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Teacher job satisfaction: International evidence on the role of school working conditions and teacher characteristics☆

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ABSTRACT

Teacher job satisfaction is considered a crucial factor in retaining successful teachers in the workforce and for the general well-being of teachers. Understanding the relationship between school working conditions with job satisfaction is considered to be essential for enhancing teacher motivation, retention, and ultimately, student outcomes. Following the influential study by Toropova et al. (2021), the current study employs regression analysis of TIMSS 2019 data from 46 countries and benchmarking entities to investigate the relationship between school working conditions – school leadership, student discipline, and teacher workload – and teacher job satisfaction among secondary school teachers. The findings shed light on the specific aspects of school working conditions that are significantly associated with teacher job satisfaction. The findings highlight a notable association between leadership support and student discipline with teacher job satisfaction in various countries. Furthermore, our findings indicate that, on average, female teachers report higher job satisfaction than male teachers across most countries, although country-specific workforce compositions may play a role in shaping this relationship, and professional development was found to be positively correlated with teacher job satisfaction. The effects of years of teaching experience, majoring in mathematics, and majoring in mathematics education yielded inconsistent results. The results contribute to the existing research on teacher job satisfaction and provide practical implications for policymakers, school administrators, and educational stakeholders to create supportive and conducive working environments for teachers and contribute to the professional well-being of teachers worldwide.

1. Introduction

The global teacher shortage is a serious problem, negatively associated with both student learning outcomes and the effectiveness of educational systems as a whole (Carver-Thomas & Darling-Hammond, 2017; European Commission, 2021; Ingersoll, 2003). Due to challenges in attracting qualified individuals into the teaching profession, many educational systems worldwide struggle with staff shortages and the resulting scarcity of teacher quality (Viac & Fraser, 2020). The lack of qualified teachers is related to challenges such as larger class sizes, increased workloads for current teachers, and decreased educational quality (Albulescu et al., 2018; Ronfeldt et al., 2013). To effectively address this issue, a multifaceted approach is required, and improving teachers' job satisfaction is a fundamental component of this process (Toropova et al., 2021). When teachers experience high levels of job satisfaction, they are more likely to remain in the profession, contributing to both teacher retention and the attractiveness of the teaching profession (Collie & Martin, 2017). By prioritizing teachers' job satisfaction, educational institutions can foster a more motivating work environment that supports teacher well-being (Viac & Fraser, 2020). Consequently, there is an urgent need to better understand the factors associated with teachers' job satisfaction and their relationship with teaching and learning processes.

Teacher job satisfaction is not only crucial for addressing teacher shortages but also for the daily experiences of teachers. Teachers play an essential role in fostering a stimulating learning environment,

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supporting student success, and shaping the future of society. The effectiveness of education systems is strongly related to teachers' job satisfaction, as it is associated with their efficacy (Burić & Kim, 2021), commitment (Blömeke et al., 2017; Klassen & Chiu, 2011), and career longevity (Evans, 1997). Furthermore, when teachers are satisfied with their work, they tend to demonstrate higher levels of engagement, enthusiasm, and dedication (Collie et al., 2012; Stride et al., 2007), leading to improved instructional quality and better student outcomes (Klusmann et al., 2008a, 2008b; Kunter et al., 2013). Despite the widely recognized importance of teachers in promoting student achievement and cultivating an enriching educational environment, relatively few studies have examined how school working conditions and teacher characteristics relate to teacher job satisfaction, particularly in an international context (Johnson et al., 2012; Sims, 2017).

A notable contribution to this field is the study by Toropova et al. (2021), which systematically examined the relationship between school working conditions, teacher characteristics, and teacher job satisfaction using large-scale data from Sweden specifically using TIMSS 2015 data. Their research highlighted the importance of factors such as leadership support, workload, and student discipline in shaping teachers' professional experiences. However, while their study provided valuable insights, its findings were based on a single-country context, raising questions about their generalizability across diverse educational settings. Given the increasing emphasis on understanding cross-national variations in teacher job satisfaction, there is a need to extend this research to a broader, international context.

In response to this gap, our study builds upon and extends the work of Toropova et al. (2021) by analyzing data from the Trends in International Mathematics and Science Study (TIMSS) 2019, which includes data from 46 education systems. By examining the relationship between school working conditions (e.g., leadership support, student discipline, and teacher workload) and teacher job satisfaction while also considering individual teacher characteristics, this study provides updated insights across different education systems. Our research contributes to the literature by offering an international comparative perspective, helping to inform policymakers and educators on the broader structural factors related to teacher job satisfaction.

Cross-national research offers important insights by allowing for the comparison of patterns across diverse education systems, helping to identify both universal and context-specific factors that are associated with teacher job satisfaction. Scholars have emphasized that international datasets, such as TIMSS, enable a broader understanding of how institutional, cultural, and systemic contexts shape teaching conditions (Hanushek & Woessmann, 2011; Schleicher, 2018). These comparisons help inform evidence-based policy by highlighting the best practices and structural challenges across countries. However, such research is not without limitations. One frequently cited concern is the issue of construct comparability—the extent to which concepts like job satisfaction or leadership are understood similarly across cultural contexts (Byrne & Van de Vijver, 2010; Rutkowski & Svetina, 2014). Additionally, while international large-scale assessments (ILSAs) offer breadth, they often sacrifice contextual depth and may not fully capture localized nuances in teacher experiences (Crossley & Watson, 2010). Researchers have also cautioned that cultural response styles, differences in school systems, and language translation may introduce bias in cross-country comparisons (He & van de Vijver, 2012). Despite these limitations, when methodological safeguards such as measurement invariance testing are employed, cross-national analyses remain a powerful tool for generating globally relevant insights into educational phenomena.

1.1. Literature review

1.1.1. Teacher job satisfaction

Teacher job satisfaction has been a key area of research for over seven decades due to its strong association with teacher retention, instructional quality, and student outcomes (Judge et al., 2001). Satisfied teachers are more likely to remain in the profession, reducing turnover rates and the need for replacements (Blömeke et al., 2016; Ingersoll, 2017; Skaalvik & Skaalvik, 2011, 2017). The negative association between job satisfaction and teacher turnover is particularly relevant as teacher shortages are a growing concern in many educational systems worldwide (Carver-Thomas & Darling-Hammond, 2017; García & Weiss, 2019). Research suggests that teachers who perceive a negative school climate or inadequate resources report lower job satisfaction, which in turn contributes to higher attrition rates (Collie et al., 2012; Olsen & Huang, 2019; Toropova et al., 2021).

Despite extensive discussions in the academic literature, there is no universally agreed-upon definition of job satisfaction. Generally, it is conceptualized as the level of fulfillment individuals experience in their professional roles, particularly in relation to their working conditions and expectations (Pepe et al., 2017). Expanding on Locke's (1976) definition, teachers' job satisfaction can be understood as "a sense of fulfillment and gratification resulting from being a teacher and from working in a particular teaching job" (Mostafa & Pal, 2018, p. 15).

Recent studies utilizing international large-scale assessments have provided further insights into teacher job satisfaction and its associations with working conditions. For instance, Fütterer et al. (2023) examined differences in job satisfaction between first-career and second-career teachers using PISA data, highlighting the role of teacher preparedness in shaping satisfaction. Similarly, Schirle et al. (2024) explored how teachers manage to engage with professional literature despite workload constraints, emphasizing that workplace conditions might be related to their ability to integrate research-based practices into teaching. Other studies using TALIS data have reinforced the idea that satisfied teachers are less likely to leave their school or the profession altogether (Sims & Jerrim, 2020). The association between job satisfaction and student learning has also been documented, with studies showing that dissatisfied teachers may underperform in the classroom (Klusmann et al., 2008a, 2008b; Lopes & Oliveira, 2020).

The literature on job satisfaction frequently distinguishes between two main components: affective and cognitive (Locke, 1976; Moorman, 1993). The affective component pertains to teachers' emotional responses to their work, such as feeling enthusiastic, inspired, or proud (Locke, 1976). In contrast, the cognitive component involves evaluative judgments regarding one's profession, including comparisons between expectations and actual working conditions (Moorman, 1993).

In the context of teaching, both affective and cognitive dimensions play a role in shaping overall job satisfaction. Affective factors, such as feeling motivated and engaged, influence a teacher's daily experience in the classroom, while cognitive factors, such as assessing the long-term benefits of the profession, shape career commitment and retention (Dicke et al., 2020; OECD, 2014b). Additionally, teacher-level variables, such as gender, teaching experience, and professional development participation, have been linked to differences in job satisfaction levels (Aytac, 2015; Kyndt et al., 2016; Skaalvik & Skaalvik, 2015). Understanding how these dimensions interact is essential for improving teacher well-being and reducing turnover rates.

This study adopts a conceptualization of teacher job satisfaction that focuses on affective responses to the teaching profession. While broader definitions often include both affective and cognitive components, the available items in this study primarily capture teachers' emotional experiences—such as enjoyment, pride, and enthusiasm for their work (see the Measures section for further details). Given the relevance of job satisfaction to teacher motivation and retention, examining it within an international comparative framework offers valuable insights for policymakers and education stakeholders seeking to improve teachers' working conditions globally.

1.1.2. Related concepts

To provide a conceptual foundation for our study, we draw on Herzberg's Two-Factor Theory (Herzberg et al., 1959) and Self-Determination Theory (SDT) (Deci & Ryan, 1985). These

frameworks offer complementary perspectives on job satisfaction and help explain how different aspects of the school environment affect teachers' professional experiences.

Herzberg's theory distinguishes between hygiene factors—conditions that prevent dissatisfaction but do not necessarily motivate—and motivators, which directly enhance job satisfaction. In this framework, leadership support and student discipline are treated as hygiene factors: they ensure a functional work environment and reduce dissatisfaction but may not, on their own, foster intrinsic motivation. Meanwhile, motivators such as perceived professional growth opportunities (e.g., through professional development) are more closely linked to internal satisfaction and engagement. Teacher workload, while not a motivator, is often a strong hygiene factor, where excessive demands can lead to dissatisfaction.

Complementing Herzberg's model, SDT posits that autonomy, competence, and relatedness are core psychological needs that influence motivation and well-being. Although autonomy (e.g., in workload management or instructional choices) is not directly measured in this study, professional development and leadership support may indirectly foster a sense of competence and relatedness, respectively. By examining these constructs through the lens of both theories, we identify relevant variables—leadership, student behavior, workload, and teacher characteristics—as meaningful predictors of job satisfaction. These frameworks guided our selection and interpretation of variables and provide a structure for understanding the complex nature of teacher motivation and satisfaction.

1.1.3. School working conditions

The term "school working conditions" broadly encompasses the diverse array of factors within an educational setting that have the potential to association with teachers' professional experiences and overall well-being (Burkhauser, 2017; Ladd, 2011). Recognized as a fundamental dimension of the teaching profession, school working conditions wield considerable influence over teachers' motivation, effectiveness, and job satisfaction (Bascia & Rottmann, 2011). These conditions encompass a wide spectrum of elements embedded within the school environment, which can exert both direct and indirect effects on teachers' job satisfaction. Key facets of school working conditions that have been extensively studied and recognized for their relevance to teacher job satisfaction include school leadership support, student discipline dynamics, and teacher workload (Boyd et al., 2011; Kraft et al., 2016; Ladd, 2011; Perryman & Calvert, 2020).

The identification of specific components within school working conditions that exhibit the strongest correlations with teachers' job satisfaction holds significant potential in addressing challenges related to teacher availability in educational institutions. Understanding the nuanced interplay between these factors can inform targeted strategies and interventions aimed at enhancing teacher job satisfaction, ultimately contributing to the recruitment and retention of educators within the teaching profession.

1.1.4. School leadership

Effective leadership in educational settings is strongly positively associated with higher teacher job satisfaction, as it fosters clear communication, access to resources, and professional development opportunities (Boyd et al., 2011). Teachers who perceive their school leaders as competent, approachable, and supportive tend to report greater job satisfaction and professional motivation (Skaalvik & Skaalvik, 2011). Supportive leadership, characterized by collaborative decision-making, recognition of teachers' efforts, and a culture of trust, has been linked to lower stress levels, stronger workplace engagement, and increased retention rates among educators.

Conversely, a lack of leadership support is negatively associated with teacher job satisfaction, often leading to heightened stress, frustration, and reduced motivation. When school administrators fail to provide clear guidance, allocate adequate resources, or foster a supportive workplace culture, teachers are more likely to experience job dissatisfaction, emotional exhaustion, and higher turnover intentions (Skaalvik & Skaalvik, 2011). In schools where leadership is perceived as ineffective, teachers may feel isolated, disengaged, and undervalued, further exacerbating job dissatisfaction.

Extensive research has consistently demonstrated that strong school leadership is one of the most significant school working conditions linked to teacher job satisfaction (Bogler & Nir, 2015; Boyd et al., 2011; Johnson et al., 2012; Kraft et al., 2016; Ladd, 2011; Sims, 2020). In this study, school leadership is conceptualized as the collaborative relationship between school leaders and teachers, particularly in instructional planning and decision-making. Understanding how effective leadership contributes to positive teacher experiences is essential for fostering a supportive and productive educational environment that enhances teacher well-being and retention.

1.1.5. Student discipline

Student discipline, encompassing student behavior, conduct, and adherence to school standards, is a critical factor in shaping teachers' professional experiences. Disruptive behaviors such as disobedience, negativity, and lack of classroom engagement can contribute to teacher stress and burnout (Albulescu et al., 2018; Johnson & Birkeland, 2003).

Extensive research indicates that teachers' job satisfaction is closely tied to their perception of the school's disciplinary climate. Teachers who work in schools with well-behaved students, clear behavioral expectations, and a supportive disciplinary environment report higher job satisfaction and reduced stress levels (Kraft et al., 2016; Sims, 2020; Skaalvik & Skaalvik, 2011). In contrast, frequent classroom disruptions and student misbehavior are associated with lower teacher job satisfaction, as they increase emotional exhaustion, reduce instructional effectiveness, and create a challenging work environment. This underscores the importance of establishing effective disciplinary strategies and a positive school climate to enhance teacher well-being, maintain motivation, and support long-term teacher retention.

In our study, the conceptualization of student discipline mirrors the definition used by Toropova et al. (2021), encompassing teachers' perceptions of students' behavior in relation to their interactions with teachers, adherence to school culture and regulations, and their overall conduct within the educational environment.

1.1.6. Teacher workload

The term "teacher workload" encompasses the multitude of tasks, responsibilities, and scheduled requirements that teachers face within their profession (Cooper Gibson Research, 2018). This comprehensive concept entails a wide range of duties, including preparing lessons, maintaining effective classroom management, conducting student evaluations, fulfilling administrative obligations, actively participating in extracurricular activities, and continuously engaging in professional development (Perryman & Calvert, 2020).

Extensive research has examined the relationship between teacher workload and job satisfaction, highlighting its significant role in shaping teachers' professional experiences. Studies such as Ma and MacMillan (1999) indicate that when teachers perceive their workload as manageable, balanced, and reasonable, they are more likely to report higher job satisfaction. Conversely, excessive job demands, including administrative duties, large class sizes, and extended teaching hours, are frequently associated with higher stress, burnout, and reduced job satisfaction (Perryman & Calvert, 2020; Skaalvik & Skaalvik, 2011). However, some research suggests that moderate workloads, particularly when linked to professional growth and meaningful work, may not necessarily decrease satisfaction and can even enhance motivation under certain conditions (OECD, 2013).

Teachers' autonomy in allocating their working hours across various tasks plays a crucial role in job satisfaction and retention, which is particularly relevant to the ongoing teacher shortages worldwide. Research indicates that teachers with greater autonomy over their

workload report higher job satisfaction and a stronger commitment to the profession (Foster, 2019). Data from the OECD's Teaching and Learning International Survey (TALIS) 2018 suggests significant cross-country variations in teacher autonomy, with those in decentralized education systems often enjoying greater control over lesson planning and task prioritization, contributing to lower burnout rates (OECD, 2020). Moreover, studies show that teachers who have decision-making power in their professional development are more likely to stay in the profession (Brodie, 2021). The ability to manage workload independently not only enhances perceptions of job manageability but also mitigates stress, which is a key factor in preventing attrition (Ingersoll & Strong, 2011). Given these findings, policies that expand teachers' autonomy—such as flexible scheduling, involvement in school governance, and personalized professional development opportunities—could be effective strategies to enhance job satisfaction and address teacher shortages (National Foundation for Educational Research (NFER), 2022).

The research conducted by the Organization for Economic Co-operation and Development (OECD, 2013) further underscores the significance of effectively managing teacher workload to promote higher levels of job satisfaction among educators. Additionally, the study by Skaalvik and Skaalvik (2011) corroborates these findings by demonstrating that excessive teacher workload can lead to negative outcomes, including increased stress and reduced job satisfaction.

In summary, these studies collectively emphasize that the relationship between teacher workload and job satisfaction is a critical aspect of the teaching profession. It underscores the importance of managing and balancing workload effectively to foster a positive work environment for teachers, ultimately enhancing their job satisfaction and overall well-being in the field of education.

In our study, the conceptualization of teacher workload aligns with that of Toropova et al. (2021), encompassing various aspects of a teacher's work such as instructional practices, administrative responsibilities, and guidance provided to students regarding their academic tasks.

1.1.7. Teacher characteristics and teacher job satisfaction

The selection of the five teacher characteristics—gender, years of teaching experience, educational background (mathematics or mathematics education), participation in professional development, and workload perception—is based on previous research highlighting their association with job satisfaction.

- Gender: Prior studies have produced mixed findings on gender differences in teacher job satisfaction. While some research suggests that female teachers report slightly higher job satisfaction due to greater intrinsic motivation and relational engagement (Klassen & Chiu, 2010; Menon & Athanasoula-Reppa, 2011), others have found no significant gender differences (Crossman & Harris, 2006).
- Teaching Experience: Research suggests that newer teachers experience lower job satisfaction due to early career challenges, while mid-career teachers often report higher satisfaction (Aytac, 2015). However, late-career teachers may experience declining satisfaction due to burnout (Mertler, 2002).
- Educational Background: The relationship between academic specialization and job satisfaction has been underexplored in international studies. While some studies indicate that STEM teachers experience lower job satisfaction due to higher workloads and external accountability pressures (Sims, 2018), others report no significant differences (OECD, 2020). Given that TIMSS focuses on mathematics and science achievement, it is particularly relevant to distinguish between teachers with and without a mathematics or mathematics education background. Mathematics teachers often face higher expectations regarding student performance, standardized assessment outcomes, and curriculum demands. They are also in high demand in the labor market, which might be related to their career mobility, stress levels, and long-term job satisfaction (García & Weiss, 2019). Prior research suggests that mathematics teachers may experience different job satisfaction patterns compared to their colleagues in other subjects due to these factors (Toropova et al., 2021). By including this distinction, our study aims to provide a more nuanced understanding of how subject-specific teaching experiences relate to job satisfaction in different educational contexts.
- Professional Development Participation: Engaging in continuous professional development (CPD) is often associated with higher job satisfaction, as it enhances teacher confidence and instructional effectiveness (Bakkenes et al., 2010). However, if CPD requirements are excessive or misaligned with teachers' needs, they may contribute to stress.
- Workload Perception: Teacher workload is a well-documented predictor of job satisfaction. When teachers perceive their workload as excessive, they report higher stress and lower job satisfaction (Perryman & Calvert, 2020; Skaalvik & Skaalvik, 2011). Conversely, greater autonomy in workload management is associated with higher satisfaction and retention rates (National Foundation for Educational Research (NFER), 2022; OECD, 2013).

Therefore, to gain a better understanding of how teacher characteristics are related to their perception of job satisfaction, further research in this area needs to be conducted, utilizing data from diverse countries. Our current study aims to address this gap by investigating the effect of these teacher characteristics to obtain more comprehensive information across countries. It is worth noting that while existing literature provides valuable insights, effect sizes for teacher characteristics are generally small, a point we aim to address in our analysis.

1.2. Current study

Based on the definitions and empirical evidence mentioned above, this current study lays the foundation for researchers and policymakers to further understand how school working conditions and teacher characteristics are related teachers' job satisfaction. Specifically, this study aims to investigate the between leadership support, student discipline, teacher workload, as well as individual factors such as gender, teaching years, having a mathematics or mathematics education background, and participation in professional development programs, with teacher job satisfaction.

Research on the prediction of teacher job satisfaction has often been divided into two distinct streams. On one hand, certain studies have exclusively examined school working conditions, as evidenced by Sims' investigations in 2017 and 2020. On the other hand, a separate body of research, such as the work conducted by Menon and Athanasoula-Reppa (2011), has focused solely on teacher characteristics. However, it is paramount to acknowledge that teacher characteristics and working conditions are not mutually exclusive but rather interconnected elements that collectively shape teachers' job satisfaction. This recognition underscores the need for a holistic examination of these factors in understanding the complexities of teacher job satisfaction. Furthermore, a significant study by Toropova et al. (2021) examined the relationship between school working conditions, teacher characteristics, and job satisfaction in Sweden using TIMSS 2015 data, highlighting the importance of leadership support, student behavior, and workload. Their findings demonstrated that favorable working conditions are strongly associated with higher job satisfaction, but their study was limited to a single-country context. Our study builds upon their work by expanding the analysis to an international context using TIMSS 2019 data, allowing for a broader understanding of how these relationships vary across different education systems. Diverging from this domestic perspective, our current study aspires to both replicate and enhance their research endeavors by broadening the scope to an international context. Thus, the ambition of our research is to provide a comprehensive and up-to-date analysis of how these multifaceted factors interplay on a global scale.

Specifically, we investigate the relationship between leadership support, student discipline, teacher workload, as well as individual factors such as gender, teaching years, having a mathematics or mathematics education background, and participation in professional development programs with teacher job satisfaction. By utilizing the dataset of TIMSS 2019, which includes comprehensive information on school working conditions and teacher perceptions, this study provides valuable insights into this relationship at the international level.

In this study, we focused on eighth-grade mathematics teachers as TIMSS provides teacher-level data specifically for this group. Our analysis is guided by the structure of the TIMSS dataset, allowing us to examine teacher job satisfaction within this context. This approach ensures consistency while making use of the most relevant data to address our research questions.

This study was specifically guided by the following research questions:

1. How are school-working conditions, such as student discipline, leadership support, and teacher workload, associated with teacher job satisfaction?
2. What is the relationship between teacher characteristics (e.g., gender, years of experience, educational degree (mathematics or mathematics education), professional development) and job satisfaction?

2. Method

2.1. Data

This research presents a secondary data analysis of data from the latest cycle of the Trends in International Mathematics and Science Study (TIMSS) in 2019 conducted by the International Association for the Evaluation of Educational Achievement (IEA). TIMSS is a four-year cycle study that is widely employed to evaluate the mathematics and science competency of fourth and eighth grade students. In this study, we focus on grade 8 only. Along with student proficiency levels, TIMSS also gathers background data on students, parents, teachers and principals to shed light on how background factors are related to students' learning.

TIMSS applies a two-stage cluster stratified sampling strategy. In the first stage, schools are randomly sampled with probability proportional to their size (PPS) from the list of all schools in the population that contain eligible students. The second sampling stage consists of selecting at random one (or more) intact class from the target grade of each participating school (Martin et al., 2020). To collect context information, the mathematics teachers of the target sample were surveyed. Therefore, our analysis focuses on teachers who teach 8th grade, which should be considered when interpreting the generalizability of our findings.

In this study, we use data from the eighth-grade mathematics teacher questionnaires across all participating countries. This represents data from 13,048 teachers in 46 countries and benchmarking entities. The number of participating teachers from each country varies, ranging from 142 teachers in England to 1203 teachers in the United Arab Emirates.

2.2. Variables and measures

This section highlights the variables used in the current study, which include three latent variables that were measured using scales constructed from items in the TIMSS 2019 teacher questionnaire. Latent variables allow for the measurement of unobservable constructs, reduce measurement error, enhancing the statistical power, reliability, and better represents the concepts within the theoretical framework than single items (Gustafsson, 2009). In addition, five teacher characteristics including gender, teaching experience, teacher education in math and math education, and professional development were included for this study. The items along with descriptive statistics for the international pooled data can be found in Table 1. The Table also includes the item names for reference and the model variables' descriptive statistics. In the Appendix, Tables A1a,/b show the scale and item statistics by country.

The outcome variable for this study is teacher job satisfaction which consists of five items from the questionnaire. The items ask teachers how often they have certain feelings about their role as a teacher (e.g., I am content with my profession as a teacher, my work inspires me, etc.). The items denoting teacher job satisfaction were recoded so that higher values represent higher levels of teacher job satisfaction. Cronbach's alpha for the teacher job satisfaction scale was 0.907 for five items for the pooled international data.

In this study, teacher job satisfaction is assessed using items from the TIMSS 2019 teacher questionnaire. The selected items capture the affective dimension of job satisfaction, reflecting teachers' emotional responses to their profession—such as enjoyment, pride, and enthusiasm.

The following items are used to measure the affective component:

- *I am enthusiastic about my job.*
- *My work inspires me.*
- *I am proud of the work I do.*
- *I am content with my profession as a teacher.*
- *I find my work full of meaning and purpose.*

Although some of these items may appear to have cognitive elements, in this study they are interpreted as part of the affective domain due to their strong emotional undertones. Thus, teacher job satisfaction is conceptualized and measured as an affective construct. This approach aligns with prior research that highlights the central role of emotional experiences in job satisfaction (Dicke et al., 2020; OECD, 2014b).

2.2.1. Independent variables

The variable of student discipline consists of five items from the questionnaire. The items capture teacher perceptions about the extent to which they agree about certain characterizations of student behavior and conduct at their school (e.g., students behave in an orderly manner, the school has clear rules about student conduct, etc.). The items denoting student discipline were recoded so that higher values represent better student behavior. Cronbach's alpha for student discipline scale was 0.882 for five items for the pooled international data.

The variable of teacher workload consists of five items from the questionnaire. The items capture teachers' agreement with several statements regarding their level of work at the school (e.g., I have too many teaching hours, I need more time to prepare for class, etc.). The items denoting teacher workload were recoded so that higher values represent higher levels of teacher workload. Cronbach's alpha for teacher workload scale was 0.729 for five items for the pooled international data.

Compared to the measures of student discipline and teacher workload, the measure of school leadership was constructed using responses to a single item. Specifically, the single item asks teachers to characterize the level of collaboration between teachers and school leadership from very low (1) to very high (5).

3. Analytical strategy

Our analytical approach involves a two-step process to comprehensively investigate the relationships between school working conditions and teacher job satisfaction. In the initial step, we formulate latent variables for school working conditions and job satisfaction. A single-level analysis was conducted at the teacher level, as the study does not include school- or classroom-level variables, and each teacher's response is treated as an independent observation. The percentage of missing values at the item level was low across all variables used in the analyses (about 10 %), with no significant differences observed across items and countries. Given the minimal amount of missing data, we

Table 1
Descriptive statistics of the current study's variables for pooled data.

Variable	Indicator/Statement	N	Min	Max	M	SD
Teacher Job Satisfaction: How often do you feel the following way about being a teacher? Never (1) -sometimes (2) -often (3) -very often (4)						
BTBG08A	I am content with my profession as a teacher	12,037	1	4	3.43	0.68
BTBG08B	I find my work full of meaning and purpose	12,039	1	4	3.52	0.64
BTBG08C	I am enthusiastic about my job	12,037	1	4	3.45	0.67
BTBG08D	My work inspires me	12,042	1	4	3.35	0.72
BTBG08E	I am proud of the work I do	12,052	1	4	3.53	0.65
Teacher Workload: The extent to which you agree or disagree with each of the following. Disagree a lot (1) to agree a lot (4).						
BTBG09B	I have too much material to cover in class	11,734	1	4	2.95	0.87
BTBG09C	I have too many teaching hours	11,708	1	4	2.49	0.95
BTBG09D	I need more time to prepare for class	11,724	1	4	2.79	0.90
BTBG09E	I need more time to assist individual students	11,723	1	4	3.37	0.73
BTBG09H	I have too many administrative tasks	11,727	1	4	2.49	1.00
Student Discipline: About your current school, the extent to which you agree or disagree. Disagree a lot (1) to agree a lot (4).						
BTBG07D	The students behave in an orderly manner	11,991	1	4	3.07	0.79
BTBG07E	The students are respectful of the teachers	11,981	1	4	3.14	0.76
BTBG07F	The students respect school property	11,985	1	4	2.94	0.83
BTBG07G	This school has clear rules about student conduct	11,992	1	4	3.47	0.69
BTBG07H	This school's rules are enforced in a fair and consistent manner	11,992	1	4	3.26	0.78
Leadership Support: How would you characterize each of the following within your school? Very low (1) to very high (5).						
BTBG06L	Collaboration between school leadership and teachers to plan inst.	12,008	1	5	3.84	0.89
Teacher Gender: Are you female or male?						
BTBG02	Male/Female	12,095	4792 (m)	7303(f)		
Teaching years: By the end of this school year, how many years will you have been teaching altogether?						
BTBG01	How many years have you been teaching?	12,066	0	59	15.5	10.41
Mathematics: During your education, what was your major or main area(s) of study? Mathematics						
BTBG05A	Mathematics as main area of study	11,856	2863 (no)	8993(yes)		
Mathematics education During your education, what was your major or main area(s) of study? Education–Mathematics						
BTBG05F	Mathematics education as main area of study	11,726	5801 (no)	5925(yes)		
Professional Development: In the past two years, how many hours in total have you spent in formal for mathematics?						
BTBM23	How many hours of professional development did you have? None (1) – Less than 6 h (2) – 6–15 h (3) 16–35 h (4) – More than 35 h (5)	11,942	1	5	3.34	1.319

applied listwise deletion to ensure consistency in the analyses. This approach retained cases with complete data while maintaining the robustness of the results. To ensure the validity of our measures across diverse contexts, we test for measurement invariance. In the second step of our analysis, we employ regression models to explore the relationships between these measures and teacher job satisfaction. Each of these steps will be elaborated upon in greater detail in the subsequent sections, providing a comprehensive methodological framework for our study.

3.1. Creating scales for school working conditions

3.1.1. Measurement validation (CFA and factor loadings)

First, a confirmatory factor analysis (CFA) was conducted to assess the model fit for each of the scales, including teacher job satisfaction, teacher workload, and student discipline, individually for all participating countries. To achieve this, we estimated a unidimensional model for each scale and systematically explored correlations among residuals in cases where the initial model fit indicated room for improvement.

To assess the consistency of the model data within each country, the Comparative Fit Index (CFI), Tucker-Lewis index (TLI) as goodness of fit statistics, and Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean-Squared Residual (SRMR) as residual fit statistics, are used. It is relevant to point out that the better the model fits, the closer the CFI and TLI values are to 1 and the closer RMSEA and SRMR are to 0. According to Hu & Bentler (1999) and Rutkowski & Svetina (2014), an acceptable model fit is defined as having CFI $>$ .90, TLI $>$ .90, RMSEA $<$ .10; and SRMR $<$ 0.08 values.

3.1.2. Measurement invariance (cross-country comparability check)

Measurement instruments or indicators should be interpreted in the same manner for each group in the research to establish valid comparisons of average scores across various groups (Byrne & Van de Vijver, 2010). For this reason, cross-cultural comparability of these scales was subsequently investigated using a multi-group confirmatory factor analysis (MG-CFA) across all educational systems. Based on Brown (2015), we estimate configural, metric, and scalar invariance models, building the process up from the least restrictive model to the most restrictive model in order to estimate the measurement invariance models.

Measurement invariance is tested in phases, starting with configural invariance. It is connected to a model where the latent structure is the same for all groups (Kline, 2011). Each group is assumed to have equal factor loadings under metric invariance. Latent variances and covariances between latent variables can be compared if this level of invariance is confirmed (Kline, 2011). At scalar level invariance, it is assumed that item constants and intercepts are comparable across groups. Measurement invariance must meet the more restrictive level (scalar invariance) in order to compare these constructs' means across countries however this is often a challenge (Kline, 2011). In our case, we aim to compare the coefficients in the regressions rather than mean levels across countries. Thus, reaching metric level invariance is satisfactory in this study.

Configural invariance was investigated by implementing a multiple group confirmatory factor analysis (MG-CFA) to verify the measurement model. In order to evaluate MG-CFA results, change in CFI (ΔCFI) and change in RMSEA (ΔRMSEA) values were considered in order to evaluate metric and scalar invariance. We used the criteria suggested by Chen (2007) and Rutkowski and Svetina (2014). To determine metric invariance, these authors suggest a slightly more liberal criterion of around − 0.020 for ΔCFI and 0.030 for ΔRMSEA. To determine scalar invariance, the traditional cut-off values were taken into consideration, i.e., − 0.010 for ΔCFI and a ΔRMSEA of 0.010.

3.1.3. Exploring the relationship between teacher working conditions and characteristics with teacher job satisfaction

To answer the research questions, we first conduct a regression analysis using pooled data and then estimated separate regression models for each educational system. In these models, we examine the relationship between school working conditions and teacher characteristics with teacher job satisfaction. The regression model estimated for each education system is outlined below.

The dependent variable job satisfaction (*Job_Sat*) was regressed on the three working conditions measures and five and teacher characteristics:

$$Job\_Sat = \beta0 + \beta1 * Teach\_Workload + \beta2 * Stu\_Dis + \beta3 * Lead\_Sup + \beta4 * Gender + \beta5 * Teach\_Years + \beta6 * Maths + \beta7 * Maths\_Ed + \beta8 * PD + \varepsilon$$

In this study, our primary focus lies in examining the relationship between school working conditions and teacher characteristics with job satisfaction. For example, this study examines the overall relationship between gender and teacher job satisfaction across countries without distinguishing between workforce compositions. While differences in gender representation may exist, our primary focus remains on identifying general trends in teacher job satisfaction across diverse education systems. As our research objectives revolve exclusively around teacher-level variables, we made a deliberate choice not to employ teacher weights in our analysis. The use of teacher weights is typically relevant when considering student-level outcomes or characteristics, which fall outside the scope of our investigation. Our decision aligns with the specific goals and parameters of this research, ensuring that our analysis accurately reflects the relationships between teacher-related factors and job satisfaction. All estimations were performed using Mplus 8.4 (Muthen & Muthen, 2019) and executed in the R statistical software (R Core Team, 2019; Rosseel, 2012).

4. Results

In this section, latent measurement models of teacher job satisfaction, teacher workload and student discipline are constructed and evaluated based on standardized factor loadings and model fit indices.

4.1. A latent model of teacher job satisfaction, teacher workload and student discipline

4.1.1. Measurement validation (CFA and factor loadings)

We modeled separate CFA models to evaluate the three scales for teacher job satisfaction, teacher workload and student discipline. First, a latent model of the dependent variable, teacher job satisfaction, was constructed and evaluated. To achieve an optimal model fit, we introduced correlated residuals between the items "I am content with my profession as a teacher" and "I find my work full of meaning and purpose." This adjustment, based on insights from previous research by Evans (1997) and Toropova et al. (2021), contributed to an improved model fit. The initial model achieved a perfect fit to the data, with the indicator 'I am enthusiastic about my job' exhibiting the highest factor loading (0.871), while the remaining indicators ranged from 0.762 to 0.866 (Table 2).

Second, a latent model of the independent variable, teacher workload, was constructed and evaluated. To ensure an optimal model fit, we assessed the factor loadings and introduced correlated residuals as necessary. The model achieved a good fit to the data, with the indicator "need more time to prepare for class" displaying the highest factor loading (0.780), while the remaining indicators exhibited factor loadings ranging from 0.486 to 0.614.

The teacher workload construct encompasses both instructional and non-instructional responsibilities, reflecting the multifaceted nature of teachers' professional demands. While the item measuring administrative tasks ('I have too many administrative tasks') has a slightly lower factor loading (0.486), it remains within an acceptable range for inclusion (Hair et al., 2010; Kline, 2011). Despite this moderate loading, the overall Cronbach's alpha (0.729) for the teacher workload scale indicates acceptable internal consistency, supporting its retention in the model. Research suggests that factor loadings above 0.40 can still meaningfully contribute to construct validity, particularly when the item captures an essential aspect of the underlying construct (Kline, 2011). Given its theoretical relevance and role in shaping teacher workload perceptions, the administrative tasks item was included to ensure a comprehensive representation of workload. Prior studies (Ma & MacMillan, 1999; Perryman & Calvert, 2020) highlight that administrative burden significantly contributes to teacher stress and job dissatisfaction, further reinforcing its importance in the scale.

Lastly, a latent model of the independent variable, student discipline, was constructed and evaluated. In order to ensure the highest model fit quality, we examined the factor loadings and incorporated correlated residuals where necessary. Remarkably, the model achieved an excellent fit to the data, with the indicator "The students are respectful of the teachers" exhibiting the highest factor loading (0.894), while the remaining indicators displayed factor loadings ranging from 0.551 to 0.864. It is worth noting that the pairs of items "This school has clear rules about student conduct" and "This school's rules are enforced in a fair and consistent manner" showed significant similarities in terms of adherence to school rules, consistent with the findings of Toropova et al. (2021). To enhance the model fit further, we, therefore, introduced corresponding correlated residuals between BTBG07G and BTBG07H.

Table 2
Measurement models.

Construct	Items	Factor Loadings
Teacher Job Satisfaction		
BTBG08A	I am content with my profession as a teacher	0.762
BTBG08B	I find my work full of meaning and purpose	0.773
BTBG08C	I am enthusiastic about my job	0.871
BTBG08D	My work inspires me	0.866
BTBG08E	I am proud of the work I do	0.768
Residual correlation	BTBG08A–BTBG08B	0.202
Model fit indices	CFI = 0.995, TLI = 0.987, RMSEA = 0.065, SRMR = 0.010, N = 11,985	
Teacher Workload		
BTBG09B	I have too much material to cover in class	0.517
BTBG09C	I have too many teaching hours	0.568
BTBG09D	I need more time to prepare for class	0.780
BTBG09E	I need more time to assist individual students	0.614
BTBG09H	I have too many administrative tasks	0.486
Residual correlation	BTBG09B–BTBG09C	0.114
Model fit indices	CFI = 0.976, TLI = 0.939, RMSEA = 0.077, SRMR = 0.021, N = 11,631	
Student Discipline		
BTBG07D	The students behave in an orderly manner	0.864
BTBG07E	The students are respectful of the teachers	0.894
BTBG07F	The students respect school property	0.831
BTBG07G	This school has clear rules about student conduct	0.551
BTBG07H	This school's rules are enforced in a fair and consistent manner	0.624
Residual correlation	BTBG07G–BTBG07H	0.523
Model fit indices	CFI = 0.995, TLI = 0.987, RMSEA = 0.061, SRMR = 0.013, N = 11,911	

Note. Factor loadings and model fit for pooled international data.

4.2. Multi-group confirmatory factor analysis

After evaluating the model fit for the pooled data, we investigated the invariance of the three measurement models across countries. Table 3 shows the results of each invariance level and the change in CFI

Table 3
Measurement invariance across countries.

Model	χ2	df	CFI	RMSEA	ΔRMSEA	ΔCFI	Δχ2	Δdf
Teacher Job Satisfaction								
Configural	451.42	184	0.986	0.074			643.955	180
Metric	1068.72	364	0.963	0.086	0.012	− 0.02	2216.882	360
Scalar	2471.962	544	0.897	0.116	0.03	− 0.06	1752.141	180
Teacher Workload								
Configural	496.065	180	0.974	0.082			540.156	176
Metric	1036.221	356	0.945	0.086	0.004	− 0.029	5685.227	352
Scalar	6181	532	0.540	0.202	0.116	− 0.405	5145.071	176
Student Discipline								
Configural	332.818	184	0.993	0.056			497.417	180
Metric	827.105	364	0.979	0.07	0.014	− 0.02	2506.179	360
Scalar	2767.094	544	0.9	0.125	0.055	− 0.07	2139.452	180

Note. χ2 values apply the Satorra–Bentler correction, df = degrees of freedom, the invariance models are specified with the same residual correlations as in Table 2 (BTBG08A–BTBG08B; BTBG09B–BTBG09C; BTBG07G–BTBG07H).

for all countries. At the configural invariance level, the general model fit indices are within an acceptable range. When moving from configural invariance to metric invariance, the change in the CFI should be maximum around 0.020, for teacher job satisfaction, student discipline and teacher workload scales, this criterion is met, which means these three scales met metric level invariance. However, when moving from metric level invariance to scalar level invariance for the teacher job satisfaction, student discipline and teacher workload scales, the change in CFI should not exceed around 0.01. However, in our case, the change in CFI for these three scales is greater than 0.01, which means that these three scales did not reach scalar level invariance. In summary, the teacher job satisfaction, student discipline, and teacher workload scales reached metric level invariance, which allows us to make comparisons of associations, such as correlation and regression coefficients, between groups. It is important to note that we utilized factor scores after achieving metric invariance, facilitating meaningful comparisons. Factor scores were employed as they provide a more interpretable representation of latent constructs and enhance the clarity of comparative analyses. However, we are unable to make comparisons of means.

4.3. Association between teacher job satisfaction with school working conditions and teacher characteristic (pooled data)

We estimate two sets of regression models in this study. First, we estimate a baseline model using pooled international data to provide a comprehensive overview of the relationship between school-working conditions, teacher characteristics, and teacher job satisfaction across all participating education systems. Subsequently, we estimate separate regression models for each education system to explore variations in these relationships at the national level. This dual approach allows us to assess the global patterns as well as the specific dynamics within individual countries, providing a more comprehensive understanding of the factors influencing teacher job satisfaction (Table 4).

Table 4
Standardized regression estimates for pooled international data.

	Estimate	Standard Error
Leadership Support	*0.266***	*− 0.013*
Student Discipline	*0.356***	*− 0.013*
Teacher workload	*− 0.113***	*− 0.012*
Gender	*0.071***	*− 0.022*
Teaching years	*− 0.006***	*− 0.001*
Mathematics	*0.023*	*− 0.025*
Mathematics Education	*− 0.029*	*− 0.021*
PD	*0.084***	*− 0.008*
Leadership Support	*0.266***	*− 0.013*

*p < 0.05.
*** p < 0.001.
** p < 0.01.

The regression models demonstrate the estimates of the relationship between teacher job satisfaction and school-working conditions and teacher characteristics which consists of leadership support, student discipline, teacher workload, gender, years of teaching, mathematics, and mathematics education as main major and professional development. This is done for pooled data first to show general pattern.

In this pooled data regression analysis, the relationship between various factors and teacher job satisfaction was examined. The results indicate that leadership support and student discipline have a positive relationship with teacher job satisfaction, suggesting that higher levels of support and better student behavior contribute to increased job satisfaction. Conversely, teacher workload, teaching years, and being female appear to have a negative relationship with job satisfaction, with more workload, longer teaching experience, and being female playing roles in reducing satisfaction levels. Participation in professional development, on the other hand, positively affects job satisfaction. However, having a mathematics major or a mathematics education major does not seem to be significantly related to teacher job satisfaction in this analysis. These findings are based on a substantial dataset comprising numerous observations for the pooled data.

4.4. Country-specific regression results

Furthermore, the aforementioned analyses were carried out for 46 participating countries in TIMSS 2019. The parameter estimates of eight variables with their significance levels and standard errors in parentheses and correlation are provided along with information on the sample size of teachers for each participating country (see Figs. 1 and 2 and Table A2a in Appendix).

The results show a consistent pattern across most countries. Leadership support was found to be positively related to indicators of teacher job satisfaction across countries. This relationship is statistically significant in most countries (27 countries). That is, teachers who have more leadership support from their principals tend to have a higher level of job satisfaction than teachers who have less leadership support from their principals.

A similar pattern to the one found for leadership support can be seen in the relationship between student discipline and teacher job satisfaction across different countries. The student discipline scale was a positive, statistically significant predictor ($p < 0.001$, $p < 0.01$ or $p < 0.05$) of teacher job satisfaction except for in two educational systems: Western Cape and Gauteng. This relationship is also positive but non-significant for Western Cape and negative and non-significant for Gauteng. Therefore, teachers who have students who are more disciplined tend to have higher job satisfaction than teachers who have students who are less disciplined.

When it comes to teacher workload, there is a mixed pattern across different countries. Teacher workload was negatively related to teacher job satisfaction in 37 countries. This relationship is statistically

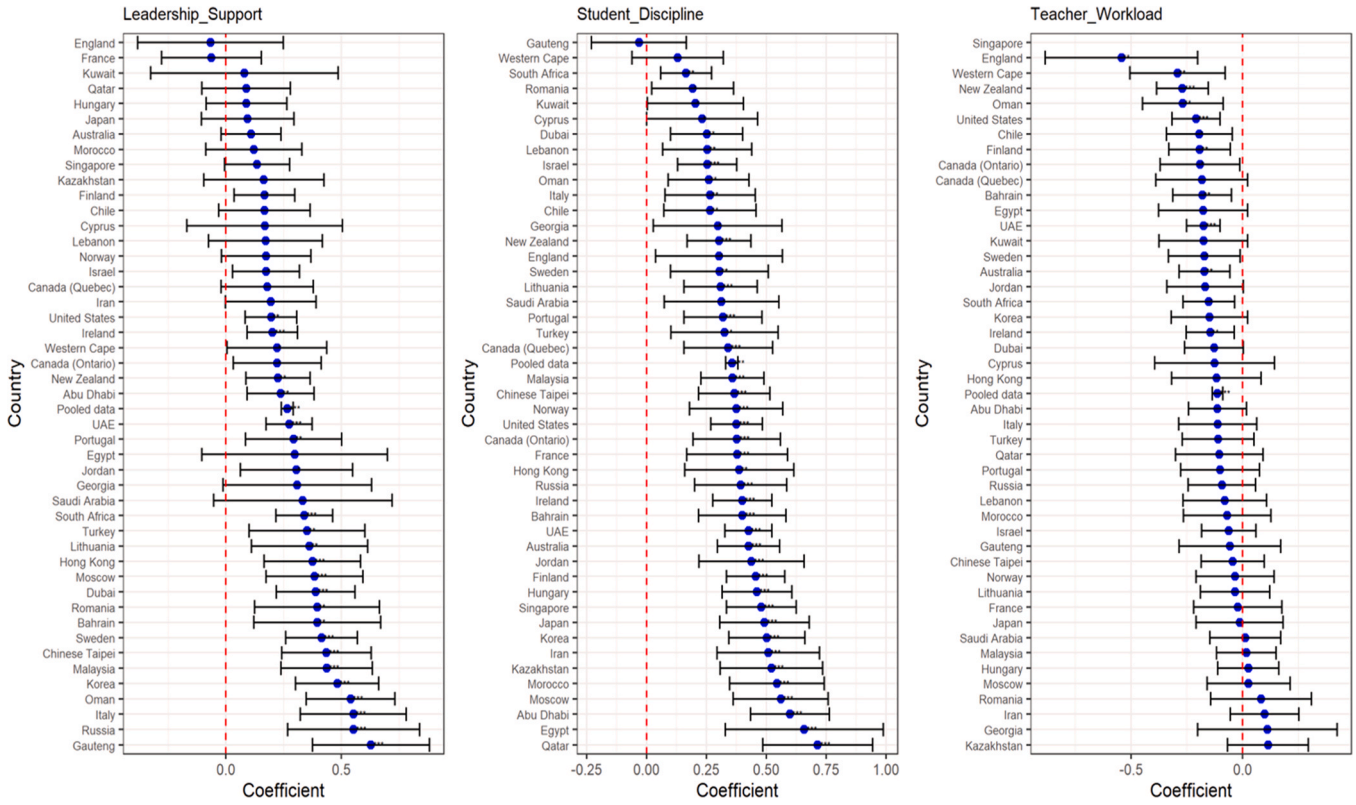

Fig. 1. Estimates & significance levels from models for each country with standard errors for school working conditions.

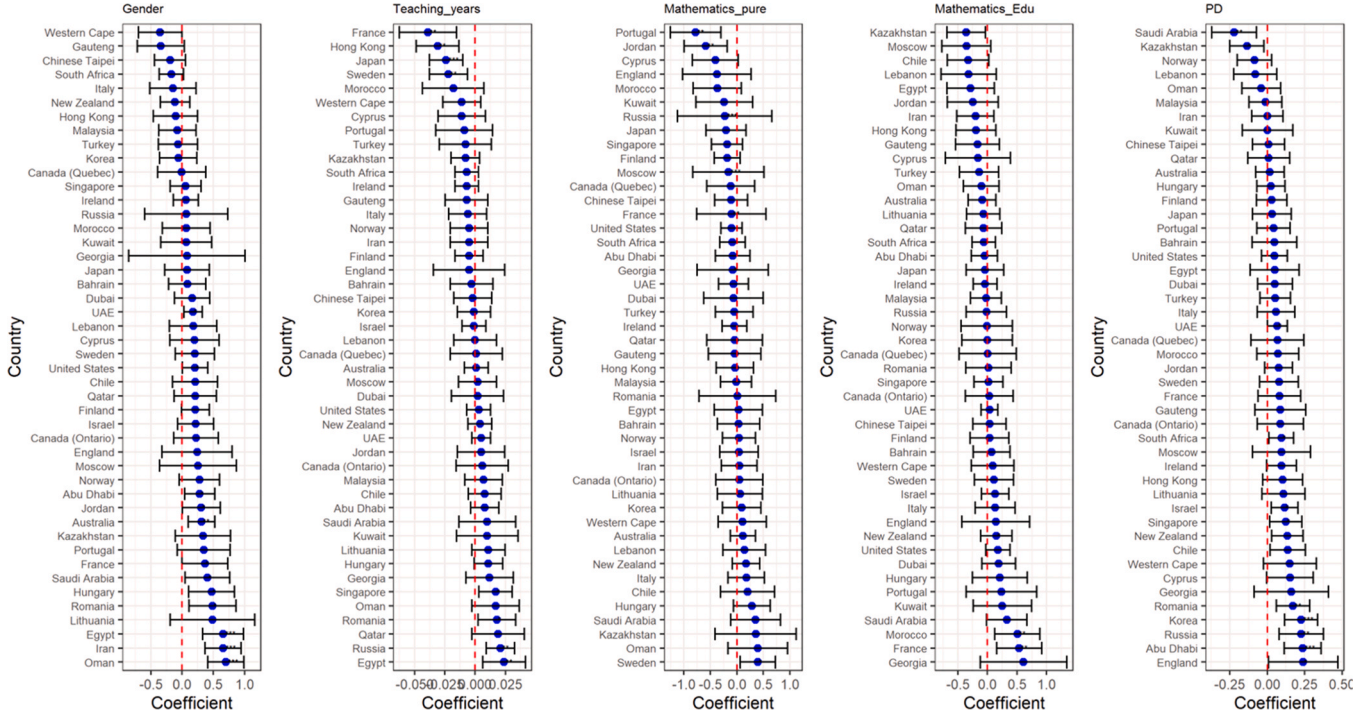

Fig. 2. Estimates & significance levels from models for each country with standard errors for teacher characteristics.

significant in 14 countries. For most countries, we can conclude that teachers who have higher workloads tend to have less job satisfaction than teachers who have lighter workloads. In eight countries (Georgia, Hungary, Iran, Kazakhstan, Malaysia, Romania, Saudi Arabia and Moscow), teachers who have higher workloads tend to have more teacher job satisfaction than teachers who have less workload.

Moreover, we investigated the relationship between teacher job satisfaction and teacher characteristics which consists of gender, years of teaching, mathematics, and mathematics education as main major and professional development. While female teachers reported higher

average job satisfaction than male teachers in 35 countries, this difference was statistically significant in only 12 countries. Therefore, no systematic gender difference in job satisfaction can be inferred across all countries, and the observed variations should be interpreted with caution. Professional development is positively related to teacher job satisfaction in 40 countries although this relationship is significant in only 9 countries. When it comes to years of teaching, mathematics and mathematics education as main major, there are inconsistent results across different countries. Notably, these relationships tend to exhibit minor associations, emphasizing the nuanced nature of the association of these variables with teacher job satisfaction, suggesting that the effect of years of teaching and academic background on job satisfaction is subtle and context-dependent.

5. Discussion

This study aimed to examine the relationship between school working conditions, teacher characteristics, and teacher job satisfaction across 46 countries and benchmarking entities using the TIMSS 2019 dataset. Drawing inspiration from the pioneering work of Sims (2017) and taking into account the insights provided by Toropova et al. (2021), we contribute to the field by using the more recent TIMSS 2019 data to investigate the relationship between school working conditions, teacher characteristics, and teacher job satisfaction in a comparative manner. This study updates those results by using more recent TIMSS 2019 data. Overall, the findings of this study suggest that school working conditions play a more significant role than teacher characteristics in predicting teacher job satisfaction across countries. This section presents and discusses the main findings in line with the research questions of the study.

5.1. School working conditions

In our cross-national study of school working conditions, teacher workload emerges as a pivotal factor being associated with teacher job satisfaction. As we delve into the implications of our findings, we begin by examining the multifaceted relationship between teacher workload and job satisfaction, shedding light on the nuanced patterns that unfolded across the 46 participating countries in TIMSS 2019. In many countries, teacher workload emerged as a critical determinant of teacher job satisfaction, consistently exerting a negative association with their overall contentment in their roles. Our analysis underscores the critical role that workload plays in shaping teachers' professional experiences and overall job satisfaction, offering valuable insights for educators, policymakers, and researchers seeking to enhance the teaching profession worldwide. This result suggests that teachers who have a heavy workload may experience increased stress and burnout. Managing numerous obligations, demands, and deadlines can be challenging and draining for educators. Consequently, they may feel overwhelmed, exhausted, and ultimately dissatisfied with their job. This finding aligns with the findings of Skaalvik and Skaalvik (2016), whose study revealed that reduced teacher job satisfaction is a consequence of an excessive workload, which is strongly associated with psychological exhaustion and a higher inclination to leave the teaching profession. Although non-significant results were observed in some countries, our study's findings underscore the importance of a manageable workload for teachers' job satisfaction. It is possible that the relative importance of different aspects of teacher workload varies across countries due to differences in school administrative structures and teacher responsibilities. Future research could further explore cross-national variations in factor loadings to assess whether different dimensions of teacher workload have differential effects on job satisfaction depending on the education system context.

A particular aspect of the school working conditions—student discipline—was significantly and positively associated with teachers' job satisfaction almost everywhere when examined consecutively. This result suggests that teachers who have less disruptive students might better handle work-related challenges in the class, resulting in increased teacher job satisfaction. Teacher cooperation and student discipline also turned out as important for teacher perceptions of job satisfaction, a result well corroborated by previous research (Borman & Dowling, 2008; Ingersoll, 2017; Wang et al., 2020; Sims, 2017; Toropova et al., 2021). Our study's findings also expand the results of previous research by using recent TIMSS 2019 data. One way of explaining this inconsistency might be that teachers who have more disciplined students might feel less stress and burnout and eventually lead to higher teacher job satisfaction (McCarthy et al., 2009). It can also be argued that teachers who are not satisfied in their current jobs may have an impact on how students behave in the classroom or school. Therefore, it is suggested that future longitudinal research investigate how varying student discipline might be related to teacher satisfaction with their jobs.

The other aspect of the school working conditions – leadership support – was positively associated with teacher job satisfaction and it is significant in slightly more than half of the participating countries. This result suggests that school principals that are approachable and supportive with planning for instruction have a positive association with teachers' job satisfaction in a direct manner. Our findings echo the studies conducted by Aldridge and Fraser (2016) with Australian high school teachers and Toropova et al. (2021) in the Swedish context with eighth grade students' mathematics teachers and by Bogler (2001) for Israeli teachers and by Sims (2020) in the England context using TALIS 2013 data. Therefore, based on the literature, it was advised the future studies on principal support for teacher job satisfaction across countries by Aldridge and Fraser (2016). This study expanded the previous studies by focusing on 46 countries and benchmarking entities with TIMSS 2019 data. However, narrow measures of school leadership support might restrict us to get more detailed information in this sense.

The results of this study reveal significant cross-country variations in the relationship between teacher job satisfaction and its predictors. While leadership support consistently showed a positive relationship with teacher satisfaction in 27 countries, this pattern was not universal. Similarly, student discipline was positively associated with job satisfaction in most countries, but the relationship was not observed or even reversed in the educational systems of Western Cape and Gauteng. This finding highlights the importance of considering local contexts when examining teacher job satisfaction. The association between teacher workload and job satisfaction also varied across countries. In 37 countries, a negative relationship was found, while in Georgia, Hungary, Iran, Kazakhstan, Malaysia, Romania, Saudi Arabia, and Moscow, the association was positive, suggesting that the way workload is perceived may differ depending on national policies and working conditions. Regarding teacher characteristics, female teachers reported higher job satisfaction than their male colleagues in most countries, though the statistical significance of this relationship varied. Similarly, professional development was positively associated with job satisfaction in 40 countries, though this association was statistically significant in only a subset of them. The relationships between years of teaching, mathematics as a major, and teacher job satisfaction were less consistent, suggesting that these factors may be more context-dependent. These findings indicate that while certain aspects of school working conditions, such as leadership support and student discipline, show consistent associations with job satisfaction, the strength and direction of these relationships differ depending on country-specific educational policies, systems, and sociocultural factors. This underscores the importance of adopting a comparative, country-specific approach when examining teacher job satisfaction internationally.

5.2. Teacher characteristics

In our study, female teachers reported higher job satisfaction than their male colleagues in most countries. Previous research has indicated varying relationships between teacher gender and job satisfaction, which can be attributed to the intricate and multifaceted nature of

gender, influenced by diverse social, cultural, economic, and political factors. Moreover, these relationships may exhibit notable differences across the countries examined in our study. However, the gender differences observed in our study can be seen in a broader global perspective, as it aligns with findings from many countries where female teachers consistently report higher levels of job satisfaction compared to male teachers. This finding expands upon the previous study conducted by Toropova et al. (2021) which focused only on the Swedish context using TIMSS 2015 data.

There might be several reasons as to why female teachers have higher level of teacher job satisfaction than male teachers. One possible explanation for the higher job satisfaction among female teachers in most participating countries, regardless of their context, could be their alignment with the teaching profession and a stronger sense of fulfillment derived from this connection (Berge, 2004; Drudy et al., 2005). Additionally, women are often perceived as possessing intrinsic maternal and empathic attributes, which can be positively related to their interactions with colleagues, students, and the broader school community (Acker, 1995). This capacity to relate to and empathize with others may contribute to their higher job satisfaction. Another factor to consider is the importance of work-life balance, which might be more significant for female teachers. Achieving work-life balance can lead to greater job satisfaction and well-being (Weiner, 2006). It is worth noting that while these reasons might partially explain the gender differences in job satisfaction, the issue is complex, and contextual factors should also be considered. We should be careful in interpreting this result as this study only focused on eighth grade mathematics teachers. This mechanism might vary depending on the grade level of teachers or subject taught by teachers (for example science and language). These issues need further investigations to gain deeper and better understanding of teacher job satisfaction, overall.

Furthermore, it is important to note that years of teaching, mathematics, and mathematics education as the main major did not provide us with a clear picture, as they yielded inconsistent results across different countries. Based on this finding, it is recommended that future research examine the specific contextual factors that may be responsible for the variable outcomes found for the number of years of teaching, the subject matter, and mathematics / mathematics education as the primary major in various nations.

The positive relationship between the hours of professional development taken by teachers and their job satisfaction, as found in this study and consistent with previous research conducted by Ingersoll et al. (2014) and Kraft et al. (2016), highlights the importance of prioritizing and investing in high-quality professional development opportunities for teachers. This recommendation is crucial for educational institutions and policymakers to enhance teacher satisfaction, improve teacher retention, and ultimately enhance the overall quality of education.

5.3. Limitations and suggestions for future directions

This study has limitations that should not be disregarded. First, the cross-sectional nature of our data is one of the study's limitations. Many research studies already in existence employ a cross-sectional approach that provides a brief description of the associations between working conditions in schools, the characteristics of teachers, and job satisfaction. An evaluation of cumulatively extended processes was not possible since the studied data was restricted to one time in the educational careers of the teachers. Therefore, in the future studies, the dynamic nature of these interactions can be better understood through longitudinal studies that follow teachers over an extended amount of time, and they can also assist in identifying the factors that contribute to long-term job satisfaction. With the recent release of TIMSS 2023, future research can build upon our findings by testing whether the relationships identified in this study remain consistent over time. This would provide valuable insights into the stability of teacher job satisfaction patterns and the evolving role of school working conditions across educational systems.

Second, quantitative measures and surveys created by researchers are commonly used in studies in this area of research and it might lead to bias as it is self-reported data (Rosenman et al., 2011). Moreover, our conceptualizations of the constructs used in this study are limited by the related questionnaires used by IEA in TIMSS 2019. So, we cannot capture all parts of school working conditions constructs with limited questions. Therefore, qualitative research is required to examine teachers' individual experiences, perspectives, and standpoints in reference to their working environments and level of job satisfaction. This could provide a deeper awareness of the complicated variables affecting teacher satisfaction.

Although the teacher workload scale demonstrated acceptable reliability, one item ('I have too many administrative tasks') exhibited a slightly lower factor loading (0.486). However, it was retained due to its theoretical relevance and its alignment with previous studies on teacher workload stress (Perryman & Calvert, 2020; Skaalvik & Skaalvik, 2011). Moreover, while this study utilizes well-documented large-scale assessment (LSA) data, the validity of the selected indicators to operationalize the constructs warrants further discussion. Although the measures used align with prior research and theoretical frameworks, some constructs may not fully capture the complexity of teacher job satisfaction and school working conditions, as LSAs often rely on self-reported data. Future research could benefit from a deeper exploration of construct validity by incorporating additional latent variable modeling techniques or triangulating survey responses with observational or administrative data.

Third, existing research often overlooks the intersectionality of teacher identities, that is, how multiple characteristics such as gender, race/ethnicity, socioeconomic status (SES), and career stage interact to shape teachers' experiences in schools (Crenshaw, 2013; Shields, 2017). This omission can lead to incomplete understanding of how school working conditions affect teacher job satisfaction. For example, prior studies have shown that women of color or teachers from lower SES backgrounds may face unique workplace stressors or marginalization not captured when identities are examined in isolation (Santoro, 2021). Future research should apply an intersectional lens to examine how combinations of these identities interact with school leadership, workload, and student discipline—factors that may be experienced differently depending on teachers' social positioning. Additionally, variations in workforce composition, particularly the proportion of female teachers in different countries, may moderate the observed relationship between gender and job satisfaction (OECD, 2020). This underscores the importance of including contextual and structural variables, such as national gender norms or school-level demographic profiles, in future cross-national analyses.

We should bear in mind that the findings may be limited to the specific group of teachers included in each participating country, as this study focused on eighth-grade mathematics teachers. While this study provides valuable insights into the relationship between school working conditions and teacher job satisfaction, it is important to acknowledge that the TIMSS teacher sample is drawn from teachers instructing nationally representative student samples rather than being a fully representative sample of the broader teacher population. As a result, findings should be interpreted as reflective of the experiences of teachers within the sampled student cohorts rather than being fully generalizable to all teachers. Future research could explore the implementation of teacher-centered weights, as proposed by Haberman et al. (2024), to improve the representativeness of teacher-level analyses in international large-scale assessments. In addition, given the broad, cross-national scope of the current study, future research could benefit from more in-depth, country-specific investigations that examine how local policy environments, workforce compositions, and school governance structures mediate the relationship between school working conditions and teacher job satisfaction. For example, qualitative case studies or mixed-methods research in selected countries could explore how teachers interpret leadership support or manage workload within

particular institutional or cultural settings. Studies might also investigate regional disparities within countries or examine how policy reforms (e.g., decentralization, teacher autonomy policies, or new evaluation systems) influence job satisfaction longitudinally. Moreover, longitudinal studies tracking teacher satisfaction over time—especially using newer waves of TIMSS or TALIS data—could shed light on how changing educational policies or working conditions shape teacher outcomes. Such designs would complement the current broad analysis and allow for more nuanced, contextually grounded understandings of the mechanisms underlying teacher job satisfaction.

6. Conclusions

The present study adds to the body of literature in several ways despite some limitations. In particular, it identifies and characterizes important aspects of school working conditions—student discipline and leadership support—which are associated with teacher job satisfaction in the majority of countries examined. Moreover, reducing the level of workload stress may also improve satisfaction with work. While many government policies have an indirect effect on these factors, school principals directly manage these factors in their schools. Given the significance of job satisfaction for teacher's retention, schools may develop or reinforce various aspects of the school environment. According to previous research, if teachers who are satisfied with their jobs are more enthusiastic about devoting time and effort to teaching their students, then this should be a key area of focus for schools aiming to support student learning. In this sense, school principals play a vital role for teacher job satisfaction. Therefore, the findings offer practical advice for those seeking to promote teachers' retention and satisfaction.

Appendix 1

Table A1a
Descriptive statistics of the current study's variables by country–job satisfaction and school working condition.

Country	N	Job_Sat Mean (SD)	Teach_Workload Mean (SD)	Stu_Dis Mean (SD)	Lead_Sup Mean (SD)
Australia	450	3.38 (0.59)	3.10 (0.58)	3.18 (0.69)	3.46 (0.87)
Bahrain	233	3.73 (0.39)	2.72 (0.67)	3.29 (0.51)	4.25 (0.76)
Chile	173	3.67 (0.43)	3.10 (0.59)	3.03 (0.62)	3.55 (0.93)
Chinese Taipei	313	3.33 (0.61)	2.69 (0.49)	3.16 (0.46)	3.54 (0.74)
Cyprus	184	3.45 (0.68)	2.73 (0.63)	3.14 (0.69)	4.15 (0.71)
Finland	389	3.20 (0.58)	2.44 (0.50)	2.86 (0.53)	3.44 (0.86)
France	196	3.14 (0.62)	2.75 (0.41)	2.88 (0.59)	3.73 (0.87)
Georgia	178	3.57 (0.38)	2.41 (0.51)	3.40 (0.41)	4.05 (0.68)
Hong Kong	185	3.24 (0.60)	2.98 (0.47)	3.23 (0.56)	3.61 (0.76)
Hungary	300	3.24 (0.56)	3.17 (0.58)	3.12 (0.51)	3.91 (0.64)
Iran	220	3.48 (0.63)	2.85 (0.58)	3.29 (0.62)	4.15 (0.81)
Ireland	565	3.43 (0.58)	2.94 (0.59)	3.33 (0.62)	3.68 (0.94)
Israel	444	3.59 (0.52)	2.73 (0.67)	3.19 (0.68)	4.11 (0.82)
Italy	209	3.36 (0.53)	2.57 (0.43)	3.06 (0.39)	3.73 (0.78)
Japan	210	3.09 (0.61)	2.85 (0.49)	2.86 (0.45)	3.44 (0.77)
Kazakhstan	223	3.58 (0.46)	2.67 (0.45)	3.57 (0.40)	4.33 (0.6)
Jordan	235	3.45 (0.61)	2.92 (0.53)	3.24 (0.57)	4.26 (0.69)
Korea	228	3.22 (0.60)	3.11 (0.51)	3.01 (0.48)	3.9 (0.78)
Kuwait	173	3.80 (0.29)	2.75 (0.56)	3.45 (0.44)	4.63 (0.62)
Lebanon	204	3.63 (0.42)	2.65 (0.57)	3.18 (0.61)	3.94 (0.87)
Lithuania	256	3.25 (0.57)	2.69 (0.55)	3.24 (0.43)	4.12 (0.61)
Malaysia	296	3.48 (0.51)	3.06 (0.43)	3.10 (0.49)	3.92 (0.61)
Morocco	261	3.45 (0.62)	2.66 (0.53)	3.09 (0.64)	3.67 (0.93)
Oman	243	3.55 (0.57)	2.97 (0.53)	3.35 (0.45)	4.15 (0.84)
New Zealand	410	3.34 (0.63)	2.96 (0.62)	3.16 (0.69)	3.49 (0.94)
Norway	276	3.43 (0.49)	3.07 (0.54)	3.16 (0.56)	3.11 (0.87)
Portugal	190	3.23 (0.59)	3.37 (0.50)	3.07 (0.59)	3.8 (0.84)
Qatar	198	3.70 (0.45)	2.77 (0.71)	3.29 (0.65)	4.05 (0.97)
Romania	219	3.50 (0.56)	2.88 (0.54)	3.45 (0.54)	4.32 (0.74)
Russian Federation	207	3.28 (0.55)	2.67 (0.54)	3.24 (0.49)	3.85 (0.6)
Saudi Arabia	222	3.77 (0.38)	2.62 (0.61)	3.47 (0.55)	4.5 (0.71)
Singapore	306	3.27 (0.63)		3.28 (0.64)	3.64 (0.83)
South Africa	543	3.49 (0.55)	2.86 (0.62)	2.78 (0.71)	3.71 (0.94)
Sweden	228	3.32 (0.54)	2.98 (0.56)	3.00 (0.45)	3.12 (1.03)
United Arab Emirates	1203	3.68 (0.49)	2.72 (0.72)	3.43 (0.66)	4.11 (0.86)
Turkey	181	3.50 (0.58)	2.34 (0.65)	3.08 (0.66)	3.94 (0.79)
Egypt	169	3.61 (0.51)	2.81 (0.51)	3.33 (0.56)	4.31 (0.71)
United States	536	3.36 (0.64)	2.89 (0.59)	2.93 (0.75)	3.55 (0.95)
England	142	3.28 (0.50)	2.85 (0.63)	3.25 (0.66)	3.57 (0.93)
Dubai	301	3.64 (0.48)	2.68 (0.70)	3.46 (0.61)	3.97 (0.94)
Abu Dhabi	465	3.65 (0.52)	2.81 (0.70)	3.29 (0.77)	3.93 (0.91)
Canada (Ontario)	205	3.61 (0.53)	2.89 (0.59)	3.16 (0.67)	3.51 (0.94)
Canada (Quebec)	151	3.40 (0.56)	2.86 (0.55)	3.00 (0.58)	3.52 (0.9)
Moscow	206	3.42 (0.54)	2.37 (0.54)	3.17 (0.49)	3.85 (0.71)
Gauteng	151	3.56 (0.53)	2.87 (0.66)	2.76 (0.73)	3.81 (0.96)
Western Cape Province	171	3.36 (0.57)	2.82 (0.61)	2.78 (0.71)	3.72 (0.88)

Note: Job_Sat = Teacher Job Satisfaction; Teach_Workload = Teacher Workload; Stu_Di = Student Discipline; Lead_Sup = Leadership Support.

Table A1b
Descriptive statistics of the current study's variables by country–teacher characteristics.

Country	N	Gender		Teac_Years	Maths		Maths_Edu		PD
		M	F	Mean (SD)	No	Yes	No	Yes	Mean (SD)
Australia	450	201	208	13.69 (11.32)	168	239	171	235	3.23 (1.18)
Bahrain	233	103	128	13.93 (8.54)	28	196	95	129	4.05 (1.05)
Chile	173	56	105	14.86 (12.2)	25	135	54	106	3.06 (1.51)
Chinese Taipei	313	171	142	15.6 (8.01)	109	203	212	100	3.15 (1.18)
Cyprus	184	41	89	11.68 (8.51)	4	127	102	29	3.13 (1.08)
Finland	389	176	212	14.51 (9.18)	150	231	321	60	2.27 (1.14)
France	196	67	87	14.67 (8.87)	12	141	86	67	3.02 (1.23)
Georgia	178	19	156	24.94 (11.87)	2	167	18	79	3.98 (1.07)
Hong Kong	185	99	76	14.71 (9.73)	72	102	93	82	3.03 (1.22)
Hungary	300	50	234	25.3 (11.43)	216	68	32	252	2.77 (1.44)
Iran	220	119	101	17.3 (8.81)	60	159	131	89	3.29 (1.38)
Ireland	565	195	330	14.06 (9.87)	129	391	279	233	3.21 (1)
Israel	444	88	340	14.79 (10.43)	60	362	124	298	3.87 (1.43)
Italy	209	36	169	19.35 (10.5)	80	125	101	103	3.44 (1.33)
Japan	210	162	47	15.56 (10.84)	45	164	101	108	2.44 (1.15)
Kazakhstan	223	34	185	19.93 (11.9)	4	207	114	93	4.17 (1.23)
Jordan	235	120	112	10.69 (8.6)	27	195	181	39	3.13 (1.51)
Korea	228	65	162	15.05 (10.29)	118	109	64	163	3.31 (1.35)
Kuwait	173	78	88	13.89 (7.1)	35	128	104	57	3.6 (1.16)
Lebanon	204	75	129	13.8 (9.69)	55	133	144	44	2.81 (1.3)
Lithuania	256	16	237	28.9 (9.98)	26	226	109	143	3.74 (0.9)
Malaysia	296	70	224	13.79 (7.62)	77	212	140	148	3.39 (1.13)
Morocco	261	180	75	12.29 (12.34)	40	156	156	34	2.62 (1.49)
Oman	243	126	110	13.75 (6.25)	29	205	113	117	3.52 (1.28)
New Zealand	410	160	210	17.1 (11.88)	157	208	229	134	2.82 (1.17)
Norway	276	101	101	12.13 (9.59)	46	156	167	34	2.54 (1.32)
Portugal	190	36	152	20.95 (7.12)	10	179	18	171	3.56 (1.45)
Qatar	198	104	93	12.43 (8.67)	21	176	93	104	3.58 (1.17)
Romania	219	67	142	23.55 (10.7)	5	174	133	45	2.84 (1.57)
Russian Federation	207	15	192	25.73 (12.56)	2	205	67	140	4.43 (0.99)
Saudi Arabia	222	103	106	11.18 (7.07)	32	175	128	76	3.4 (1.17)
Singapore	306	122	184	11.16 (8.03)	46	260	110	195	3.5 (1.09)
South Africa	543	272	262	14.36 (10.38)	103	425	289	230	3.36 (1.2)
Sweden	228	100	121	15.84 (9.23)	65	144	80	129	2.76 (1.22)
United Arab Emirates	1203	421	562	13.35 (8.13)	98	868	455	511	3.8 (1.22)
Turkey	181	83	97	10.15 (6.68)	49	129	38	139	2.34 (1.37)
Egypt	169	105	62	18.44 (10.34)	32	127	63	94	3.31 (1.16)
United States	536	149	347	14.56 (9.08)	271	225	201	295	3.53 (1.14)
England	142	42	86	13.06 (8.65)	10	77	42	45	3.16 (1.08)
Dubai	301	106	148	11.98 (7.12)	23	229	101	151	3.51 (1.23)
Abu Dhabi	465	166	197	14.12 (8.36)	51	305	168	187	3.81 (1.17)
Canada (Ontario)	205	62	111	14.28 (7.96)	148	25	141	30	3.29 (1.13)
Canada (Quebec)	151	54	78	16.67 (8.65)	59	72	37	94	2.64 (1.09)
Moscow	206	25	181	23.18 (11.53)	1	201	42	160	4.56 (0.82)
Gauteng	151	79	70	14.25 (10.26)	21	127	76	67	3.54 (1.2)
Western Cape Province	171	73	95	15.64 (11.21)	42	125	78	86	3.27 (1.06)

Note: Teac_Years = Teaching years; Maths = Mathematics; Maths_Edu = Mathematics Education; PD = Professional Development.

Table A2a
Regression estimates by country–school working conditions.

Country	*Leadership Support*	*Student Discipline*	*Teacher workload*	*N*
Australia	0.109 (0.066)	0.426*** (0.066)	− 0.171** (0.058)	387
Bahrain	0.395** (0.14)	0.4*** (0.093)	− 0.181** (0.067)	202
Chile	0.167 (0.101)	0.265** (0.098)	− 0.194* (0.075)	153
Chinese Taipei	0.435*** (0.099)	0.366*** (0.076)	− 0.045 (0.072)	300
Cyprus	0.168 (0.172)	0.232* (0.118)	− 0.126 (0.137)	115
Finland	0.167* (0.067)	0.455*** (0.062)	− 0.193** (0.07)	375
France	− 0.063 (0.11)	0.378*** (0.107)	− 0.022 (0.101)	145
Georgia	0.309 (0.164)	0.297* (0.137)	0.11 (0.159)	90
Hong Kong	0.374*** (0.107)	0.387** (0.116)	− 0.118 (0.102)	163
Hungary	0.089 (0.089)	0.461*** (0.074)	0.025 (0.07)	276
Iran	0.194 (0.1)	0.508*** (0.109)	0.098 (0.078)	212
Ireland	0.201*** (0.056)	0.4*** (0.063)	− 0.145** (0.055)	467
Israel	0.174* (0.074)	0.253*** (0.063)	− 0.063 (0.062)	404
Italy	0.552*** (0.117)	0.265** (0.096)	− 0.112 (0.089)	198
Japan	0.094 (0.102)	0.492*** (0.095)	− 0.014 (0.099)	199

(*continued on next page*)

Table A2a (*continued*)

Country	*Leadership Support*	*Student Discipline*	*Teacher workload*	*N*
Kazakhstan	0.164 (0.133)	0.521*** (0.109)	0.113 (0.092)	189
Jordan	0.305* (0.124)	0.438*** (0.112)	− 0.168 (0.087)	195
Korea	0.482*** (0.092)	0.502*** (0.081)	− 0.149 (0.087)	220
Kuwait	0.08 (0.207)	0.204* (0.102)	− 0.176 (0.101)	140
Lebanon	0.171 (0.126)	0.253** (0.095)	− 0.08 (0.095)	152
Lithuania	0.362** (0.128)	0.309*** (0.078)	− 0.034 (0.079)	240
Malaysia	0.436*** (0.101)	0.358*** (0.067)	0.016 (0.068)	285
Morocco	0.121 (0.106)	0.544*** (0.101)	− 0.069 (0.1)	167
Oman	0.54*** (0.098)	0.259** (0.086)	− 0.268** (0.092)	211
New Zealand	0.225** (0.071)	0.302*** (0.068)	− 0.27*** (0.059)	344
Norway	0.174 (0.099)	0.374*** (0.099)	− 0.034 (0.089)	177
Portugal	0.293** (0.106)	0.319*** (0.083)	− 0.102 (0.09)	186
Qatar	0.088 (0.098)	0.714*** (0.117)	− 0.105 (0.1)	187
Romania	0.395** (0.138)	0.192* (0.087)	0.082 (0.115)	165
Russia	0.553*** (0.146)	0.393*** (0.098)	− 0.093 (0.077)	205
Saudi Arabia	0.333 (0.197)	0.313* (0.122)	0.011 (0.081)	167
Singapore	0.135 (0.072)	0.479*** (0.074)		302
South Africa	0.339*** (0.063)	0.165** (0.054)	− 0.152* (0.059)	463
Sweden	0.414*** (0.079)	0.304** (0.104)	− 0.172* (0.082)	204
UAE	0.274*** (0.051)	0.425*** (0.05)	− 0.176*** (0.038)	921
Turkey	0.351** (0.128)	0.325** (0.114)	− 0.11 (0.082)	176
Egypt	0.298 (0.205)	0.658*** (0.168)	− 0.177 (0.102)	147
United States	0.195** (0.057)	0.375*** (0.055)	− 0.209*** (0.055)	487
England	− 0.067 (0.161)	0.302* (0.135)	− 0.543** (0.174)	75
Dubai	0.388*** (0.087)	0.251** (0.077)	− 0.128 (0.067)	236
Abu Dhabi	0.237** (0.074)	0.598*** (0.084)	− 0.113 (0.066)	345
Canada (Ontario)	0.222* (0.097)	0.377*** (0.093)	− 0.191* (0.091)	165
Canada (Quebec)	0.179 (0.102)	0.341*** (0.094)	− 0.183 (0.105)	131
Moscow	0.383*** (0.107)	0.56*** (0.101)	0.026 (0.095)	197
Gauteng	0.628*** (0.129)	− 0.032 (0.101)	− 0.057 (0.116)	128
Western Cape	0.221* (0.11)	0.13 (0.097)	− 0.292** (0.109)	148

Table A2a
Regression estimates by country–teacher characteristics.

Country	*Gender*	*Teaching years*	*Mathematics*	*Mathematics Education*	*PD*	*N*
Australia	0.31** (0.109)	0.001 (0.005)	0.115 (0.12)	− 0.088 (0.12)	0.018 (0.049)	387
Bahrain	0.083 (0.151)	− 0.003 (0.009)	0.033 (0.204)	0.073 (0.158)	0.047 (0.076)	202
Chile	0.208 (0.185)	0.008 (0.007)	0.204 (0.261)	− 0.325 (0.178)	0.137 (0.06)	153
Chinese Taipei	− 0.192 (0.126)	− 0.002 (0.008)	− 0.107 (0.158)	0.036 (0.143)	0.009 (0.055)	300
Cyprus	0.201 (0.202)	− 0.011 (0.01)	− 0.406 (0.222)	− 0.163 (0.28)	0.152 (0.079)	115
Finland	0.213 (0.113)	− 0.005 (0.006)	− 0.182 (0.126)	0.037 (0.167)	0.03 (0.052)	375
France	0.365* (0.186)	− 0.039** (0.012)	− 0.103** (0.033)	0.535** (0.194)	0.081 (0.073)	145
Georgia	0.078 (0.476)	0.012 (0.01)	− 0.077* (0.034)	0.61 (0.374)	0.16 (0.127)	90
Hong Kong	− 0.104 (0.181)	− 0.031** (0.009)	− 0.036 (0.18)	− 0.195 (0.172)	0.103 (0.068)	163
Hungary	0.472* (0.188)	0.011 (0.006)	0.284 (0.178)	0.211 (0.236)	0.024 (0.048)	276
Iran	0.658*** (0.148)	− 0.005 (0.008)	0.045 (0.171)	− 0.202 (0.16)	0.001 (0.053)	212
Ireland	0.061 (0.103)	− 0.007 (0.005)	− 0.048 (0.119)	− 0.039 (0.102)	0.095 (0.051)	467
Israel	0.216 (0.148)	− 0.001 (0.005)	0.042 (0.184)	0.132 (0.119)	0.116* (0.045)	404
Italy	− 0.148 (0.189)	− 0.006 (0.008)	0.178 (0.175)	0.133 (0.172)	0.059 (0.064)	198
Japan	0.081 (0.182)	− 0.024*** (0.007)	− 0.203 (0.192)	− 0.044 (0.162)	0.032 (0.066)	199
Kazakhstan	0.335 (0.226)	− 0.008 (0.006)	0.355 (0.391)	− 0.359* (0.166)	− 0.136* (0.058)	189

(*continued on next page*)

Table A2a (*continued*)

Country	*Gender*	*Teaching years*	*Mathematics*	*Mathematics Education*	*PD*	*N*
Jordan	0.308* (0.154)	0.005 (0.01)	− 0.589** (0.208)	− 0.246 (0.219)	0.076 (0.047)	195
Korea	− 0.061 (0.152)	− 0.001 (0.007)	0.095 (0.185)	− 0.003 (0.217)	0.226*** (0.056)	220
Kuwait	0.068 (0.208)	0.01 (0.013)	− 0.237 (0.274)	0.253 (0.253)	0.002 (0.086)	140
Lebanon	0.178 (0.193)	0 (0.009)	0.141 (0.205)	− 0.317 (0.238)	− 0.08 (0.073)	152
Lithuania	0.487 (0.345)	0.011 (0.007)	0.06 (0.216)	− 0.071 (0.143)	0.108 (0.073)	240
Malaysia	− 0.075 (0.153)	0.007 (0.008)	− 0.012 (0.149)	− 0.022 (0.133)	− 0.013 (0.056)	285
Morocco	0.068 (0.196)	− 0.018 (0.013)	− 0.369 (0.231)	0.505** (0.193)	0.071 (0.071)	167
Oman	0.701*** (0.147)	0.017 (0.01)	0.393 (0.287)	− 0.104 (0.153)	− 0.04 (0.066)	211
New Zealand	− 0.113 (0.119)	0.004 (0.005)	0.173 (0.133)	0.153* (0.135)	0.135 (0.053)	344
Norway	0.277 (0.164)	− 0.005 (0.008)	0.041 (0.16)	− 0.011 (0.222)	− 0.085 (0.059)	177
Portugal	0.346 (0.217)	− 0.009 (0.012)	− 0.779** (0.244)	0.237 (0.305)	0.042 (0.057)	186
Qatar	0.211 (0.172)	0.019 (0.011)	− 0.044 (0.268)	− 0.065 (0.158)	0.01 (0.071)	187
Romania	0.487* (0.191)	0.018* (0.008)	0.009 (0.37)	0.017 (0.195)	0.172** (0.057)	165
Russia	0.067 (0.34)	0.021** (0.006)	− 0.228*** (0.045)	− 0.016 (0.174)	0.227** (0.075)	205
Saudi Arabia	0.404* (0.183)	0.01 (0.012)	0.354 (0.239)	0.326 (0.173)	− 0.221** (0.076)	167
Singapore	0.057 (0.126)	0.017* (0.007)	− 0.184 (0.15)	0.02 (0.125)	0.124* (0.055)	302
South Africa	− 0.171 (0.099)	− 0.007 (0.005)	− 0.082 (0.123)	− 0.062 (0.101)	0.095* (0.042)	463
Sweden	0.202 (0.16)	− 0.022** (0.008)	0.398* (0.17)	0.111 (0.17)	0.079 (0.066)	204
UAE	0.176* (0.076)	0.005 (0.004)	− 0.065 (0.144)	0.035 (0.072)	0.067* (0.034)	921
Turkey	− 0.067 (0.16)	− 0.008 (0.011)	− 0.051 (0.181)	− 0.142 (0.169)	0.053 (0.052)	176
Egypt	0.657*** (0.166)	0.024** (0.009)	0.032 (0.232)	− 0.283 (0.205)	0.05 (0.083)	147
United States	0.205* (0.104)	0.003 (0.005)	− 0.099 (0.103)	0.179 (0.105)	0.048 (0.044)	487
England	0.241 (0.287)	− 0.005 (0.015)	− 0.376 (0.331)	0.143 (0.292)	0.239* (0.118)	75
Dubai	0.16 (0.145)	0.002 (0.011)	− 0.064 (0.288)	0.189 (0.145)	0.052 (0.059)	236
Abu Dhabi	0.283* (0.124)	0.008 (0.006)	− 0.079 (0.165)	− 0.049 (0.113)	0.236*** (0.063)	345
Canada (Ontario)	0.222 (0.182)	0.006 (0.011)	0.046 (0.227)	0.03 (0.205)	0.088 (0.079)	165
Canada (Quebec)	− 0.007 (0.197)	0.001 (0.011)	− 0.113 (0.231)	0.005 (0.247)	0.068 (0.09)	131
Moscow	0.255 (0.313)	0.002 (0.008)	− 0.159*** (0.034)	− 0.353 (0.211)	0.095 (0.099)	197
Gauteng	− 0.341 (0.193)	− 0.007 (0.009)	− 0.042 (0.253)	− 0.166 (0.189)	0.088 (0.087)	128
Western Cape	− 0.352* (0.177)	− 0.011 (0.008)	0.104 (0.232)	0.089 (0.183)	0.151 (0.09)	148

Standard errors in parentheses ***p < 0.001, **p < 0.01, *p < 0.05, N = Teacher.

References

Acker, S. (1995). Chapter 3: Gender and teachers'work. *Review of Research in Education, 21*(1), 99–162.

Albulescu, P., Tușer, A., & Sulea, C. (2018). Effective strategies for coping with burnout. A study on Romanian teachers. *Psihologia Resurselor Umane, 16*(2), 59–74.

Aldridge, J. M., & Fraser, B. J. (2016). Teachers' views of their school climate and its relationship with teacher self-efficacy and job satisfaction. *Learning Environments Research, 19*, 291–307.

Aytac, T. (2015). The effect of gender on teachers' job satisfaction: A meta-analysis. *Anthropologist, 20*(3), 385–396.

Bakkenes, I., Vermunt, J. D., & Wubbels, T. (2010). Teacher learning in the context of educational innovation: Learning activities and learning outcomes of experienced teachers. *Learning and Instruction, 20*(6), 533–548.

Bascia, N., & Rottmann, C. (2011). What's so important about teachers' working conditions? The fatal flaw in North American educational reform. *Journal of Education Policy, 26*(6), 787–802.

Berge, B. (2004). Whatever happened to the male teacher? Gendered discourses and progressive education in Sweden 1945–2000. *History of Education Review, 33*(2), 15–29.

Blömeke, S., Busse, A., Kaiser, G., König, J., & Suhl, U. (2016). The relation between content-specific and general teacher knowledge and skills. *Teaching and Teacher Education, 56*, 35–46.

Blömeke, S., Houang, R., Hsieh, F. J., & Wang, T. Y. (2017). Effects of job motives, teacher knowledge and school context on beginning teachers' commitment to stay in

the profession: A longitudinal study in Germany, Taiwan and the United States. In G. K. LeTendre, & M. Akiba (Eds.), *International handbook of teacher quality and policy* (pp. 374–387). London: Routledge.
Bogler, R. (2001). The influence of leadership style on teacher job satisfaction. *Educational administration quarterly, 37*(5), 662–683.
Bogler, R., & Nir, A. E. (2015). The contribution of perceived fit between job demands and abilities to teachers' commitment and job satisfaction. *Educational Management Administration & Leadership, 43*(4), 541–560.
Borman, G. D., & Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of Educational Research, 78*(3), 367–409.
Boyd, D., Grossman, P., Ing, M., Lankford, H., Loeb, S., & Wyckoff, J. (2011). The influence of school administrators on teacher retention decisions. *American Educational Research Journal, 48*(2), 303–333.
Brodie, K. (2021). Teacher agency in professional learning communities. *Professional Development in Education, 47*(4), 560–573.
Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. New York: Guildford Press.
Burić, I., & Kim, L. E. (2021). Job satisfaction predicts teacher self-efficacy and the association is invariant: Examinations using TALIS 2018 data and longitudinal Croatian data. *Teaching and Teacher Education, 105*, Article 103406.
Burkhauser, S. (2017). How much do school principals matter when it comes to teacher working conditions? *Educational Evaluation and Policy Analysis, 39*(1), 126–145.
Byrne, B. M., & Van de Vijver, F. J. R. (2010). Testing for measurement and structural equivalence in large-scale cross-cultural studies: Addressing the issue of nonequivalence. *International Journal of Testing, 10*, 107–132.
Carver-Thomas, D., & Darling-Hammond, L. (2017). *Addressing California's growing teacher shortage: 2017 update*. ⟨https://learningpolicyinstitute.org/sites/default/files/productfiles/Addressing_Californias_Growing_Teacher_Shortage_2017_Update_REPORT.pdf⟩.
Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation modeling: A Multidisciplinary Journal, 14*(3), 464–504.
Collie, R. J., & Martin, A. J. (2017). Teachers' sense of adaptability: Examining links with perceived autonomy support, teachers' psychological functioning, and students' numeracy achievement. *Learning and Individual Differences, 55*, 29–39.
Collie, R. J., Shapka, J. D., & Perry, N. E. (2012). School climate and social–emotional learning: Predicting teacher stress, job satisfaction, and teaching efficacy. *Journal of Educational Psychology, 104*(4), 1189.
Cooper Gibson Research. (2018). *Factors affecting teacher retention: qualitative investigation*. London, UK: Department for Education.
Crenshaw, K. W. (2013). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *The public nature of private violence* (pp. 93–118). Routledge.
Crossley, M., & Watson, K. (2010). Comparative and international education: Policy transfer, context sensitivity and professional development. *Disciplines of Education* (pp. 113–131). Routledge.
Crossman, A., & Harris, P. (2006). Job satisfaction of secondary school teachers. *Educational Management Administration Leadership, 34*(1), 29–46.
Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer. https://doi.org/10.1007/978-1-4899-2271-7
Dicke, T., Marsh, H. W., Parker, P. D., Guo, J., Riley, P., & Waldeyer, J. (2020). Job satisfaction of teachers and their principals in relation to climate and student achievement. *Journal of Educational Psychology, 112*(5), 1061.
Drudy, S., Martin, M., O'Flynn, J., & Woods, M. (2005). *Men and the classroom: Gender imbalances in teaching*. London: Routledge.
European Commission. (2021). *Teachers in Europe careers, development and well-being*. Retrieved from Luxembourg. ⟨https://eacea.ec.europa.eu/nationalpolicies/eurydice/sites/default/files/teachers_in_euroe_2020_foreword.pdf⟩.
Evans, L. (1997). Addressing problems of conceptualization and construct validity in researching teachers' job satisfaction. *Educational Research, 39*(3), 319–331.
Foster, D. (2019). *Teacher recruitment and retention in England*. House of Commons Library. Retrieved from ⟨https://researchbriefings.files.parliament.uk/documents/CBP-7222/CBP-7222.pdf⟩.
Fütterer, T., van Waveren, L., Hübner, N., Fischer, C., & Sälzer, C. (2023). I can't get no (job) satisfaction? Differences in teachers' job satisfaction from a career pathways perspective. *Teaching and Teacher Education, 121*, Article 103942.
García, E., & Weiss, E. (2019). *The teacher shortage is real, large and growing, and worse than we thought: The first report in 'The Perfect Storm in the Teacher Labor Market' series*. Economic Policy Institute.
Gustafsson, J.-E. (2009). Strukturell Ekvationsmodellering [structural equation modeling]. In G. Djurfeldt, & M. Barmark (Eds.), *Statistisk verktygslåda 2 Multivariat analys* (pp. 269–321). Lund, Sweden: Studentlitteratur.
Haberman, S. J., Meinck, S., & Koop, A. K. (2024). Teacher-centered analysis with TIMSS and PIRLS data: Weighting approaches, accuracy, and precision. *Large-Scale Assessments in Education, 12*(1), 29.
Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson.
Hanushek, E. A., & Woessmann, L. (2011). The economics of international differences in educational achievement. *Handbook of the Economics of Education, 3*, 89–200.
He, J., & van de Vijver, F. (2012). Bias and equivalence in cross-cultural research. *Online Readings in Psychology and Culture, 2*(2), 8.
Herzberg, F., Mausner, B., & Snyderman, B. B. (1959). *The motivation to work* (2nd ed.). John Wiley & Sons.
Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation modeling: a Multidisciplinary Journal, 6*(1), 1–55.
Ingersoll, R. M. (2003). The teacher shortage: Myth or reality? *Educational Horizons, 81*(3), 146–152.
Ingersoll, R. (2017). Misdiagnosing America's teacher quality problem. In G. K. LeTendre, & M. Akiba (Eds.), *International handbook of teacher quality and policy* (pp. 79–96). London: Routledge.
Ingersoll, R., Merrill, L., & May, H. (2014). *What are the effects of teacher education and preparation on beginning teacher attrition? (Research Report [#RR-82])*. Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.
Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of Educational Research, 81*(2), 201–233.
Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of educational research, 81*(2), 201–233.
Johnson, S. M., & Birkeland, S. E. (2003). Pursuing a "sense of success": New teachers explain their career decisions. *American Educational Research Journal, 40*(3), 581–617.
Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record, 114*(10), 1–39.
Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction–job performance relationship: A qualitative and quantitative review. *Psychological Bulletin, 127*(3), 376.
Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*(3), 741–756.
Klassen, R. M., & Chiu, M. M. (2011). The occupational commitment and intention to quit of practicing and pre-service teachers: Influence of self-efficacy, job stress, and teaching context. *Contemporary Educational Psychology, 36*(2), 114–129.
Kline, R. B. (2011). *Principles and practices of structural equation modelling* (3rd ed.). New York: The Guilford Press.
Klusmann, U., Kunter, M., Trautwein, U., Lüdtke, O., & Baumert, J. (2008a). Teachers' occupational well-being and quality of instruction: The important role of self-regulatory patterns. *Journal of Educational Psychology, 100*(3), 702.
Klusmann, U., Kunter, M., Trautwein, U., Lüdtke, O., & Baumert, J. (2008b). Engagement and emotional exhaustion in teachers: Does the school context make a difference? *Applied Psychology, 57*, 127–151.
Kraft, M. A., Marinell, W. H., & Shen-Wei Yee, D. (2016). School organizational contexts, teacher turnover, and student achievement: Evidence from panel data. *American Educational Research Journal, 53*(5), 1411–1449.
Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013). Professional competence of teachers: Effects on instructional quality and student development. *Journal of Educational Psychology, 105*(3), 805.
Kyndt, E., Gijbels, D., Grosemans, I., & Donche, V. (2016). Teachers' everyday professional development: Mapping informal learning activities, antecedents, and learning outcomes. *Review of Educational Research, 86*(4), 1111–1150.
Ladd, H. F. (2011). Teachers' perceptions of their working conditions: How predictive of planned and actual teacher movement? *Educational Evaluation and Policy Analysis, 33*(2), 235–261.
Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297–1343). Chicago, IL: Rand McNally.
Lopes, J., & Oliveira, C. (2020). Teacher and school determinants of teacher job satisfaction: A multilevel analysis. *School Effectiveness and School Improvement, 31*(4), 641–659.
Ma, X., & MacMillan, R. B. (1999). Influences of workplace conditions on teachers' job satisfaction. *The Journal of Educational Research, 93*(1), 39–47.
Martin, M. O., von Davier, M., & Mullis, I. V. (2020). *Methods and procedures: TIMSS 2019 technical report*. International Association for the Evaluation of Educational Achievement.
McCarthy, C. J., Lambert, R. G., O'Donnell, M., & Melendres, L. T. (2009). The relation of elementary teachers' experience, stress, and coping resources to burnout symptoms. *The Elementary School Journal, 109*(3), 282–300.
Menon, M. E., & Athanasoula-Reppa, A. (2011). Job satisfaction among secondary school teachers: The role of gender and experience. *School Leadership & Management, 31*(5), 435–450.
Mertler, C. A. (2002). Job satisfaction and perception of motivation among middle and high school teachers. *American Secondary Education*, 43–53.
Moorman, R. H. (1993). The influence of cognitive and affective based job satisfaction measures on the relationship between satisfaction and organizational citizenship behavior. *Human Relations, 46*(6), 759–776.
Mostafa, T., & Pal, S. (2018). Science teachers' satisfaction: Evidence from the PISA 2015 teacher survey. *OECD education working*. OECD Publishing.
Muthen, B., & Muthen, L. (2019). *Mplus (Version 8.4) [Computer software]*.
National Foundation for Educational Research (NFER). (2022). *Teacher autonomy: How does it relate to job satisfaction and retention?* Retrieved from ⟨https://www.nfer.ac.uk/publications/teacher-autonomy-how-does-it-relate-to-job-satisfaction-and-retention⟩.
OECD. (2013). *How's life? 2013: Measuring well-being*. Paris: OECD Publishing. https://doi.org/10.1787/9789264201392-en
OECD. (2014b). *TALIS 2013 technical report*. OECD. Available at: ⟨http://www.oecd.org/education/school/TALIS-technical-report-2013.pdf⟩ accessed 1.3.20.
Olsen, A., & Huang, F. (2019). Teacher job satisfaction by principal support and teacher cooperation: Results from the schools and staffing survey. *Education Policy Analysis Archives, 27*, 11-11.

Organisation for Economic Co-operation and Development (OECD). (2020). *TALIS 2018 results (Volume I): Teachers and school leaders as lifelong learners*. OECD Publishing. https://doi.org/10.1787/1d0bc92a-en

Pepe, A., Addimando, L., & Veronese, G. (2017). Measuring teacher job satisfaction: Assessing invariance in the teacher job satisfaction scale (TJSS) across six countries. *Europe's journal of psychology, 13*(3), 396.

Perryman, J., & Calvert, G. (2020). What motivates people to teach, and why do they leave? Accountability, performativity and teacher retention. *British Journal of Educational Studies, 68*(1), 3–23.

R Core Team (2019). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. (Retrieved from: ⟨https://www.R-project.org/⟩).

Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal, 50*(1), 4–36.

Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural and Healthcare Research, 2*(4), 320–332.

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5-12 (BETA). *Journal of Statistical Software, 48*(2), 1–36.

Rutkowski, L., & Svetina, D. (2014). Assessing the hypothesis of measurement invariance in the context of large-scale international surveys. *Educational and Psychological Measurement, 74*(1), 31–57.

Santoro, D. A. (2021). *Demoralized: Why teachers leave the profession they love and how they can stay*. Harvard Education Press.

Schirle, L., Just, A., & Sälzer, C. (2024). Too busy to read, too important to ignore: How teachers manage to read work-related literature in their day-to-day work. *Education Sciences, 14*(12), 1296.

Schleicher, A. (2018). *World class: How to build a 21st-century school system*. OECD Publishing.

Shields, C. M. (2017). *Transformative leadership in education: Equitable and socially just change in an uncertain and complex world*. Routledge.

Sims, S. (2017). *TALIS 2013: Working conditions, teacher job satisfaction and retention (Department for Education Statistical Working Paper)*. London: Department of Education.

Sims, S. (2018). *Essays on the recruitment and retention of teachers* (Doctoral dissertation). University College London.

Sims, S. (2020). Modelling the relationships between teacher working conditions, job satisfaction and workplace mobility. *British Educational Research Journal, 46*(2), 301–320.

Sims, S., & Jerrim, J. (2020). *TALIS 2018: Teacher Working Conditions, Turnover and Attrition. Statistical Working Paper*. UK Department for Education. Castle View House East Lane, Runcorn, Cheshire, WA7 2GJ, UK.

Skaalvik, E. M., & Skaalvik, S. (2011). Teacher job satisfaction and motivation to leave the teaching profession: Relations with school context, feeling of belonging, and emotional exhaustion. *Teaching and Teacher Education, 27*(6), 1029–1038.

Skaalvik, E. M., & Skaalvik, S. (2015). Job satisfaction, stress and coping strategies in the teaching profession–What do teachers say? *International Education Studies, 8*(3), 181–192.

Skaalvik, E. M., & Skaalvik, S. (2016). Teacher stress and teacher self-efficacy as predictors of engagement, emotional exhaustion, and motivation to leave the teaching profession. *Creative Education, 7*(13), 1785.

Stride, C., Wall, T. D., & Catley, N. (2007). *Measures of job satisfaction, organizational commitment, mental health and job-related well-being: A benchmarking manual* (2nd ed.). New York, NY: John Wiley.

Toropova, A., Myrberg, E., & Johansson, S. (2021). Teacher job satisfaction: The importance of school working conditions and teacher characteristics. *Educational Review, 73*(1), 71–97.

Viac, C., & Fraser, P. (2020). Teachers' well-being: A framework for data collection and analysis. *OECD education working papers, No. 213*. Paris: OECD Publishing. https://doi.org/10.1787/c36fc9d3-en

Wang, K., Li, Y., Luo, W., & Zhang, S. (2020). Selected factors contributing to teacher job satisfaction: A quantitative investigation using 2013 TALIS data. *Leadership and Policy in Schools, 19*(3), 512–532.

Weiner, G. (2006). The nation strikes back: Recent influences on teacher education in Europe. *Hitotsubashi Journal of Social Studies, 38*(1), 79–88.