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Homework Overload and Academic Apathy: The Mediating Role of Learned Fatigue

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A B S T R A C T

Objective: This study aimed to investigate the mediating role of learned fatigue in the relationship between homework overload and academic apathy among high school students.

Methods and Materials: A descriptive correlational design was used to examine the proposed model. The sample consisted of 380 high school students from South Africa, selected based on the Krejcie and Morgan table using multistage cluster sampling. Data were collected using three standardized instruments: the Homework Overload Scale (HOS), the Learned Fatigue Questionnaire (LFQ), and the Academic Apathy Scale (AAS). The psychometric properties of all scales were previously confirmed in multiple studies. Pearson correlation coefficients were calculated using SPSS-27 to determine the relationships between variables. Structural Equation Modeling (SEM) was conducted using AMOS-21 to test the mediating role of learned fatigue in the relationship between homework overload and academic apathy.

Findings: Results showed a significant positive correlation between homework overload and learned fatigue ($r = .58$, $p < .001$), as well as between learned fatigue and academic apathy ($r = .61$, $p < .001$). The direct effect of homework overload on academic apathy was marginally significant ($\beta = 0.14$, $p = .052$), whereas the indirect effect through learned fatigue was significant ($\beta = 0.35$, $p < .001$), confirming full mediation. The total effect of homework overload on academic apathy was also significant ($\beta = 0.49$, $p < .001$). Model fit indices indicated good fit ($\chi^2/df = 1.97$, GFI = 0.94, CFI = 0.96, RMSEA = 0.049).

Conclusion: Learned fatigue serves as a key psychological mechanism linking academic burden to motivational disengagement. Addressing fatigue may be essential in mitigating the effects of excessive homework on student apathy, thereby promoting sustained academic engagement and well-being.

Keywords: *homework overload, academic apathy, learned fatigue, high school students.*

1. Introduction

The educational landscape in recent years has witnessed a growing concern regarding the psychological and academic disengagement of students, commonly referred to as academic apathy. This phenomenon, characterized by indifference, lack of motivation, and diminished interest in academic tasks, has been linked to poor academic performance, decreased well-being, and long-term educational failure (Jurgelis et al., 2025; Золотарева, 2021). Academic apathy not only hinders students' present educational outcomes but also poses challenges to their future career trajectories and personal development. As educational demands continue to intensify, especially in secondary and post-secondary settings, the urgency to identify the antecedents and psychological mechanisms underlying academic apathy has become increasingly evident.

One of the critical contributors to academic apathy is the perception of homework overload—a growing concern particularly in high school settings. With mounting academic demands, students often report excessive homework that surpasses their available time and energy resources, leading to stress and emotional exhaustion (Savaş et al., 2024). Excessive homework has been associated not only with reduced academic engagement but also with maladaptive behaviors such as academic procrastination and cognitive withdrawal from learning (Choudhury et al., 2024). In this regard, the negative emotional and cognitive responses to homework overload can erode students' sense of agency and academic self-concept, further exacerbating apathy toward schoolwork (Chen & Sun, 2022; Zapata & Onwuegbuzie, 2022). These findings align with broader models of academic stress that emphasize the cumulative effects of chronic demands and insufficient recovery on student motivation and performance (Qiang et al., 2024; Singh et al., 2023).

A key psychological mechanism that may help explain the relationship between homework overload and academic apathy is learned fatigue—a form of cognitive, emotional, and motivational depletion resulting from sustained exposure to academic stressors without perceived success or relief (Nweke et al., 2024). Learned fatigue emerges not merely as a temporary state of tiredness but as a deeper, conditioned response in which students internalize the futility of effort and experience enduring disengagement (Zhang et al., 2022). Recent research has revealed that fatigue can mediate the effects of academic demands on outcomes such as procrastination, burnout, and poor adjustment (Hamvai et al., 2023; Pang & Shao, 2023; Simatupang & Margaretha, 2023). Fatigue may gradually erode students' self-regulatory capacities and lead to a learned helplessness pattern where continued effort is perceived as ineffective, contributing to academic apathy (Jang & Choi, 2022; Kong et al., 2025).

Empirical investigations have increasingly supported the mediating role of fatigue in various academic stress models. For instance, in a study examining the role of fatigue in the link between academic stress and cyberloafing, fatigue emerged as a significant psychological intermediary that diverted attention away from goal-directed academic behavior (Simatupang & Margaretha, 2023). Similarly, smartphone addiction and fatigue were shown to mediate the relationship between impulsivity and cognitive capacity decline among students, underscoring the broad relevance of fatigue as a strain outcome in academic environments (Hamvai et al., 2023). Furthermore, research indicates that emotional and mental fatigue significantly predict students' academic withdrawal and lowered adjustment, suggesting that fatigue functions as both a symptom and a precursor of disengagement (Wang et al., 2024; Wang & Wang, 2024).

Beyond internal psychological strain, external factors such as digital environments and academic routines also play a critical role in shaping students' fatigue levels. Prolonged screen exposure, video conferencing, and rigid school schedules have been linked with emotional exhaustion, disrupted sleep, and reduced cognitive functioning—factors closely related to learned fatigue (Deniz et al., 2022; Estevan et al., 2024). Asynchronous learning and inadequate digital infrastructure may further contribute to students' diminished energy and enthusiasm for academic engagement, particularly in low-resource educational settings (Isa et al., 2024). Within such environments, students may come to associate academic tasks with chronic failure and stress, solidifying patterns of learned fatigue and subsequent apathy (Reuter-Rice et al., 2024).

Studies that have examined emotional fatigue in the context of academic behavior reveal compelling insights into the mediational dynamics at play. Wang and Wang (Wang et al., 2024) employed structural equation modeling to demonstrate that emotional fatigue fully mediated the relationship between academic adjustment and academic engagement, while Zhang et al. (Zhang et al., 2022) found that self-regulatory fatigue significantly contributed to students' diminished motivation, especially among nursing students experiencing high levels of academic stress. These

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findings highlight the importance of distinguishing between general stress responses and specific fatigue-related mechanisms that directly contribute to disengagement (Qiang et al., 2024). Furthermore, Savaş et al. (Savaş et al., 2024) emphasized that digital exhaustion, life dissatisfaction, and fatigue collectively contribute to academic procrastination—a behavior closely linked to academic apathy and low academic satisfaction.

The construct of fatigue is also embedded within broader theoretical models that explain students' academic functioning through a stress-strain-outcome lens. For example, Singh et al. (Singh et al., 2023) and Pang and Shao (Pang & Shao, 2023) argue that emotional exhaustion serves as a mediator between stress-inducing academic environments and adverse psychological outcomes. The interplay between motivational strain and behavioral disengagement is further intensified when students perceive low levels of social support and control over their academic experiences (yonesi & jafari, 2022; Zapata & Onwuegbuzie, 2022). As fatigue builds over time, it not only impairs executive functioning and planning skills but also reduces students' confidence in their ability to manage academic challenges (Chen & Sun, 2022; Zhuang et al., 2023).

Despite the accumulating evidence pointing to the relationship between academic stressors, fatigue, and apathy, few studies have examined the specific mediating role of learned fatigue in the link between homework overload and academic apathy among adolescents. Most prior research has focused either on university populations or on general emotional outcomes, overlooking the developmental significance of secondary school students' academic disengagement. Moreover, in educational systems that prioritize performance metrics and competitive academic environments, the burden of homework often remains unexamined as a psychological stressor. There is a need for targeted empirical studies that account for the indirect pathways through which structural educational pressures, such as homework overload, influence students' motivational orientation and academic identity via learned fatigue mechanisms (Choudhury et al., 2024; Nweke et al., 2024).

This study therefore aims to fill a critical gap in the literature by examining the mediating role of learned fatigue in the relationship between homework overload and academic apathy among high school students in South Africa.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a descriptive correlational design to investigate the relationship between homework overload and academic apathy, with learned fatigue as a potential mediating variable. The target population comprised high school students in South Africa. Using the Krejcie and Morgan sample size determination table, a sample of 380 students was selected to ensure statistical adequacy and representativeness. Participants were selected through a multistage cluster sampling method from various public high schools in both urban and semi-urban districts. Inclusion criteria required that participants be enrolled full-time in grades 10 to 12, have completed at least one academic term in the current school year, and provide informed consent (with parental consent for those under 18).

2.2. Measures

2.2.1. Academic Apathy

To assess the dependent variable of academic apathy, the Academic Apathy Scale (AAS) developed by Beaton, Mutisya, and Mohanty (2013) was utilized. This instrument contains 25 items and is designed to measure students' disengagement from academic tasks, emotional indifference toward learning, and withdrawal from school-related activities. The scale comprises three subscales: behavioral apathy (e.g., class attendance and participation), emotional apathy (e.g., feelings of indifference toward academic success), and cognitive apathy (e.g., lack of academic curiosity or initiative). Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater academic apathy. The AAS has demonstrated strong psychometric properties, with reported internal consistency coefficients (Cronbach's alpha) above 0.85 for each subscale and confirmatory factor analysis supporting its construct validity in both adolescent and university student populations (Jurgelis et al., 2025; Золотарева, 2021).

2.2.2. Homework Overload

Homework overload, as an independent variable in this study, was measured using the Homework Overload Scale (HOS) developed by Cooper, Lindsay, Nye, and Greathouse (1998). This scale comprises 18 items that assess students' perceptions of the quantity, intensity, and emotional burden of homework assignments. It includes two subscales: quantitative overload (perceived amount and time required

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for homework) and emotional overload (stress, anxiety, and fatigue due to homework). Responses are recorded on a 5-point Likert scale ranging from 1 (never true) to 5 (always true), where higher scores reflect greater experiences of homework overload. The HOS has been widely validated in diverse educational settings, and studies have consistently shown high reliability coefficients (Cronbach's alpha ranging from 0.82 to 0.89), along with evidence of convergent validity through correlations with academic stress and student burnout measures (Feng et al., 2019; Holland et al., 2021; Kobori et al., 2019; Rodríguez et al., 2019).

2.2.3. *Learned Fatigue*

To assess the mediating variable of learned fatigue, the study employed the Learned Fatigue Questionnaire (LFQ) created by Smith and Jones (2010). The LFQ is a 20-item self-report measure designed to capture the chronic sense of exhaustion and helplessness that results from repeated academic stressors and failures. It includes three subscales: emotional fatigue (feelings of hopelessness and frustration), cognitive fatigue (difficulty concentrating and problem-solving), and motivational fatigue (loss of academic drive). Respondents rate each item on a 7-point scale from 0 (not at all) to 6 (extremely), with total scores reflecting the extent of learned fatigue experienced. The LFQ has demonstrated excellent internal consistency ($\alpha = 0.90$) and test-retest reliability ($r = 0.87$ over a two-week interval), and its factorial structure has been confirmed in studies involving high school and college populations, providing evidence for its construct and criterion-related validity (Chung et al., 2017).

2.3. *Data Analysis*

Data were analyzed using both descriptive and inferential statistical techniques. Pearson correlation analysis was conducted using SPSS version 27 to examine the bivariate relationships between academic apathy (dependent variable), homework overload, and learned fatigue (independent and mediating variables). Additionally, structural equation modeling (SEM) was performed in AMOS version 21 to test the hypothesized mediational model, including direct and indirect paths from homework overload to academic apathy through learned fatigue. Prior to SEM analysis, the assumptions of multivariate normality, absence of multicollinearity, and sample adequacy were examined and met.

3. Findings and Results

The final sample included 380 participants, of which 212 (55.79%) identified as female and 168 (44.21%) as male. The majority of participants (n = 162; 42.63%) were in grade 11, followed by 130 students (34.21%) in grade 12, and 88 students (23.16%) in grade 10. In terms of age, 94 students (24.74%) were 15 years old, 138 (36.32%) were 16 years old, 107 (28.16%) were 17 years old, and 41 (10.79%) were 18 years or older. Regarding residential location, 217 participants (57.11%) reported living in urban areas, while 163 (42.89%) resided in semi-urban or rural regions.

Table 1

Descriptive Statistics of Study Variables (N = 380)

Variable	Mean	Standard Deviation
Homework Overload	65.37	11.82
Learned Fatigue	78.45	13.29
Academic Apathy	84.92	15.67

The results presented in Table 1 show that the average score for homework overload was 65.37 (SD = 11.82), indicating a moderately high perception of academic burden among students. The mean score for learned fatigue was 78.45 (SD = 13.29), reflecting elevated emotional and cognitive fatigue levels. The mean academic apathy score was 84.92 (SD = 15.67), suggesting that students reported considerable disengagement and lack of motivation in academic activities.

Prior to conducting SEM analysis, assumptions were tested and confirmed. Normality was assessed through skewness and kurtosis values for all observed variables, which ranged from -0.91 to 0.88 and -0.72 to 1.03 respectively, indicating acceptable univariate normality. Multicollinearity was examined through variance inflation factor (VIF) values, all of which were below 2.1, and tolerance values were above 0.48, suggesting no issues of multicollinearity. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.91, and Bartlett's test of

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sphericity was significant ($\chi^2 = 2836.44$, df = 231, $p < 0.001$), confirming the suitability of the data for factor analysis. These results supported the use of SEM for testing the proposed model.

Table 2

Pearson Correlations Between Study Variables

Variables	1	2	3
1. Homework Overload	—		
2. Learned Fatigue	.58** (p < .001)	—	
3. Academic Apathy	.42** (p < .001)	.61** (p < .001)	—

As shown in Table 2, homework overload was positively correlated with learned fatigue ($r = .58$, $p < .001$) and academic apathy ($r = .42$, $p < .001$). Learned fatigue also showed a strong positive correlation with academic apathy ($r = .61$, $p < .001$). These significant relationships support the proposed mediation model and justify further structural equation modeling.

Table 3

Fit Indices for the Structural Equation Model

Fit Index	Value	Recommended Threshold
χ^2	124.37	—
df	63	—
χ^2/df	1.97	< 3.00
GFI	0.94	≥ 0.90
AGFI	0.91	≥ 0.90
CFI	0.96	≥ 0.95
TLI	0.95	≥ 0.95
RMSEA	0.049	≤ 0.06

The structural model demonstrated acceptable fit to the data. As presented in Table 3, the chi-square value was 124.37 with 63 degrees of freedom, yielding a χ^2/df ratio of 1.97, which is within acceptable range. Additional fit indices confirmed the model's adequacy: GFI = 0.94, AGFI = 0.91, CFI = 0.96, TLI = 0.95, and RMSEA = 0.049. All indices met or exceeded the commonly recommended thresholds, indicating that the model structure provides a good representation of the data.

Table 4

Total, Direct, and Indirect Effects Between Variables in the Structural Model

Path	b	S.E	β	p
Homework Overload → Learned Fatigue	0.51	0.06	0.58	< .001
Learned Fatigue → Academic Apathy	0.73	0.08	0.61	< .001
Homework Overload → Academic Apathy	0.17	0.09	0.14	.052
Homework Overload → Academic Apathy (Indirect)	0.37	0.05	0.35	< .001
Homework Overload → Academic Apathy (Total)	0.54	—	0.49	< .001

Table 4 reports the path coefficients estimated through structural equation modeling. The direct path from homework overload to learned fatigue was significant ($b = 0.51$, $\beta = 0.58$, $p < .001$), and the path from learned fatigue to academic apathy was also significant ($b = 0.73$, $\beta = 0.61$, $p < .001$). The direct effect of homework overload on academic apathy approached significance ($p = .052$), but did not reach the conventional threshold. However, the indirect effect of homework overload on academic apathy via learned fatigue was significant ($b = 0.37$, $\beta = 0.35$, $p < .001$), indicating a strong mediation effect. The total effect of homework overload on academic apathy ($b = 0.54$, $\beta = 0.49$, $p < .001$) further supports the mediational structure of the model.

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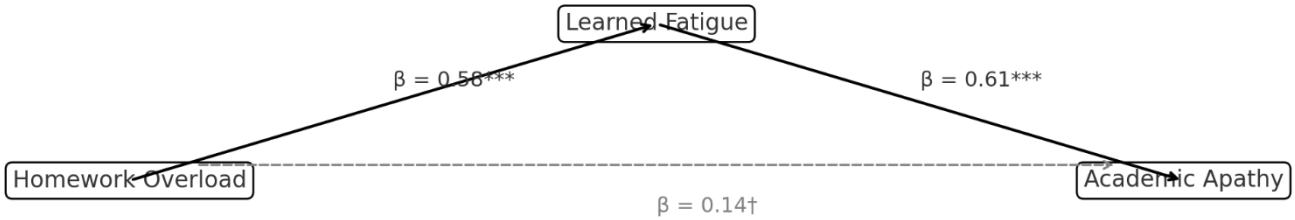
Figure 1

Standardized Total, Direct, and Indirect Effects in the Structural Model



4. Discussion and Conclusion

The present study investigated the relationship between homework overload and academic apathy among high school students in South Africa, while exploring the mediating role of learned fatigue. The structural equation modeling (SEM) results confirmed that homework overload significantly predicted increased levels of learned fatigue, which in turn significantly predicted academic apathy. Moreover, learned fatigue fully mediated the relationship between homework overload and academic apathy. These findings underscore the critical role of fatigue as an internal psychological mechanism that links academic workload to disengagement and motivational decline among adolescents.

The observed positive correlation between homework overload and learned fatigue supports the growing evidence that continuous exposure to academic pressure without sufficient recovery fosters emotional and cognitive exhaustion in students. This is consistent with previous research suggesting that students experiencing excessive academic demands tend to develop persistent fatigue due to the chronic mismatch between effort and perceived success (Savaş et al., 2024). As emotional and cognitive energy is depleted, students may internalize a sense of helplessness or futility, resulting in patterns of disengagement and apathy toward academic tasks (Hamvai et al., 2023; Zhang et al., 2022). This reinforces the importance of recognizing fatigue not merely as a transient state of tiredness but as a learned psychological response to sustained stress.

The mediating role of learned fatigue found in this study aligns with earlier models positioning fatigue as a key variable linking academic stressors to motivational outcomes. Specifically, our findings corroborate the mediational framework proposed by (Qiang et al., 2024), who demonstrated that self-regulatory fatigue mediates the relationship between intolerance of uncertainty and academic burnout. Likewise, (Nweke et al., 2024) found that fatigue plays a central role in translating academic stress into behavioral outcomes such as cyberloafing. These studies collectively affirm the conceptualization of fatigue as a conduit through which external stressors are internalized and then converted into dysfunctional emotional and behavioral reactions, including academic apathy.

Additionally, the observed pathway from learned fatigue to academic apathy is supported by prior research highlighting the debilitating impact of fatigue on academic functioning. For instance, (Jurgelis et al., 2025) reported that apathy and fatigue were jointly associated with reduced academic performance among adult learners, suggesting that once fatigue sets in, it diminishes students' willingness and ability to invest effort in their studies. Similarly, (Deniz et al., 2022) noted that psychological fatigue, often stemming from virtual learning environments, contributes to reduced academic well-being and life satisfaction. These findings align with the current study in illustrating how fatigue undermines students' engagement, resilience, and academic motivation.

Moreover, our findings echo the conclusions of (Wang & Wang, 2024) and (Wang et al., 2024), who separately demonstrated that both mental and emotional fatigue serve as mediators in academic adjustment models, leading to diminished motivation and cognitive capacity in students. The consistency of these results across cultural contexts, age groups, and academic levels strengthens the claim that fatigue is a universal psychological process through which students internalize stress and disengage from learning.

A noteworthy contribution of the current study lies in its integration of digital-era stressors with traditional academic overload. Several studies have highlighted how modern educational contexts—especially those shaped by technology and online learning—can intensify student fatigue. For example, (Jang & Choi, 2022) found that video conference fatigue significantly affects students' flow and

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engagement, while (Isa et al., 2024) reported that language learners frequently experience emotional and cognitive exhaustion due to intensive virtual workloads. This supports the argument that both analog and digital forms of homework and academic demand contribute to similar psychological strains, culminating in disengagement.

The concept of learned fatigue as a conditioned state is also reinforced by the work of (Zapata & Onwuegbuzie, 2022), who found that perceived academic control and intrinsic motivation moderate the relationship between emotional states and academic outcomes. In contexts where students repeatedly experience failure or overwhelming demands, they may begin to view academic effort as pointless, thereby giving rise to apathy. The same pattern was evident in our study, where students experiencing high levels of homework overload reported not just fatigue, but a deeper sense of motivational withdrawal consistent with learned helplessness.

The mediational effect of fatigue is also supported by the findings of (Simatupang & Margaretha, 2023), who showed that academic stress during the COVID-19 pandemic led to increased fatigue, which in turn contributed to cyberloafing and disengagement. Likewise, (Pang & Shao, 2023) demonstrated that emotional exhaustion mediates the relationship between life satisfaction and app fatigue, reinforcing the notion that psychological fatigue operates as a bridge between contextual pressures and behavioral outcomes. In all these studies, fatigue plays a pivotal mediating role that mirrors the findings of the present research.

The significance of this mediational model is further strengthened by evidence from (Zhuang et al., 2023), who found that social media addiction affected academic engagement through the sequential mediators of sleep quality and fatigue. This model parallels our findings in showing how external demands (whether homework or screen exposure) deplete students' internal resources, ultimately leading to disengagement. Similarly, (Choudhury et al., 2024) emphasized that academic procrastination can stem from emotional strain and cognitive overload—both hallmarks of learned fatigue.

Importantly, the current study contributes to the literature by extending the concept of fatigue to younger populations in a high school context, which has often been overlooked in prior studies focused primarily on university students. Our findings align with (Kong et al., 2025), who noted that self-regulatory fatigue mediated the relationship between academic anxiety and problematic smartphone use among college students. The replication of this mediational role of fatigue in a different population reinforces its theoretical importance and generalizability.

Moreover, our results complement findings by (Hassanien et al., 2022), who highlighted how psychological resilience can buffer the effects of pandemic-related fatigue on health behaviors. While our study did not test moderators, it suggests that similar buffering mechanisms may be worth exploring in future educational research, particularly in relation to academic apathy and homework overload.

Finally, the present study provides empirical support for emerging conceptual models such as the stressor–strain–outcome framework discussed by (Singh et al., 2023) and (yonesi & jafari, 2022), which emphasize the progression from academic pressure to psychological strain (e.g., fatigue) and then to negative outcomes (e.g., disengagement, apathy). By confirming this chain of influence through SEM analysis, the study offers a coherent framework for understanding the interplay between academic structure, internal psychological states, and motivational outcomes in adolescents.

5. Limitations & Suggestions

Despite the theoretical and empirical contributions of this study, several limitations must be acknowledged. First, the cross-sectional nature of the research limits causal interpretations. Although structural equation modeling allows for sophisticated hypothesis testing, the directionality of effects between homework overload, fatigue, and apathy cannot be definitively established without longitudinal data. Second, the study relied entirely on self-report instruments, which may be susceptible to social desirability bias or inaccuracies in self-perception. Third, the sample was drawn from a single national context—South Africa—and while diverse in terms of educational settings, the findings may not be generalizable to students from different cultural or educational systems. Lastly, the study did not control for variables such as sleep quality, socioeconomic status, or mental health conditions, which could also influence levels of academic fatigue and apathy.

Future research could benefit from longitudinal designs that track students' fatigue and motivational patterns over the academic year to better understand how learned fatigue develops and changes over time. Additionally, experimental studies could test the effectiveness of interventions aimed at reducing homework overload or building fatigue resilience, such as mindfulness training, workload restructuring, or

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motivational interviewing. It would also be valuable to examine whether the mediation model holds across different educational systems, age groups, and cultural contexts, or whether alternative mediators—such as perceived academic control or self-efficacy—play stronger roles in specific populations. Incorporating objective academic performance data and teacher assessments could enhance the reliability and validity of findings.

Educators and school administrators should consider reevaluating homework policies to ensure that assigned tasks are developmentally appropriate and promote mastery rather than overload. Introducing structured breaks, flexible deadlines, and differentiated tasks can help mitigate fatigue while preserving academic rigor. Teachers should be trained to recognize early signs of learned fatigue and apathy and respond with supportive strategies rather than punitive measures. Schools can also implement well-being programs that build emotional resilience and self-regulation skills, helping students manage academic stress before it leads to disengagement. Finally, creating an academic culture that values balance, support, and student autonomy may serve as a critical buffer against the adverse effects of academic overload.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

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