.	

Job Satisfaction	We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?	1 (not at all) 2 (to some extent) 3 (quite a bit) 4 (a lot)
Satisfaction with Work Environment (subscale)	I would like to change to another school if that were possible* I enjoy working at this school I would recommend this school as a good place to work All in all, I am satisfied with my job	1 (strongly disagree) 2 (disagree) 3 (agree) 4 (strongly agree)
Satisfaction with Profession (subscale)	The advantages of being a teacher clearly outweigh the disadvantages If I could decide again, I would still choose to work as a teacher. I regret that I decided to become a teacher* I wonder whether it would have been better to choose another profession*	

Note. *denotes reverse-scored items.

Supplemental Materials

Covariance matrix provided to aid in replicability of the analyses in this study.

	1	2	3	4	5	6	7	8
1. Efficacy Eng.	0.322							
2. Efficacy Ins.	0.128	0.249						
3. Efficacy Man.	0.196	0.106	0.339					
4. Stress 1	-0.038	-0.008	-0.021	0.923				
5. Stress 2	-0.083	-0.007	-0.052	0.636	1.026			
6. Stress 3	-0.040	0.008	-0.021	0.486	0.389	0.992		
7. Job Sat. Prof.	0.121	0.080	0.088	-0.170	-0.171	-0.096	0.370	
8. Job Sat. Env.	0.093	0.057	0.070	-0.165	-0.211	-0.100	0.176	0.301