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Workload and Need for Recovery in the Academy: The Moderating Role of Student Demands and Meaningful Work Perceptions

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ABSTRACT

Research has often focused on which teaching-related stressors might undermine teachers' effectiveness, with spillover effects on students' performance. This connection makes studies on teacher well-being crucial, as well as the search for variables that can act as a buffer for unavoidable job stressors. The present study investigates whether the relationship between academic workload and the need for recovery varies based on student demands and meaningful work perceptions. Hence, a moderated moderation model was tested on 236 Italian university teachers. The results show that the effect of academic workload on the need for recovery is higher in conditions of high student demands. Meaningful work plays a protective role, mitigating the effect of academic workload in both high and low student demands conditions. These findings suggest the promotion of protective elements that can trigger a virtuous process such that teachers' well-being improves effectiveness, which, in turn, improves students' learning experience.

1 | Introduction

In recent years, research on the causes of stress in university professors has made relevant progress. It has shifted from a common view of the academy as a workplace characterised by low workloads, high flexibility, autonomy and various perks (e.g., free time, possibility to travel), to a more realistic view that sees the university professors subject to high workloads, mental load and work pressure due to the 'publish or perish' mission (Gillespie et al. 2001) and the increase in bureaucratic and administrative commitments (Bryson 2004; Pace et al. 2022). Furthermore, working in a context characterised by high interpersonal interaction, they may also have to manage the burden resulting from the need to control and manipulate their emotional expressions (Pace and Sciotto 2021). Studies in several countries have highlighted many stressors associated

with teachers' work, including increased cognitive and emotional demands, work overload, challenging schedules, work-life conflict, job insecurity and unchanged resources (Shin and Jung 2014; Mudrak et al. 2018). Investigating factors that may undermine teachers' functioning is particularly important as it is related to crucial outcomes, such as the efficiency of their teaching methods and student performance (Huyghebaert et al. 2018). Numerous studies (e.g., Watts and Robertson 2011; Bakker and Demerouti 2017; Huyghebaert et al. 2018) have demonstrated the involvement of stress factors in the process of psychological health impairment (i.e., emotional exhaustion) and in predicting some work attitudes and behaviours (e.g., job satisfaction, motivation) rather than others (e.g., absenteeism, job dissatisfaction). It is not clear, however, what can distinguish the behaviour of one teacher from another, under the same stressful conditions. Previous research

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suggests that professors can derive motivation from their disciplines, specifically from passing on knowledge through teaching (Gillespie et al. 2001) and from expanding knowledge horizons through research (Pace and Sciotto 2021). A sense of belonging to the educational institution is fostered under conditions of autonomy, flexibility and social support (Crawford, LePine, and Rich 2010; Skaalvik and Skaalvik 2018), and when clarity of roles, recognition for one's achievements and work-life balance are provided (Shin and Jung 2014; Hu, Cui, and Wang 2016). This emotional commitment, in turn, can translate into a greater sense of meaning attached to one's work and, consequently, positive outcomes in terms of both performance and overall well-being (Ugwu and Onyishi 2018; Allan et al. 2019; Minkkinen, Auvinen, and Mauno 2020).

The international literature on stress and psychosocial well-being in the workplace in recent decades has focused on the issue of the imbalance between job demands and resources, highlighting that job demands, if not compensated by support components, can explain the onset of negative perceptions towards one's work (Bakker, Demerouti, and Sanz-Vergel 2023). The job demands–resources model (JD-R; Bakker and Demerouti 2017) is one of the most used theoretical frameworks to address the issue of well-being and psychosocial risks of academics (Dicke et al. 2018; Skaalvik and Skaalvik 2018; Pace and Sciotto 2021; Brondino et al. 2022). It provides a comprehensive analysis of the combined effects of stressful and protective factors. Its application in the present study aims to deepen the understanding of some dynamics of academic work and the unique challenges of the university teaching profession.

1.1 | Theoretical Framework: The Job Demands–Resources Model

Research on work-related stress is based on the fundamental distinction between work-related stressors and resource factors and assumes that stressors are related to fatigue and tension, while resources are related to well-being and may function as a buffer against stress (Bakker, Demerouti, and Sanz-Vergel 2023). Every potential job stressor is not negative in itself. If it does not exceed the individual's capabilities and resources, it does not necessarily have a negative effect on well-being. Instead,

if capabilities and resources are exceeded on a daily basis, it is likely to have a detrimental effect on individuals' psychological and occupational well-being (Zapf et al. 2021). The JD-R model (Bakker and Demerouti 2017) is based on the assumption that job demands and job resources characterise all work environments and that these can produce both negative effects, such as burnout and work-related stress, and positive effects, such as increased work engagement and work-related well-being (Bakker and Demerouti 2017). Job demands include all those work elements that require mental or physical effort, while job resources include those individual, social or organisational aspects that can be functional for workers both to regulate the stress related to job demands and to achieve their work goals (Bakker and Demerouti 2017). According to the model, the two sets of factors can induce health impairment processes and motivational processes, respectively. If the individual possesses enough resources (personal resources) or receives them from the work environment (organisational resources), interacting with job demands these resources can trigger motivational processes that ultimately lead to positive organisational outcomes through work engagement. If, however, individual and/or organisational resources are insufficient, a process of health deterioration can be triggered, such that high job demands exhaust the already limited mental and physical resources available and can thus lead to exhaustion and poor mental health (Crawford, LePine, and Rich 2010; Bakker, Demerouti, and Sanz-Vergel 2023). A persistent condition of fatigue and exhaustion can give rise to both negative organisational and health outcomes (Dormann and Zapf 2004; Sonnentag and Fritz 2015; Zapf et al. 2021). For example, studies on teachers have shown that suffering from emotional exhaustion decreases their level of job satisfaction and commitment and may cause them to leave the teaching profession (Boyd et al. 2011; Skaalvik and Skaalvik 2018; Dicke et al. 2018). On the other hand, the opportunity to regularly benefit from organisational resources (e.g., training, autonomy, feedback), personal resources (e.g., the perception of doing meaningful work) and social resources (e.g., support from colleagues and supervisors) can decrease the occurrence of negative consequences (Hakanen, Bakker, and Schaufeli 2006; Minkkinen, Auvinen, and Mauno 2020; Pace et al. 2022; Bakker, Demerouti, and Sanz-Vergel 2023). See Figure 1 for an attempt to summarise the variables most frequently examined in previous research to test the JD-R model in the educational context.

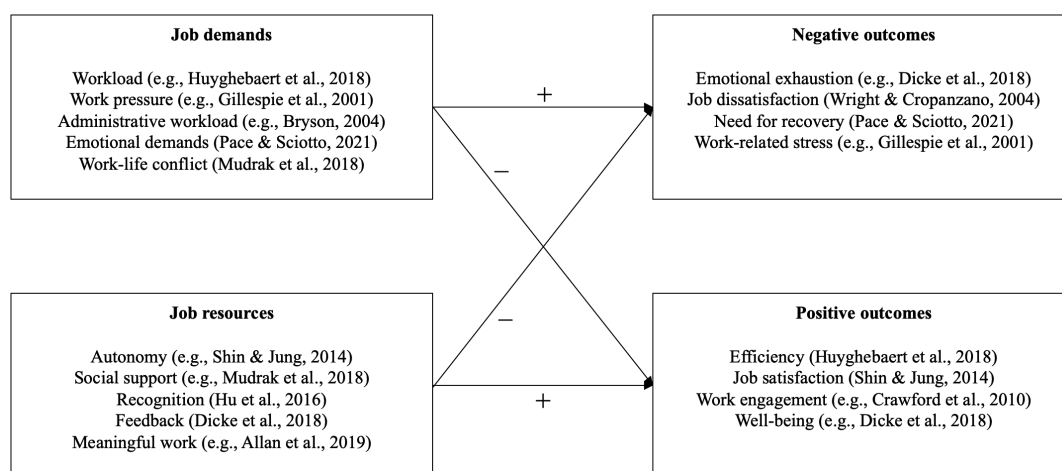


FIGURE 1 | The job demands–resources model in the educational context.

The link between job demands and negative outcomes, however, is not always linear and predictable. The meta-analysis by Crawford, LePine, and Rich (2010) delved into the JD-R theory and found that work demands and engagement can be significantly correlated and the direction of the relationship varies depending on the nature of the demand in question. Job demands such as workload, time pressure and high levels of job responsibility can be considered examples of challenge stressors (Cavanaugh et al. 2000). Unlike hindrance stressors, these have the potential to promote experience, skill, personal growth or future earnings, so they can foster work engagement as much as job resources can (Cavanaugh et al. 2000).

Ultimately, job demands can only become a source of stress when they exceed employees' resources and when meeting them requires significant effort on the part of the worker without adequate recovery (Sonnentag and Fritz 2015). On the other hand, they can also lead to positive outcomes if, while requiring effort, they are also stimulating and challenging, provoking a problem-solving-oriented response in the worker and thus becoming an opportunity for personal and professional growth (Cavanaugh et al. 2000; Crawford, LePine, and Rich 2010).

1.2 | Job Demands: Academic Workload and Student Demands

Academics perform complex and crucial work in a demanding and rapidly developing environment (Mudrak et al. 2018). Traditionally, universities have defined the role of academic teaching staff based on the three areas of teaching, research and service. Very often it is difficult to reconcile all these aspects, with serious effects on stress levels (Tytherleigh et al. 2005; Boyd et al. 2011; Shin and Jung 2014). Investigating the impact of academic workload plays a crucial role in the context of university teaching, as a key element that directly affects not only the quality and effectiveness of teaching but also the educational experience of students (Huyghebaert et al. 2018). Excessive workload is one of the most common sources of stress for academics and an influential reason to leave the profession (Gillespie et al. 2001; Hakanen, Bakker, and Schaufeli 2006; Bowling and Kirkendall 2012). The results of a survey among academics in the United Kingdom showed that 93% of academics suffered from work-related stress and 62% from excessive strain; 86% of them blamed their workload as too heavy (Tytherleigh et al. 2005). In a recent study on a sample of Italian university researchers (Pace and Sciotto 2021), the academic workload was significantly related to the need to recover physical and mental energy at the end of the working day, especially if associated with high levels of emotional demands. Other research has proven a cause-and-effect relationship between job demands (including work pressure and workload) and work-related stress (Boyd et al. 2011; Dicke et al. 2018). The stress resulting from the workload has, in turn, a strong impact on job performance (McLean and McDonald Connor 2015). Indeed, it has been shown that the increase in workload and work-related stress has led to a reduction in the time dedicated to research and professional development (measured in terms of publications), a worsening of teaching standards and an increase in interpersonal conflicts with the academic staff (Boyd et al. 2011), with repercussions also on personal life caused by the worsening of the quality of

free time (Tytherleigh et al. 2005). Significant associations have also been found between workload and emotional exhaustion (Wirtz et al. 2017), sleep disturbances and overcommitment (Huyghebaert et al. 2018), fatigue (Nixon et al. 2011), and difficulty recovering resources during free time as influenced by work-related thoughts (Mudrak et al. 2018). Among the variables that may contribute to increased academic workload and that are impossible to avoid as an intrinsic element of a university teacher's mandate, student demands, especially when perceived as excessive, could further contribute to teacher fatigue (Shin and Jung 2014). However, to date and based on our knowledge, no research has evaluated this specific variable or included it in a job demands-resources model.

1.3 | Job Resources: Meaningful Work

In the attempt to investigate which resources can act as protective elements for the well-being of teachers, in recent years some researchers have investigated whether the perception that one's work is significant and relevant for oneself and others can alleviate the burden of job demands (Minkkinen, Auvinen, and Mauno 2020; Pace et al. 2022), recognising the role of meaningfulness as a possible personal resource in managing the academic workload. As indicated by Rosso, Dekas, and Wrzesniewski (2010), the concept of meaningful work does not simply indicate what the work means to the individual (meaning), but the relevance and importance it has for oneself and others, especially if it is in concordance with one's value system (meaningfulness). Meaningful work may be highly relevant in coping with stressful situations, as those who find meaning in their work experience greater well-being (Arnold et al. 2007; Pace et al. 2022) and greater satisfaction and cohesion in the work environment (Steger, Dik, and Duffy 2012). Perceiving one's work as meaningful motivates individuals to perform tasks productively, demonstrating a strong commitment to their work and the organisation, a tendency to be more ethical and professional and greater job satisfaction (Allan et al. 2019). Furthermore, assuming they find it convenient in terms of time and energy, it makes individuals willing to work long hours without expecting additional compensation, show flexibility and cultivate positive social relationships, thus contributing to the organisation's results through the quality of their work (Steger, Dik, and Duffy 2012). In the educational context, meaningful work can lead to a sense of empowerment resulting from the enrichment of students' lives, the perception of influencing students' lives, the alignment between personal and professional values, the opportunity to express creativity within their tasks and the ability to establish meaningful relationships (Minkkinen, Auvinen, and Mauno 2020). Few studies have investigated the link between meaningful work and positive work outcomes in educational contexts. However, research conducted to date has revealed encouraging results, demonstrating that teachers' perceptions of doing meaningful work can mitigate the effects of stress on health (Minkkinen, Auvinen, and Mauno 2020) and lead to positive work behaviours (Willemse and Deacon 2015). Furthermore, teachers with high levels of perceived meaningfulness exhibited significantly higher work engagement, even in contexts of organisational frustration (Ugwu and Onyishi 2018), and higher levels of pleasure in working, moderating the negative effects of technostress due to online teaching methods (Pace et al. 2022).

1.4 | Need for Recovery

At the end of the workday, individuals may feel the need to recover the physical and psychological energies expended while working in order to reduce or eliminate the symptoms of fatigue resulting from job demands and stressful work events (Sonnetag and Fritz 2015). This need is proportional to the amount of emotional, cognitive and behavioural load faced during the working day. People with high levels of need for recovery are characterised by feelings of overload, irritability, social withdrawal, lack of energy and, if persistent, reduced performance levels (Sonnetag and Zijlstra 2006). The need for recovery is related to the urge to take a break when fatigue accumulates, resulting in a reluctance to continue current demands or accept new ones (Demerouti, Taris, and Bakker 2007). Conditions related to the need for recovery include, for example, the inability to relax at the end of the day, lack of concentration in free time, the desire for days off and fatigue experienced already at the beginning of the working day (Sonnetag and Fritz 2015). When work demands increase, so does the experienced fatigue. If the energies are not restored, the fatigue can manifest itself through psychosomatic symptoms such as mood disorders and deterioration of cognitive functioning, potentially affecting individuals' private lives and their mental health (Zapf et al. 2021; Sciotto and Pace 2022). High levels of workload can compromise the process of recovery (Cropley, Rydstedt, and Andersen 2020) and, in line with the health impairment process (Bakker and Demerouti 2017), may trigger a process of resource deterioration that can eventually lead to psychophysical strain and sleep disorders (Sonnetag, Cheng, and Parker 2022). Those who perform work subject to high pace and workload are exposed to risks to their mental and physical health seven times greater than those who do not (Cropley, Rydstedt, and Andersen 2020). Job resources, if present, can act as a buffer and ease the burden of work demands on the ability to recover energy. For example, work autonomy (i.e., the possibility of shifting to less demanding tasks at the end of the workday or changing work methodology) and support from co-workers can significantly lighten the workload (Sonnetag and Zijlstra 2006), acting on improved recovery levels and mood (Sonnetag, Cheng, and Parker 2022).

1.5 | Aims

Based on these premises and drawing on the JD-R theoretical model (Bakker and Demerouti 2017), the present study aims to verify the associations between two job demand variables

(academic workload and excessive students' demands) and a job resource variable (meaningful work) with the perceived need for recovery in a sample of academics (researchers and professors). Specifically, we hypothesise that (Figure 2):

Hypothesis 1. *Academic workload is negatively associated with the need for recovery.*

Hypothesis 2. *Excessive student demands moderate the relationship between academic workload and the need for recovery so that in conditions of high student demands the need for recovery is higher.*

Hypothesis 3. *This relationship is further moderated by meaningful work perception, which has a protective role.*

2 | Materials and Methods

2.1 | Sample

Data were collected through a snowball sampling procedure between December 2022 and February 2023. An invitation email was sent using the email addresses publicly listed on the websites of each Italian university. The email contained information about the research, the objectives of the study (i.e., to assess work-related well-being within the academy), a link to the online questionnaire, informed consent documents and a privacy statement. Participants were assured complete anonymity throughout the data collection process, following the guidelines of the Ethics Committee of the University of Palermo. A sample of 236 subjects was analysed in this study. Overall, 43.2% are female and 56.8% male. The mean age of the participants is 52.8 years (SD=8.54). The sample is made up of 53% associate professors, 31.4% full professors, 6.8% permanent researchers, 6.7% fixed-term researchers and 2.1% 'other' (lecturers on contract, research fellows, post-doctoral fellows). The CUN areas of affiliation are distributed as follows: 38.1% Industrial and Information Engineering, 13.1% Architecture, 11.4% Biological Sciences, 7.2% Civil Engineering, 5.9% Mathematical and Computer Sciences, 4.7% Physical Sciences, 4.7% Chemical Sciences, 3% Economics and Statistics, 3% History, Philosophical and Pedagogical Sciences, 2.1% Medical Sciences, 2.1% Legal Sciences, 1.7% Ancient, Philological-Literary and Historical-Artistic Sciences, 1.3% Agricultural and Veterinary Sciences, 0.8% Political and Social Sciences, 0.4% Psychological Sciences and 0.4% Earth Sciences.

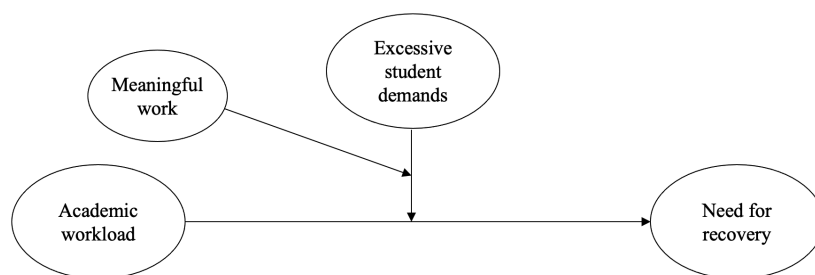


FIGURE 2 | The hypothesised model.

2.2 | Measures

Two scales from the Academic Quality at Work Tool (AQ@workT; Brondino et al. 2022) were used to assess academic workload (a scale originally proposed by Boyd et al. 2011) and excessive students' demands (a scale adapted from Dormann and Zapf 2004). Both were rated on a 6-point Likert scale from 1 = 'totally disagree' to 6 = 'totally agree'. Higher scores indicate a greater presence of the construct.

The academic workload scale consists of six items (e.g., 'I don't have enough time to do quality research'). It measures the amount of work tasks typically related to academic activity (lessons, administrative duties and research) to be completed by the end of the working day, and the potential inability to complete them all adequately. Cronbach's α for this study is 0.81.

The excessive student demands scale is composed of four items (e.g., 'Students burden my work by making improper demands'). It measures the amount of requests received from students and the possibility that they slow down the teacher's work due to behaviours that indicate inattention or lack of motivation. Cronbach's α for this study is 0.82.

To assess meaningful work and need for recovery, two scales from the Questionnaire on the Experience and Evaluation of Work 2.0 (QEEW 2.0; Van Veldhoven et al. 2015) were used. Both scales were rated on a 4-point Likert scale ranging from 1 = 'strongly disagree' to 4 = 'strongly agree', and higher scores indicate a greater presence of the construct.

The meaningful work scale consists of 10 items (e.g., 'In my work, I can be meaningful to others'). It measures the perception that one's profession is meaningful and important, both to oneself (according to one's aspirations, attitudes and values) and to others, in terms of its relevance for the improvement of individuals and society. Cronbach's α value in this study is 0.89.

The need for recovery scale consists of six items (e.g., 'I find it difficult to relax at the end of a working day'). It measures the perceived need to recover physical and mental energy expended during work and the feeling of not being able to detach from work-related thoughts even at home. Cronbach's α for this study is 0.87.

2.3 | Data Analysis

Descriptive statistics, correlations, means, standard deviations, common method bias and reliability indices for all study variables were measured using SPSS 29. Skewness and kurtosis were also assessed to check the distribution of the data. Both indices were within the acceptable range, so the distribution can be considered normal. To verify the factor structure of the measurements, a confirmatory factor analysis (CFA) was conducted through Mplus 8, and the goodness-of-fit was evaluated. The following indices were used: χ^2 likelihood ratio statistic, Tucker-Lewis index (TLI), comparative fit index (CFI) and the root mean square error of approximation (RMSEA). Values ≥ 0.90 for TLI and CFI, and ≤ 0.08 for RMSEA and SRMR indicate a

good fit to the data (Hu and Bentler 1999). To test the research hypotheses, a moderated moderation model was carried out through the macro PROCESS for SPSS (version 3.5; Hayes 2018), using Model 3. This is a method widely used in the social sciences and allows for a simple and effective test of whether the presence of a second moderator moderates a first moderating effect of a variable on a linear relationship between two other variables (Hayes 2018). To assess the true presence of interaction effects, it is necessary to test the statistical significance of each conditional effect (Hayes 2018). A hierarchical regression analysis was also conducted to control for the effect of some sociodemographic variables such as gender, age and academic role, and to assess the contribution of the set of variables to the variance.

3 | Results

3.1 | Common Method Bias Testing

Since the instruments used to assess the variables in this study are all self-reports and the survey took place at a single point in time, there may be a portion of variance attributable to the measurement method instead of the constructs, that is, the common method bias. We chose to investigate the bias through Harman's single-factor test, using SPSS 29. An exploratory factor analysis (EFA) was conducted by entering all items from all scales and loading them on a single factor, without rotation. The results showed that this single factor accounted for 23% of the total variance, which was well below the 50% cut-off point (Podsakoff and Organ 1986). Therefore, it was possible to conclude that common method bias is not present.

3.2 | Hypotheses Testing

Prior to the hypotheses testing, a confirmatory factor analysis (CFA) was conducted to verify that the factor structure of the instruments used is supported by the data. The estimation method was maximum likelihood (ML). All factor loadings were statistically significant ($p < 0.001$) and between 0.414 and 0.951. The fit of the model is adequate ($\chi^2 = 515.982$, $df = 293$, $p < 0.001$; RMSEA = 0.057, 90% CI = 0.049–0.065; CFI = 0.93; TLI = 0.92; SRMR = 0.06), with all index values above the cut-off point (Hu and Bentler 1999).

Table 1 shows means, standard deviations and correlations among the study variables.

In line with the literature, the correlation matrix shows that the perception of meaningful work negatively correlates with the job demand variables. As hypothesised, the need for recovery positively correlates with academic workload and excessive student demands. In contrast, the relationship between the latter and the perception of meaningful work, while negative in sign, was not found to be statistically significant. Table 2 shows the hierarchical regression analysis with the need for recovery as the outcome.

In the first step, gender, age and role in the university were inserted as control variables. In the second step, all the study variables were added. Finally, the interaction terms were added in the

TABLE 1 | Means, standard deviations and correlations ($N=236$).

Variable	Mean (SD)	1	2	3	4
1. Academic workload	3.76 (1.50)	1			
2. Excessive student demands	2.19 (1.27)	0.295 ^a	1		
3. Meaningful work	3.04 (0.78)	-0.178 ^a	-0.099	1	
4. Need for recovery	2.07 (0.86)	0.449 ^a	0.283 ^a	-0.296 ^a	1

^aCorrelation is significant at the 0.01 level (2-tailed).

TABLE 2 | Coefficients table of hierarchical regression analysis ($N=236$).

Predictors	Need for recovery			
	R^2	ΔR^2	β	SE
<i>Step 1—Control variables</i>	0.05			
Gender			0.039	0.11
Age			-0.141*	0.01
Academic role			0.093	0.05
<i>Step 2—Variables</i>	0.29	0.24		
Academic workload			0.358**	0.06
Excessive student demands			0.084	0.06
Meaningful work			-0.260**	0.06
<i>Step 3—Interactions</i>	0.33	0.04		
Academic workload \times excessive student demands			0.174**	0.06
Academic workload \times meaningful work			-0.078	0.05
Meaningful work \times excessive student demands			0.140*	0.06
Academic workload \times meaningful work \times excessive student demands			0.026	0.06

Note: β = standardised beta coefficient from the final step.

* $p < 0.05$.

** $p < 0.01$.

third step. The final model explains 33% of the variance. Before calculating the interactions, all the variables were standardised (mean = 0 and SD = 1). Among the control variables, neither gender nor academic role (professor or researcher) has a significant effect. As regards age, however, it seems linked to the need for recovery. Considering the beta value, age seems to be inversely proportional to the need for recovery. The relation between excessive student demands and the need for recovery was not statistically significant. However, academic workload and the need for recovery are negatively associated, as expected. Two interactions, the one between academic workload and excessive student demands, and the one between perceived meaningful work and excessive student demands, were found to be statistically significant. Hypothesis 1 and Hypothesis 2 are both confirmed.

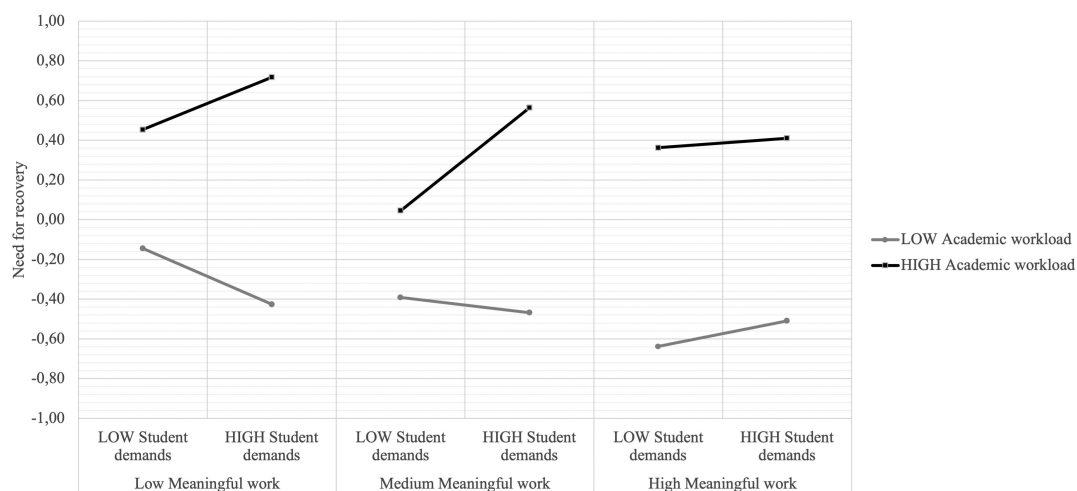
To test the moderated moderation model, we used Model 3 of the macro PROCESS (Hayes 2018) for SPSS. We computed the need for recovery as the outcome, academic workload as the independent variable, excessive student demands as the first

moderator and perceived work meaningfulness as the second moderator. The results confirmed the significant effects of the two interactions that emerged from the hierarchical regression in Table 2. The interaction effects of academic workload and excessive student demands at different levels of perceived meaningfulness of work are almost all significant, as shown in Table 3.

The effect of academic workload on the need for recovery increases significantly at high levels of excessive student demands, especially if the perception of meaningful work is low. In contrast, in conditions of high levels of meaningful work perceptions, the interaction effect of the job demands on the need for recovery is significantly lower. This result supports the hypothesis that perceiving one's job as meaningful acts as a job resource and has the potential to protect from physical and mental fatigue at the end of the workday. Consequently, Hypothesis 3 is also confirmed. See Figure 3 for the graphical representation of results.

TABLE 3 | Conditional effects of the focal predictor at values of the moderators ($N = 236$).

Moderator 1	Moderator 2	Effect	SE	<i>p</i>
Low excessive student demands	Low meaningful work	0.414**	0.07	0.000
Low excessive student demands	Medium meaningful work	0.341**	0.06	0.000
Low excessive student demands	High meaningful work	0.267**	0.08	0.001
High excessive student demands	Low meaningful work	0.590**	0.11	0.000
High excessive student demands	Medium meaningful work	0.532**	0.09	0.000
High excessive student demands	High meaningful work	0.475**	0.12	0.000

* $p < 0.05$.** $p < 0.01$.**FIGURE 3** | Interaction effects between academic workload, excessive student demands and meaningful work on the need for recovery ($N = 236$).

4 | Discussion

The present study aimed to confirm the negative association between academic workload and the need for recovery in a sample of university teachers (both professors and researchers), and to test whether the perceived meaningfulness associated with one's job could play a protective role also in the academic context.

The choice of variables to measure fell on academic workload, the need for recovery, and the influence of student demands as factors that could damage professors' efficiency and their teaching performance, with spillover effects on students' efficiency and learning performance. It is crucial also for universities to be concerned about the return on investment of psychosocial risk assessment initiatives, as healthy and efficient employees are linked to improved human capital, better productivity, reduced turnover and fewer days of unplanned absences (World Economic Forum 2013). Quantitative evidence effectively supports the planning and implementation of wellness programmes, which go through the promotion of job resources where job demands cannot be acted upon as they may be an integral or characterising part of the job (such as administrative requirements and student support in the case of university teachers). The choice to measure the perception of meaningfulness associated

with one's work is justified by recent evidence in the literature (e.g., Ugwu and Onyishi 2018; Minkkinen, Auvinen, and Mauno 2020; Pace et al. 2022) and, at the same time, by the novelty of the construct compared to other job resources that have already been extensively studied.

Drawing on the job demands–resources model (Bakker and Demerouti 2017), we treated academic workload and excessive demands from students as job demands. Conversely, we hypothesised that the perception of meaningful work could be a job resource. Consequently, job demands should have been positively associated with fatigue, operationalised as the need to recover physical and mental energy at the end of the workday, while the job resource should have dampened the relationship. The hypotheses were confirmed.

The results showed that the levels of physical and mental fatigue at the end of the workday are higher for subjects who experience higher levels of academic workload. Academics who perceive that they face an overload of work duties may be hindered in recovering their energy at the end of the workday. According to the health impairment process (Bakker and Demerouti 2017) and the theorisations on the need for recovery (e.g., Sonnentag and Fritz 2015), the inability or impossibility to recover the resources spent during the workday

could trigger a loss spiral such that unrecovered fatigue affects the next day's physical and mental state, which in turn will further increase fatigue, and so on (Demerouti, Taris, and Bakker 2007; Sonnentag, Cheng, and Parker 2022; Bakker, Demerouti, and Sanz-Vergel 2023).

In the academic context, the relationship between workload and the need for recovery intensifies when the levels of demands from students are also higher. Responding to the needs of their students is not a duty that teachers can set aside, especially since in the academic context teachers' evaluations depend precisely on the evaluation of their students. Support in and out of the classroom is an essential part of the job. The increase in the number of students enrolled in universities and the number of teaching positions remaining relatively stagnant, however, contributes to the increase in academic workload (Shin and Jung 2014). The results of the present study showed that student demands, when perceived as excessive and frequent, significantly worsen the need for recovery at the end of the workday. This association is stronger in conditions of low and medium levels of meaningful work. If one's work is not experienced as particularly meaningful, excessive demands from students have a greater impact on the need for recovery. In contrast, among academics who perceive their work as meaningful, receiving excessive demands from their students does not have a worsening effect. In this case, the levels of need for recovery seem to depend more on the level of academic workload. This result is in line with the motivational process of the JD-R model (Bakker and Demerouti 2017), according to which job resources have the potential to dampen the burden of job demands and foster workers' motivation. In this case, the meaningfulness attributed to work could alleviate the need for recovery by giving meaning to fatigue. Thinking of one's work as important and necessary, therefore, might make the fatigue experienced in doing it more tolerable because teachers might feel that, despite the weight of workloads, it is still worth investing their time and energy in it (Pace et al. 2022).

The perceived meaningfulness of work has an interesting effect also among academics with low levels of workload. In fact, the levels of need for recovery under low workload conditions decrease as meaningful work levels increase. Among subjects who do not consider their workload to be excessive, students' demands do not seem to have a worsening effect, especially in conditions of low and medium levels of perceived meaningfulness. It is possible that in conditions of low academic workload excessive students' demands might be experienced as challenging job demands (Crawford, LePine, and Rich 2010). This result is crucial because it could be evidence that lightening the academic workload is the key to a better teaching and learning experience for students. Fewer unavoidable work duties could benefit the performance of both professors and students, who could be better supported and encouraged in their academic pursuits.

Finally, regarding the negative relationship between age and the need for recovery, it would seem that the level of fatigue decreases as age increases. This could be explained by the fact that, as the career progresses, the workload and responsibilities associated with it decrease, as does the stressful burden of 'publish or perish', which is typically linked to the beginning of an academic career (Pace and Sciotto 2021).

4.1 | Limitations and Future Research

The limitations of the present study are several. Due to the cross-sectional design, it is not possible to draw inferences on the cause-effect relationships between the variables. Furthermore, it is based only on self-report data and belongs to a specific context, the Italian context, which is largely influenced by Italian specificities in terms of research and universities. Therefore, it is not possible to generalise the results. Future research directions include transforming the design to longitudinal, by adding further measurements to track any fluctuations in the variables.

5 | Conclusion

The present study aims to highlight two crucial aspects of the relationship between individuals and their work: the importance of the meaning attributed to one's profession and the need for detachment from work-related thoughts during free time.

In the case of university teachers, our data seem to support the hypothesis that the meaning attached to one's work may offer protection from the perceived burden of workload and, consequently, the need to recover, even when aggravated by the perception of having to respond to excessive demands from students.

Work-related stress in the academic context appears to be an incremental phenomenon in recent years (Brondino et al. 2022). The reasons seem to lie in several aspects. On the one hand, the unstoppable progress of technologies applied to educational systems increasingly allows a constant connection between students and teachers (Pace et al. 2022). On the other hand, the fact that educational institutions (universities more than others) increasingly base evaluations of teacher effectiveness on surveys conducted in classrooms (Knight 2002) means that teachers are pushed to respond quickly and effectively to student requests (Bryson 2004; Brondino et al. 2022).

The literature suggests that promoting workers' well-being means not only protecting their health but also improving their professional effectiveness and therefore performance, which in turn decreases voluntary turnover (Wright and Cropanzano 2004). Universities that want to maintain high standards should pay attention to employee protection processes for both reasons.

The perception of meaningfulness of work could be considered as an individual resource, and it is probably true that some psychological traits support it, especially in the case of professions with a high social value such as teaching (Minkkinen, Auvinen, and Mauno 2020). However, we believe it is useful to draw attention to the fact that the perception of significance can depend to a large extent on how the organisation allows employees to perform their role, for example, by respecting its value system. Therefore, to a certain extent, the work organisation (the university, in this case) can intervene at multiple levels to strengthen the shared perception of significance, starting from paying attention to places and spaces, to shared procedures, to communication actions, and more generally to faculty development processes (Austin and Sorcinelli 2013).

A possible theoretical development starting from the results of the present study could be to systematically explore the aspects that contribute to the creation of a sense of meaningfulness in the increasingly complex academic context. For example, starting from the exploration of the weight of personal values and the concordance between these and organisational values, and focusing on the investigation of professional experiences, to evaluate how the latter may have changed teachers' perceptions. In our opinion, the significance of the teaching profession could play an important role in protecting work-related well-being and effectiveness. Its perception depends not only on individual characteristics but also on the educational institution, which must not limit itself to exploiting it as an inexhaustible resource but must support it and, where possible, help to build it.

Author Contributions

Giulia Sciotto: conceptualisation, methodology, formal analysis, writing – original draft, writing – review and editing, data curation. **Francesco Pace:** conceptualisation, investigation, supervision, writing – original draft. **Cristina Moavero:** writing – original draft.

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Ethics Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Palermo. Informed consent was obtained from all the subjects involved in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are openly available in the OSF repository at https://osf.io/xh7fz/?view_only=50f0e39bad2440f9ae9721cecc4ec0cb.

References

- Allan, B. A., C. Batz-Barbarich, H. M. Sterling, and L. Tay. 2019. "Outcomes of Meaningful Work: A Meta-Analysis." *Journal of Management Studies* 56, no. 3: 500–528. <https://doi.org/10.1111/joms.12406>.
- Arnold, K. A., N. Turner, J. Barling, E. K. Kelloway, and M. C. McKee. 2007. "Transformational Leadership and Psychological Well-Being: The Mediating Role of Meaningful Work." *Journal of Occupational Health Psychology* 12: 193–203. <https://doi.org/10.1037/1076-8998.12.3.193>.
- Austin, A. E., and M. D. Sorcinelli. 2013. "The Future of Faculty Development: Where Are We Going?" *New Directions for Teaching and Learning* 2013, no. 133: 85–97. <https://doi.org/10.1002/tl.20048>.
- Bakker, A. B., and E. Demerouti. 2017. "Job Demands-Resources Theory: Taking Stock and Looking Forward." *Journal of Occupational Health Psychology* 22, no. 3: 273–285. <https://doi.org/10.1037/ocp0000056>.
- Bakker, A. B., E. Demerouti, and A. Sanz-Vergel. 2023. "Job Demands-Resources Theory: Ten years Later." *Annual Review of Organizational*

Psychology and Organizational Behavior 10, no. 1: 25–53. <https://doi.org/10.1146/annurev-orgpsych-120920-053933>.

Bowling, N. A., and C. Kirkendall. 2012. "Workload: A Review of Causes, Consequences, and Potential Interventions." In *Contemporary Occupational Health Psychology: Global Perspectives on Research and Practice*, edited by J. Houdmont, S. Leka, and R. R. Sinclair, vol. 2, 221–238. Hoboken, NJ: Wiley Blackwell. <https://doi.org/10.1002/9781119942849>.

Boyd, C. M., A. B. Bakker, S. Pignata, A. H. Winefield, N. Gillespie, and C. Stough. 2011. "A Longitudinal Test of the Job Demands-Resources Model Among Australian University Academics." *Applied Psychology* 60, no. 1: 112–140. <https://doi.org/10.1111/j.1464-0597.2010.00429.x>.

Brondino, M., F. Signore, A. Zambelli, et al. 2022. "A New Academic Quality at Work Tool (AQ@workT) to Assess the Quality of Life at Work in the Italian Academic Context." *International Journal of Environmental Research and Public Health* 19, no. 6: 3724. <https://doi.org/10.3390/ijerph19063724>.

Bryson, C. 2004. "What About the Workers? The Expansion of Higher Education and the Transformation of Academic Work." *Industrial Relations Journal* 35, no. 1: 38–57. <https://doi.org/10.1111/j.1468-2338.2004.00299.x>.

Cavanaugh, M. A., W. R. Boswell, M. V. Roehling, and J. W. Boudreau. 2000. "An Empirical Examination of Self-Reported Work Stress Among US Managers." *Journal of Applied Psychology* 85, no. 1: 65–74. <https://doi.org/10.1037/0021-9010.85.1.65>.

Crawford, E. R., J. A. LePine, and B. L. Rich. 2010. "Linking Job Demands and Resources to Employee Engagement and Burnout: A Theoretical Extension and Meta-Analytic Test." *Journal of Applied Psychology* 95, no. 5: 834–848. <https://doi.org/10.1037/a0019364>.

Cropley, M., L. W. Rydstedt, and D. Andersen. 2020. "Recovery From Work: Testing the Effects of Chronic Internal and External Workload on Health and Well-Being." *Journal of Epidemiology & Community Health* 74, no. 11: 919–924. <https://doi.org/10.1136/jech-2019-213367>.

Demerouti, E., T. W. Taris, and A. B. Bakker. 2007. "Need for Recovery, Home-Work Interference and Performance: Is Lack of Concentration the Link?" *Journal of Vocational Behavior* 71, no. 2: 204–220. <https://doi.org/10.1016/j.jvb.2007.06.002>.

Dicke, T., F. Stebner, C. Linninger, M. Kunter, and D. Leutner. 2018. "A Longitudinal Study of Teachers' Occupational Well-Being: Applying the Job Demands-Resources Model." *Journal of Occupational Health Psychology* 23, no. 2: 262–277. <https://doi.org/10.1037/ocp0000070>.

Dormann, C., and D. Zapf. 2004. "Customer-Related Social Stressors and Burnout." *Journal of Occupational Health Psychology* 9, no. 1: 61–82. <https://doi.org/10.1037/1076-8998.9.1.61>.

Gillespie, N. A., M. Walsh, A. H. Winefield, J. Dua, and C. Stough. 2001. "Occupational Stress in Universities: Staff Perceptions of the Causes, Consequences and Moderators of Stress." *Work & Stress* 15, no. 1: 53–72. <https://doi.org/10.1080/02678370110062449>.

Hakanen, J. J., A. B. Bakker, and W. B. Schaufeli. 2006. "Burnout and Work Engagement Among Teachers." *Journal of School Psychology* 43: 495–513. <https://doi.org/10.1016/j.jsp.2005.11.001>.

Hayes, A. F. 2018. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. 2nd ed. New York, NY: The Guilford Press.

Hu, C., S. Cui, and L. Wang. 2016. "Path Analysis of Work-Family Conflict, Job Salary and Promotion Satisfaction, Work Engagement to Subjective Well-Being of the Primary and Middle School Principals." *Journal of Education and Training Studies* 4, no. 9: 10–15. <https://doi.org/10.11114/jets.v4i9.1619>.

Hu, L., and P. M. Bentler. 1999. "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New

- Alternatives." *Structural Equation Modeling: A Multidisciplinary Journal* 6, no. 1: 1–55. <https://doi.org/10.1080/10705519909540118>.
- Huyghebaert, T., N. Gillet, N. Beltou, F. Tellier, and E. Fouquereau. 2018. "Effects of Workload on Teachers' Functioning: A Moderated Mediation Model Including Sleeping Problems and Overcommitment." *Stress and Health* 34, no. 5: 601–611. <https://doi.org/10.1002/smi.2820>.
- Knight, P. 2002. "The Achilles' Heel of Quality: The Assessment of Student Learning." *Quality in Higher Education* 8, no. 1: 107–115. <https://doi.org/10.1080/13538320220127506>.
- McLean, L., and C. M. McDonald Connor. 2015. "Depressive Symptoms in Third-Grade Teachers: Relations to Classroom Quality and Student Achievement." *Child Development* 86: 945–954. <https://doi.org/10.1111/cdev.12344>.
- Minkinen, J., E. Auvinen, and S. Mauno. 2020. "Meaningful Work Protects Teachers' Self-Rated Health Under Stressors." *Journal of Positive School Psychology* 4, no. 2: 140–152.
- Mudrak, J., K. Zabrodska, P. Kveton, et al. 2018. "Occupational Well-Being Among University Faculty: A Job Demands-Resources Model." *Research in Higher Education* 59, no. 3: 325–348. <https://doi.org/10.1007/s11162-017-9467-x>.
- Nixon, A. E., J. J. Mazzola, J. Bauer, J. R. Krueger, and P. E. Spector. 2011. "Can Work Make You Sick? A Meta-Analysis of the Relationships Between Job Stressors and Physical Symptoms." *Work and Stress* 25, no. 1: 1–22. <https://doi.org/10.1080/02678373.2011.569175>.
- Pace, F., G. D'Urso, C. Zappulla, and U. Pace. 2021. "The Relation Between Workload and Personal Well-Being Among University Professors." *Current Psychology* 40: 3417–3424. <https://doi.org/10.1007/s12144-019-00294-x>.
- Pace, F., and G. Sciotto. 2021. "The Effect of Emotional Dissonance and Mental Load on Need for Recovery and Work Engagement Among Italian Fixed-Term Researchers." *International Journal of Environmental Research and Public Health* 18, no. 1: 99. <https://doi.org/10.3390/ijerph18010099>.
- Pace, F., G. Sciotto, N. A. Randazzo, and V. Macaluso. 2022. "Teachers' Work-Related Well-Being in Times of COVID-19: The Effects of Technostress and Online Teaching." *Social Sciences* 11, no. 10: 453. <https://doi.org/10.3390/socsci11100453>.
- Podsakoff, P. M., and D. W. Organ. 1986. "Self-Reports in Organizational Research: Problems and Prospects." *Journal of Management* 12, no. 4: 531–544. <https://doi.org/10.1177/014920638601200408>.
- Rosso, B. D., K. H. Dekas, and A. Wrzesniewski. 2010. "On the Meaning of Work: A Theoretical Integration and Review." *Research in Organizational Behaviour* 30: 91–127. <https://doi.org/10.1016/j.riob.2010.09.001>.
- Sciotto, G., and F. Pace. 2022. "The Role of Surface Acting in the Relationship Between Job Stressors, General Health and Need for Recovery Based on the Frequency of Interactions at Work." *International Journal of Environmental Research and Public Health* 19, no. 8: 4800. <https://doi.org/10.3390/ijerph19084800>.
- Shin, J. C., and J. Jung. 2014. "Academics Job Satisfaction and Job Stress Across Countries in the Changing Academic Environments." *Higher Education* 67, no. 5: 603–620. <https://doi.org/10.1007/s10734-013-9668-y>.
- Skaalvik, E. M., and S. Skaalvik. 2018. "Job Demands and Job Resources as Predictors of Teacher Motivation and Well-Being." *Social Psychology of Education* 21, no. 5: 1251–1275. <https://doi.org/10.1007/s11218-018-9464-8>.
- Sonnentag, S., B. H. Cheng, and S. L. Parker. 2022. "Recovery From Work: Advancing the Field Toward the Future." *Annual Review of Organizational Psychology and Organizational Behavior* 9: 33–60. <https://doi.org/10.1146/annurev-orgpsych-012420-091355>.
- Sonnentag, S., and C. Fritz. 2015. "Recovery From Job Stress: The Stressor-Detachment Model as an Integrative Framework." *Journal of Organizational Behavior* 36: S72–S103. <https://doi.org/10.1002/job.1924>.
- Sonnentag, S., and F. R. H. Zijlstra. 2006. "Job Characteristics and Off-Job Activities as Predictors of Need for Recovery, Well-Being, and Fatigue." *Journal of Applied Psychology* 91, no. 2: 330–350. <https://doi.org/10.1037/0021-9010.91.2.330>.
- Steger, M. F., B. J. Dik, and R. D. Duffy. 2012. "Measuring Meaningful Work: The Work and Meaning Inventory (WAMI)." *Journal of Career Assessment* 20, no. 3: 322–337. <https://doi.org/10.1177/1069072711436160>.
- Tytherleigh, M. Y., C. Webb, C. L. Cooper, and C. Ricketts. 2005. "Occupational Stress in UK Higher Education Institutions: A Comparative Study of all Staff Categories." *Higher Education Research and Development* 24, no. 1: 41–61. <https://doi.org/10.1080/0729436052000318569>.
- Ugwu, F. O., and I. E. Onyishi. 2018. "Linking Perceived Organizational Frustration to Work Engagement: The Moderating Roles of Sense of Calling and Psychological Meaningfulness." *Journal of Career Assessment* 26, no. 2: 220–239. <https://doi.org/10.1177/1069072717692735>.
- Van Veldhoven, M. J. P. M., J. Prins, P. A. van der Laken, and L. Dijkstra. 2015. *QEEW2.0: 42 Short Scales for Survey Research on Work, Well-Being and Performance*. Amsterdam: SKB.
- Watts, J., and N. Robertson. 2011. "Burnout in University Teaching Staff: A Systematic Literature Review." *Educational Research* 53, no. 1: 33–50. <https://doi.org/10.1080/00131881.2011.552235>.
- Willemse, M., and E. Deacon. 2015. "Experiencing a Sense of Calling: The Influence of Meaningful Work on Teachers' Work Attitudes." *SA Journal of Industrial Psychology* 41, no. 1: 1274. <https://doi.org/10.4102/sajip.v41i1.1274>.
- Wirtz, N., T. Rigotti, K. Otto, and C. Loeb. 2017. "What About the Leader?: Crossover of Emotional Exhaustion and Work Engagement From Followers to Leaders." *Journal of Occupational Health Psychology* 22, no. 1: 86–97. <https://doi.org/10.1037/ocp0000024>.
- World Economic Forum. 2013. "The Workplace Wellness Alliance. Making the Right Investment: Employee Health and the Power of Metrics." https://www3.weforum.org/docs/WEF_HE_WorkplaceWellnessAlliance_Report_2013.pdf.
- Wright, T. A., and R. Cropanzano. 2004. "The Role of Psychological Well-Being in Job Performance." *Organizational Dynamics* 33, no. 4: 338–351. <https://doi.org/10.1016/j.orgdyn.2004.09.002>.
- Zapf, D., M. Kern, F. Tschan, D. Holman, and N. K. Semmer. 2021. "Emotion Work: A Work Psychology Perspective." *Annual Review of Organizational Psychology and Organizational Behavior* 8: 139–172. <https://doi.org/10.1146/annurev-orgpsych-012420-062451>.