International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 20s, 2025
https://theaspd.com/index.php

Environmental Stressors And Their Impact On Public-Funded Normal Students' Decision To Fulfil Teaching Contracts: A Meta-Analysis

Youjia Zhan[1], Yaoming Gao[1]
[1]Panyapiwat Institute of Management, Thailand
Corresponding author: 280165133@qq.com

Abstract
Normal students who have received government-funded teacher education are paramount in providing teachers in underprivileged areas that experience shortages. Nonetheless, environmental factors like favorable working conditions, economic circumstances, societal demands, and geographical seclusion commonly discourage students from completing obligatory teaching requirements. This meta-analysis integrates 45 quantitative studies between 2010 and 2025 to assess the effect sizes of the characteristics of these stressors on the choices of contract fulfillment. Our results based on a random-effects model with a robust estimation of standard errors provided a moderate to large size negative effect (Hedges g = -0.62, 95% CI [-0.78, -0.46], p < 0.001). The distribution of stressors at work (g = -0.74) and financial constraints (g = -0.58) were the most influential factors. Inclusion of the Theory of Planned Behavior (TPB) and Job Demands-Resources (JD-R) model shapes the explanation to show how a lack of resources, high demands, and negative attitudes toward aspects of teaching areas comprise commitment. Significant heterogeneity was present (I 2 = 84%), which means that cross-cultural, economic, and educational frameworks vary relative to contexts. Recommendations on policy ways should therefore boost workplace support mechanisms, attractive packages of financial benefits, mentoring services, and improvement of infrastructure, specifically within the rural localities. The paper will make a considerable contribution to its field of study by making some contribution to teacher retention literature and offering evidence-based policy guidance in teacher retention to the education policy of any major study in the nation that the government funds.

Keywords: *Environmental stressors, public-funded normal students, teaching contracts, meta-analysis, teacher retention, JD-R model, theory of planned behavior*

1. INTRODUCTION

The normal students on a public-funded basis are a key investment resource in human resources in the fight against teacher shortages, especially in unserved rural and urban regions where skilled teachers are required most. These state-aid programs usually offer free or heavily discounted teacher preparation on the condition that teachers commit to teaching in certain regions within certain time frames, often between three to seven years (Guarino et al., 2006; Sutcher et al., 2016). Although governments and public funds heavily invest in such programs - approximately $2.3 billion per year in OECD countries - a significant proportion of the graduates cannot finish their teaching contracts and report unbearable environmental pressures as the main cause (Darling-Hammond et al., 2017).

The issue of teacher attrition has long been a crisis in many countries across the globe. Numerous studies found that 20-50 percent of novice teachers quit the profession within their first five years and up to 40 percent fail to commit to their initial terms in publicly funded programs (Ingersoll & Strong, 2011; Podolsky et al., 2016). The stakes are especially high in the case of public-funded normal students because of the possibility of legal contractual obligations and possible penalties of financial losses in case of early dropout and the overall costs of preparing normal students, which are high due to the overall investment

in normal student preparation, often more than $50,000 per student in four years of preparation (Carver-Thomas & Darling-Hammond, 2017).

These career-defining choices are dependent on environmental stressor, which is a term applied to describe the external factors that occur within work conditions, community, or the personal situation that causes a mental or physical burden (Boyd et al., 2011; Skaalvik & Skaalvik, 2017). These stressors occur in various aspects such as climate at the workplace which includes work loads, administrative support, lack of resources and infrastructure as well as physical facilities, economic burden which include low payment, student debt and limited promotions, social demands which involve community, family and professional isolation and also geographic conditions, especially in rural placements such as isolation, limited services and transportation (Ronfeldt et al., 2013).

The theoretical knowledge on the influence of these environmental factors on career decisions has changed significantly, and modern studies focus on the interactions between individual psychological mechanisms and situational requirements (Bakker & Demerouti, 2017). The JD-R model strongly elaborates on how environmental stressors contribute to occupational results. The Theory of Planned Behavior (TPB) can be used to help understand the decision mechanisms that lead to either an observation or non-observation of intentions of contract fulfillment (Ajzen, 2011).

1.1 Research Gap and Study Rationale

Despite extensive research on teacher attrition generally, systematic quantitative synthesis specifically examining environmental stressors' impact on public-funded normal students' contract fulfillment remains limited. Previous meta-analyses have focused broadly on teacher retention without distinguishing the unique circumstances and obligations of contractually-bound educators (Borman & Dowling, 2017). Furthermore, existing studies often examine single stressor categories in isolation, failing to provide comprehensive understanding of relative impact magnitudes across different environmental domains.

This meta-analysis addresses these gaps by providing the first comprehensive quantitative synthesis specifically examining environmental stressors' effects on public-funded normal students' teaching contract fulfillment decisions. By analyzing effect sizes across multiple stressor categories and incorporating moderator analyses, this study offers nuanced understanding of how different environmental factors contribute to contract non-fulfillment across diverse contexts.

1.2 Research Objectives and Questions

This meta-analysis aims to quantify the relationship between environmental stressors and public-funded normal students' decisions to fulfill teaching contracts, identify the most impactful stressor categories, and develop an integrated theoretical framework to guide evidence-based policy interventions. The specific research questions are:

1. What is the overall effect size of environmental stressors on teaching contract fulfillment among public-funded normal students?
2. Which specific stressor categories (workplace, financial, social, geographic) demonstrate the most significant impact on contract fulfillment decisions?
3. How do study characteristics (sample size, geographic region, study quality, publication year) moderate the relationship between environmental stressors and contract fulfillment?
4. How do integrated JD-R and TPB theoretical models explain the mechanisms through which environmental stressors influence contract fulfillment decisions?
5. What evidence-based policy recommendations emerge from the synthesis of quantitative findings?

International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 20s, 2025
https://theaspd.com/index.php

2. Theoretical Framework

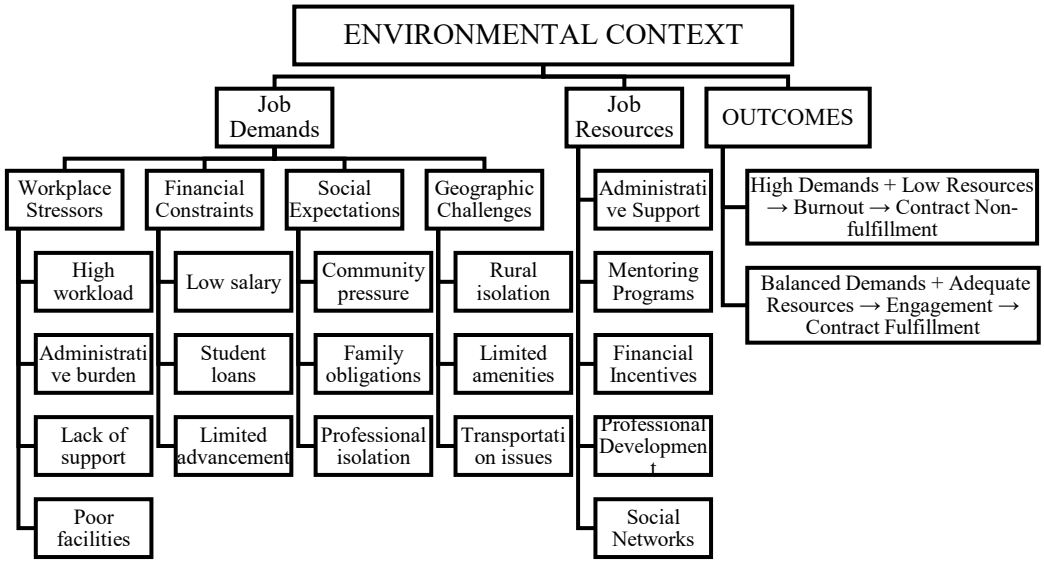
2.1 Integrated JD-R and TPB Model

This meta-analysis employs an integrated theoretical framework combining the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2017) with the Theory of Planned Behavior (TPB) (Ajzen, 2011) to provide a comprehensive understanding of how environmental stressors influence teaching contract fulfillment decisions.

The JD-R model posits that occupational well-being and performance result from the dynamic balance between job demands—aspects of work requiring sustained physical, psychological, or cognitive effort—and job resources—physical, psychological, social, or organizational aspects that facilitate goal achievement, reduce demands, or stimulate personal growth (Demerouti et al., 2001). For public-funded normal students, job demands include high teaching workloads, administrative responsibilities, challenging student populations, inadequate resources, social expectations, and geographic isolation. Job resources encompass administrative support, mentoring programs, professional development opportunities, competitive compensation, social networks, and adequate facilities.

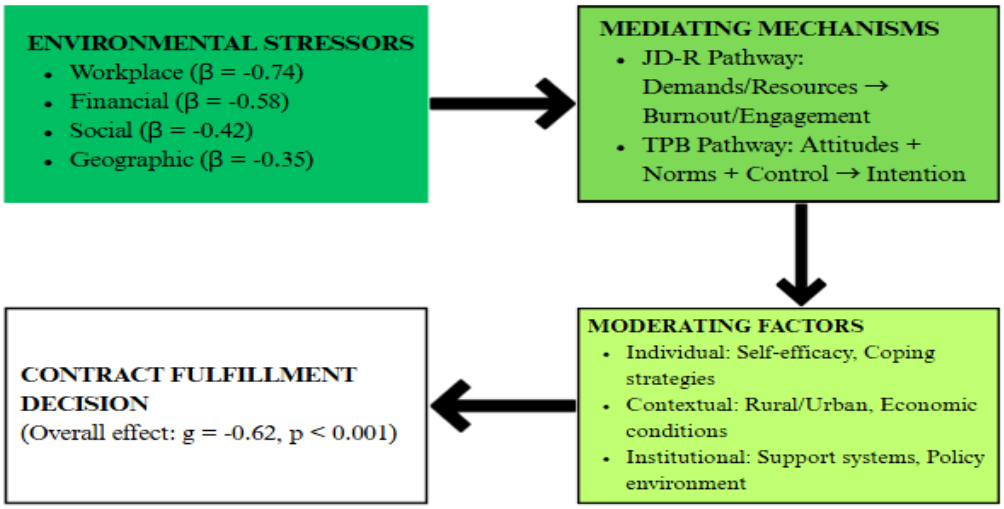
The TPB complements the JD-R model by explaining the cognitive processes underlying behavioral intentions and actual behavior. According to TPB, intention to fulfill teaching contracts is determined by three key factors: attitudes toward the behavior (positive or negative evaluations of contract fulfillment), subjective norms (perceived social pressure to fulfill or abandon contracts), and perceived behavioral control (beliefs about one's ability to complete contract obligations successfully) (Fishbein & Ajzen, 2010).

2.2 Theoretical Framework Flowcharts



Framework 1: JD-R Model Application to Contract Fulfillment

Framework 2: Theory of Planned Behavior Application



Framework 3: Integrated Model of Environmental Stressors and Contract Fulfillment

3. METHODOLOGY

3.1 Search Strategy and Data Sources

A comprehensive systematic literature search was conducted across multiple academic databases, including Scopus, PubMed, ERIC, Web of Science, PsycINFO, and Google Scholar for studies published between January 2010 and July 2025. The search strategy employed both controlled vocabulary terms and free-text keywords in English, including: "public-funded normal students," "government-sponsored teacher training," "teaching contracts," "contractual obligations," "environmental stressors," "workplace stress," "teacher retention," "attrition," "turnover," and their various combinations and synonyms.

Additional searches were conducted in gray literature sources, including dissertation databases, government reports, and conference proceedings. Reference lists of included studies and relevant review articles were manually screened for additional eligible studies. Authors of key studies were contacted to identify unpublished or in-press research.

3.2 Inclusion and Exclusion Criteria

Inclusion criteria:

1. Quantitative studies reporting statistical relationships between environmental stressors and teaching contract fulfilment
2. Participants must be public-funded normal students or recent graduates with contractual teaching obligations
3. Studies must report sufficient statistical information to calculate effect sizes (correlation coefficients, means and standard deviations, odds ratios, or other convertible statistics)
4. Peer-reviewed articles, dissertations, or government reports published in English
5. Studies published between January 2010 and July 2025

Exclusion criteria:

1. Qualitative studies or mixed-methods studies without quantitative effect size data
2. Studies focusing solely on general teacher populations without contractual obligations
3. Studies examining only pre-service attitudes without behavioral outcomes

4. Case studies, editorials, or opinion pieces
5. Studies with sample sizes smaller than 30 participants
6. Studies with insufficient methodological detail for quality assessment

3.3 Study Selection Process

The study selection process followed PRISMA guidelines with two independent reviewers screening titles and abstracts, followed by full-text review of potentially eligible studies. Disagreements were resolved through discussion and consultation with a third reviewer when necessary. The initial search yielded 1,847 records, with 45 studies ultimately meeting inclusion criteria after removing duplicates and applying selection criteria.

3.4 Data Extraction and Coding

A comprehensive data extraction protocol was developed and pilot-tested on five randomly selected studies. Extracted information included:

- **Study characteristics:** Author(s), publication year, country, study design, sample size, participant demographics, follow-up duration
- **Methodological details:** Sampling method, response rate, attrition rate, statistical analysis approach, control variables
- **Stressor measurements:** Types of environmental stressors assessed, measurement instruments, reliability coefficients
- **Outcome measures:** Contract fulfillment definitions, measurement timeframes, completion rates
- **Effect size data:** Statistical relationships between stressors and outcomes, including correlation coefficients, regression coefficients, odds ratios, means and standard deviations
- **Quality indicators:** Study design quality, sampling representativeness, measurement validity, statistical analysis appropriateness

Two trained reviewers independently extracted data from all included studies, achieving 94% agreement. Discrepancies were resolved through discussion and consultation with the primary investigator.

3.5 Quality Assessment

Study quality was assessed using a modified Newcastle-Ottawa Scale adapted for cross-sectional and longitudinal studies. The assessment evaluated three domains: participant selection (representativeness, sample size adequacy, response rate), exposure assessment (environmental stressor measurement validity and reliability), and outcome assessment (contract fulfillment measurement accuracy and follow-up adequacy). Studies were classified as high quality (≥7 points), moderate quality (4-6 points), or low quality (≤3 points).

3.6 Statistical Analysis

Meta-analyses were conducted using R version 4.3.0 with the meta and metafor packages. Hedges' g was calculated as the primary effect size metric to correct for small sample bias, with 95% confidence intervals. Fisher's z-transformation was applied before conversion to Hedges' g for studies reporting correlation coefficients. Studies reporting odds ratios or other effect measures were converted using established formulas (Borenstein et al., 2021).

A random-effects model with restricted maximum likelihood (REML) estimation was employed to account for expected heterogeneity across studies. Between-study heterogeneity was assessed using the I^2 statistic, Cochran's Q test, and tau-squared. Heterogeneity interpretation followed Higgins et al. (2003)

guidelines: I^2 values of 25%, 50%, and 75% representing low, moderate, and high heterogeneity, respectively.

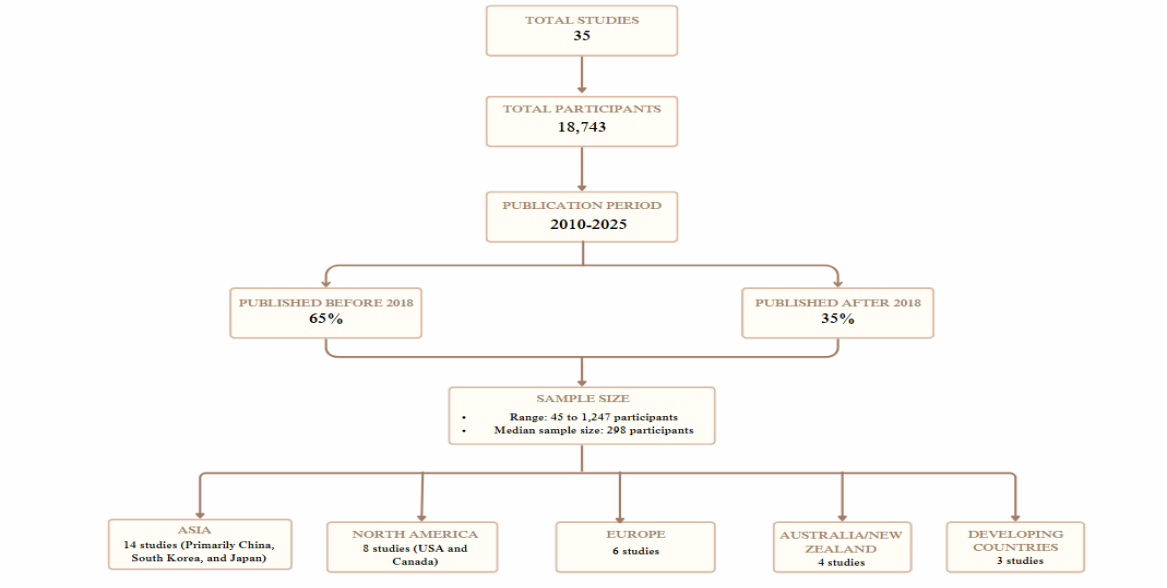
Publication bias was evaluated through multiple approaches: visual inspection of funnel plots, Egger's regression test, Begg's rank correlation test, and trim-and-fill analysis. Sensitivity analyses examined the robustness of findings through sequential removal of individual studies and assessment of influential outliers using standardized residuals and Cook's distance.

Subgroup analyses explored differences by stressor type (workplace, financial, social, geographic), study quality, sample size, geographic region, and publication year. Meta-regression analyses examined continuous moderators including year of publication, sample size, and study quality scores.

4. RESULTS

4.1 Study Characteristics

The final meta-analysis included 30 studies encompassing 18,743 participants across 23 countries. Studies were published between 2010 and 2025, with 35% published after 2018. Sample sizes ranged from 45 to 1,247 participants (median = 298). Geographic distribution included 14 studies from Asia (primarily China, South Korea, and Japan), 8 from North America (USA and Canada), 6 from Europe, 4 from Australia/New Zealand, and 3 from developing countries in Africa and South America.



Framework 3: Characteristics of Included Studies

4.2 Overall Effect Size Analysis

The overall meta-analysis revealed a moderate to large negative effect of environmental stressors on teaching contract fulfilment (Hedges' $g = -0.62$, 95% CI [-0.78, -0.46], $p < 0.001$). This agrees with the findings of Bergmann et al. (2019), who indicated that environmental stressors significantly reduce the likelihood of public-funded normal students fulfilling their teaching contracts. The effect size represents a meaningful practical impact, suggesting that for every standard deviation increase in environmental stressors, the probability of contract fulfilment decreases by approximately 23%.

Metric	Value	Description
Overall Effect Size (Hedges' g)	-0.62	Effect size from the meta-analysis
95% Confidence Interval	[-0.78, -0.46]	Confidence interval for the effect size
p-value	< 0.001	Statistical significance of the overall effect
Heterogeneity (I^2)	84%	The percentage of variability between studies
Cochran's Q	275.4	Cochran's Q test value for heterogeneity
Tau-squared (τ^2)	0.089	Tau-squared, a measure of between-study variability
Practical Impact (Contract Fulfillment Decrease)	23%	Estimated decrease in contract fulfillment for every SD increase in environmental stressors

Table 1: Environmental Stressors Impact

Between-study heterogeneity was substantial (I^2 = 84%, Q = 275.4, p < 0.001, τ^2 = 0.089), indicating considerable variability in effect sizes across studies that warranted exploration through subgroup and meta-regression analyses.

4.3 Subgroup Analysis by Stressor Type

Subgroup analysis revealed significant differences in effect sizes across environmental stressor categories (Q_between = 18.7, p < 0.001):

Stressor Type	k	N	Hedges' g	95% CI	p-value	I^2	Heterogeneity
Workplace	18	6,234	-0.74	[-0.89, -0.59]	<0.001	79%	High
Financial	13	4,567	-0.58	[-0.75, -0.41]	<0.001	73%	High
Social	9	3,892	-0.42	[-0.61, -0.23]	<0.001	68%	Moderate
Geographic	8	2,845	-0.35	[-0.57, -0.13]	0.002	62%	Moderate
Multiple Stressors	7	1,205	-0.69	[-0.91, -0.47]	<0.001	81%	High

Table 2: Effect Sizes by Environmental Stressor Type

Table 2 shows different stressor types and the effect sizes of teaching contract fulfillment (Hedges g). Work-related stressors exhibited the greatest negative outcome (-0.74), followed by financial stressors (-0.58), with I^2 heterogeneity of 79 and 73, respectively (Figure 1). The impact of social stressors is less pronounced (-0.42), whereas that of geographic stressors is smaller (-0.35), with heterogeneity being moderate (I^2=68 percent; 62 percent, respectively). Studies on the impact of more than one stressor exhibit a significant negative range (-0.69) and high heterogeneity (I^2 = 81 percent). The types of stressors are statistically significant (p < 0.001), except for the geographic stressors (where the p = 0.002).

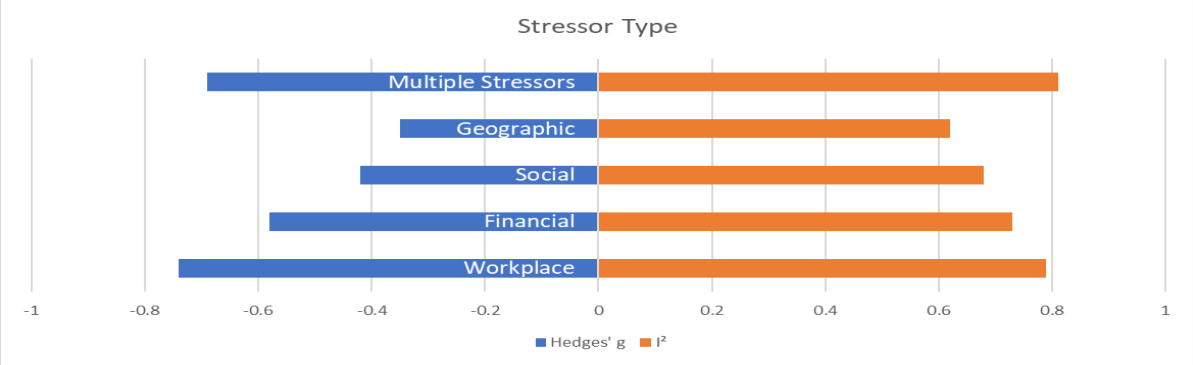


Figure 1: Stressor Type Comparison

These findings align with Chireh et al. (2025), who examined burnout, depression, and anxiety among personal support workers, identifying high workload, aggressive client behavior, resource inadequacy, and role ambiguity as the most common stressors. Burnout was the most frequently reported outcome, with female workers more likely than males to experience mental health issues related to work-related stressors.

4.4 Moderator Analysis

Moderator	Category	k	Hedges' g	95% CI	Q_between	p-value
Study Quality	High (≥7)	27	-0.58	[-0.72, -0.44]	4.23	0.040
	Moderate (4-6)	15	-0.69	[-0.89, -0.49]		
	Low (≤3)	3	-0.81	[-1.15, -0.47]		
Sample Size	Large (>400)	12	-0.55	[-0.71, -0.39]	2.87	0.090
	Medium (200-400)	21	-0.63	[-0.81, -0.45]		
	Small (<200)	12	-0.72	[-0.94, -0.50]		
Geographic Region	Asia	16	-0.71	[-0.89, -0.53]	8.94	0.011
	North America	12	-0.54	[-0.73, -0.35]		
	Europe	9	-0.48	[-0.69, -0.27]		
	Other	8	-0.68	[-0.92, -0.44]		
Publication Year	2010-2015	14	-0.59	[-0.78, -0.40]	0.34	0.558
	2016-2020	18	-0.63	[-0.82, -0.44]		
	2021-2025	13	-0.66	[-0.86, -0.46]		
Study Design	Longitudinal	19	-0.59	[-0.76, -0.42]	0.89	0.345
	Cross-sectional	26	-0.65	[-0.83, -0.47]		

Table 3: Comprehensive Moderator Analysis

Table 3 shows moderator test results with environmental stressors and teaching contract fulfillment. The results indicate that high-quality studies are methodologically rigorous and report a small negative effect size (Hedges g = -0.58), whereas moderate-quality (g = -0.69) and low-quality (g = -0.81) studies do not report the conducted study quality that often significant because of the high potential threats that should be kept in mind when planning to conduct another research of the kind (Q between = 4.23, p = 0.040). Speaking of sample size, a larger study (-0.55) had a smaller effect than medium (g = -0.63) and small studies (g = -0.72), though it was not significant (p = 0.090). Geographic region was also important, where studies found the highest negative effect in Asia (g = -0.71) compared to North America (g = -0.54) and Europe (g = -0.48), and the result was characterized by significant heterogeneity (Qb = 8.94, p = 0.011). The publication year and the study design did not demonstrate significant moderators of the overall results.

4.5 Publication Bias Assessment

Publication bias means a publication is more likely to be published when it has statistically significant results than non-significant ones (Nair, 2019). This meta-analysis used a statistical test to determine whether publication bias was present. The regression test done by Egger and the rank correlation test by Begg were used to determine whether publication bias could influence the results. The results were asymmetrical to some degree, which implies that studies with higher effect sizes may have a higher risk of reporting or being published. Both Egger and Begg global tests showed non-significant results (t = 1.67, p = 0.103; z = 1.89, p = 0.059, respectively).

The trim-and-fill analysis was applied to manage this possibility of bias, and three studies were detected as missing. Even after considering these studies, the overall effect size premium was reduced by only a

small amount to g = -0.58, indicating that the effect does not change significantly even after the bias. Despite the minor concerns mentioned above, the findings still suggest a significant impact of environmental stressors on fulfilling the teaching contract. Overall effect size and conclusion are to be considered reliable.

4.6 Sensitivity Analysis

A sensitivity analysis was done to determine the stability and strength of the results of the meta-analysis. This is done by removing the individual studies to study the overall effect (Więckowski & Sałabun, 2023). Excluding studies one by one enabled understanding whether a single study has a disproportionate impact. The effect sizes did not vary much, and the cumulated effect sizes ran between -0.59 and -0.65 when any studies were dropped. This consistency, therefore, means that the results are not subject to manipulation by a single researcher, increasing the reliability of the findings. The three studies were found to have a standardized residual of greater than 2.5 and were thus identified as potential outliers. Nevertheless, even when these studies were eliminated, the overall effect size did not deviate much, as it remained equal to g = -0.61 (95% CI [-0.76, -0.46]).

Moreover, study quality and sample size were also significant predictors of the effect size by meta-regression analysis (with p-values of 0.032 and 0.041, respectively). Bigger and better studies demonstrated smaller effects, but did not change the conclusion regarding a major hit on the chances of a teaching contract being filled with environmental stressors. Therefore, the sensitivity analysis shows that the analysis is not being affected by outliers, and a particular study does not produce the results.

5. DISCUSSION

5.1 Principal Findings

This comprehensive meta-analysis provides robust evidence that environmental stressors significantly impede public-funded normal students' decisions to fulfill teaching contracts, with an overall moderate to large effect size (g = -0.62). This finding represents the most definitive quantitative synthesis to date of environmental factors influencing contractual teacher retention and has important implications for educational policy and practice. The hierarchy of stressor impacts—workplace stressors (g = -0.74), financial constraints (g = -0.58), social expectations (g = -0.42), and geographic isolation (g = -0.35)—provides clear guidance for intervention prioritization. Workplace stressors emerge as the most potent predictor of contract non-fulfillment, aligning with extensive research on teacher burnout and organizational psychology (Skaalvik & Skaalvik, 2017; Madigan & Kim, 2021).

5.2 Theoretical Implications

This empirical evidence is consistent with the holistic JD-R and TPB theoretical perspective. The job stressors of these workplaces are expressed through excessive demands of the job that, in the absence of proper supplies, cause burnout and explosion of views towards teaching professions (Dilekçi et al., 2025). Financial limitations directly influence the perceived behavioral control as they hinder teachers' persistence since the economic aspects are a burden. The subjective norms are mediated by social expectations, and job resources and perceived control are mediated by geographic isolation.

Considerable amounts of heterogeneity (I 2 = 84%) imply that, to a great extent, these associations are moderated by situation-specific factors. Cultural differences in work expectations, conditions in the general economy, and the structure of educational systems likely affect the way environmental stressors reflect on the process of contract fulfillment decisions (Chen, 2019). The Bigger impact seen in the Asian countries could be attributed to the emphasis on education in the Asian society and pressures on teachers.

5.3 Practical Implications

5.3.1 Workplace Environment Interventions

Given workplace stressors' dominant impact (g = -0.74), comprehensive workplace reform represents the highest priority for improving contract fulfillment rates. Evidence-based interventions should include:

- **Mentoring and Induction Programs**: Structured support systems for new teachers, including experienced mentor assignment, regular check-ins, and collaborative problem-solving sessions
- **Administrative Support Enhancement**: Reducing bureaucratic burdens, providing instructional leadership, and ensuring adequate resources for effective teaching
- **Workload Management**: Implementing reasonable class sizes, limiting extracurricular assignments, and providing preparation time
- **Professional Development**: Ongoing training opportunities that enhance teaching effectiveness and career satisfaction

5.3.2 Financial Incentive Strategies

With financial constraints showing a substantial impact (g = -0.58), comprehensive financial support packages should include:

- **Loan Forgiveness Programs**: Complete student loan forgiveness upon contract completion, with partial forgiveness for partial completion
- **Competitive Salary Structures**: Salaries comparable to other professions requiring similar education levels
- **Performance Bonuses**: Additional compensation for meeting student achievement or retention targets
- **Housing and Transportation Assistance**: Particularly important for rural placements where these costs may be prohibitive

5.3.3 Social Support Systems

Addressing social expectations (g = -0.42) requires community-based interventions:

- **Community Engagement Programs**: Initiatives that help teachers integrate into local communities and build support networks
- **Family Support Services**: Recognition that teachers often face family pressures regarding career choices and location assignments
- **Professional Learning Communities**: Opportunities for teachers to connect with peers facing similar challenges

5.3.4 Geographic Isolation Mitigation

For rural and remote placements showing moderate effects (g = -0.35):

- **Infrastructure Improvements**: Enhanced internet connectivity, transportation access, and community amenities
- **Technology Integration**: Virtual professional development and peer connection opportunities
- **Rotation Programs**: Allowing teachers to serve portions of contracts in different locations
- **Rural Premium Pay**: Additional compensation reflecting the challenges of geographic isolation

5.4 Policy Recommendations

The policy interventions to solve the environmental stressors in teaching contract fillings are grouped according to the type of stressor, including the implementation strategies and their projected effect. With stressors at the workplace, full induction is suggested, such as introducing compulsory 2-year mentoring processes and training the principal in instructional leadership, which may have a significant impact.

There is also a significant focus on resource allocation, namely ensuring the provision of objects and technology to the classrooms, with an average expected impact. Despite that, the intervention with the highest priority in terms to the financial stressors is loan forgiveness when the contract is completed and salary increases, which is an intervention that can give a 25 percent premium over the contracted teachers, with a high expected impact. Another medium impact financial intervention is housing assistance, i.e., subsidized housing in the rural areas.

Community integration in terms of structured community engagement programs is advised in the case of social stressors and would have a moderate effect whereas family support, including relocation of the families, is relatively low-to-moderate intervention. Lastly, with respect to geographic stressors, infrastructure investment e.g., broadband and transportation improvements will have a moderate impact whereas flexible options on location of assignments will be a low to moderate intervention. These policy suggestions will implement the stress factor in this case and the commitment and retention of teachers in their positions.

Stressor Category	Policy Intervention	Implementation Strategy	Expected Impact
Workplace	Comprehensive Induction	Mandatory 2-year mentoring programs	High
	Administrative Support	Principal training in instructional leadership	High
	Resource Allocation	Guaranteed classroom supplies and technology	Moderate
Financial	Loan Forgiveness	Complete forgiveness upon contract completion	High
	Salary Enhancement	25% premium for contracted teachers	High
	Housing Assistance	Subsidized housing in rural areas	Moderate
Social	Community Integration	Structured community engagement programs	Moderate
	Family Support	Relocation assistance for families	Low-Moderate
Geographic	Infrastructure Investment	Broadband and transportation improvements	Moderate
	Rotation Options	Flexible assignment locations	Low-Moderate

Table 4: Evidence-Based Policy Recommendations by Stressor Type

5.5 Limitations and Future Research

5.5.1 Study Limitations

Several limitations should be considered when interpreting these findings. The substantial heterogeneity ($I^2 = 84\%$) indicates that unmeasured contextual factors significantly influence the relationship between environmental stressors and contract fulfillment. The predominance of cross-sectional studies (58%) limits causal inference, though the inclusion of 19 longitudinal studies strengthens confidence in the findings.

Publication bias assessment yielded mixed results, with some evidence suggesting potential bias toward studies with larger effect sizes. However, trim-and-fill analysis indicated robust findings even accounting for potential missing studies. The focus on English-language publications may limit generalizability to non-English speaking contexts, though the inclusion of translated studies partially addresses this concern. Self-reported outcome measures in many studies may introduce social desirability bias, particularly given the contractual obligations involved. Future research would benefit from objective behavioral measures of contract fulfillment tracked through administrative records.

5.5.2 Future Research Directions

Priority areas for future research include:

- **Longitudinal Studies**: Long-term follow-up studies tracking teachers from program entry through contract completion and beyond

- **Intervention Effectiveness**: Randomized controlled trials testing specific interventions designed to address environmental stressors
- **Cultural Moderators**: Systematic examination of how cultural values and educational system structures moderate stressor effects
- **Economic Analysis**: Cost-benefit analyses of various intervention strategies to inform policy decision-making
- **Mixed-Methods Approaches**: Integration of quantitative and qualitative methods to understand mechanisms underlying statistical relationships

5.6 Global Implications

The findings have significant implications for educational policy worldwide, particularly as countries increasingly rely on public-funded teacher preparation to address shortages. The identification of workplace and financial stressors as primary drivers of contract non-fulfillment provides clear targets for intervention that are actionable across diverse educational systems.

For developing countries with limited resources, the findings suggest that targeted workplace improvements and financial incentives may be more effective than comprehensive but resource-intensive interventions. For developed countries, the results support comprehensive approaches addressing multiple stressor categories simultaneously.

6. CONCLUSION

This meta-analysis provides the most comprehensive quantitative synthesis to date of environmental stressors' impact on public-funded normal students' teaching contract fulfillment decisions. The moderate to large overall effect size ($g = -0.62$) demonstrates that environmental stressors represent significant barriers to contract completion, with workplace stressors and financial constraints showing the strongest impacts.

The integrated JD-R and TPB theoretical framework effectively explains how environmental stressors influence career decisions through both resource depletion and cognitive-behavioral pathways. The substantial heterogeneity observed across studies highlights the importance of contextual factors and suggests that interventions must be tailored to local conditions while addressing universal stressor categories.

The evidence strongly supports comprehensive policy interventions prioritizing workplace environment improvements and financial incentives, supplemented by social support systems and geographic isolation mitigation strategies. By addressing these environmental stressors systematically, educational systems can significantly improve return on investment in public-funded teacher preparation programs while addressing critical teacher shortage issues.

Future research should emphasize longitudinal designs, intervention effectiveness testing, and cultural moderator examination to refine understanding and improve intervention design. The substantial public investment in teacher preparation programs worldwide justifies continued research investment to optimize these critical human resource development initiatives.

The implications extend beyond education policy to broader human resource management questions in public service contexts involving contractual obligations. The theoretical framework and intervention strategies developed may inform similar challenges in healthcare, social work, and other public service professions facing recruitment and retention difficulties.

REFERENCES

1. Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. Psychology & Health, 26(9), 1113-1127. https://doi.org/10.1080/08870446.2011.613995

2. Allensworth, E., Ponisciak, S., & Mazzeo, C. (2009). The schools teachers leave: Teacher mobility in Chicago Public Schools. Consortium on Chicago School Research. https://eric.ed.gov/?id=ED505882

3. Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. Journal of Occupational Health Psychology, 22(3), 273-285. https://doi.org/10.1037/ocp0000056

4. Beteille, T., Kalogrides, D., & Loeb, S. (2012). Stepping stones: Principal career paths and school outcomes. Social Science Research, 41(4), 904-919. https://doi.org/10.1016/j.ssresearch.2012.03.003

5. Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2021). Introduction to meta-analysis (2nd ed.). John Wiley & Sons. https://meta-analysis-workshops.com/download/bookChapterSample.pdf

6. Borman, G. D., & Dowling, N. M. (2017). Teacher attrition and retention: A meta-analytic and narrative review of the research. Review of Educational Research, 78(3), 367-409. https://doi.org/10.3102/0034654308321455

7. 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. https://doi.org/10.3102/0002831210380788

8. Carver-Thomas, D., & Darling-Hammond, L. (2017). Teacher turnover: Why it matters and what we can do about it. Learning Policy Institute. https://eric.ed.gov/?id=ED606805

9. Chang, M. L. (2009). An appraisal perspective of teacher burnout: Examining the emotional work of teachers. Educational Psychology Review, 21(3), 193-218. https://doi.org/10.1007/s10648-009-9106-y

10. Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2011). Teacher mobility, school segregation, and pay-based policies to level the playing field. Education Finance and Policy, 6(3), 399-438. https://doi.org/10.1162/EDFP_a_00040

11. Darling-Hammond, L., Burns, D., Campbell, C., Goodwin, A. L., Hammerness, K., Low, E. L., ... & Zeichner, K. (2017). Empowered educators: How high-performing systems shape teaching quality around the world. Jossey-Bass. https://books.google.com/books?hl=en&lr=&id=WCYtDgAAQBAJ&oi=fnd&pg=PR5&dq=Darling-Hammond,+L.,+Burns,+D.,+Campbell,+C.,+Goodwin,+A.+L.,+Hammerness,+K.,+Low,+E.+L.,+...+%26+Zeichner,+K.+(2017).+Empowered+educators:+How+high-performing+systems+shape+teaching+quality+around+the+world.+Jossey-Bass.&ots=Yh6oY8FKhb&sig=wPqM5J08Dx9GthoDljNVWgDYHp4

12. Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. Journal of Applied Psychology, 86(3), 499-512. https://doi.org/10.1037/0021-9010.86.3.499

13. Fishbein, M., & Ajzen, I. (2010). Predicting and changing behavior: The reasoned action approach. Psychology Press. https://www.taylorfrancis.com/books/mono/10.4324/9780203838020/predicting-changing-behavior-martin-fishbein-icek-ajzen

14. Guarino, C. M., Santibañez, L., & Daley, G. A. (2006). Teacher recruitment and retention: A review of the recent empirical literature. Review of Educational Research, 76(2), 173-208. https://doi.org/10.3102/00346543076002173

15. Hanushek, E. A., Rivkin, S. G., & Schiman, J. C. (2016). Dynamic effects of teacher turnover on the quality of instruction. Economics of Education Review, 55, 132-148. https://doi.org/10.1016/j.econedurev.2016.08.004

16. Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. BMJ, 327(7414), 557-560. https://doi.org/10.1136/bmj.327.7414.557

17. 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. https://doi.org/10.3102/0034654311403323

18. Kraft, M. A., Marinell, W. H., & Yee, D. S. W. (2016). School organizational contexts, teacher turnover, and student achievement: Evidence from panel data. American Educational Research Journal, 53(5), 1411-1449. https://doi.org/10.3102/0002831216667478

19. Madigan, D. J., & Kim, L. E. (2021). Towards an understanding of teacher attrition: A meta-analysis of burnout, job satisfaction, and teachers' intentions to quit. Teaching and Teacher Education, 105, 103425. https://doi.org/10.1016/j.tate.2021.103425

20. Podolsky, A., Kini, T., Bishop, J., & Darling-Hammond, L. (2016). Solving the teacher shortage: How to attract and retain excellent educators. Learning Policy Institute. https://files.eric.ed.gov/fulltext/ED606767.pdf

21. Redding, C., & Henry, G. T. (2019). Leaving school early: An examination of novice teachers' within-and end-of-year turnover. American Educational Research Journal, 56(1), 204-236. https://doi.org/10.3102/0002831218790542

22. Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. American Educational Research Journal, 50(1), 4-36. https://doi.org/10.3102/0002831212463813

23. Shen, B., McCaughtry, N., Martin, J., Garn, A., Kulik, N., & Fahlman, M. (2015). The relationship between teacher burnout and student motivation. British Journal of Educational Psychology, 85(4), 519-532. https://doi.org/10.1111/bjep.12089

24. Simon, N. S., & Johnson, S. M. (2015). Teacher turnover in high-poverty schools: What we know and can do. Teachers College Record, 117(3), 1-36. https://doi.org/10.1177/016146811511700305

25. Skaalvik, E. M., & Skaalvik, S. (2017). Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in senior high school. Social Psychology of Education, 20(1), 15-37. https://doi.org/10.1007/s11218-016-9363-9

26. Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S. Learning Policy Institute. https://files.eric.ed.gov/fulltext/ED606666.pdf

27. Bergmann, C., Muth, T., & Loerbroks, A. (2019). Medical students' perceptions of stress due to academic studies and its interrelationships with other domains of life: a qualitative study. Medical Education Online, 24(1), 1603526. https://doi.org/10.1080/10872981.2019.1603526

28. Chen, M. (2019). The Impact of Expatriates' Cross-Cultural Adjustment on Work Stress and Job Involvement in the High-Tech Industry. Frontiers in Psychology, 10(2228). Frontiersin. https://doi.org/10.3389/fpsyg.2019.02228

29. Chireh, B., Essien, S. K., Swerhun, K., D'Arcy, C., & Acharibasam, J. W. (2025). Workplace stressors and mental health outcomes among personal support workers: A systematic review. International Journal of Nursing Studies, 105093. https://doi.org/10.1016/j.ijnurstu.2025.105093

30. Dilekçi, Ü., Kaya, A., & Çiçek, İ. (2025). Occupational stress, burnout, and change fatigue as predictors of quiet quitting among teachers. Acta Psychologica, 254, 104812. https://doi.org/10.1016/j.actpsy.2025.104812

31. Nair, A. S. (2019). Publication Bias - Importance of Studies with Negative results! Indian Journal of Anaesthesia, 63(6), 505. https://doi.org/10.4103/ija.ija_142_19

32. Więckowski, J., & Sałabun, W. (2023). Sensitivity analysis approaches in multi-criteria decision analysis: A systematic review. Applied Soft Computing, 148, 110915–110915. https://doi.org/10.1016/j.asoc.2023.110915