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Keywords: teacher burnout; physical activity; body image; occupational stress; teachers; mental health; well-being; depersonalization; personal accomplishment



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Article

# Association Between Physical Activity, Body Image Satisfaction, and Burnout Symptoms: A Sex-Based Analysis

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## Highlights

### What are the main findings?

- Moderate physical activity was associated with lower depersonalization and higher personal accomplishment among teachers.
- Body image dissatisfaction was not significantly associated with burnout dimensions, and sex did not moderate the observed associations.

### What are the implications of the main findings?

- Promoting moderate physical activity may represent a feasible strategy to support teacher occupational well-being and reduce specific burnout-related symptoms.
- Teacher burnout should be addressed through multidimensional approaches integrating lifestyle behaviors alongside organizational and occupational factors.

## Abstract

**Background:** Teaching is a high-demand profession associated with elevated levels of occupational stress and burnout. While physical activity and body image have been linked to psychological well-being, their independent and combined associations with burnout in teachers remain insufficiently understood, particularly regarding potential sex differences. **Objectives:** To examine the associations between physical activity, body image satisfaction, and burnout symptoms in teachers, and to determine whether these relationships differ between men and women. **Methods:** A cross-sectional study was conducted using secondary data from two independent datasets, comprising 189 teachers from primary and secondary education in the Lisbon and Tagus Valley region, Portugal. Burnout was assessed using the Maslach Burnout Inventory, body image through a self-report measure (Figure Rating Scale), and physical activity using the International Physical Activity Questionnaire-Short Form. Multiple linear and logistic regression analyses were performed, and moderation analyses were conducted, controlling for age and years of service. **Results:** Moderate physical activity was significantly associated with lower depersonalization ( $\beta = -0.180$ ,  $p = 0.022$ ) and higher personal accomplishment ( $\beta = 0.197$ ,  $p = 0.011$ ), but not with emotional exhaustion. Body image was not significantly associated with burnout dimensions. Moderate physical activity was also marginally associated with higher odds of body image dissatisfaction (OR = 4.467,  $p = 0.050$ ). Additionally, sex did not moderate the associations between physical activity and burnout outcomes. **Conclusions:** Moderate physical activity appears to be associated with lower depersonalization and higher personal accomplishment in teachers, whereas body image does not play a central role. These

associations were consistent across men and women. These findings support a multidimensional perspective of teacher well-being, highlighting physical activity as a relevant, though complementary, factor alongside occupational demands, with consistent effects across sexes.

**Keywords:** teacher burnout; physical activity; body image; occupational stress; teachers; mental health; well-being; depersonalization; personal accomplishment

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## 1. Introduction

The teaching profession has undergone substantial transformation in recent decades, with increasing demands extending beyond traditional instructional responsibilities. Teachers are now required to manage complex classroom environments characterized by behavioural challenges, cultural diversity, and heightened socio-emotional needs among students, alongside growing administrative workload and accountability pressures [1,2]. These increasing and multifaceted demands contribute to elevated occupational stress, with large-scale evidence indicating that teachers consistently report high levels of stress and psychological strain across educational systems [3]. Meta-analytic findings further suggest that burnout symptoms are prevalent within the profession and are systematically associated with workload, emotional demands, and classroom-related stressors [4]. Collectively, this evidence identifies teaching as a high-risk profession for adverse mental health outcomes, underscoring the need to better understand factors that contribute to psychological vulnerability in this population.

Burnout is conceptualized as a psychological syndrome arising from chronic exposure to occupational stressors, classically characterized by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment [5,6]. Contemporary theoretical models, particularly the Job Demands-Resources framework, suggest that burnout develops when job demands such as workload, emotional strain, and classroom management challenges chronically exceed the individual's available psychological and organizational resources [7]. Within educational settings, this imbalance is especially pronounced, as teachers are routinely exposed to sustained emotional and cognitive demands, which have been consistently linked to elevated levels of emotional exhaustion and burnout symptoms [2,8]. At a population level, meta-analytic evidence confirms that burnout is prevalent among teachers and is associated with adverse outcomes including reduced job satisfaction, increased turnover intentions, and diminished instructional quality [4]. Moreover, burnout has been linked to a broad range of psychological and physical health impairments, reinforcing its characterization as a multidimensional occupational health concern [9].

Body image has also been increasingly recognized as a relevant construct within the broader framework of psychological well-being. However, its role in occupational contexts, particularly in relation to burnout, remains less clearly established. Conceptually, body image encompasses individuals' perceptions, attitudes, and affective responses toward their own bodies, reflecting a multidimensional self-representational system with cognitive, emotional, and behavioral components [10]. Negative body image has been consistently associated with adverse mental health outcomes, including elevated stress, anxiety, and depressive symptomatology, suggesting that negative body-related self-evaluations may function as a chronic psychological stressor [11,12]. Although these associations are well documented in general populations, evidence linking body image specifically to occupational stress and burnout remains limited. In this context, teachers' psychological well-being plays a critical role not only in their own functioning but also in shaping classroom climate, student development, and overall educational quality [13,14]. Notably, body image is closely linked to health-related behaviours, including physical activity and lifestyle patterns, which are themselves associated with stress regulation and psychological resilience [15].

Physical activity has been consistently identified as a key determinant of both physical and psychological health, with robust evidence linking higher levels of activity to reduced stress, improved emotional regulation, and enhanced overall well-being [16,17]. Within the framework of

occupational stress, physical activity may strengthen an individual's capacity to cope with job demands and mitigate the impact of stressors on burnout-related outcomes. Empirical findings indicate that individuals who engage in regular physical activity report lower levels of emotional exhaustion and burnout symptoms, supporting its protective role in high-demand professions [17]. In addition to its direct effects, physical activity is closely associated with body image, with higher levels of engagement linked to more positive body-related perceptions, improved self-esteem, and greater body satisfaction [15]. However, some evidence suggests that engagement in physical activity may also be driven by body dissatisfaction, indicating a complex and potentially bidirectional relationship between these variables [15]. These findings suggest that physical activity may influence burnout both directly and indirectly, through its impact on body image and related psychological processes. Together, these relationships suggest a potential interconnected framework in which physical activity may influence burnout both directly and indirectly through body image-related mechanisms. Evidence further suggests that these relationships may differ according to sex. Women tend to report lower levels of physical activity at the population level [18], greater body image dissatisfaction [19], and higher levels of certain burnout dimensions, particularly emotional exhaustion [20], although findings are not entirely consistent across studies. These differences highlight the importance of adopting a sex-based analytical approach when examining the interplay between physical activity, body image, and burnout, as the strength and direction of these associations may vary between men and women.

Despite the growing body of research on occupational stress in teachers, the extent to which physical activity and body image are independently and jointly associated with distinct burnout dimensions remains insufficiently understood. Moreover, little is known about whether these relationships differ according to sex. In particular, it is unclear whether physical activity and body image are independently and jointly related to burnout, and whether these associations vary according to sex. To the best of our knowledge, few studies have simultaneously examined physical activity and body image as potential correlates of burnout within a teacher population using a multidimensional approach. Addressing these gaps is essential for advancing a more integrative understanding of teacher well-being and for identifying potentially modifiable targets for intervention. Understanding these associations is particularly relevant for informing targeted interventions aimed at improving teacher well-being and reducing burnout risk within educational settings. Therefore, the present study examines the associations between physical activity, body image satisfaction, and burnout symptoms in teachers. Specifically, this study aims to: (i) examine the associations between physical activity, body image, and burnout dimensions; and (ii) test whether these associations are moderated by sex.

## 2. Materials and Methods

### 2.1. Study Design and Participants

This study employed a cross-sectional design based on the secondary analysis of data derived from the integration of two independent datasets previously collected in studies involving teachers from basic and secondary education in Portugal. The two datasets were collected using comparable methodologies and instruments, allowing for their integration into a single analytical sample. This approach allowed for an increased sample size and enhanced variability in participant characteristics. The final sample comprised teachers recruited from primary and secondary schools in Setúbal district, Portugal, including both grouped and non-grouped school institutions, thereby ensuring a heterogeneous and contextually diverse sample. Participants were eligible for inclusion if they met the following criteria: (i) were actively employed as teachers in basic or secondary education and (ii) had completed all relevant study measures. Participants with incomplete responses on key study variables were excluded using listwise deletion. All procedures were conducted in accordance with the ethical standards of the World Medical Association Declaration of Helsinki. Ethical approval for the original data collection was obtained from the Institutional Ethics Committee of Instituto Piaget

(approval code: P02-S09-27042022). All participants provided informed consent prior to participation, and data were anonymized before analysis to ensure confidentiality.

## 2.2. Data Collection Procedures

Data were collected using structured self-report questionnaires administered in person in school settings during the academic period (2024-2025). Prior to participation, all individuals were informed about the study objectives, procedures, and their rights as participants, including the voluntary nature of participation and the assurance of anonymity and confidentiality. Questionnaires were completed under standardized conditions within the school environment, with instructions provided by the research team to ensure consistency across data collection sessions. Sociodemographic variables, including age, sex, and professional context, were collected to be included as covariates in the analyses, accounting for potential confounding effects among the study variables. No incentives were offered for participation. Completed questionnaires were anonymized at the point of collection and subsequently entered into a secure database for analysis.

## 2.3. Measures

### 2.3.1. Burnout

The Maslach Burnout Inventory (MBI) is a psychometric instrument developed by Maslach et al., 1981 [5], designed to assess burnout in professionals working in human service occupations. It consists of 22 items distributed across three main dimensions: Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA). Emotional Exhaustion assesses feelings of emotional overload and fatigue caused by work. Depersonalization measures impersonal and negative attitudes toward recipients of one's services. Personal Accomplishment reflects the sense of competence and achievement at work. Each item is rated on a scale from 0 to 6, representing how frequently the individual experiences each feeling, ranging from "never" to "every day." The instrument is self-administered and widely used across professional contexts. Interpretation of the results considers that Emotional Exhaustion and Depersonalization indicate higher levels of burnout when scores are high, whereas Personal Accomplishment indicates higher levels of burnout when scores are low.

### 2.3.2. Body Image

The Body Image questionnaire, the Figure Rating Scale, developed by Stunkard et al., 1983 [21], is a widely used instrument for assessing an individual's perception of body image, that is, how a person sees and interprets their own body. This instrument is particularly useful in clinical and research contexts, especially in the fields of psychology, nutrition, public health, and physical education, serving as a simple yet effective tool for identifying discrepancies between perceived body image and ideal body image. The Figure Rating Scale consists of a set of nine drawn silhouettes representing human bodies of both sexes, progressively ranging from very thin to very obese. These figures do not include facial features or other elements that might distract the participant, focusing exclusively on body shape and volume. There are distinct versions for men and women, reflecting typical differences in body morphology between the sexes. The scale is administered in a very straightforward way: participants are asked to look at the nine silhouettes and select two of them. The first represents the figure that best corresponds to how they currently see themselves (perceived body image), and the second represents the figure they would like to have (ideal body image). The difference between these two choices allows for the assessment of the individual's level of body (dis)satisfaction. A zero difference (that is, selecting the same figure for both the current and ideal body) theoretically indicates satisfaction with one's body image, while larger differences suggest some degree of dissatisfaction.

### 2.3.3. Physical Activity

Habitual physical activity was assessed using the International Physical Activity Questionnaire Short Form (IPAQ-SF), originally developed by Craig et al. (2003) [22] and subsequently validated for the Portuguese population by Pais-Ribeiro et al. (2005) [23]. The short version of the IPAQ was used to assess the frequency and duration of physical activity performed over the previous seven days. Participants were instructed to report all physical activity undertaken during a typical week, excluding atypical situations (e.g., illness or unusual events), and to complete all items regardless of their perceived activity level. In the present study, physical activity was quantified in metabolic equivalent (MET)-minutes per week, following the standard IPAQ scoring protocol. Total physical activity was calculated by weighting the reported time spent in walking, moderate, and vigorous activities by their respective MET values and summing across domains.

### 2.4. Statistical Analysis

Statistical analyses were conducted using SPSS (version 23, IBM Corp., Armonk, NY, USA). Descriptive statistics (means, standard deviations, and frequencies) were calculated to characterize the sample. Pearson correlation coefficients were computed to examine bivariate associations between continuous variables. Independent samples t-tests and chi-square tests were used to assess differences between men and women for continuous and categorical variables, respectively. Multiple linear regression analyses were performed to examine the associations between physical activity variables (vigorous, moderate, and walking), body image, and burnout dimensions (emotional exhaustion, depersonalization, and personal accomplishment), adjusting for age, sex, and years of service. Logistic regression analysis was conducted to assess factors associated with body image dissatisfaction. Moderation analyses were performed using the PROCESS macro for SPSS (Model 1) to test whether sex moderated the relationship between physical activity variables and burnout outcomes. Prior to analysis, assumptions of linear regression, including normality, linearity, homoscedasticity, and multicollinearity, were assessed. Statistical significance was set at  $p < 0.05$ , and effect sizes were interpreted where appropriate.

## 3. Results

### 3.1. Sample Characteristics

The characteristics of the sample ( $n = 189$ ) are presented in Table 1. No significant sex differences were observed for age, years of service, depersonalization, personal accomplishment, body image, or physical activity variables ( $p > 0.05$ ). Specifically, no significant sex differences were observed for vigorous physical activity, moderate physical activity, or walking. A marginal difference was observed for emotional exhaustion ( $p = 0.050$ ), with higher values in women.

Regarding body image, most participants reported dissatisfaction related to the desire to be thinner (68.3%), whereas 26.5% were satisfied and 5.3% reported dissatisfaction related to the desire to be larger.

**Table 1.** Sample Characteristics ( $n = 189$ ).

| Variables                               | Total ( $n = 189$ ) | Female ( $n = 150$ ) | Male ( $n = 39$ ) | p-value |
|---|---------------------|----------------------|-------------------|---------|
| Age (mean $\pm$ SD)                     | 52.4 (8.7)          | 52.1 (8.7)           | 53.9 (8.7)        | 0.228   |
| Years of service (mean $\pm$ SD)        | 25.6 (11.1)         | 25.2 (11.1)          | 27.4 (10.9)       | 0.269   |
| Emotional exhaustion (mean $\pm$ SD)    | 20.0 (10.3)         | 20.8 (9.8)           | 17.1 (11.8)       | 0.050   |
| Depersonalization (mean $\pm$ SD)       | 8.0 (3.6)           | 8.0 (3.6)            | 7.9 (3.8)         | 0.875   |
| Personal accomplishment (mean $\pm$ SD) | 31.4 (5.3)          | 31.5 (5.3)           | 31.3 (5.3)        | 0.905   |
| Body image score (mean $\pm$ SD)        | 1.0 (1.1)           | 1.1 (1.0)            | 0.95 (1.2)        | 0.540   |

|  |             |             |            |                                  |
|--|-------------|-------------|------------|----------------------------------|
| BI Satisfied (0)                               | 50 (26.5%)  | 35 (23.3%)  | 15 (38.5%) | $\chi^2 = 0.003,$<br>$p = 0.959$ |
| BI Dissatisfied – desire to be larger (-2, -1) | 10 (5.3%)   | 8 (5.4%)    | 2 (5.1%)   |                                  |
| BI Dissatisfied – desire to be thinner (1–4)   | 129 (68.3%) | 107 (71.3%) | 22 (56.4%) |                                  |
| Vigorous PA (n, %)                             | 76 (40.2%)  | 56 (37.3%)  | 20 (51.3%) | 0.082                            |
| Moderate PA (n, %)                             | 143 (75.7%) | 116 (77.3%) | 27 (69.2%) | 0.198                            |
| Walking (n, %)                                 | 144 (76.2%) | 111 (74.0%) | 33 (84.6%) | 0.118                            |

Note: Values are presented as mean  $\pm$  standard deviation (SD) or frequency (percentage). Independent samples t-tests were used for continuous variables and chi-square tests for categorical variables.

Legend: BI = Body Image; PA = Physical Activity.

### 3.2. Associations Between Physical Activity, Body Image, and Burnout

#### 3.2.1. Multiple Linear Regression Analyses

Overall, the regression models revealed a consistent pattern across burnout dimensions. For emotional exhaustion, the model was not statistically significant ( $F(7,181) = 1.201, p = 0.304$ ), explaining a small proportion of variance ( $R^2 = 0.044$ ). Although the overall model was not statistically significant, sex emerged as a significant individual predictor of emotional exhaustion ( $\beta = -0.148, p = 0.049$ ), while no significant associations were observed for vigorous physical activity, moderate physical activity, walking, or body image. In contrast, moderate physical activity was significantly associated with depersonalization. Although the overall model did not reach statistical significance ( $F(7,181) = 1.472, p = 0.180; R^2 = 0.054$ ), participants moderate physical activity was a significant predictor, with participants engaging in moderate physical activity presenting lower levels of depersonalization ( $\beta = -0.180, p = 0.022$ ). For personal accomplishment, the model was statistically significant ( $F(7,181) = 2.664, p = 0.012$ ), explaining 9.3% of the variance ( $R^2 = 0.093$ ). Both years of service ( $\beta = 0.393, p = 0.006$ ) and moderate physical activity ( $\beta = 0.197, p = 0.011$ ) were positively associated with personal accomplishment.

Taken together, these findings indicate that moderate physical activity, but not vigorous physical activity or walking, is associated with lower depersonalization and higher personal accomplishment, but not emotional exhaustion.

#### 3.2.2. Logistic Regression Analysis (Body Image)

The logistic regression model examining factors associated with body image dissatisfaction was not statistically significant ( $\chi^2(6) = 7.688, p = 0.262$ ), explaining 11.8% of the variance (Nagelkerke  $R^2 = 0.118$ ).

Although the overall model was not statistically significant, a borderline association was observed between moderate physical activity and body image dissatisfaction (OR = 4.467,  $p = 0.050$ ). No significant associations were observed for vigorous physical activity or walking, although a non-significant trend was observed for vigorous physical activity ( $p = 0.082$ ). Additionally, years of service were positively associated with body image dissatisfaction (OR = 1.103, 95% CI [1.004–1.212],  $p = 0.042$ ). No significant associations were observed for the remaining variables (Table 2).

**Table 2.** Logistic Regression Analysis for Body Image Dissatisfaction.

| Variable         | B      | OR (Exp(B)) | 95% CI          | p-value |
|------------------|--------|-------------|-----------------|---------|
| Vigorous PA      | -0.517 | 0.596       | [0.137, 2.594]  | 0.491   |
| Moderate PA      | 1.497  | 4.467       | [1.001, 19.937] | 0.050   |
| Walking          | -0.205 | 0.815       | [0.178, 3.736]  | 0.792   |
| Age              | -0.086 | 0.918       | [0.809, 1.042]  | 0.186   |
| Years of service | 0.098  | 1.103       | [1.004, 1.212]  | 0.042   |
| Sex              | 1.169  | 1.184       | [0.225, 6.231]  | 0.842   |

Legend: OR = Odds Ratio; CI = Confidence Interval; PA = Physical Activity.

### 3.2.3. Moderation Analyses

No significant interaction effects were observed for any of the burnout dimensions, indicating that the associations between moderate physical activity and burnout outcomes did not differ by sex (Table 3).

Specifically, for personal accomplishment, the interaction between moderate physical activity and sex was not significant ( $B = 3.308$ ,  $p = 0.109$ ), although years of service remained a significant positive predictor ( $B = 0.165$ ,  $p = 0.014$ ).

Similarly, no interaction effect was found for depersonalization ( $B = -0.242$ ,  $p = 0.868$ ). Nevertheless, a significant main effect of moderate physical activity was observed ( $B = -1.557$ ,  $p = 0.030$ ), indicating lower depersonalization levels among active participants.

For emotional exhaustion, neither the interaction effect ( $B = 0.092$ ,  $p = 0.982$ ) nor the main effect of moderate physical activity ( $B = -1.851$ ,  $p = 0.359$ ) was significant.

Overall, these findings indicate that the associations between moderate physical activity and burnout outcomes are consistent across sexes and are not moderated by sex.

**Table 3.** Moderation Analyses of Sex on the Relationship Between Moderate Physical Activity and Burnout Dimensions.

| Outcome                        | Predictor         | B      | SE    | p-value |
|--------------------------------|-------------------|--------|-------|---------|
| <b>Personal Accomplishment</b> | Moderate PA       | 1.489  | 1.005 | 0.140   |
|                                | Sex               | -2.381 | 1.737 | 0.172   |
|                                | Moderate PA × Sex | 3.308  | 2.054 | 0.109   |
|                                | Years of service  | 0.165  | 0.066 | 0.014*  |
|                                | Age               | -0.141 | 0.085 | 0.098   |
| <b>Depersonalization</b>       | Moderate PA       | -1.557 | 0.709 | 0.030*  |
|                                | Sex               | 0.041  | 1.226 | 0.973   |
|                                | Moderate PA × Sex | -0.242 | 1.450 | 0.868   |
|                                | Years of service  | -0.026 | 0.047 | 0.585   |
|                                | Age               | -0.026 | 0.060 | 0.669   |
| <b>Emotional Exhaustion</b>    | Moderate PA       | -1.851 | 2.011 | 0.359   |
|                                | Sex               | -4.066 | 3.476 | 0.244   |
|                                | Moderate PA × Sex | 0.092  | 4.111 | 0.982   |
|                                | Years of service  | 0.060  | 0.133 | 0.654   |
|                                | Age               | 0.043  | 0.169 | 0.799   |

Analyses were conducted using the PROCESS macro (Model 1), controlling for age and years of service. PA = Physical Activity. \* $p < 0.05$ .

## 4. Discussion

The present study aimed to examine the associations between physical activity, body image satisfaction, and burnout symptoms in teachers, while also exploring potential sex differences in these relationships. Overall, the findings support the role of physical activity as a relevant factor in specific dimensions of teacher well-being, while suggesting a limited contribution of body image in explaining burnout outcomes. To the best of our knowledge, this is one of the few studies to simultaneously examine physical activity and body image in relation to distinct burnout dimensions in a teacher population.

One of the main findings was that moderate physical activity was associated with lower depersonalization and higher personal accomplishment, but not with emotional exhaustion. These results are broadly consistent with previous literature indicating that physical activity may function as a protective factor against certain dimensions of burnout, particularly those related to professional efficacy and interpersonal functioning [16,17]. Within the Job Demands–Resources (JD–R) framework [7], physical activity may be conceptualized as a personal resource that enhances coping capacity and psychological resilience, thereby mitigating the impact of occupational stressors. The observed

association with personal accomplishment suggests that physically active teachers may experience greater feelings of competence and effectiveness in their professional roles, while lower depersonalization may reflect improved emotional regulation and reduced psychological distancing from students [13].

However, the absence of a significant association between physical activity and emotional exhaustion suggests that not all burnout dimensions are equally influenced by lifestyle behaviours. Emotional exhaustion is often considered the core component of burnout and is more strongly linked to chronic job demands such as workload, time pressure, and emotional labour [2,6]. Therefore, it is possible that structural and organizational factors play a more prominent role in explaining this dimension, limiting the extent to which individual-level behaviours such as physical activity can exert a buffering effect. This finding reinforces the importance of addressing both individual-level and organizational-level determinants when designing interventions to reduce burnout in teachers.

Contrary to expectations, body image was not significantly associated with any burnout dimension. Although body image has been linked to broader indicators of psychological well-being, including stress, anxiety, and depressive symptoms [11,12], its role in occupational burnout remains unclear. The present findings suggest that, within a professional context such as teaching, body image may not represent a central determinant of burnout. This may be explained by the fact that burnout is primarily driven by work-related stressors [7], whereas body image is a more general psychosocial construct that may exert indirect rather than direct effects. Additionally, the relatively homogeneous profile of the sample (e.g., age and professional experience) may have attenuated variability in body image perceptions, limiting its explanatory power. It is also possible that the measurement approach used to assess body image may not have fully captured its multidimensional nature, potentially contributing to the lack of observed associations.

Interestingly, the logistic regression analysis indicated that moderate physical activity was associated with higher odds of body image dissatisfaction, although this finding was marginal and should be interpreted with caution. This result appears counterintuitive given the well-established positive association between physical activity and body image [15]. One possible explanation is that individuals who are dissatisfied with their bodies may be more likely to engage in physical activity as a compensatory behaviour, rather than physical activity leading to dissatisfaction. This interpretation is consistent with evidence suggesting a complex and potentially bidirectional relationship between these variables [15], highlighting the need for longitudinal research to disentangle the directionality of these associations. This finding also underscores the importance of considering motivational factors underlying physical activity engagement, which may differ across individuals. Another relevant finding was that years of service were positively associated with body image dissatisfaction, suggesting that more experienced teachers may report greater discrepancies between perceived and ideal body image. This may reflect age-related changes in body composition or shifting personal expectations over time, which have been previously associated with body image perceptions across adulthood [10]. However, further research is needed to better understand this association.

Regarding sex differences, the results showed that sex did not moderate the relationship between physical activity and burnout, indicating that the observed associations were consistent across men and women. This finding contrasts with some previous studies suggesting sex-based differences in burnout and health behaviours [18,20] but aligns with more recent evidence indicating that the mechanisms linking physical activity to psychological outcomes may be broadly similar across sexes [17]. The absence of moderation effects suggests that interventions promoting physical activity may be broadly applicable across sexes, although future research should continue to explore potential contextual or sociocultural influences.

Despite these contributions, several limitations should be acknowledged. First, the cross-sectional design precludes causal inferences. Second, all variables were assessed using self-report measures, which may be subject to reporting bias. Third, the sample was regionally restricted, which may limit generalizability. Finally, the relatively low explained variance in some models indicates

that additional factors, particularly organizational and psychosocial variables—should be considered in future research [4,7]. Future studies should also consider longitudinal designs and incorporate objective measures of physical activity to strengthen causal inference and reduce measurement bias.

## 5. Conclusions

In conclusion, the present study provides evidence that moderate physical activity is associated with specific burnout-related outcomes in teachers, specifically lower depersonalization and higher personal accomplishment, while no significant association was observed for emotional exhaustion. These findings highlight the role of physical activity as a relevant, though not sufficient, factor in promoting occupational well-being among teachers.

In contrast, body image did not emerge as a significant predictor of burnout, suggesting that its role in this context may be limited or indirect, and potentially mediated by other psychosocial factors. The absence of sex differences further indicates that the relationships between physical activity and burnout are consistent across men and women.

Overall, these findings support a multidimensional perspective of teacher well-being, in which individual lifestyle behaviours such as physical activity complement, but do not replace, the influence of structural and organizational determinants. From a practical standpoint, promoting moderate physical activity may represent a feasible and accessible strategy to enhance certain aspects of teacher well-being. However, comprehensive interventions that address both individual-level behaviours and workplace-level conditions are likely necessary to effectively reduce burnout in this population. Future research should further explore these relationships using longitudinal designs to better understand causal pathways.

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data supporting the findings of this study are available from the principal investigators upon reasonable request.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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