social sciences

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The Role of Techno-Stress and Psychological Detachment in the Relationship between Workload and Well-Being in a Sample of Italian Smart Workers: A Moderated Mediated Model

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Abstract: Well-being conditions at work are determined by the balance between the demands from the organizational context and the perception of people to possess resources concerning the ability to cope with such requests. The pandemic caused by COVID-19 has changed working conditions, and employees have had to adapt to smart working (SW) by bringing new resources into play to meet new demands. Many organizations are questioning how to implement SW after the pandemic. According to the JD-R model, the present study considered workload during smart working and Techno-stress (the perceived stress concerning the use of technologies) as new requests (i.e., demands) coming from the organization and Psychological Detachment (the ability to create psychological distancing from work) as a personal resource. We investigated the moderator role of Psychological Detachment in the relationship between workload in SW and Well-being, mediated by Techno-stress (in its three dimensions: Techno-Overload, Techno-Invasion, and Techno-Complexity). The sample is made up of 622 Italian public administration employees who completed a questionnaire containing the following scales: Quantitative Workload Inventory, Well-being Index, Psychological Detachment, Techno-stress Creator Scale. Mediation and moderate-mediation models have been tested with PROCESS Macro. Findings showed that Techno-Invasion and Techno-Complexity fully mediate the relationship between workload in SW and well-being. Psychological detachment moderates the effect of the workload on Well-being, which in turn is mediated by Techno-Invasion. Furthermore, findings suggest the importance of identifying protective factors that can mitigate the workload effects on the employees' well-being in SW.

Keywords: workload; techno-stress; psychological detachment; well-being

Citation: Mondo, Marina, Jessica Pileri, Barbara Barbieri, Diego Bellini, and Silvia De Simone. 2023. The Role of Techno-Stress and Psychological Detachment in the Relationship between Workload and Well-Being in a Sample of Italian Smart Workers: A Moderated Mediated Model. *Social Sciences* 12: 530. https://doi.org/10.3390/socsci12100530

Academic Editor: Nigel Parton

Received: 23 June 2023
Revised: 15 September 2023
Accepted: 19 September 2023
Published: 22 September 2023

1. Introduction

Organizations need to be increasingly "fast" to be efficient globally. The introduction of new technologies and the increase in competitiveness represent a constant challenge affecting workers' lives and well-being (Paškvan and Kubicek 2017). People's well-being is a social resource linked to general human progress (Delhey et al. 2018). In the workplace, well-being is represented by the subjective assessment that one's work generates satisfaction (Maddux 2018), and it is considered one of the central aspects of subjective well-being. Subjective well-being (SWB) at work can be considered a protective factor of employees' physical and mental health (Mondo et al. 2023; Sahai and Mahapatra 2020) and can prevent turnover intentions (Mondo et al. 2022). It is present when workers have positive emotions that outweigh the negative ones when they perceive high levels of satisfaction, and in turn, they are more performing (De Simone et al. 2022; Taris and Schaufeli 2015). In literature,

subjective well-being at work is associated with numerous constructs that can predict and positively impact it (i.e., Babic et al. 2020; Bobbio et al. 2022; Garg and Singh 2020; Kumar 2020; Lee et al. 2021). However, other situations may adversely affect subjective well-being and negatively impact it, especially when workers need to adapt to new situations that they have never experienced before (Bellini et al. 2022a, 2022b, 2023).

The pandemic from COVID-19 was a sudden event that impacted the lives of millions of workers worldwide, bringing profound changes and innovations to which organizations and individuals have had to adapt (Barbieri et al. 2021a; Coulombe et al. 2020; De Simone et al. 2021; Mondo et al. 2021; De Vincenzi et al. 2022; Kniffin et al. 2021).

In Italy, almost all organizations, especially public administrations, have had to face a transition to smart working that has allowed them to continue their activities and avoid contagion (Di Tecco et al. 2021; Rapisarda et al. 2021). These forms of work organization, based on flexibility and autonomy and characterized by the absence of time or space restrictions and an organization by processes and objectives, have been a necessity during the COVID-19 pandemic and have not always had negative effects or results (Angelici and Profeta 2023; Darouei and Pluut 2021; Heiden et al. 2021; Standaert et al. 2023). Todisco et al. (2023) have conducted research to assess workers' experiences in the public sector with smart working before and after the pandemic. The results showed that smart working had a positive impact on organizational flexibility and improved the adaptability of organizations, but problems related to the right of disconnection and the work-life balance emerged. Morea et al. (2023), in research on a sample of public employees, highlighted only positive aspects of smart working. Employees could redefine spaces, time, organizational involvement, and a better balance between work and personal life. However, smart working used massively in public administration during the emergency COVID-19 has involved some risks related to well-being, such as 24-h connection (that is, what measures the fulfillment of the performance is not as much its chronological dimension as its productive dimension), isolation from colleagues, the intensification of work, forced cohabitation with other people working or studying in the same home (Bonacini et al. 2021; Charalampous et al. 2019). This situation could affect employees' productivity, benefits, and well-being (Escudero-Castillo et al. 2021; Magnavita et al. 2021; Restubog et al. 2020; Xiao et al. 2021). Similarly, the increased use of technologies already in use and the introduction of new technologies previously unknown, necessary for safe and distance work (de Lucas Ancillo et al. 2021), which represent workload, can induce technostress (Molino et al. 2020b; Nimrod 2022; Spagnoli et al. 2020) and can have an impact on subjective well-being at work (Christensen et al. 2020).

According to the JD-R model (Bakker and Demerouti 2014, 2017; Demerouti et al. 2001; Schaufeli and Taris 2014) used as a theoretical framework, this unprecedented event has had a strong impact in the process of balancing the organization's new demands with the resources that people can use to answer them. Indeed, the presence of an excessive workload related to the use of technologies (qualitative and quantitative) generates stress and can have significant repercussions in organizational contexts and a negative impact on subjective well-being (Hernandez et al. 2021; Nhung Nguyen and Tuan 2022; Pace et al. 2021).

To cope with excessive job demands in organizations (e.g., technostress) and recover from depleted resources, individuals need individual strategies such as, for example, to detach from work (Sonnentag 2012; Sonnentag and Fritz 2015).

Psychological detachment is a protective factor to cope with excessive job demands. It refers to the ability to psychologically disengage from work when away from the workplace to recover depleted resources (Sonnentag and Fritz 2015). A high workload can hinder psychological detachment, especially in high autonomy and flexibility conditions, forcing workers to remain mentally tied to work (Sonnentag and Bayer 2005). Based on the theoretical background and study we have cited, we assume that the perceived stress due to the excessive use of technology in smart working (i.e., Techno-stress) correlates to workload and mediates the relationship between workload and well-being and that

psychological detachment has the role of moderator in the indirect relationship between Workload and Well-being and that this relationship is weaker for people with high levels of psychological detachment.

2. Literature Review

2.1. The Positive Effects of Workload on Technostress and Their Impact on Well-Being within the JD-R Model

Generally, workload refers to workers' perception of their work experience regarding pace and volume. The concept includes the uncertainty of completing the work on time and in the usual manner (Spector and Jex 1998b), "an all-encompassing term that includes any variable that reflects the amount or difficulty of one's work" (Bowling and Kirkendall 2012, p. 222).

Workload is considered a job demand that can affect workers' responsiveness, i.e., the resources they perceive and can use to meet these demands. A high workload does not necessarily involve stress; workloads and stress are different concepts, which can be related if the workload is perceived as overlapping.

However, Bowling et al. (2015) highlighted how the workload is positively associated with perceived stress and how this correlation brings consequences at the level of well-being (Barbieri et al. 2021b; Hernandez et al. 2021; Nhung Nguyen and Tuan 2022; Pace et al. 2021; Schaufeli and Taris 2014). Zappalà et al. (2022) identified a negative impact of the workload on well-being in a homeworkers sample. Aalto et al. (2018) achieved the same results in a sample of physicians, and they found that workload was negatively associated with well-being. Angioha et al. (2020) underlined that the workload negatively and significantly impacts the well-being of a sample of civil servants. Sadiq (2022) found that workload causes work–family conflict, job stress, and job dissatisfaction. Finally, Zinke et al. (2023) highlight how ICT workload has detrimental effects on well-being, as already noted by Barber and Santuzzi (2015) and Day et al. (2010).

Based on the foregoing, we formulate the following hypothesis:

Hypothesis 1: *Workload smart-working condition is negatively related to well-being.*

In this research, we consider a particular form of stress, such as technostress, strictly generated, directly or indirectly, by the technology used in smart working and correlated to workload during the pandemic period. Studies on technostress have increased with the increasing use of ITC (Information and Communications Technology) within organizations (Ayyagari et al. 2011; Tarafdar et al. 2019). Literature defines this construct as "the amount of stress (constant or high) that a person experiences and manifests when using a specific type of technology, or when he is in direct or indirect contact with it" (Weil and Rosen 1997; Castillo et al. 2020, p. 18) and represents "a modern disease of adaptation" generated by the effort of employees to accept new technologies (Bondanini et al. 2020, p. 2). Techno-stress comes in three dimensions: technological overload, which is defined as the discrepancy perceived by the worker between his working rhythms and the times imposed by the use of technologies; technological invasion, defined as the invasion by ICT of the personal life of workers that make the boundaries between work and private contexts more blurred; techno-complexity, defined as the perceived inadequacy of the worker in performing a task that requires the use of technologies (Molino et al. 2020b; Ragu-Nathan et al. 2008).

Castillo et al. (2020) highlighted a positive relationship between workload and technostress in an interesting review that considers both workers in the field of technology and employees in organizations that use technology only as a tool. Effiyanti and Sagala (2018) affirmed that workload could influence technostress in a sample of teachers called to use ITC tools. Other studies have also highlighted the positive relationship between workload and techno-stress in a sample of workers subjected to increased use of technologies (Christian et al. 2020; Molino et al. 2020b; Spagnoli et al. 2020). The same results were obtained in the research by Melin et al. (2014) and by Suharti and Susanto (2014), in which workload increased techno-stress in samples composed of teachers and employees.

Salanova et al. (2014) and Atanasoff and Venable (2017) highlighted how technostress impacts workers' health and overall well-being and tends to increase the stress already present. Estrada-Muñoz et al. (2021) affirmed that technostress is a "dark side" of ICT, a factor deteriorating well-being, and Wu et al. (2022) obtained the same results: techno-stress negatively affects employee well-being and performance in a sample of employees in smart hotels. Hang et al. (2022) have shown how technological overload, technological invasion, and technological complexity negatively affected the well-being of employees in a sample of banking employees. Finally, Hurbean et al. (2022) analyzed the relationship between techno-stress and well-being in a sample of employees in smart working, detecting how the former can negatively impact the latter. The same results were obtained by Wang et al. (2023) in a sample of employees from three manufacturing companies in China.

The negative effects of workload and technostress on well-being in the organizational context can be described by the JD-R model (Bakker and Demerouti 2014, 2017; Demerouti et al. 2001). According to this model, it is possible to describe the environment and the characteristics of the job using two different categories: job demands and job resources. The job demands refer to the physical, psychological, and socio-organizational aspects of the work and represent the efforts required of the workers to complete their tasks. These demands include workload, time pressure, role ambiguity, conflicting demands, or emotional labor. Such requests are not necessarily negative if they are supported by adequate job resources, which are considered the physical aspects, psychological, social, or organizational workable to handle job demands and allow the development and growth of the worker (Bakker 2011). It has consolidated the concept that high and unmatched job demands increase stress (Bakker and Demerouti 2007).

Later, the model was integrated and considered individual strategies that employees can implement to change their job demands and job resources, such as job crafting and psychological detachment (Bakker and Demerouti 2017). These strategies represent methods or plans that people choose to achieve a goal or solve a problem, and their effectiveness depends on the situations in which workers act (Demerouti 2015).

Based on the foregoing, we formulate the following hypothesis.

Hypothesis 2: *Techno-stress (overload) mediates the relationship between Workload and Well-being in smart-working conditions.*

Hypothesis 3: *Techno-stress (invasion) mediates the relationship between Workload and Well-being in smart-working conditions.*

Hypothesis 4. *Techno-stress (complexity) mediates the relationship between Workload and Well-being in smart-working conditions.*

2.2. The Positive Effect of Psychological Detachment on Resource Restoration and Well-Being and Its Moderating Role between Job Demands and Negative Work Outcomes

Technology allows people to stay connected and have up-to-date information at all times. This possibility has positive aspects, allowing them to solve real-life problems. However, as we have already pointed out, this constant connection can have several disadvantages and impact on work and well-being. According to some studies in literature, psychological detachment (i.e., the ability and strategy to psychologically disengage from work) facilitates the process of resource restoration (Sonnentag 2011; Sonnentag and Bayer 2005; Sonnentag and Fritz 2015) and promotes well-being (Fritz et al. 2010; Sonnentag et al. 2017; Sonnentag 2018b); also, psychological detachment allows the recovery of a perceived technological overload (Sandoval-Reyes et al. 2019).

Specifically, psychological detachment is considered the most effective individual strategy in the recovery process, able to repair the negative strain effects (Sonnentag and Natter 2004), to reduce fatigue in times of increased stress (Sonnentag and Bayer 2005) and to promote higher levels of well-being (Sonnentag and Fritz 2007, 2015).

Psychological detachment is a protective factor to mitigate the harmful effects of a society in which constant connectivity is the new norm (Sonnentag and Fritz 2015). The mediating role of psychological detachment was demonstrated in previous research: the employees who managed to break away from work experienced higher levels of well-being (Sonnentag and Fritz 2007, 2015) and achieved better performance (Binnewies et al. 2010). While his role as moderator is still partly controversial, according to the meta-analysis by Wendsche and Lohmann-Haislah (2017), the moderating role of psychological detachment on the relationships between job demands and job outcomes is unclear. The study by Allen et al. (2015) also revealed an inconsistent role of psychological detachment as a moderator in the relationship between work-related stress and well-being. Conversely, other studies have shown that psychological detachment can mediate the investigated relationships (Sonnentag 2018a). Sonnentag et al. (2013) revealed that psychological detachment from work moderated the negative relationship between relational conflict and well-being in a white-collar sample. Lu and Chou (2020) underlined that psychological detachment moderates the effects of working hours on work engagement and work performance in a sample of employees working in diverse industries. In particular, psychological detachment attenuates the effects of the negative relationship between working time, work commitment, and work performance. In longitudinal research, Moreno-Jiménez et al. (2009) highlighted that psychological detachment moderates the relationship between role conflict and workplace bullying and between bullying and psychological strain in a sample of employees of three telecommunications companies. Finally, Cooper and Lu (2019) proposed the moderating role of psychological detachment in the recovery/rebuild process of resources in a condition of excessive availability for work.

Based on the foregoing, we formulate the following hypothesis (Figure 1).

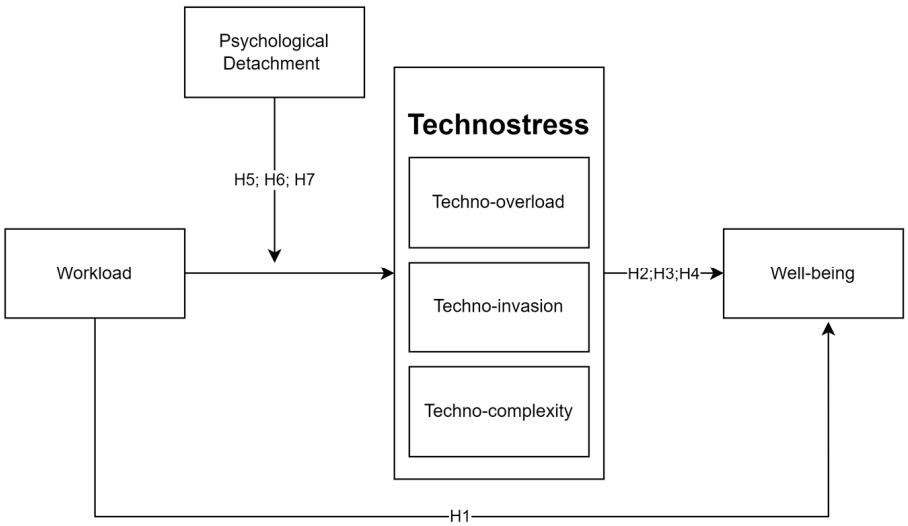

Figure 1. Conceptual model.

Hypothesis 5: *Psychological detachment moderates the mediated relationship of Workload with Well-being through Techno-stress (overload), such that the mediated relationship is weaker when psychological detachment is high.*

Hypothesis 6: *Psychological detachment moderates the mediated relationship of Workload with Well-being through Techno-stress (invasion), such that the mediated relationship is weaker when psychological detachment is high.*

Hypothesis 7: *Psychological detachment moderates the mediated relationship of Workload with Well-being through Techno-stress (complexity), such that the mediated relationship is weaker when psychological detachment is high.*

Information and communication technologies (ICT) are now fundamental tools for work. These tools can bring benefits to work processes, but they can also be potentially harmful to workers. They can be considered a "new" demand that represents a workload due to the massive use of technologies. Such overload can generate a stress response due to technologies that can be mitigated by protective factors that allow individuals to mentally "disconnect" from work when not in the office.

This study will assess the impact of workload in smartworking on well-being, considering the fundamental contribution of a protective factor such as psychological detachment in mitigating the effects of technostress.

3. Materials and Methods

3.1. Data Collection and Participants

The questionnaire was administered to employees who work in an Italian Public administration, which collaborated with the authors for this research. Participants completed the questionnaire using Google Forms during the pandemic period. In particular, data were collected via online administration. A psychologist invited the participating people to connect to the online video-conferencing platform and explained the research objectives. Afterward, participants were provided with the link to the questionnaire on the platform. The sample consisted of 622 employees: 29.1% were men (N = 181) and 70.9% were women (N = 441), in line with ISTAT 2020 data on distribution by gender in public administrations (ISTAT 2020). The average age of participants was 48 years (26 ÷ 66, SD = 8.17). Regarding educational level, 2.3% of participants had less than a high school level, 21.9% had a high school diploma, 48.1% completed a bachelor's or master's degree, and 27.8% held postgraduate specializations or Ph.D. 25.6% carry out childcare tasks or assistance to relatives/friends or parents. 30.3% only take care of the children, 20.6% only with the assistance of relatives/friends or parents, and 20.5% do not deal with care tasks relating to the children or assistance to relatives -you/friends or parents. Participants carry out an average of 18 h of smart-working per week (SD = 8.79; 6 ± 40).

3.2. Measures

Workload in Smart Working. In order to measure the amount of work participants perceive to be done in Smart Working, the five items of the Quantitative Workload Inventory (Spector and Jex 1998a) were adopted. The words "in smart working" have been added to each item. For example, "How often do you have to do more work than you can do well?" has been modified as follows: "How often do you have to do more work than you can do well in smart working?".

Techno-stress. In order to measure the stress caused by technology, the Italian version (Molino et al. 2020b) of the Techno-stress creators scale (Ragu-Nathan et al. 2008; Tarafdar et al. 2007) was used. The scale consists of eleven items measuring three distinct dimensions: Techno-overload (example of item: I am forced by technology to work much faster), Techno-invasion (example of item: I spend less time with my family due to technology), and Techno-complexity (an example of item is: I do not know enough about technology to handle my job satisfactorily).

Psychological detachment. In order to measure psychological detachment, four items of the Recovery Experience Questionnaire (Sonnentag and Fritz 2007) were used for the same purpose by Seva et al. (2021) (an example of item is: I forget about work after working hours).

Well-being. Well-being was measured through the World Health Organization-5 Well-Being Index (WHO-5; World Health Organization 1998). The scale consists of 5 items (for example: Over the past two weeks, I have felt calm and relaxed). The scoring of this scale is done by multiplying the sum of the scores of the items by 4. The World Health Organization proposes a cut-off to check for depression. We did not proceed with this step as in other works that did not have a clinical purpose (for example, Cipolletta et al. 2022).

All the instruments not yet validated in Italian have been translated via counter-translation. For all scales, participants responded based on a 6-point Likert scale.

3.3. Data Analysis

SPSS 25—Amos and Jamovi 2.3.24. was used to perform the data analysis. Harman's single-factor test was used to check for common method bias, mainly in cross-sectional studies (Podsakoff et al. 2003). No single factor explained most of the 50% of the variance, so common method bias did not affect this study. Using Confirmatory Factor Analysis, we tested the fit of our research model by comparing two measurement models, a one-factor model and a five-factor model. Convergent validity was also assessed by calculating the average variance extracted (AVE), which should exceed a value of 0.50 but remains acceptable even with an AVE value below 0.50 and a CR above 0.60 (Bagozzi and Yi 1988; Fornell and Larcker 1981). For discriminant validity, correlation coefficients were compared to the square root of AVE (Fornell and Larcker 1981). Descriptive statistics for the variables of interest were calculated, followed by zero-order correlation analysis to determine the associations among variables. Cronbach's Alpha was calculated for each scale. Finally, to test our hypotheses, we followed the suggestions of Preacher et al. (2007) and Hayes (2013), first testing the mediation hypotheses (Hypotheses 1) using the PROCESS macro for SPSS (Model 4). Next, we incorporated the moderator into the model, using Model 7 to test the moderate mediation model Hypotheses 2). To test for the significance of the effects, the bootstrapping method (5000 resamples; Hayes 2018) was used, and predictor and interaction terms were mean-centered.

"PROCESS Macro" is widely acknowledged as a contemporary approach in current literature. Within the resampling approach employed in this method, it is noteworthy that the Type I error rates are lower than anticipated (MacKinnon et al. 2004), and this method is deemed capable of providing more accurate confidence intervals (Sürücü et al. 2023).

4. Results

4.1. Measurement Model

The results of the Confirmatory Factor Analysis are displayed in Table 1. The 5-factor model revealed a satisfactory model fit. Indeed, CFI and TLI are considered acceptable if they are greater than 0.90 (Hu and Bentler 1999; Bentler and Bonnet 1980); RMSEA and SRMR are acceptable if they are equal to or smaller than 0.08 (Bentler and Bonnet 1980; Steiger 1990; Hu and Bentler 1999).

Table 1. Fit statistics of Measurement Model.

	χ^2	df	CFI	TLI	RMSEA	SRMR
One-factor model	5882	275	0.334	0.274	0.181	0.158
Five-factor model	854	260	0.930	0.919	0.0606	0.0511

Note. CFI = Comparative Fit Index. TLI = Tucker-Lewis index. RMSEA = the Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual.

4.2. Descriptive Statistics, Correlation Analysis and Reliability of Scales

Table 2 shows that Well-being is significantly negatively correlated with Workload ($r = -0.12$, $p < 0.01$), Techno-overload ($r = -0.13$, $p < 0.001$), Techno-invasion ($r = -0.19$, $p < 0.001$), and Techno-complexity ($r = -0.17$, $p < 0.001$). The workload is also positively significantly correlated with Techno-invasion ($r = 0.28$, $p < 0.001$), Techno-invasion ($r = 0.25$, $p < 0.001$), and Techno-complexity ($r = 0.19$, $p < 0.001$), and negatively significantly correlated with Psychological detachment ($r = -0.19$, $p < 0.001$). Furthermore, all variables have a good reliability value and adequate convergent and discriminant validity.

Table 2. Mean, standard deviation, Cronbach' Alpha and correlation results.

	M	SD	α	CR	AVE	1	2	3	4	5	
1. Workload	3.93	1.08	0.89	0.89	0.63	**0.797**					
2. Techno-overload	2.76	1.25	0.88	0.89	0.68	0.28 ***	**0.826**				
3. Techno-invasion	2.30	1.16	0.72	0.73	0.48	0.25 ***	0.52 ***	**0.698**			
4. Techno-complexity	2.21	1.10	0.84	0.86	0.61	0.19 ***	0.44 ***	0.37 ***	**0.786**		
5. Psychological detachment	2.89	1.12	0.76	0.77	0.50	−0.19 ***	−0.074	−0.18 ***	−0.04	**0.710**	
6. Well-being	79.63	18.53	0.87	0.87	0.59	−0.12 **	−0.13 ***	−0.19 ***	−0.17 ***	0.05	**0.770**

Notes. ** = $p < 0.01$; *** = $p < 0.001$. SD = Standard deviation. CR = Composite Reliability. Diagonal elements (in bold) are the square root of the average variance extracted (AVE).

4.3. Mediation Analysis

The Model 4 of PROCESS macro for SPSS was used to test Hypothesis 1, 2, and 3, controlling for age and educational level. Table 3 shows that workload had significant positive associations with Techno-overload, Techno-invasion, and Techno-complexity. When Workload, Techno-overload, Techno-invasion, and Techno-complexity were entered into the regression equation with Well-being as a dependent variable, Techno-invasion Techno-complexity showed a negative association with Well-being whereas the relationship between Techno-overload and Well-being was not significant, as well as the relationship between Workload and Well-being. The mediation bootstrap confidence intervals did not contain zero for significant path (Workload → Techno-invasion → Well-being (Effect = −0.0267 [−0.0528; −0.0053]); Workload → Techno-complexity → Well-being (Effect = −0.0171 [−0.0365; −0.0027]). The total effect was also significant (Effect = 0.0812 [−0.0365; −0.0238]). These results indicated the full mediation effect of work overload on well-being through Tecno-invasion and Tecno-complexity. However, they did not confirm the mediating role of Tecno-overload between work overload and well-being. Thus, only H2 and H3 were supported.

Table 3. Mediation Analysis.

Outcome	Predictor(s)	R	R^2	Coeff	t	LLCI	ULCI	*p*
Techno-overload	Workload	0.33	0.11	0.32	7.15	0.23	0.41	0.000
	Age			0.01	2.54	0.00	0.02	0.011
	Educational level			−0.11	−2.64	−0.20	−0.02	0.008
Techno-invasion	Workload	0.26	0.06	0.27	6.36	0.18	0.35	0.000
	Age			0.00	0.68	−0.00	0.01	0.494
	Educational level			0.01	0.68	−0.06	0.10	0.661
Techno-complexity	Workload	0.31	0.09	0.16	4.13	0.08	0.24	0.000
	Age			0.03	5.62	0.02	0.04	0.000
	Educational level			−0.03	−0.97	−0.11	0.03	0.332
Well-being	Workload	0.25	0.06	−0.04	−1.11	−0.11	0.03	0.266
	Techno-overload			−0.01	−0.53	−0.09	0.05	0.594
	Techno-invasion			−0.09	−2.63	−0.17	−0.02	0.011
	Techno-complexity			−0.10	−2.63	−0.17	−0.02	0.008
	Age			0.00	1.05	−0.00	0.01	0.292
	Educational level			−0.07	−2.13	−0.13	−0.01	0.033

4.4. Moderated Mediation Analysis

The Model 7 of PROCESS macro for SPSS was used to test Hypothesis 4–6. Results in Table 4 show the conditional process analysis. The results indicated that Psychological Detachment has a direct significant and negative effect on Techno-invasion (coeff. = −0.15; $p < 0.000$), and the interaction of Workload and Psychological Detachment on Techno-invasion was significant (coeff. = −0.07; $p < 0.027$). Additionally, the bootstrapped confidence interval for index of moderated mediation did not contain zero. The results supported Hypothesis 5.

Table 4. Conditional process analysis.

Outcome	Predictor(s)	R	R^2	Coeff	t	LLCI	ULCI	*p*
Techno-overload	Workload	0.33	0.11	0.32	6.98	0.23	0.41	0.000
	Psychological detachment			−0.01	−0.25	−0.09	0.07	0.798
	Int			−0.04	−1.31	−0.11	0.02	0.188
	Age			0.01	2.50	0.00	0.02	0.012
	Educational level			−0.11	−2.64	−0.20	−0.03	0.008
	Index of moderated mediation	Index = 0.0009				−0.0028	0.0072	
Techno-invasion	Workload	0.31	0.09	0.24	5.63	0.15	0.32	0.000
	Psychological detachment			−0.15	−3.66	−0.23	−0.07	0.000
	Int			−0.07	−2.21	−0.13	−0.00	0.027
	Age			0.00	0.49	−0.00	0.01	0.619
	Educational level			0.02	0.60	−0.05	0.10	0.546
	Index of moderated mediation	Index = 0.0071				0.01	0.02	
Techno-complexity	Workload	0.31	0.09	0.16	4.13	0.08	0.24	0.000
	Psychological detachment							
	Int							
	Age			0.03	5.62	0.02	0.04	0.000
	Educational level			−0.03	−0.97	−0.11	0.03	0.332

Figure 2 graphically shows the "buffer" effect that psychological detachment plays in the relationship between the Workload and the techno-invasion.

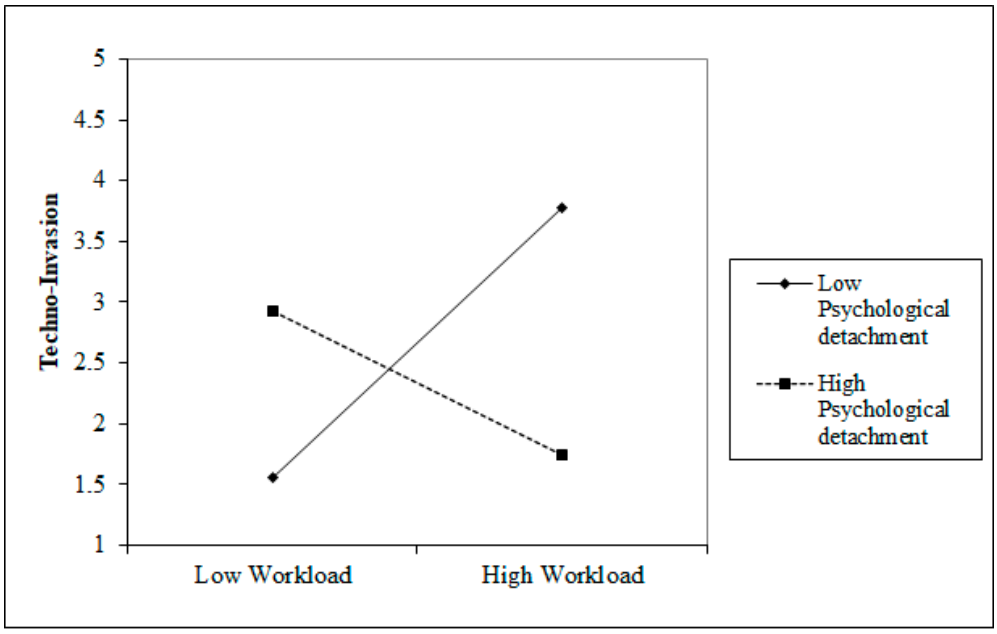

Figure 2. Moderating effect on Techno-invasion.

Table 5 shows hypothesis in terms of their acceptance or rejection.

Table 5. Hypothesis in terms of their acceptance or rejection.

H1	Workload is negatively related with well-being	Rejected
H2	Techno-stress (overload) mediates the relationship between Workload and Well-being in smart-working condition.	Rejected
H3	Techno-stress (invasion) mediates the relationship between Workload and Well-being being in smart-working condition.	Accepted
H4	Techno-stress (complexity) mediates the relationship between Workload and Well-being being in smart-working condition.	Accepted
H5	The psychological detachment moderates the mediated relationship of Workload with Well-being through Techno-stress (overload), such that the mediated relationship is weaker when psychological detachment is high	Rejected
H6	The psychological detachment moderates the mediated relationship of Workload with Well-being through Techno-stress (invasion), such that the mediated relationship is weaker when psychological detachment is high.	Accepted
H7	The psychological detachment moderates the mediated relationship of Workload with Well-being through Techno-stress (complexity), such that the mediated relationship is weaker when psychological detachment is high.	Rejected

5. Discussion and Conclusions

In the present study, using the JD-R model as a theoretical basis (Bakker and Demerouti 2014, 2017; Demerouti et al. 2001; Schaufeli and Taris 2014), we have considered the workload during smart working and techno-stress as new organizational demands (Molino et al. 2020b; Nimrod 2022; Spagnoli et al. 2020) that can impact on well-being (Hernandez et al. 2021; Nhung Nguyen and Tuan 2022; Pace et al. 2021), and psychological detachment which is a personal resource able to moderate the relationship between workload in SW and well-being, in turn, mediated by techno-stress.

In our first hypothesis, we have considered a negative relation between workload in smart working and well-being. Previous research shows a negative relation between workload and several factors related to well-being (Angioha et al. 2020; Sadiq 2022; Zappalà et al. 2022; Zinke et al. 2023).

However, our results show that this direct relationship is not significant, and this is probably due to the very characteristics of the context, whose complexity is constantly growing, accelerated by the pandemic of COVID-19. In this sense, the well-being condition is probably influenced not by a single factor but by the dynamic interaction of several factors, by a set of demands and resources, which can no longer be considered as static entities, separated from each other, but that work together to determine the outcomes in terms of well-being. In this sense, the workload impacts well-being through the mediation of technostress. Another explanation may be due, as Knight et al. (2023) state in interesting research, to the fact that the processes of change are dynamic and challenging to interpret, especially in the face of sudden changes.

In Hypotheses 2–4, we postulated how a high workload in SW, induced by excessive use of the ITC, can impact the well-being of workers in organizations and that this relationship, in turn, is mediated by high levels of Techno-stress. The results stressed that two components of techno-stress (i.e., techno-invasion and techno-complexity) fully mediate the relationship between workload and well-being. In contrast, techno-overload did not mediate the relationship between workload and well-being.

Techno-invasion is a perceived condition when technologies make the boundaries between the life and work areas poorly defined. This possible and reciprocal conflict between life and work is always present and, it can become more problematic if associated with emergency conditions in which there is no choice and effective physical and temporal

division between the two areas. Techno-invasion can improve work-life balance and affect well-being (Ma et al. 2021; Saim et al. 2021). A culture that promotes actions to support employees in reconciling work-family and vice versa is essential in conflict management processes (De Carlo et al. 2019; Masterson et al. 2021).

Techno-complexity occurs when individuals are forced to learn and understand new technologies and applications. In this situation, workers have to adapt quickly in terms of learning ability, and this can have negative consequences (Ragu-Nathan et al. 2008; Tarafdar et al. 2011, 2015). Therefore, using new technologies in remote working requires acquiring new skills that can impact the perception of well-being. This can happen mainly if the introduction of these new technologies are not supported by adequate training (Brivio et al. 2018; Gabr et al. 2021; Molino et al. 2020a; Rayburn et al. 2021) and technical support (Kim and Chang 2021; Pfaffinger et al. 2022; Tarafdar et al. 2011, 2015).

Conversely, techno-overload did not impact well-being, just like workload did not have a significant direct effect. This is probably because these dimensions are solely related to the measure of "load" (caused by technology or otherwise) and not to the subsequent evaluation associated with this load, as is the case with the sense of invasion (Techno-invasion) and complexity (Techno-complexity). Government restrictions to control the COVID-19 virus have made technologies indispensable to continue working, generating high levels of workload caused by the heavy use of ICT, which have induced a perception of stress and have had an impact on well-being (i.e., Castillo et al. 2020; Christian et al. 2020; Hang et al. 2022; Molino et al. 2020b; Spagnoli et al. 2020).

We have considered psychological detachment as a protective factor able to facilitate the process of restoration of resources to promote the well-being and recovery of a perceived technological overload (i.e., Bennett et al. 2018; Fritz et al. 2010; Sandoval-Reyes et al. 2019; Sonnentag et al. 2017; Sonnentag and Fritz 2015; Steed et al. 2019).

Our results (Hypotheses 5–7) showed that Psychological detachment moderated the indirect relationship between Workload and Well-being mediated by techno-invasion. In particular, when the workload is high and the Psychological detachment is low, people have higher levels of tecno-invasion. In other words, individuals with a higher ability of Psychological detachment can psychologically disengage from work to restore resources and thus cope with technological demands. Although the moderating role of psychological detachment on the relationships between job demands and job outcomes has been demonstrated in other studies (i.e., Cooper and Lu 2019; Lu and Chou 2020; Moreno-Jiménez et al. 2009; Sonnentag 2018a; Sonnentag et al. 2013), the researcher did not come to clear conclusions (i.e., Wendsche and Lohmann-Haislah 2017). It should also be noted that Psychological Detachment moderates only the relationship between workload and Techno-invasion, most likely due to the characteristics associated with the invasion and work boundaries. Future research could consider including other variables that potentially have a "buffering effect" on other dimensions of techno-stress, such as self-efficacy. Indeed, some authors highlight how the impact of technological overload can be alleviated by the self-efficacy of being able to master the demands of a technological nature (Delpechitre et al. 2019; Tarafdar et al. 2015; Saleem et al. 2021; Schoch 2023) and might reduce technostress levels (Chou and Chou 2021; Yener et al. 2020). Self-efficacy is an indispensable personal resource facilitating ICT's clever and frequent use (Salanova et al. 2013).

Further studies are needed to improve the understanding of its role.

In conclusion, what emerges from our research is the importance of psychological detachment in mitigating the effects of a high workload, linked to high use of ITC, on the perception of no longer having boundaries between work and private life and the consequent positive impact on well-being. From the point of view of theoretical advancement, the mediating role of technostress between the particular form of workload in smart working and well-being is interesting. Our results allow us to better understand the phenomena linked to the changes taking place in organizational contexts.

6. Practical Implications

In this research, we have pointed out the importance of psychological detachment as a protective factor to cope with excessive technological demands in organizations, moderating the workload effects on the employees' well-being in SW, mediated by tecno-invasion.

It is crucial to identify possible interventions to enhance the ability of workers to set clear boundaries between work and life, to detach themselves and protect themselves from the excessive load of technologies, thus avoiding the stress derived from technology invasion (Eldridge and Nisar 2022; Pfaffinger et al. 2022). Several authors have been concerned with identifying techniques to enhance psychological detachment. These interventions are very heterogeneous and focus on different conceptualizations of and on different contexts in which they take place. However, a meta-analysis by Karabinski et al. (2021) revealed that, on average, interventions have effectively increased the detachment from work. Some of these interventions encourage detachment during breaks from work (i.e., de Bloom et al. 2017), while others favor detachment outside work (i.e., Virtanen et al. 2019). Then, there are work-directed interventions aimed at changing the characteristics of the task or the organizational environments (i.e., Niks et al. 2018), while others are person-directed interventions focusing on competencies, cognitive skills, and behavioral change (i.e., Thiart et al. 2015). The methodologies used are multiple. They can be lessons and guided programs on the PC, lasting from one day to several weeks. Also, the target of the workers to whom the interventions are addressed can vary: they can be dedicated to those who have proven problems or open to all workers.

However, regardless of the type of intervention chosen, the most critical aspect is to exploit the role of psychological detachment in the Workload attenuation mechanism to avoid high levels of technostress and maintain a state of well-being in workers.

7. Limitations

This study presents several limitations that warrant consideration. To begin with, we employed a cross-sectional design and relied on self-reported measures, which may have inherent limitations in capturing dynamic processes and introducing potential biases. Moreover, our sample was drawn exclusively from the public sector, which restricts the applicability of our findings to a broader spectrum of employee populations across various sectors. Additionally, it is worth noting that the issue of social desirability bias could have influenced participants' responses, particularly given the convenience sampling approach we utilized. These combined limitations emphasize the need for caution when interpreting and generalizing the results of this study.

8. Future Research

The findings offer valuable insights and suggest several important recommendations for future research on smart working (SW) and employee well-being. Firstly, longitudinal studies are recommended to gain a deeper understanding of the long-term effects of SW on well-being. Additionally, investigating whether the moderating role of Psychological Detachment remains consistent over time is crucial to comprehend its lasting impact. Furthermore, researchers should expand their investigations through comparative analyses, exploring differences in well-being outcomes across various work arrangements, such as in-office work, hybrid models, and full-time SW. This comprehensive approach can help organizations determine the most suitable work arrangements for their employees.

Exploring personal and organizational protective factors that buffer the impact of SW workload on well-being is another critical research avenue. Identifying and understanding these factors can inform initiatives to enhance well-being within organizations. Cross-cultural studies should assess the generalizability of findings across diverse cultural contexts. Lastly, supplementing quantitative research with qualitative investigations can better understand employee experiences with SW. Qualitative data can uncover nuanced aspects of well-being and coping strategies not fully captured through quantitative measures alone.

Author Contributions: Conceptualization, M.M., S.D.S. and B.B.; methodology, M.M., S.D.S., B.B. and J.P.; formal analysis, J.P.; writing—original draft preparation, M.M., S.D.S., B.B. and J.P.; writing—review and editing, M.M., S.D.S., B.B., J.P. and D.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Ethical review and approval were not required for the study on human participants since the study did not imply any risk to participants and did not include biological measures.

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

Data Availability Statement: The data supporting the conclusions of this article will be made available by the authors on reasonable request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

References

Aalto, Anna-Mari, Tarja Heponiemi, Kim Josefsson, Martti Arffman, and Marko Elovainio. 2018. Social relationships in physicians' work moderate relationship between workload and wellbeing—9-year follow-up study. *European Journal of Public Health* 28: 798–804. [CrossRef] [PubMed]

Allen, Belinda C., Peter Holland, and Roslyn Reynolds. 2015. The effect of bullying on burnout in nurses: The moderating role of psychological detachment. *Journal of Advanced Nursing* 71: 381–90. [CrossRef] [PubMed]

Angelici, Marta, and Paola Profeta. 2023. Smart-Working: Work Flexibility Without Constraints. *Management Science* 8165: 115. [CrossRef]

Angioha, Pius U., Thomas A. Omang, Eno U. Ishie, and Mary E. Iji. 2020. Employee Stressors and Wellbeing of Healthcare Workers in Government owned Hospitals in Calabar, Nigeria. *Journal of Public Administration* 2: 36–43.

Atanasoff, Lynn, and Melissa A. Venable. 2017. Technostress: Implications for adults in the workforce. *The Career Development Quarterly* 65: 326–38. [CrossRef]

Ayyagari, Ramakrishna, Varun Grover, and Russell Purvis. 2011. Technostress: Technological Antecedents and Implications. *MIS Quarterly* 35: 831–58. [CrossRef]

Babic, Audrey, Nicolas Gillis, and Isabelle Hansez. 2020. Work-to-family interface and well-being: The role of workload, emotional load, support and recognition from supervisors. *SA Journal of Industrial Psychology* 46: 1–13. [CrossRef]

Bagozzi, Richard P., and Youjae Yi. 1988. On the evaluation of structural equation models. *Journal of The Academy of Marketing Science* 16: 74–94. [CrossRef]

Bakker, Arnold B. 2011. An evidence-based model of work engagement. *Current Directions in Psychological Science* 20: 265–69. [CrossRef]

Bakker, Arnold B., and Evangelia Demerouti. 2007. The job demands-resources model: State of the art. *Journal of Managerial Psychology* 22: 309–28. [CrossRef]

Bakker, Arnold B., and Evangelia Demerouti. 2014. Job Demands-Resources Theory. In *Work and Wellbeing: A Complete Reference Guide*. Edited by Peter Y. Chen and Cary Cooper. New York: John Wiley & Sons, vol. 3, pp. 1–28.

Bakker, Arnold B., and Evangelia Demerouti. 2017. Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology* 22: 273–85. [CrossRef] [PubMed]

Barber, Larissa K., and Alecia M. Santuzzi. 2015. Please respond ASAP: Workplace telepressure and employee recovery. *Journal of Occupational Health Psychology* 20: 172–89. [CrossRef] [PubMed]

Barbieri, Barbara, Ilaria Buonomo, Maria Luisa Farnese, and Paula Benevene. 2021a. Organizational capital: A resource for changing and performing in public administrations. *Sustainability* 13: 5436. [CrossRef]

Barbieri, Barbara, Silvia Balia, Isabella Sulis, Ester Cois, Cristina Cabras, Sara Atzara, and Silvia De Simone. 2021b. Don't call it smart: Working from home during the pandemic crisis. *Frontiers in Psychology* 12: 741585. [CrossRef] [PubMed]

Bellini, Diego, Barbara Barbieri, Michela Loi, Marina Mondo, and Silvia De Simone. 2023. The Restorative Quality of the Work Environments: The Moderation Effect of Environmental Resources between Job Demands and Mindfulness. *Social Sciences* 12: 375. [CrossRef]

Bellini, Diego, Barbara Barbieri, Marina Mondo, Serena Cubico, and Tiziana Ramaci. 2022a. An Environmental Resource within the Job Demands-Resources Model: The Mediating Role of Self-Efficacy between Properties of the Learning Environment and Academic Engagement. *Social Sciences* 11: 548. [CrossRef]

Bellini, Diego, Serena Cubico, Piermatteo Ardolino, Marino Bonaiuto, Maria Lidia Mascia, and Barbara Barbieri. 2022b. Understanding and exploring the concept of fear, in the work context and its role in improving safety performance and reducing well-being in a steady job insecurity period. *Sustainability* 14: 14146. [CrossRef]

Bennett, Andrew A., Arnold B. Bakker, and James G. Field. 2018. Recovery from work related effort: A meta-analysis. *Journal of Organizational Behavior* 39: 262–75. [CrossRef]

Bentler, Peter M., and Douglas G. Bonnet. 1980. Significance Tests and Goodness of Fit in the Analysis of Covariance Structures. *Psychological Bulletin* 88: 588–606. [CrossRef]
Binnewies, Carmen, Sabine Sonnentag, and Eva J. Mojza. 2010. Recovery during the weekend and fluctuations in weekly job performance: A week-level study examining intra-individual relationships. *Journal of Occupational and Organizational Psychology* 83: 419–41. [CrossRef]
Bobbio, Andrea, Luigina Canova, and Anna Maria Manganelli. 2022. Organizational Work-Home Culture and its Relations with the Work–Family Interface and Employees' Subjective Well-being. *Applied Research in Quality of Life* 17: 2933–66. [CrossRef]
Bonacini, Luca, Giovanni Gallo, and Sergio Scicchitano. 2021. Working from home and income inequality: Risks of a 'new normal' with COVID-19. *Journal of Population Economics* 34: 303–60. [CrossRef]
Bondanini, Giorgia, Gabriele Giorgi, Antonio Ariza-Montes, Alejandro Vega-Muñoz, and Paola Andreucci-Annunziata. 2020. Technostress dark side of technology in the workplace: A scientometric analysis. *International Journal of Environmental Research and Public Health* 17: 8013. [CrossRef]
Bowling, Nathan A., and Cristina Kirkendall. 2012. Workload: A review of causes, consequences, and potential interventions. In *Contemporary Occupational Health Psychology: Global Perspectives on Research and Practice*. Edited by Jonathan Houdmont, Stavroula Leka and Robert R. Sinclair. Chichester: Wiley-Blackwell, vol. 2, pp. 221–38. [CrossRef]
Bowling, Nathan. A., Gene M. Alarcon, Caleb B. Bragg, and Michael J. Hartman. 2015. A meta-analytic examination of the potential correlates and consequences of workload. *Work & Stress* 29: 95–113. [CrossRef]
Brivio, Eleonora, Fulvio Gaudioso, Ilaria Vergine, Cassandra Rosa Mirizzi, Claudio Reina, Anna Stellari, and Carlo Galimberti. 2018. Preventing technostress through positive technology. *Frontiers in Psychology* 9: 2569. [CrossRef] [PubMed]
Castillo, José Manuel, Edith Galy, and Pierre Thérouanne. 2020. Mental Workload and Technostress at Work. Which Perspectives and Theoretical Frameworks Can Help Us Understand Both Phenomena Together? Engineering Psychology and Cognitive Ergonomics. *Mental Workload, Human Physiology, and Human Energy* 2: 14–30. [CrossRef]
Charalampous, Maria, Christine A. Grant, Carlo Tramontano, and Evie Michailidis. 2019. Systematically reviewing remote e-workers' well-being at work: A multidimensional approach. *European Journal of Work and Organizational Psychology* 28: 51–73. [CrossRef]
Chou, Hui-Lien, and Chien Chou. 2021. A multigroup analysis of factors underlying teachers' technostress and their continuance intention toward online teaching. *Computers & Education* 175: 104335. [CrossRef]
Christensen, Jan Olav, Live Bakke Finne, Anne Helene Gardea, Morten Birkeland Nielsen, Kathrine Sørensena, and Jolien Vleeshouwers. 2020. *The Influence of Digitalization and New Technologies on Psychosocial Work Environment and Employee Health: A Literature Review*; Oslo: National Institute of Occupational Health, pp. 1–55.
Christian, Michael, Edi Purwanto, and Suryo Wibowo. 2020. Technostress creators on teaching performance of private universities in Jakarta during Covid-19 pandemic. *Technology Reports of Kansai University* 62: 2799–809.
Cipolletta, Sabrina, Arianna Mercurio, and Rachele Pezzetta. 2022. Perceived social support and well-being of international students at an Italian university. *Journal of International Students* 12: 613–32. [CrossRef]
Cooper, Cary L., and Luo Lu. 2019. Excessive availability for work: Good or bad? Charting underlying motivations and searching for game-changers. *Human Resource Management Review* 29: 100682. [CrossRef]
Coulombe, Simon, Tyler Pacheco, Emily Cox, Christine Khalil, Marina M. Doucerain, Emilie Auger, and Sophie Meunier. 2020. Risk and resilience factors during the COVID-19 pandemic: A snapshot of the experiences of Canadian workers early on in the crisis. *Frontiers in Psychology* 11: 580702. [CrossRef] [PubMed]
Day, Arla, Natasha Scott, and E. Kevin Kelloway. 2010. Information and communication technology: Implications for job stress and employee well-being. In *New Developments in Theoretical and Conceptual Approaches to Job Stress*. Edited by Pamela L. Perrewé and Daniel C. Ganster. Bingley: Emerald Group Publishing Limited, vol. 8, pp. 317–50. [CrossRef]
Darouei, Maral, and Helen Pluut. 2021. Work from home today for a better tomorrow! How working from home influences work-family conflict and employees' start of the next workday. *Stress and Health* 37: 986–99. [CrossRef]
de Bloom, Jessica, Marjaana Sianoja, Kalevi Korpela, Martti Tuomisto, Ansa Lilja, Sabine Geurts, and Ulla Kinnunen. 2017. Effects of park walks and relaxation exercises during lunch breaks on recovery from job stress: Two randomized controlled trials. *Journal of Environmental Psychology* 51: 14–30. [CrossRef]
De Carlo, Alessandro, Damiano Girardi, Alessandra Falco, Laura Dal Corso, and Annamaria Di Sipio. 2019. When does work interfere with teachers' private life? An application of the job demands-resources model. *Frontiers in Psychology* 10: 1121. [CrossRef] [PubMed]
Delhey, Jan, Georgi Dragolov, and Klaus Boehnke. 2018. Social Cohesion and Well-Being in Europe. Available online: https://www.eurofound.europa.eu/publications/report/2018/social-cohesion-and-well-being-in-europe (accessed on 1 May 2023).
Delpechitre, Duleep, Hulda G. Black, and John Farrish. 2019. The dark side of technology: Examining the impact of technology overload on salespeople. *Journal of Business and Industrial Marketing* 34: 317–37. [CrossRef]
de Lucas Ancillo, Antonio, María Teresa del Val Núñez, and Sorin Gavrila Gavrila. 2021. Workplace change within the COVID-19 context: A grounded theory approach. *Economic Research-Ekonomska Istraživanja* 34: 2297–316. [CrossRef]
Demerouti, Evangelia. 2015. Strategies used by individuals to prevent burnout. *European Journal of Clinical Investigation* 45: 1106–12. [CrossRef]
Demerouti, Evangelia, Arnold B. Bakker, Friedhelm Nachreiner, and William. B. Schaufeli. 2001. The job demands-resources model of burnout. *Journal of Applied Psychology* 86: 499–512. [CrossRef]

De Simone, Silvia, Jessica Pileri, Marina Mondo, Max Rapp-Ricciardi, and Barbara Barbieri. 2022. Mea Culpa! The Role of Guilt in the Work-Life Interface and Satisfaction of Women Entrepreneur. *International Journal of Environmental Research and Public Health* 19: 10781. [CrossRef]

De Simone, Silvia, Jessica Pileri, Max Rapp-Ricciardi, and Barbara Barbieri. 2021. Gender and entrepreneurship in pandemic time: What demands and what resources? An exploratory study. *Frontiers in Psychology* 12: 668875. [CrossRef]

De Vincenzi, Clara, Martina Pansini, Bruna Ferrara, Ilaria Buonomo, and Paula Benevene. 2022. Consequences of COVID-19 on Employees in Remote Working: Challenges, Risks and Opportunities an Evidence-Based Literature Review. *International Journal of Environmental Research and Public Health* 19: 11672. [CrossRef]

Di Tecco, Cristina, Matteo Ronchetti, Simone Russo, Monica Ghelli, Bruna Maria Rondinone, Benedetta Persechino, and Sergio Iavicoli. 2021. Implementing Smart Working in Public Administration: A follow up study. *La Medicina del Lavoro* 112: 141–52. [PubMed]

Effiyanti, Tri, and Gaffar Hafiz Sagala. 2018. Technostress among teachers: A confirmation of its stressors and antecedent. *International Journal of Education Economics and Development* 9: 134–48. [CrossRef]

Eldridge, Derek, and Tahie M. Nisar. 2022. Technostress, Work-home Boundary, and Emotional Exhaustion During the Crisis of COVID-19. In *Academy of Management Proceedings*. New York: Academy of Management, vol. 1, pp. 2151–6561.

Escudero-Castillo, Israel, Fco. Javier Mato-Díaz, and Ana Rodriguez-Alvarez. 2021. Furloughs, teleworking and other work situations during the COVID-19 lockdown: Impact on mental well-being. *International Journal of Environmental Research and Public Health* 18: 2898. [CrossRef] [PubMed]

Estrada-Muñoz, Carla, Alejandro Vega-Muñoz, Dante Castillo, Sheyla Müller-Pérez, and Joan Boada-Grau. 2021. Technostress of Chilean Teachers in the Context of the COVID-19 Pandemic and Teleworking. *International Journal of Environmental Research and Public Health* 18: 5458. [CrossRef]

Fornell, Claes, and David F. Larcker. 1981. Structural equation models with unobservable variables and measurement error: Algebra and statics. *Journal of Marketing Research* 18: 382–88. [CrossRef]

Fritz, Charlotte, Maya Yankelevich, Anna Zarubin, and Patricia Barger. 2010. Happy, healthy, and productive: The role of detachment from work during nonwork time. *Journal of Applied Psychology* 95: 977–98. [CrossRef]

Gabr, Hala Marawan, Shaimaa Sherif Soliman, Heba Khodary Allam, and Shaimaa Yaihya Abdel Raouf. 2021. Effects of remote virtual work environment during COVID-19 pandemic on technostress among Menoufia University Staff, Egypt: A cross-sectional study. *Environmental Science and Pollution Research* 28: 53746–53. [CrossRef]

Garg, Neha, and Pankaj Singh. 2020. Work engagement as a mediator between subjective well-being and work-and-health outcomes. *Management Research Review* 43: 735–52. [CrossRef]

Hang, Yong, Ghulam Hussain, Anam Amin, and Muhammad Ibrahim Abdullah. 2022. The moderating effects of technostress inhibitors on techno-stressors and employee's well-being. *Frontiers in Psychology* 12: 821446. [CrossRef] [PubMed]

Hayes, Andrew F. 2013. *Mediation, Moderation, and Conditional Process Analysis. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York: Guilford Publications, pp. 1–20.

Hayes, Andrew F. 2018. Partial, conditional, and moderated moderated mediation: Quantification, inference, and interpretation. *Communication Monographs* 85: 4–40. [CrossRef]

Heiden, Marina, Linda Widar, Birgitta Wiitavaara, and Eva Boman. 2021. Telework in academia: Associations with health and well-being among staff. *Higher Education* 81: 707–22. [CrossRef]

Hernandez, Raymond, Elizabeth A. Pyatak, Cheryl L. P. Vigen, Haomiao Jin, Stefan Schneider, Donna Spruijt-Metz, and Shawn C. Roll. 2021. Understanding worker well-being relative to high-workload and recovery activities across a whole day: Pilot testing an ecological momentary assessment technique. *International Journal of Environmental Research and Public Health* 18: 10354. [CrossRef]

Hu, Li-tze, and Peter M. Bentler. 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 6: 1–55. [CrossRef]

Hurbean, Luminita, Octavian Dospinescu, Valentin Munteanu, and Doina Danaiata. 2022. Effects of Instant Messaging Related Technostress on Work Performance and Well-Being. *Electronics* 11: 2535. [CrossRef]

ISTAT. 2020. Censimento Permanente Delle Istituzioni Pubbliche 2020: Risultati Definitivi. Available online: https://www.istat.it/it/files//2022/12/Report-censimento-istituzioni-pubbliche-2020.pdf (accessed on 1 March 2023).

Karabinski, Tina, Verena C. Haun, Annika Nübold, Johannes Wendsche, and Jürgen Wegge. 2021. Interventions for improving psychological detachment from work: A meta-analysis. *Journal of Occupational Health Psychology* 26: 224–42. [CrossRef]

Kim, Dae Geun, and Won Lee Chang. 2021. Exploring the roles of self-efficacy and technical support in the relationship between techno-stress and counter-productivity. *Sustainability* 13: 4349. [CrossRef]

Kniffin, Kevin M., Jayanth Narayanan, Frederik Anseel, John Antonakis, Susan P. Ashford, Arnold B. Bakker, Peter Bamberger, Hari Bapuji, Devasheesh P. Bhave, Virginia K. Choi, and et al. 2021. COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist* 76: 63–77. [CrossRef]

Knight, Caroline, Anita C. Keller, and Sharon K. Parkr. 2023. Job demands, not resources, predict worsening psychological distress during the early phase of the COVID-19 pandemic. *Work & Stress* 37: 55–77. [CrossRef]

Kumar, S. Pavan. 2020. Workplace Spirituality as an Antecedent of University Teachers' Subjective Well-being: Mediating Role of Job Satisfaction and Job Performance. *Journal of Engineering Education Transformations* 33: 137–146. [CrossRef]

Lee, Tzai-Chiao, Michael Yao-Ping Peng, Lin Wang, and Hao-Kai Hung. 2021. Factors influencing employees' subjective wellbeing and job performance during the COVID-19 global pandemic: The perspective of social cognitive career theory. *Frontiers in Psychology* 12: 577028. [CrossRef]

Lu, Luo, and Chun Yi Chou. 2020. Protecting job performance and well-being in the demanding work context: The moderating effect of psychological detachment for Chinese employees. *Applied Psychology* 69: 1199–214. [CrossRef]

MacKinnon, David P., Chondra M. Lockwood, and Jason Williams. 2004. Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research* 39: 99–128. [CrossRef] [PubMed]

Maddux, James E. 2018. *Subjective Well-Being and Life Satisfaction: An Introduction to Conceptions, Theories, and Measures*. Londra: Routledge/Taylor & Francis Group.

Ma, Jichang, Ariane Ollier-Malaterre, and Chang-qin Lu. 2021. The impact of techno-stressors on work–life balance: The moderation of job self-efficacy and the mediation of emotional exhaustion. *Computers in Human Behavior* 122: 106811. [CrossRef]

Magnavita, Nicola, Giovanni Tripepi, and Carlo Chiorri. 2021. Telecommuting, off-time work, and intrusive leadership in workers' well-being. *International Journal of Environmental Research and Public Health* 18: 3330. [CrossRef]

Masterson, Courtney, Keimei Sugiyama, and Jamie Ladge. 2021. The value of 21st century work–family supports: Review and cross-level path forward. *Journal of Organizational Behavior* 42: 118–38. [CrossRef]

Melin, Marika, Wanja Astvik, and Claudia Bernhard-Oette. 2014. New work demands in higher education. A study of the relationship between excessive workload, coping strategies and subsequent health among academic staff. *Quality in Higher Education* 20: 290–308. [CrossRef]

Molino, Monica, Claudio G. Cortese, and Chiara Ghislieri. 2020a. The promotion of technology acceptance and work engagement in industry 4.0: From personal resources to information and training. *International Journal of Environmental Research and Public Health* 17: 2438. [CrossRef]

Molino, Monica, Emanuela Ingusci, Fulvio Signore, Amelia Manuti, Maria Luisa Giancaspro, Vincenzo Russo, Margherita Zito, and Claudio G. Cortese. 2020b. Wellbeing costs of technology use during Covid-19 remote working: An investigation using the Italian translation of the technostress creators scale. *Sustainability* 12: 5911. [CrossRef]

Mondo, Marina, Barbara Barbieri, Silvia De Simone, Flavia Bonaiuto, Luca Usai, and Mirian Agus. 2021. Measuring career adaptability in a sample of Italian university students: Psychometric properties and relations with the age, gender, and STEM/no STEM Courses. *Social Sciences* 10: 372. [CrossRef]

Mondo, Marina, Gianfranco Cicotto, Jessica Pileri, Ester Cois, and Silvia De Simone. 2023. Promote Well-Being and Innovation in Sustainable Organizations: The Role of Job Crafting as Mediator. *Sustainability* 15: 8899. [CrossRef]

Mondo, Marina, Jessica Pileri, Federica Carta, and Silvia De Simone. 2022. Social Support and Self-Efficacy on Turnover Intentions: The Mediating Role of Conflict and Commitment. *Social Sciences* 11: 437. [CrossRef]

Morea, Donato, Gianpaolo Basile, Isabella Bonacci, and Andrea Mazzitelli. 2023. Smart working as an organisational process or as a social change? An Italian pandemic experience. *Employee Relations: The International Journal* 45: 677–703. [CrossRef]

Moreno-Jiménez, Bernardo, Alfredo Rodríguez-Muñoz, Juan Carlos Pastor, Ana Isabel Sanz-Vergel, and Eva Garrosa. 2009. The moderating effect of psychological detachment and thoughts of revenge in workplace bullying. *Personality and Individual Differences* 46: 359–64. [CrossRef]

Nhung Nguyen, Thi Hong, and Luu Trong Tuan. 2022. Trust in multi-level managers and employee extra-role behavior in the US federal government: The role of psychological well-being and workload. *Review of Public Personnel Administration* 42: 312–37. [CrossRef]

Niks, Irene, Jan de Jonge, Josette Gevers, and Irene Houtman. 2018. Work stress interventions in hospital care: Effectiveness of the DISCovery method. *International Journal of Environmental Research and Public Health* 15: 332. [CrossRef]

Nimrod, Galit. 2022. Technostress in a hostile world: Older internet users before and during the COVID-19 pandemic. *Aging & Mental Health* 26: 526–33. [CrossRef]

Pace, Francesco, Giulio D'Urso, Carla Zappulla, and Ugo Pace. 2021. The relation between workload and personal well-being among university professors. *Current Psychology* 40: 3417–24. [CrossRef]

Paškvan, Matea, and Bettina Kubicek. 2017. The intensification of work. In *Job Demands in a Changing World of Work: Impact on Workers' Health and Performance and Implications for Research and Practice*. Edited by Christian Korunka and Bettina Kubicek. New York: Springer International Publishing, pp. 25–43. [CrossRef]

Pfaffinger, Katharina F., Julia A. M. Reif, and Erika Spieß. 2022. When and why telepressure and technostress creators impair employee well-being. *International Journal of Occupational Safety and Ergonomics* 28: 958–73. [CrossRef]

Podsakoff, Philip M., Scott B. MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff. 2003. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology* 88: 879–903. [CrossRef]

Preacher, Kristopher J., Derek D. Rucker, and Andrew F. Hayes. 2007. HayesAddressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research* 42: 185–227. [CrossRef]

Ragu-Nathan, T. S., Monideepa Tarafdar, Bhanu S. Ragu-Nathan, and Qiang Tu. 2008. The consequences of technostress for end users in organizations: Conceptual development and empirical validation. *Information Systems Research* 19: 417–33. [CrossRef]

Rapisarda, Sebastiano, Elena Ghersetti, Damiano Girardi, Nicola Alberto De Carlo, and Laura Dal Corso. 2021. Smart working and online psychological support during the COVID-19 pandemic: Work-family balance, well-being, and performance. *InPACT: 301–6*. [CrossRef]

Rayburn, Steven W., Vishag Badrinarayanan, Sidney T. Anderson, and Aditya Gupta. 2021. Continuous techno-training and business-to-business salesperson success: How boosting techno-efficacy enhances sales effort and performance. *Journal of Business Research* 133: 66–78. [CrossRef]

Restubog, Simon Lloyd D., Anna Carmella G. Ocampo, and Lu Wang. 2020. Taking control amidst the chaos: Emotion regulation during the COVID-19 pandemic. *Journal of Vocational Behavior* 119: 103440. [CrossRef] [PubMed]

Sadiq, Misbah. 2022. Policing in pandemic: Is perception of workload causing work–family conflict, job dissatisfaction and job stress? *Journal of Public Affairs* 22: e2486. [CrossRef]

Sahai, Anjali, and Mamata Mahapatra. 2020. Subjective well-being at workplace: A review on its implications. *Journal of Critical Reviews* 7: 807–10. Available online: https://www.jcreview.com/admin/Uploads/Files/6204c168b65eb8.58114030 (accessed on 3 April 2023).

Saim, Mohammad Amir Shah Mohammad, Wan Edura Wan Rashid, and Siti Noorsuriani MA'ON. 2021. Technostress creator and work life balance: A systematic literature review. *Romanian Journal of Information Technology and Automatic Control* 31: 77–88. [CrossRef]

Salanova, Marisa, Susana Llorens, and Eva Cifre. 2013. The dark side of technologies: Technostress among users of information and communication technologies. *International Journal of Psychology* 48: 422–36. [CrossRef]

Salanova, Marisa, Susana Llorens, and Mercedes Ventura. 2014. Technostress: The dark side of technologies. In *The Impact of ICT on Quality of Working Life*. Edited by Christian Korunka and Peter Hoonakker. Dordrecht: Springer, pp. 87–103.

Saleem, Farida, Muhammad Imran Malik, Saiqa Saddiqa Qureshi, Muhammad Faisal Farid, and Sabeen Qamar. 2021. Technostress and employee performance nexus during COVID-19: Training and creative self-efficacy as moderators. *Frontiers in Psychology* 12: 595119. [CrossRef]

Sandoval-Reyes, Juan, Julio C. Acosta-Prado, and Carlos Sanchís-Pedregosa. 2019. Relationship amongst technology use, work overload, and psychological detachment from work. *International Journal of Environmental Research and Public Health* 16: 4602. [CrossRef] [PubMed]

Schaufeli, Wilmar B., and Toon W. Taris. 2014. A Critical Review of the Job Demands-Resources Model: Implications for Improving Work and Health. *In Bridging Occupational, Organizational and Public Health: A Transdisciplinary Approach. Edited by Georg F. Bauer and Oliver Hämmig. Dordrecht: Springer, pp. 43–68*. [CrossRef]

Schoch, Manfred. 2023. The Interplay of Challenge-Hindrance-Appraisal and Self-Efficacy: Technostress and Remote Working Performance. *Australasian Journal of Information Systems* 27: 1–25. [CrossRef]

Seva, Rosemary R., Lourdes Marie S. Tejero, and Vivien Fe F. Fadrilan-Camacho. 2021. Barriers and facilitators of productivity while working from home during pandemic. *Journal of Occupational Health* 63: e12242. [CrossRef]

Sonnentag, Sabine. 2011. Recovery from fatigue: The role of psychological detachment. In *Cognitive Fatigue: The Current Status and Future for Research and Application*. Edited by Phillip L. Ackerman. Washington, DC: American Psychological Association, pp. 253–72. [CrossRef]

Sonnentag, Sabine. 2012. Psychological detachment from work during leisure time: The benefits of mentally disengaging from work. *Current Directions in Psychological Science* 21: 114–18. [CrossRef]

Sonnentag, Sabine. 2018a. *Job-Stress Recovery: Core Findings, Future Research Topics, and Remaining Challenges*. Atlanta: Work Science Center Thinking Forward Report Series, pp. 1–19.

Sonnentag, Sabine. 2018b. The recovery paradox: Portraying the complex interplay between job stressors, lack of recovery, and poor well-being. *Research in Organizational Behavior* 38: 169–85. [CrossRef]

Sonnentag, Sabine, and Charlotte Fritz. 2007. The Recovery Experience Questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology* 12: 204–21. [CrossRef]

Sonnentag, Sabine, and Charlotte Fritz. 2015. Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior* 36: 72–103. [CrossRef]

Sonnentag, Sabine, and Eva Natter. 2004. Flight attendants' daily recovery from work: Is there no place like home? *International Journal of Stress Management* 11: 366–91. [CrossRef]

Sonnentag, Sabine, and Ute-Vera Bayer. 2005. Switching off mentally: Predictors and consequences of psychological detachment from work during off-job time. *Journal of Occupational Health Psychology* 10: 393–414. [CrossRef]

Sonnentag, Sabine, Dana Unger, and Inga Nägel. 2013. Workplace conflict and employee well-being: The moderating role of detachment from work during off-job time. *International Journal of Conflict Management* 24: 166–83. [CrossRef]

Sonnentag, Sabine, Laura Venz, and Anne Casper. 2017. Advances in recovery research: What have we learned? What should be done next? *Journal of Occupational Health Psychology* 22: 365–80. [CrossRef] [PubMed]

Spagnoli, Paola, Monica Molino, Danila Molinaro, Maria Luisa Giancaspro, Amelia Manuti, and Chiara Ghislieri. 2020. Workaholism and technostress during the COVID-19 emergency: The crucial role of the leaders on remote working. *Frontiers in Psychology* 11: 620310. [CrossRef] [PubMed]

Spector, Paul E., and Steve M. Jex. 1998a. Quantitative Workload Inventory. PsycTESTS Dataset. Available online: https://psycnet.apa.org/doiLanding?doi=10.1037%2Ft07345-000 (accessed on 1 May 2023).

Spector, Paul E., and Steve M. Jex. 1998b. Development of four self-report measures of job stressors and strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology* 3: 356–67. [CrossRef]

Standaert, Willem, Sophie Thunus, and Frédéric Schoenaers. 2023. Virtual meetings and wellbeing: Insights from the COVID-19 pandemic. *Information Technology & People* 36: 1766–89. [CrossRef]
Steed, Laurens Bujold, Brian W. Swider, Sejin Keem, and Joseph T. Liu. 2019. Leaving work at work: A meta-analysis on employee recovery from work. *Journal of Management* 47: 867–97. [CrossRef]
Steiger, James H. 1990. Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research* 25: 173–80. [CrossRef]
Suharti, Lieli, and Agung Susanto. 2014. The impact of workload and technology competence on technostress and performance of employees. *Indian Journal of Commerce and Management Studies* 5: 1–7.
Sürücü, Lütfi, Harun Şeşen, and Ahmet Maslakçı. 2023. *Regression, Mediation/Moderation, and Structural Equation Modeling with SPSS, AMOS, and PROCESS Macro*. Lyon: Livre de Lyon, p. 208.
Tarafdar, Monideepa, Cary L. Cooper, and Jean-François Stich. 2019. The technostress trifecta-techno eustress, techno distress and design: Theoretical directions and an agenda for research. *Information Systems Journal* 29: 6–42. [CrossRef]
Tarafdar, Monideepa, Ellen Bolman Pullins, and T. S. Ragu-Nathan. 2015. Technostress: Negative effect on performance and possible mitigations. *Information Systems Journal* 25: 103–32. [CrossRef]
Tarafdar, Monideepa, Qiang Tu, Bhanu S. Ragu-Nathan, and T. S. Ragu-Nathan. 2007. The impact of technostress on role stress and productivity. *Journal of Management Information Systems* 24: 301–28. [CrossRef]
Tarafdar, Monideepa, Qiang Tu, T. S. Ragu-Nathan, and Bhanu S. Ragu-Nathan. 2011. Crossing to the dark side: Examining creators, outcomes, and inhibitors of technostress. *Communications of the ACM* 54: 113–20. [CrossRef]
Taris, Toon W., and Wilmar B. Schaufeli. 2015. Individual well-being and performance at work. A conceptual and theoretical overview. In *Well-Being and Performance at Work: Current Issues in Work and Organisational Psychology*. Edited by Riccardo Peccei and Marc Van Veldhoven. Oxford: Psychology Press, pp. 15–34. [CrossRef]
Thiart, Hanne, Dirk Lehr, David Daniel Ebert, Matthias Berking, and Heleen Riper. 2015. Log in and breathe out: Internet-based recovery training for sleepless employees with work-related strain—Results of a randomized controlled trial. *Scandinavian Journal of Work, Environment & Health* 41: 164–74. [CrossRef]
Todisco, Lucio, Andrea Tomo, Paolo Canonico, and Gianluigi Mangia. 2023. The bright and dark side of smart working in the public sector: Employees' experiences before and during COVID-19. *Management Decision* 6: 85–102. [CrossRef]
Virtanen, Anniina, Jessica de Bloom, Jo Annika Reins, Christine Syrek, Dirk Lehr, and Ulla Kinnunen. 2019. Promoting and prolonging the beneficial effects of a vacation with the help of a smartphone-based intervention. *Gedrag en Organisatie* 32: 250–78. [CrossRef]
Wang, Huatian, Hua Ding, and Xiansui Kong. 2023. Understanding technostress and employee well-being in digital work: The roles of work exhaustion and workplace knowledge diversity. *International Journal of Manpower* 44: 334–53. [CrossRef]
Weil, Michelle M., and Larry D. Rosen. 1997. *Technostress: Coping with Technology@ Work@ Home@ Play*. New York: J. Wiley, p. 240.
Wendsche, Johannes, and Andrea Lohmann-Haislah. 2017. A meta-analysis on antecedents and outcomes of detachment from work. *Frontiers in Psychology* 7: 2072. [CrossRef] [PubMed]
World Health Organization. 1998. Wellbeing Measures in Primary Health Care. The Depcare Project. February. Available online: https://www.euro.who.int/__data/assets/pdf_file/0016/130750/E60246.pdf (accessed on 1 May 2023).
Wu, Weilin, Wynne Chin, and Yide Liu. 2022. Technostress and the smart hospitality employee. *Journal of Hospitality and Tourism Technology* 13: 404–26. [CrossRef]
Xiao, Yijing, Burcin Becerik-Gerber, Gale Lucas, and Shawn C. Roll. 2021. Impacts of working from home during COVID-19 pandemic on physical and mental well-being of office workstation users. *Journal of Occupational and Environmental Medicine* 63: 181–90. [CrossRef]
Yener, Serdar, Aykut Arslan, and Sebahattin Kilinç. 2020. The moderating roles of technological self-efficacy and time management in the technostress and employee performance relationship through burnout. *Information Technology & People* 34: 1890–919. [CrossRef]
Zappalà, Salvatore, Erasmus Keli Swanzy, and Ferdinando Toscano. 2022. Workload and mental well-being of homeworkers: The mediating effects of work-family conflict, sleeping problems, and work engagement. *Journal of Occupational and Environmental Medicine* 64: e647. [CrossRef] [PubMed]
Zinke, Janina, Tim Vahle-Hinz, and Annekatrin Hoppe. 2023. A longitudinal study on ICT workload in the extended stressor-detachment model: Testing moderated mediation models for extended work availability and workplace telepressure. *Work & Stress*: 1–17. [CrossRef]