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Classroom Disruption and Teacher Workplace Well-Being in Uzbekistan: The Mediating Role of Behaviour-Related Stress in TALIS 2024

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Abstract

Background.

Classroom disruption is among the most consistently reported sources of teacher stress internationally, yet the mechanism linking it to teacher workplace well-being remains underspecified, particularly outside Western contexts.

Objective.

Drawing on the Job Demands–Resources model and Conservation of Resources theory, this study tested student-behaviour-related stress as a statistical mediator between perceived classroom disruption and teacher workplace well-being among lower-secondary teachers in Uzbekistan, using the OECD's Teaching and Learning International Survey (TALIS 2024).

Methods.

Data came from the Uzbekistan TALIS 2024 teacher sample (full sample N = 4,431). Well-being was operationalised using TALIS's stress-oriented T4WELS scale (higher scores indicate greater stress, lower well-being). Because TALIS 2024 used a rotated questionnaire design, the predictor and mediator were jointly observed for a smaller complete-case sample (N = 1,466). Survey-weighted regression-based mediation analysis used the final teacher weight and Fay's Balanced Repeated Replication (BRR) standard errors (100 replicate weights), with robustness checks for gender, experience, and self-efficacy, and tests of whether experience or self-efficacy moderated the disruption–stress association.

Results.

Student-behaviour-related stress supported a statistically significant indirect pathway linking disruption with workplace well-being (indirect effect = 0.082, 95% CI [0.057, 0.106]), accounting for 22.5% of the estimated total association; the direct path remained significant, indicating a partial rather than full indirect pathway. No significant evidence of moderation by self-efficacy or teaching experience was detected.

Conclusions.

Findings extend JD-R and COR theorising to a Central Asian, post-Soviet context and provide a transparent, design-consistent methodological template — accounting for TALIS 2024's rotated-questionnaire missingness and complex sample design — that other researchers analysing Central Asian

TALIS 2024 sub-samples can adapt. Because the data are cross-sectional, findings describe statistical association rather than a demonstrated causal sequence.

1. Introduction

A central question in occupational and educational psychology is not simply *whether* an environmental job demand affects employee well-being, but *how* — through which psychological process an external demand comes to be experienced as internal strain. For teachers, one of the most salient classroom-level demands is student behavioural disruption, and a substantial body of psychological research links such disruption to elevated occupational stress and, ultimately, poorer well-being (Tuxford & Bradley, 2015). Yet establishing that disruption correlates with poorer well-being does not, on its own, specify the psychological mechanism connecting the two. The present study addresses that mechanism directly: it tests whether teachers' subjective, behaviour-related stress response to classroom disruption — rather than disruption itself — is the proximal psychological pathway through which a classroom-level demand may be associated with broader occupational well-being.

Teacher occupational well-being has become a central concern for education systems worldwide, not only as an end in itself but as a determinant of instructional quality, student outcomes, and workforce retention. The fourth cycle of the OECD's Teaching and Learning International Survey (TALIS 2024) gathered data from approximately 280,000 teachers and school leaders across 55 education systems, making it the largest cross-national source of evidence on teachers' working conditions currently available (OECD, 2025a). Among the working conditions TALIS tracks, classroom disruption and the demands of managing student behaviour recur as some of the most consistently reported stressors across participating systems (OECD, 2025a).

Uzbekistan's TALIS 2024 results illustrate this pattern concretely. Uzbekistani teachers report comparatively favourable overall indicators: only 8% describe experiencing stress "a lot" in their work, well below the OECD average of 19%, and 95% report overall job satisfaction, exceeding the OECD average of 89% (OECD, 2025b; Education GPS, 2025). Yet maintaining classroom discipline is by far the most frequently cited source of stress among Uzbekistani teachers, reported by 55% of respondents (OECD, 2025b). This sits alongside evidence that roughly one in five teachers across TALIS systems report significant classroom disorder, and that time spent maintaining discipline has risen since 2018 (OECD, 2025a). Low aggregate strain alongside a dominant, discipline-specific stressor is a pattern that descriptive statistics alone cannot explain; it calls for a model that specifies *how* classroom disruption is thought to translate into diminished well-being, and *through what psychological mechanism* — the question this study was designed to answer.

The present study addresses this gap by testing student-behaviour-related stress as a statistical mediating pathway linking teachers' perceived classroom disruption to their workplace well-being, using the TALIS 2024 Uzbekistan teacher sample. OECD's own reporting has descriptively linked discipline problems, lesson fulfilment, and well-being (OECD, 2025a), and comparable TALIS-based work exists for

neighbouring Kazakhstan using the 2018 cycle (see Section 1.3). But to the best of our knowledge, no published study has yet formally specified and tested a mediation model of this pathway for Uzbekistan, nor used the TALIS 2024 cycle to do so. This study aims to help close that gap and, in doing so, to offer psychological evidence that can inform teacher-support and classroom-management policy in the Uzbekistani education system.

1.1. The Job Demands–Resources Model

The Job Demands–Resources (JD-R) model (Demerouti et al., 2001; Bakker & Demerouti, 2007) provides the primary theoretical lens for this study. The model proposes that every occupation can be characterised by *job demands*, which require sustained effort and carry physiological and psychological costs, and *job resources*, which aid in achieving work goals and stimulate engagement. Demands initiate a *health-impairment process* in which chronic exposure depletes energy and produces strain (Bakker & Demerouti, 2017).

Classroom disruption functions as a job demand specific to the teaching profession. Empirical work applying the JD-R model to teachers has repeatedly identified disruptive student behaviour as one of the demands most strongly associated with strain (Collie, 2023; Dicke et al., 2018). Dicke et al. (2018), in a large longitudinal study of beginning teachers, found that classroom disturbances predicted emotional exhaustion directly, while self-efficacy in classroom management buffered this relationship — evidence that the demand–strain pathway operates specifically through classroom-management difficulties. A recent systematic review similarly identifies student-related challenges, including disruptive behaviour, as among the most frequently reported demands linked to elevated stress and diminished well-being (Moens et al., 2026).

The present study operationalises this pathway by treating perceived classroom disruption (TALIS scale T4CLSDIS) as the job demand, student-behaviour-related stress (T4STBEH) as the proximal strain response it provokes, and overall workplace well-being (T4WELS) as the downstream outcome. Behaviour-related stress is thus specified not as a parallel indicator of strain, but as the *mechanism* through which disruption is associated with well-being. The JD-R model, however, is chiefly a *structural* account: it classifies disruption as a demand and specifies that demands provoke strain, without elaborating the psychological process by which repeated exposure accumulates into a stable stress response. For that process account, this study turns to Conservation of Resources theory.

1.2. Conservation of Resources Theory as a Complementary Lens

Conservation of Resources (COR) theory (Hobfoll, 1989, 2001) complements the JD-R model by explaining *why* demand exposure accumulates into strain over time — precisely the process JD-R leaves unspecified. COR theory holds that individuals are motivated to acquire, retain, and protect resources they value, and that stress arises when resources are threatened, lost, or invested without adequate return (Hobfoll, 1989). Because resource loss is theorised to be disproportionately more impactful than

resource gain, repeated classroom disruptions can be understood as successive threats to a teacher's instructional time, sense of control, and emotional reserves — threats that accumulate rather than reset between lessons, consistent with a self-reinforcing cycle in which teacher stress increases reactive management responses, which in turn escalate disruption and produce further stress (Jennings & Greenberg, 2009).

In short, the two theories are combined because each supplies what the other lacks: JD-R supplies the structural claim that disruption functions as a job demand capable of provoking strain, while COR supplies the process account of *why* that demand becomes strain — a resource-depletion process that is self-perpetuating rather than self-correcting. This positions student-behaviour-related stress not as a parallel outcome alongside well-being, but as the *indicator of resource depletion* that carries the demand's effect forward. Neither theory alone generates the specific mediation hypothesis this study tests; it is their combination that does.

1.3. Classroom Disruption, Stress, and Teacher Well-Being: The Regional Evidence

Comparative TALIS-based research from the Central Asian region remains limited but growing. Using TALIS 2018 data from Kazakhstan, Nurmukhamed et al. (2025) modelled teacher-reported stress as a predictor of turnover intentions among 6,566 teachers nested in 331 schools, finding that reform- and policy-related stress significantly predicted intention to leave the profession. That study's stress construct centred on educational reform rather than classroom behaviour specifically, but it still establishes a methodological precedent for TALIS-based, Central-Asia-specific teacher-stress modelling, and confirms that stress functions as a consequential variable in this regional context, not merely a descriptive one. At the level of TALIS-based well-being modelling more broadly, recent work has used TALIS data to model latent profiles of teacher satisfaction and well-being (Edara et al., 2025) and to test school climate as a predictor of job satisfaction and well-being using TALIS 2018 data from Central and Eastern Europe, a region with some structural similarities to Uzbekistan's post-Soviet education system.

Domestically, existing Uzbekistan-focused research on teacher stress has concentrated on higher education faculty instead of general (K-12) school teachers, and has not, to date, tested a formal mediation model linking classroom-level demands to well-being through a validated stress mechanism.

However, descriptive evidence on the prevalence of classroom discipline-related stress does not, by itself, explain how classroom disruption may be associated with broader dimensions of teacher workplace well-being. Existing research has established links between student behavioural difficulties, teacher stress, and occupational well-being, but less attention has been given to the psychological pathway through which perceived classroom disruption may translate into broader workplace stress. In particular, student-behaviour-related stress may represent an intermediate process through which classroom disruption is associated with teachers' overall workplace well-being.

This gap is particularly relevant in Uzbekistan, where TALIS 2024 provides new nationally representative evidence on teachers' working conditions but where empirical research examining the mechanisms underlying teacher stress remains limited. Although OECD reporting describes levels of classroom discipline-related stress and overall teacher well-being, these descriptive findings do not formally test whether behaviour-related stress statistically accounts for the association between classroom disruption and workplace well-being.

Accordingly, the present study addresses three related gaps. First, it provides Uzbekistan-specific evidence on the association between perceived classroom disruption and teacher workplace well-being. Second, it examines whether student-behaviour-related stress constitutes a statistically significant indirect pathway linking classroom disruption with workplace well-being. Third, it assesses whether classroom-management self-efficacy and teaching experience alter the strength of the disruption–stress association.

1.4. The Present Study

By testing these relationships using TALIS 2024 data from lower-secondary teachers in Uzbekistan, the study extends descriptive evidence on teacher working conditions into a theoretically specified mediation framework grounded in the Job Demands–Resources model and Conservation of Resources theory. Integrating the two, this study proposes that the statistical association between classroom disruption and teacher well-being runs substantially *through* the stress associated with managing student behaviour, instead of through a direct, unmediated pathway alone.

This proposal follows the standard logic of statistical mediation, in which a predictor (X) is hypothesised to influence an outcome (Y) partly or wholly through an intervening variable (M): X affects M (the *a*-path), M affects Y (the *b*-path), and the product of these two paths (a × b) constitutes the indirect effect through which X is associated with Y. H1 and H2 below correspond to the *a*-path and *b*-path respectively; H3 corresponds to the indirect effect itself, the specific quantity a mediation hypothesis exists to test. Formally:

- **H1 (a -path)**: Perceived classroom disruption is positively associated with student-behaviour-related stress.
- **H2 (b -path)**: Student-behaviour-related stress is positively associated with T4WELS scores, indicating greater workplace stress and lower workplace well-being.
- **H3 (indirect effect, a × b)**: Student-behaviour-related stress constitutes a statistically significant indirect pathway between perceived classroom disruption and teacher workplace well-being.
- **H4a (exploratory moderation hypothesis; moderator of the a-path)**: Self-efficacy in classroom management moderates the association between classroom disruption and student-behaviour-related stress, consistent with the buffering role of personal resources identified in prior JD-R research (Dicke et al., 2018).

- **H4b (exploratory moderation hypothesis; moderator of the a-path)**: Teaching experience moderates the association between classroom disruption and student-behaviour-related stress.

H4a and H4b are labelled *exploratory* because, unlike H1–H3, they are not direct derivations of the JD-R/COR integration proposed above; they test a plausible but secondary question — whether the strength of the demand–strain link varies across teachers — raised by prior individual-differences research (Dicke et al., 2018) rather than by the core theoretical model itself.

Testing this model on the Uzbekistan TALIS 2024 teacher sample contributes (a) Uzbekistan-specific evidence on a globally-used theoretical mechanism, (b) a substantive extension of descriptive OECD reporting into formal mediation testing, and (c) a methodological template for secondary, design-consistent analysis of TALIS 2024 data that other Central Asian researchers can adapt to their own national sub-samples.

2. Methods

2.1. Research Design

This study employs a cross-sectional, correlational design based on secondary analysis of the Organisation for Economic Co-operation and Development's (OECD) Teaching and Learning International Survey (TALIS) 2024 database. A mediation model was specified in which teachers' perceived classroom disruption predicts workplace well-being, with student-behaviour-related stress tested as the mediating mechanism. Consistent with the non-experimental, cross-sectional nature of TALIS, all relationships are interpreted as statistical associations rather than causal effects (OECD, 2025a).

2.2. Data Source and Participants

Data were drawn from the TALIS 2024 core survey, International Standard Classification of Education (ISCED) Level 2 (lower secondary education) teacher questionnaire, which constitutes the default target population surveyed by all 55 participating education systems, including Uzbekistan (OECD, 2025a). TALIS employed a two-stage stratified cluster sampling design: schools were sampled with probability proportional to size, and teachers were subsequently sampled within participating schools using an implicitly stratified probabilistic procedure (OECD, 2025a). Data collection in Uzbekistan took place between March and May 2024, in line with the Northern Hemisphere collection window.

The achieved Uzbekistan sample comprised **N = 4,431 lower-secondary teachers nested within 210 schools** (M = 21.1 teachers per school). The sample was assigned a rating of "Good" (unrestricted reporting) under the OECD's data adjudication framework, indicating that participation-rate and non-response criteria were satisfied without restriction (OECD, 2025a). Of the participating teachers, 64.5% (n = 2,857) identified as female and 35.5% (n = 1,571) as male, with three teachers not reporting gender. This composition closely mirrors the feminized profile typical of lower-secondary teaching workforces internationally.

2.3. Measures

TALIS 2024 questionnaire items were combined into standardized scale scores using multiple-group confirmatory factor analysis (MGCFA), calibrated on pooled international data and standardized such that a score of 10 corresponds to the scale midpoint and the standard deviation equals 2 (OECD, 2025a). Item-level content, factor loadings, and reliability estimates for each scale are documented in the TALIS 2024 Technical Report (OECD, forthcoming, Chap. 11). Three previously validated scales served as the core model variables:

Construct	TALIS scale variable	Role in model
Perceived classroom disruption	T4CLSDIS	Independent variable (X)
Student-behaviour-related stress	T4STBEH	Mediator (M)
Workplace well-being and stress (overall)	T4WELS	Outcome (Y)

Note. T4WELS is scored such that higher values indicate *greater* stress and *lower* well-being. The scale runs in the stress direction, not the well-being direction (empirical confirmation and full discussion in Section 3, polarity note).

Two supplementary outcome/covariate scales — workload stress (T4WLOADT) and overall job satisfaction (T4JOBSAT) — are retained for sensitivity analyses and discriminant-validity checks. Self-reported gender (TT4G01), grouped total teaching experience (T4TYEXPTT), and self-efficacy in classroom management (T4SECLS) are included as covariates, consistent with prior TALIS-based stress research indicating that experience and self-efficacy condition teachers' stress responses to classroom disruption (OECD, 2025a).

2.4. Missing Data

TALIS 2024 introduced a rotated teacher questionnaire design in which no single teacher answered all questionnaire items. Instead, items of standard priority, including T4CLSDIS and T4STBEH, were administered to two of three rotated questionnaire forms (OECD, 2025a). Consequently, missingness on these items is **missing by design**: it is a direct, mechanical consequence of the survey's form-assignment procedure, not of teacher non-response, attrition, or refusal. Inspection of the Uzbekistan data file confirmed this pattern: T4CLSDIS was available for 2,942 teachers (66.4%) and T4STBEH for 2,943 teachers (66.4%). Critically, cross-tabulation revealed that the two forms carrying these items overlapped only partially: **the two constructs were jointly observed for 1,466 teachers (33.1% of the full sample)**. The outcome variable, T4WELS, was administered on a common (high-priority) form and was consequently available for nearly the entire sample (n = 4,418; 99.7%).

Per OECD's documented procedure, questionnaire forms are assigned to teachers systematically (e.g., by rotation through a fixed sequence) at the point of survey administration, before any substantive responses are recorded (OECD, 2025a). It follows from this pre-response, systematic assignment

procedure that form assignment cannot be a function of a teacher's classroom disruption, stress, or well-being levels, since these are not yet known at the point of assignment. This design-based missingness is unrelated to substantive teacher responses by construction and therefore does not arise from conventional non-response mechanisms (non-response, attrition, selective refusal). We therefore describe the missingness primarily as **missing by design** rather than relying on a missing-completely-at-random (MCAR) assumption; the two concepts are related, but "missing by design" is the more defensible and more precisely applicable description of the actual mechanism at work here. Restricting the mediation analysis to the jointly observed subsample nevertheless reduces the effective sample size and may limit generalisability. The mediation model (X → M → Y) is therefore estimated on a complete-case analytic sample of **N ≈ 1,466 teachers**. Although this analytic sample remained substantial for the regression models estimated, the reduction in jointly observed cases reduces precision and may limit the detection of smaller interaction effects, a point revisited in the moderation results (Section 3.4) and Limitations (Section 4.4). This sample-size reduction, its cause, and its implications for statistical power and generalisability are reported transparently alongside the results.

2.5. Analytic Strategy

Because TALIS employed a complex, multi-stage cluster sample, all analyses account for unequal selection probabilities and clustering: the final teacher weight (TCHWGT) is used for point estimates, and Fay's Balanced Repeated Replication (Fay's BRR; 100 replicate weights, TRWGT1–TRWGT100; k = 0.5, the value TALIS 2024 uses for all participating systems, OECD, 2023) is used for standard errors, implemented in R using a custom, base-R implementation of the Fay's BRR variance formula (rather than a dedicated package) to keep the estimation procedure fully transparent and independently verifiable; the code is provided in Additional file 2. The published TALIS teacher weights and replicate weights were retained for the complete-case analytic sample (N = 1,466) used for the mediation model; no post-stratification or recalibration of the weights was performed after this design-based restriction. Full software and estimation-platform detail is provided in Additional file 1.

The hypothesized mediation model is estimated using **survey-weighted regression-based mediation analysis**: the *a*-path (disruption → stress) and *b*-path (stress → well-being, controlling for disruption) are each estimated as a separate teacher-weighted linear regression, with the indirect effect obtained as their product (a × b), rather than as a jointly estimated structural equation model; the rationale for this choice is detailed in Additional file 1. Consistent with current mediation-analysis practice (MacKinnon, 2008), the focus throughout is on the magnitude and confidence interval of the indirect effect itself, rather than on the sequential significance-testing logic of the earlier causal-steps approach.

Inference for the indirect effect. The indirect effect's standard error is obtained via Fay's BRR replication of the full two-equation estimation procedure across all 100 replicate weights, yielding a 95% confidence interval via normal approximation (point estimate ± 1.96 × SE); the full replication procedure is detailed in Additional file 1. Covariates (gender, experience, self-efficacy) are entered as controls in both path equations for the robustness-check model reported in Section 3.3, and multi-group comparisons (e.g., by experience band) are considered as exploratory extensions in Section 3.4. All reported estimates and

their standard errors reflect the complex sample design; unweighted or design-naïve estimates are not reported as primary results.

2.6. Use of Large Language Models

During the preparation of this manuscript, the authors used Claude (Anthropic), an AI language model, to assist with editing. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

3. Results

Note on scale polarity. The T4WELS scale, labelled "Workplace well-being and stress, overall" in the TALIS 2024 documentation, is coded such that higher values indicate *greater* stress and *lower* well-being. This direction was confirmed empirically: T4WELS correlates negatively with overall job satisfaction (T4JOBSAT, r = − .36), satisfaction with the work environment (T4JSENVT, r = − .27), and satisfaction with the profession (T4JSPROT, r = − .37), and positively with workload stress (T4WLOADT, r = .37) — a pattern consistent only under the stress-polarity interpretation. All interpretations below follow this direction.

3.1. Descriptive Statistics

Table 1 presents weighted descriptive statistics for the core study variables among Uzbekistan's lower-secondary teachers. Consistent with the rotated questionnaire design described in Section 2.4, sample sizes vary across variables.

Table 1
Weighted Descriptive Statistics for Core Study Variables

Variable	n	M	SD
Perceived classroom disruption (T4CLSDIS)	2,942	7.65	1.95
Student-behaviour-related stress (T4STBEH)	2,943	9.52	2.07
Workplace well-being and stress, overall (T4WELS)	4,418	8.76	2.13
Self-efficacy in classroom management (T4SECLS)	4,429	13.73	1.88

Note. Estimates are weighted using the final teacher weight (TCHWGT) and reflect the TALIS 2024 international scale metric (item midpoint = 10, SD = 2, calibrated on the pooled international sample). T4WELS is scored such that higher values indicate *greater* stress and *lower* well-being (see polarity note above).

Table 2 reports weighted bivariate correlations among the core variables.

Table 2

Weighted Correlations Among Core Study Variables

1. Classroom disruption	**1**	**2**	**3**
	—		
2. Behaviour-related stress	.257	—	
3. Well-being (T4WELS, overall)	.352	.346	—
4. Self-efficacy (classroom mgmt.)	−.132	−.015	−.073

Note. n = 1,466 for the disruption–stress correlation (jointly observed cases only); n = 2,935–4,416 for other pairs, reflecting the rotated design. All correlations are in the theoretically expected direction under the stress-polarity interpretation of T4WELS (see caveat above): classroom disruption and behaviour-related stress are both positively associated with the well-being outcome, and self-efficacy is weakly negatively associated with all three.

3.2. Test of the Hypothesized Mediation Model (H1–H3)

The hypothesized model was estimated using teacher-weighted linear regression with Fay's Balanced Repeated Replication (BRR) standard errors (k = 0.5; 100 replicates), on the analytic sample of teachers with complete data on classroom disruption, behaviour-related stress, and well-being (N = 1,466; see Section 2.4). Results are reported in Table 3.

Table 3

Unstandardized Path Coefficients for the Mediation Model (N = 1,466)

Path	**b**	**SE**	**95% CI**	**p**
a: Disruption → Behaviour-related stress	0.275	0.034	[0.209, 0.342]	< .001
b: Behaviour-related stress → Well-being	0.297	0.027	[0.244, 0.349]	< .001
c': Disruption → Well-being (direct)	0.282	0.029	[0.226, 0.338]	< .001
a × b: Indirect effect	0.082	0.013	[0.057, 0.106]	< .001
c: Total effect (a×b + c')	0.364	—	—	—

Note. Standard errors computed via Fay's BRR (100 replicate weights). CI = confidence interval (normal-approximation, ± 1.96 × SE). Positive coefficients on paths *b*, *c'*, and the indirect effect indicate that higher disruption/stress is associated with a *higher* T4WELS score — i.e., *greater* stress and *lower* well-being, not better well-being (see polarity note, Section 3).

Hypothesis 1

was supported: teachers who perceived greater classroom disruption reported significantly higher student-behaviour-related stress (a = 0.275, p < .001). Hypothesis 2 was supported: behaviour-related stress was significantly and positively associated with T4WELS scores, indicating greater workplace

stress and lower workplace well-being, controlling for disruption (b = 0.297, p < .001). Hypothesis 3 was supported: student-behaviour-related stress constituted a statistically significant indirect pathway between classroom disruption and workplace well-being (indirect = 0.082, 95% CI [0.057, 0.106]), indicating a **statistically significant partial indirect pathway** — the direct path (c' = 0.282) remained significant alongside the indirect path. The indirect pathway accounted for approximately **22.5%** of the total effect of classroom disruption on the well-being outcome (0.082 / 0.364).

3.3. Robustness Check: Model With Covariates

To assess whether the mediation pathway held after accounting for teacher gender, years of teaching experience, and self-efficacy in classroom management, the model was re-estimated with these three covariates entered into both the *a*-path and *b*-path equations (N = 1,429; Table 4).

Table 4
Mediation Path Coefficients Controlling for Gender, Experience, and Self-Efficacy (N = 1,429)

Path	b	SE	95% CI	p
a (controlled)	0.277	0.035	[0.209, 0.345]	< .001
b (controlled)	0.297	0.027	[0.244, 0.349]	< .001
c' (controlled)	0.279	0.030	[0.221, 0.337]	< .001
a × b (controlled)	0.082	0.013	[0.057, 0.108]	< .001

Note. As in Table 3, positive coefficients indicate association with a *higher* T4WELS score (greater stress, lower well-being).

The pattern and magnitude of all path coefficients were virtually unchanged after the introduction of covariates, indicating that the estimated indirect pathway was substantively unchanged after adjustment for gender, teaching experience, and self-efficacy.

3.4. Test of Moderation on the Disruption–Stress Association (H4a, H4b)

H4a and H4b proposed that the strength of the *a*-path — the association between classroom disruption and student-behaviour-related stress — would vary by teachers' self-efficacy in classroom management (H4a) and by years of teaching experience (H4b), consistent with the resource-buffering role these variables play in prior JD-R research (Dicke et al., 2018). Note that these are tests of moderation on the *a*-path specifically, not a full moderated-mediation model with conditional indirect effects; the conceptual distinction is addressed further in Section 4.2. Two interaction terms — Disruption × Self-Efficacy (H4a) and Disruption × Experience (H4b) — were each added to the *a*-path equation and tested with Fay's BRR standard errors (Table 5).

Table 5
Tests of Moderation on the Disruption–Stress Association (H4a, H4b)

Interaction term	b	SE	95% CI	p
H4a: Disruption × Self-efficacy → Stress	0.002	0.014	[− 0.025, 0.030]	.858
H4b: Disruption × Experience → Stress	0.008	0.031	[− 0.053, 0.068]	.807

Neither interaction term was statistically significant. **No statistically significant evidence of moderation was detected for either H4a or H4b**: the strength of the association between classroom disruption and behaviour-related stress did not vary meaningfully by teachers' self-efficacy in classroom management or by their years of teaching experience in this sample. This absence of a significant interaction does not itself establish that no such moderation exists in the population; it indicates only that the present sample did not provide evidence for one. An exploratory, non-formally-tested breakdown of the indirect effect by experience-group subsample is reported in Additional file 1 (Table S1); given the null interaction test, the apparent variability across subsamples there is best interpreted as sampling variability rather than a genuine moderation effect.

3.5. Summary of Hypothesis Tests

Table 6
Summary of Hypothesis Tests

Hypothesis	Result
H1: Disruption → Behaviour-related stress (positive)	Supported
H2: Behaviour-related stress → T4WELS score (positive; i.e., greater stress/lower well-being)	Supported
H3: Behaviour-related stress constitutes a statistically significant indirect pathway, Disruption → Well-being	Supported (statistically significant partial indirect pathway, 22.5% of the estimated total association)
H4a: Self-efficacy moderates the disruption–stress (*a*-path) association	No significant evidence detected
H4b: Teaching experience moderates the disruption–stress (*a*-path) association	No significant evidence detected

4. Discussion

4.1. The Mediating Role of Student-Behaviour-Related Stress

This study set out to test whether student-behaviour-related stress constitutes a statistically significant indirect pathway in the association between perceived classroom disruption and teacher workplace well-

being among lower-secondary teachers in Uzbekistan, using the Uzbekistan TALIS 2024 teacher sample (full sample N = 4,431; complete-case mediation analytic sample N = 1,466). The results supported all three core hypotheses. Teachers who perceived greater classroom disruption reported significantly higher behaviour-related stress (H1), which in turn was significantly associated with higher T4WELS scores, indicating greater workplace stress and lower well-being (H2). This stress pathway constituted a statistically significant indirect pathway between disruption and well-being (H3), accounting for 22.5% of the estimated total association, and this pattern remained essentially unchanged after controlling for gender, teaching experience, and self-efficacy (Section 3.3) — addressing the plausible concern that one of these covariates, rather than behaviour-related stress specifically, might account for the observed association. The direct path from disruption to well-being remained significant even after accounting for the mediator, indicating that this specific stress appraisal is not the only pathway through which classroom disruption is associated with teacher well-being. Other unmeasured channels are plausible candidates, such as lost instructional time, disrupted lesson pacing, or diminished perceived teaching efficacy, all of which OECD's broader reporting has flagged (OECD, 2025a), though none of these were directly tested here.

These findings extend the largely descriptive OECD reporting on classroom discipline and teacher well-being (OECD, 2025a, 2025b) into a formally specified and empirically tested statistical model. They also fit the health-impairment pathway central to the JD-R model (Bakker & Demerouti, 2017; Demerouti et al., 2001): a classroom-specific job demand (disruption) is associated with a proximal strain response (behaviour-related stress) that is, in turn, associated with a broader well-being outcome. As the data are cross-sectional, this sequence reflects the hypothesized theoretical ordering rather than a causally demonstrated one, a point developed further in Section 4.4. The finding also aligns with COR-theoretic accounts in which repeated, unresolved classroom demands function as a form of resource threat that compounds over the school day and week, instead of dissipating between isolated incidents (Hobfoll, 1989, 2001; Jennings & Greenberg, 2009).

Beyond its regional contribution, this finding speaks to a broader question in occupational and educational psychology: whether classroom-level job demands are associated with occupational strain directly, or through an identifiable intervening appraisal process. Consistent with appraisal-based accounts of teacher stress, in which emotionally demanding classroom situations are associated with exhaustion through teachers' subjective experience of the demand rather than through the demand's objective features alone (Tuxford & Bradley, 2015), the present results indicate that a substantial share of the disruption–well-being association is statistically routed through teachers' behaviour-specific stress response, rather than operating as an undifferentiated demand–outcome link. This is consistent with recent psychological work modelling teacher well-being through complementary variable- and person-centered applications of JD-R theory (Granziera et al., 2022): the present study specifies and tests one such variable-centered pathway using a large-scale survey sample, in a cultural and educational context in which this pathway had not previously been examined.

4.2. Why Was No Evidence of Moderation by Self-Efficacy or Experience Found? (H4a, H4b)

Contrary to H4a and H4b, neither self-efficacy in classroom management nor years of teaching experience showed a statistically significant interaction with classroom disruption in predicting behaviour-related stress (the *a*-path). This null result does not establish that no such moderation exists in the population, only that the present sample did not provide statistical evidence for one. A conceptual clarification is warranted here: H4a and H4b as tested concern moderation of the disruption–stress association itself, not a full moderated-mediation model with conditional indirect effects across levels of the moderator. The two are related but distinct. The present analysis indicates that the *strength of the demand–strain link*, in this sample, did not detectably depend on self-efficacy or experience, which is sufficient to conclude that any resource-buffering effect these variables might have on the broader mediation pathway would have to operate elsewhere (e.g., on the *b*-path), not at the point where disruption first translates into stress. This null result contrasts with Dicke et al.'s (2018) longitudinal finding that classroom-management self-efficacy buffered the demand–strain relationship among beginning German teachers. Several non-mutually-exclusive explanations are worth considering.

First, Dicke et al. (2018) modelled buffering *longitudinally*, across a multi-year window in which self-efficacy could plausibly accumulate or erode alongside changing classroom demands. The present study is cross-sectional, capturing a single self-report snapshot that may be less suited to detecting a dynamic buffering process. Second, Uzbekistani teachers in this sample reported comparatively high self-efficacy in classroom management overall (M = 13.73 on the international T4SECLS metric, where the calibration midpoint is 10), suggesting relatively high levels of self-efficacy in classroom management in this sample. A sample concentrated at the high end of a resource variable offers less contrast between "low" and "high" self-efficacy teachers, which can attenuate the statistical power to detect an interaction even where a true buffering effect exists. Third, and more substantively, OECD's own cross-national analysis of TALIS 2024 notes a counter-intuitive regional pattern: in several education systems including Uzbekistan, Kazakhstan, Korea, Montenegro, Morocco, and North Macedonia, teachers with *higher* self-efficacy report certain sources of stress *more* often, not less (OECD, 2025a). This pattern is distinct from the present null finding but broadly consonant with it, and suggests that the resource-buffering logic of JD-R may not transfer uniformly across educational and cultural contexts.

One possible explanation, not directly tested here, is that school- and system-level resources may play a greater role than individual teacher resources in shaping responses to classroom disruption in this context (Hobfoll, 2001). Future research should therefore examine organisational resources such as principal support, disciplinary policy consistency, and peer collaboration.

4.3. Practical and Policy Implications

Three tentative implications follow from these results, offered with an important caveat: a mediated statistical association is not the same thing as an estimated intervention effect. The 22.5% mediated

share describes how the *observed cross-sectional association* decomposes statistically. It is not a forecast of how much teacher well-being would improve if disruption-related stress were reduced by a given amount, since that would require experimental or longitudinal evidence this study does not have. With that caveat, the pattern of results, a statistically robust indirect pathway alongside an even larger direct one, suggests that recommendations are best organised at two levels instead of treated as a single lever.

Individual level. The concentration of statistical association through the behaviour-related-stress pathway suggests that interventions targeting how teachers appraise and cope with disruption-related stress specifically, not teacher stress in general, are a theoretically motivated candidate worth testing, not a proven lever. Structured classroom-management training, particularly the kind that targets the appraisal and emotional-regulation component of managing disruptive behaviour (not only behavioural techniques), is a plausible candidate for such testing (cf. Jennings & Greenberg, 2009). Because classroom disruption is the variable most strongly associated with the stress response captured in this model, training that strengthens teachers' emotional intelligence and stress-regulation skills specifically in the context of managing student behaviour is a further candidate worth piloting and evaluating, without assuming its effectiveness a priori.

Systemic/structural level. Because the direct path (c') remained large and significant, the findings suggest that individual-level interventions alone may not address the broader association between classroom disruption and teacher well-being. Potential structural responses for future evaluation — not effects this study has tested — include a single, consistently enforced school-wide disciplinary policy, manageable class sizes and classroom workload, and adequate support staff for students with behavioural needs; such measures would, in principle, address the remaining portion of the estimated association that was not accounted for by the behaviour-related stress pathway (i.e., the direct path), and are a plausible priority for school administrations and the ministry of education to evaluate. Relatedly, the non-significant moderation by experience suggests that neither individual- nor systemic-level supports should be targeted narrowly at novice teachers: the association between disruption and stress in this sample was broadly similar across experience bands, indicating a need that cuts across career stage.

We reiterate that these are theoretically motivated candidates for future evaluation, not effects this study has demonstrated. Distinguishing statistical mediation from causal intervention effectiveness is essential before any of the above is adopted as policy.

4.4. Limitations

Several limitations qualify these conclusions. First, and most fundamentally, TALIS 2024 is a cross-sectional, self-report survey collected at a single time point. In line with OECD's own guidance (OECD, 2025a), **the temporal ordering implied by the mediation model (disruption → stress → well-being) cannot be established from these data**, and all associations reported here should be read as statistical, not causal. Reverse or reciprocal pathways cannot be ruled out with cross-sectional data — for example,

teacher stress eliciting more disruptive student responses, in line with the cyclical account in Jennings & Greenberg (2009), or well-being itself influencing how disruption is perceived and reported in the first place. The “mediation” terminology used throughout this manuscript should therefore be understood as describing a statistically consistent indirect pathway, not a demonstrated causal sequence. Second, the rotated questionnaire design reduced the analytic sample available for the joint disruption–stress model to N = 1,466 of the full 4,431 Uzbekistani teachers. While adequate for the models estimated, this limits statistical power for detecting smaller interaction effects, a relevant caveat for the null H4a/H4b findings in particular. Third, the mediator and outcome variables are both teacher self-reports collected in the same instrument, raising the possibility of common-method variance: a teacher’s general disposition toward negative affect, or their tendency to rate their own working conditions unfavourably, could inflate the association between behaviour-related stress and the well-being outcome independently of any true underlying relationship, since both are filtered through the same respondent’s momentary mood and self-report tendencies at the time of the survey. This is a structural feature of single-instrument, single-respondent survey designs generally, not one this study’s design can rule out. The reported associations may therefore be inflated by shared method variance, although the direction and magnitude of any such bias cannot be determined from the present design. Fourth, the study relies on pre-constructed, standardised scale scores instead of item-level latent-variable modelling. This is appropriate given the public-use file’s structure (Section 2.3), but it precludes examination of measurement invariance at the item level within the Uzbekistani sample specifically. Related to this, although TALIS scale scores are internationally calibrated using pooled cross-national data, the present study did not independently test measurement invariance or the cultural interpretation of the focal constructs (disruption, behaviour-related stress, well-being) within the Uzbek context specifically; cross-national calibration does not guarantee that these constructs are interpreted identically by Uzbekistani teachers as by the international reference sample. Finally, as a single-country analysis, these findings describe the Uzbekistani teaching workforce specifically and should not be generalised to other TALIS 2024 participants without direct comparative testing.

4.5. Directions for Future Research

Building on the null H4a/H4b findings, future work could test school- and system-level resources, such as principal instructional leadership, disciplinary policy consistency, and peer collaboration, as alternative or additional moderators of the disruption–stress pathway, in line with COR theory’s relational emphasis (Hobfoll, 2001). Longitudinal or panel extensions, should future TALIS cycles or complementary national data permit, would allow the buffering hypothesis to be tested under conditions closer to those in which it was originally supported (Dicke et al., 2018). Finally, replicating this model in Kazakhstan, the only other Central Asian TALIS 2024 participant, and in neighbouring former Soviet systems (e.g., Azerbaijan, Georgia), would clarify whether the mediation pathway identified here, and the absence of individual-level moderation, reflect a broader regional pattern or a feature specific to the Uzbekistani education system.

5. Conclusion

Classroom disruption is one of the most consistently reported sources of stress for teachers worldwide, and Uzbekistan is no exception. Maintaining classroom discipline is the single most frequently cited stressor among Uzbekistani lower-secondary teachers in TALIS 2024, even as the workforce reports comparatively low overall strain and high job satisfaction relative to the OECD average. This apparent tension motivated the present study's central question: not only *whether* classroom disruption relates to teacher workplace well-being, but *through what statistical mechanism*.

Grounded in the Job Demands–Resources model and Conservation of Resources theory, this study tested student-behaviour-related stress as a statistical mediating link between perceived classroom disruption and teacher workplace well-being, using the Uzbekistan TALIS 2024 teacher sample (full sample N = 4,431; complete-case mediation analytic sample N = 1,466). Three findings stand out. The hypothesized statistical indirect pathway was supported, and the estimated indirect effect was substantively unchanged after adjustment for gender, experience, and self-efficacy. The pathway was *partial*, not *full*: classroom disruption remained significantly associated with well-being independently of this specific stress pathway, so the mechanism modelled here is not the whole story. And, somewhat unexpectedly, neither self-efficacy in classroom management nor teaching experience moderated the strength of the disruption–stress link. The present findings do not provide evidence that these individual-level resources moderate this pathway in the Uzbekistani sample, despite prior evidence of buffering effects in Western European settings, pointing future inquiry toward school- and system-level resources instead.

These results make three contributions. Theoretically, they extend JD-R and COR frameworks, developed primarily in Western and East Asian systems, to a Central Asian, post-Soviet context where such formal testing has been largely absent. Empirically, they move OECD's own descriptive TALIS 2024 reporting on discipline, stress, and well-being into a formally specified, statistically tested mediation model using design-consistent estimation (Fay's BRR). Practically, the findings suggest that future policy and intervention research should consider both individual-level support and structural classroom conditions, rather than focusing exclusively on teacher-level resources such as self-efficacy.

As the most comprehensive cross-national dataset on teachers' working lives to date, TALIS 2024 offers Uzbekistan a valuable evidence base for education policy. This study contributes both a substantive finding and a transparent methodological template, including full accounting for the survey's rotated-questionnaire missingness and complex sample design, that other researchers working with Central Asian TALIS 2024 sub-samples can adapt and build upon.

Declarations

Ethics Approval and Consent to Participate

Not applicable. This study is a secondary analysis of de-identified, aggregate-level public-use survey data (OECD TALIS 2024); no primary data collection involving human participants was conducted by the

authors. Ethical approval and participant consent for the original TALIS 2024 data collection were the responsibility of the OECD and its national data collection agencies.

Consent for Publication

Not applicable. This manuscript does not contain any individual person's data in any form (e.g., individual details, images, or videos).

Availability of Data and Materials

The dataset supporting the conclusions of this article is available in the OECD TALIS 2024 Database repository, https://www.oecd.org/en/data/datasets/talis-2024-database.html (OECD, 2025a). The Uzbekistan teacher subsample, derived analytic variables, and the R code implementing the survey-weighted mediation, robustness-check, and moderation analyses described in Section 2.5 are provided in Additional files 1 and 2 accompanying this article and reproduce all values reported in Tables 3–5 and Table S1.

Competing Interests

The authors declare that they have no competing interests.

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