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# HOME-BASED TELEWORK AND JOB STRESS: THE MEDIATION EFFECT OF WORK EXTENSION

## ABSTRACT

Purpose: This paper aims to investigate how home-based telework affects job stress. We argue that an intrinsic effect of telework like work extension mediates this relationship. Work extension is reflected in two employee behaviours: working in free time and presentism.

Design/methodology/approach: The proposed model has been estimated using the Preacher and Hayes bootstrap method for multiple mediation analysis, with 1,000 repetitions. The data used come from the sixth European Working Conditions Survey.

Findings: Our analysis indicates that home-based telework does not pose an inherent risk for job stress but causes a change in the employees' behaviour, increasing working in free time and presenteeism and thus job stress. Our mediation model indicates that once these behaviours are controlled, the effect of home-based telework is to reduce stress.

Implications: We argue that companies should focus on human resource practices to control workers' behaviours that have a detrimental effect on job stress while institutions should regulate home-based telework.

Originality/value: Our analysis deepens the unclear relationship between home-based telework and job stress by introducing employees' behaviours concerning work extension into the equation.

**Keywords**: Home-based telework, job stress, work extension, working in free time, presenteeism

## 1. INTRODUCTION

Home-based telework (HBT), until last year a well-known kind of telework but so far a minority practice (Aguilera et al., 2016), has generated great debates about its advantages and disadvantages in the past two decades (Adamovic, 2022; Allen et al., 2015; Boell et al., 2016). Several meta-analyses have found that telework increases productivity, retention, turnover intention, commitment and job satisfaction (Gajendran and Harrison, 2007; Harker et al., 2012), dimensions that have positive repercussions for both the company and workers, showing that the advantages outweigh the disadvantages. However, in recent times there has been a tendency to associate HBT with the media images of stressed men/women working at home on their computers and, at the same time, taking care of children or doing housework.

The intuition that HBT can affect job stress is not new, although this belief has been heightened during the COVID-19 pandemic situation. Nevertheless, job stress has not figured prominently in telework research (Allen et al., 2015; Tavares, 2017), and its effects remain unclear (Lunde et al., 2022). The few studies on the subject obtain contradictory results, some finding a decrease in the stress of teleworkers (Delanoeije and Verbruggen, 2020; Duxbury and Halinski, 2014; Gimenez-Nadal et al., 2020; Mann and Holdsworth, 2003) while others suggest the opposite relationship (Gimenez-Nadal et al., 2020; Song and Gao, 2020). These results may be due to the fact that most empirical studies that analyse the relationship between telework and job stress contrast the direct relationship between both dimensions, justifying their results (positive or negative) through the advantages or disadvantages of telework. However, recent literature has highlighted that it is necessary to investigate "how" these effects are produced (Lunde et al., 2022).

Our work aims to shed light on this issue by analysing some mechanisms through which HBT can affect job stress. We argue that an intrinsic effect of telework is "work

extension", which is defined as a form of intensification of work (Kelliher and Anderson, 2010) that can have negative consequences on job stress (Dettmers, 2017). We propose a model in which work extension mediates this relationship. Work extension can be reflected in two employee behaviours: working in free time (Rodríguez-Moroño and López-Igual, 2021; Wöhrman et al., 2021) and working while sick, called presenteeism (Cooper and Lu, 2019). In line with Kelliher and Anderson (2010), work extension can be enabled by work conditions, can be imposed by the company or can be an act of reciprocity as teleworkers see HBT as a reward. Although work extension is a problem associated with ICT use, it is more likely to occur in HBT, as we will argue. Our paper is part of a more recent trend in human resource management literature that advocates considering the well-being and behavior of workers as a problem that concerns the company (Guest, 2017; Stahl et al. 2020). As Guest (2017) argues changes in the job and surrounding conditions can decrease the well-being of workers, with detrimental consequences for employees and for organizations, but these changes, although have been widely observed, have been ignored in the basic human resource management literature.

To achieve the research objective, we use data from the sixth European Working Conditions Survey (EWCS), last conducted before COVID-19, to analyse the impact of HBT in a "business-as-usual" situation. To slow the spread of the COVID-19 virus and reinforce employee safety, HBT was applied to all jobs wherever possible (Steidelmüller et al., 2020). Many organisations introduced telework practices with very little time to plan, consider alternative options, and set up telecommuting with their employer and manager (Agerfalk et al., 2020). Under these exceptional conditions, it is not easy to analyse the typical effects of HBT on job stress. Moreover, the conclusions or implications may be affected by the unusual situation of the pandemic since working

in lockdown and fear of contagion are already stressors (González et al., 2022). Therefore, we employed the latest available data before January 2020.

The definition and measurement of telework have been a research problem that makes the comparison of results challenging (Aguilera et al., 2016; Bailey and Kurland, 2002; Messenger et al., 2016). In order to achieve a clear interpretation of results, our work builds on a specific kind of telework, HBT. Concretely, we use the definition of HBT offered by Eurofound and ILO (2017), which includes employees who work from home regularly using information and communication technology (ICT). We compare them with employees who always work at the employers' premises using ICT. The analysis of the application of HBT in a business situation and comparing these two groups of workers, relatively homogeneous regarding ICT use but whose fundamental difference is their place of work, can establish implications for both companies and telework regulation.

## 2. HOME-BASED TELEWORK AND JOB STRESS

HBT can be a double-edged sword, and it is not straightforward to directly establish its effects on job stress (Allen et al., 2015; Lunde et al., 2022; Tavares, 2017). Besides, the literature reviews have yielded inconclusive results. Thus, while Gajendran and Harrison (2007) found in their meta-analysis that telework has a beneficial (small) effect on job stress, Lunde et al. (2022) questioned this statement in their review. Instead, they stressed that quality research finds no association or detrimental effects. Even more, empirical research that observes beneficial results between telework and job stress has only justified the results by the potential advantages of telework.

Duxbury and Halinski (2014) and Delanoeije and Verbruggen (2020), for example, have indicated that the autonomy and control of teleworkers justify the positive effect of

telework on job stress. Mann and Holdsworth (2003) added the reduction of transportation times and Gimenez-Nadal et al. (2020) the work–family balance linked to telework. In short, from this perspective, remote workers have more leisure time and can organise themselves autonomously to reduce their stress levels.

However, empirical researchers who have found a negative relationship explain their results by the disadvantages associated with telework, mainly the increased conflicting demands of work versus home (Song and Gao, 2020). For example, Gimenez-Nadal et al. (2020) used the work–family balance argument to explain the decrease in job stress in men and the work–family conflict argument to explain the increase in women. While all these explanations are plausible and considered mechanisms that can affect the relationship, they are only sometimes empirically contrasted.

Recent literature has attempted to decipher this relationship. However, the few investigations that have considered the mechanisms through which telework affects job stress have certain limitations. Fundamentally, these studies cannot generalise their results since the samples used do not allow for estimating mediating effects. For example, the research by Konrad et al. (2003) used a tiny sample, while Vander Elst et al. (2017) focused on a single company in which more than 95% of employees telework. Therefore, research on "how" telework affects stress and what its mediators are is an incipient area of research.

## 3. WORK EXTENSION: THE MEDIATION IN JOB STRESS

ICT has transformed the nature of all work, allowing employees to connect with the office and constantly communicate without being constrained by time or space (Piszczek, 2017), producing what some authors call the autonomy paradox (Mazmanian et al., 2013; Putnam et al., 2014). It is a paradox because although ICT allows workers

flexibility, peace of mind, and control over short-term interaction, also involves situations like work extension, that imply be always available. According to Chesley (2014), work extension refers to situations in which working in paid work enters non-work time and space. Although this is a problem associated with using ICT, it is especially relevant in telework (Kelliher and Anderson, 2010). Work extension can be reflected in behaviours commonly known as working in free time (Rodríguez-Modroño and López-Igual, 2021; Wöhrman and Ebner, 2021) and in others less contemplated, such as presenteeism (Cooper and Lu, 2019). Presenteeism is also a form of work extension since it implies that the employee is working when he/she should be recovering from an illness.

Work extension, as a form of work intensification (Chesley, 2014; Kelliher and Anderson, 2010), triggers employees to increase the efforts put into their jobs while they are working, which has a de2trimental effect on job stress (Dettmers and Biemelt, 2018). According to Kelliher and Anderson (2010), work extension can be motivated by (i) the enabling characteristics of the job, (ii) the imposed requirement of the company or (iii) the voluntary reciprocity of the employee to the firm. Following these arguments, we will explain how HBT encourages these behaviours and affects job stress.

### 3.1. Working in free time

HBT encourages paid work activity to be performed not only "anywhere" but also "anytime" (Tietze and Musson, 2002). This means that it breaks the conceptual assumption that paid and unpaid work are separated. The traditional spaces of paid work (the employer's premises) and the associated schedule (nine-to-five hours; five working days) are disjointed and therefore workers find it difficult to separate the time for work and the time for rest. Less rigid boundaries between work and home environments can

create confusion about when to adopt the work versus the family role (Ashforth et al., 2000) and enable working hours boundaryless (Wöhrman and Ebner, 2021).

Working in free time may also be imposed by the permanent availability required of the teleworker (Berkowsky, 2013). The temporal decoupling of the working hours of team members, including the supervisor (Wöhrman and Ebner, 2021) fostered by telework, together with the absence of fixed working hours, means that formal meetings and informal communications occur at non-standard times (Ahmad et al., 2022; Messenger et al., 2016). Consequently, teleworkers may be obliged to attend to work-related matters in their free time. As Crossan et al. (2005) stated, the distance to the employers' premises and other colleagues results in spontaneous coordination actions in the workplace often being replaced by planned meetings and more rigid procedures or cumbersome protocols in HBT. Moreover, since in HBT, direct supervision as a control mechanism is not usually used (Dimitrova, 2003), teleworkers may also try to signal their engagement by working in their free time (Cañibano and Argyro, 2022).

Finally, some authors have considered that the reciprocity argument explains work intensification and extension (Bathini and Kandathil, 2019; Kelliher and Anderson, 2010). The increased autonomy, the absence of schedules and the lack of direct supervision (Dimitrova, 2003), characteristics of HBT, may be perceived by workers as a sign of trust. As compensation, and in return, employees may respond voluntarily with reciprocal behaviour involving more significant effort.

Therefore, we posit the following:

**Hypothesis 1a.** *HBT has a positive effect on working in free time.*

The Effort-Recovery Model (Meijman and Mulder, 1998) helps to explain the effect of working in free time on stress. According to this model, exertion on the job activates the stress systems of the workers, which causes adverse reactions, such as increased

fatigue or negative affect. However, these adverse reactions are reversible and do not cause harm if the psychophysiological systems activated during the workday return to their levels during free time. When this free time is spent at work, the deactivation of these systems does not occur, accumulating stress.

Xie et al. (2018), in line with the with this model have pointed out that using ICT outside working hours hinders employees' recovery processes, thereby increasing emotional exhaustion. In addition, working at home after office hours can activate employees' negative affective states and physiological responses to job stress, making it difficult to disconnect from work physically and mentally (Sonnentag and Fritz, 2015). Several empirical analyses have demonstrated this negative relationship (Dettmers, 2017; Voydanoff, 2005).

Accordingly, we posit the next hypothesis:

**Hypothesis 1b.** *Woking in free time negatively affects job stress.*

### 3.2. Presenteeism

A first intuitive approach may lead to thinking that HBT is an appropriate measure to avoid presenteeism, defined as going to work despite health problems (Aronsson et al., 2000). However, HBT allows a new form of digital presenteeism, where sick workers perform their tasks through ICT, often from home. The changes in physical conditions (space/time) associated with HBT reduce the barriers to work while sick, enabling this new form of presenteeism (Rousculp et al., 2010; Ruhle and Schmoll, 2021). Actions linked to face-to-face work, such as commuting to the workplace, sticking to a schedule, or interacting with colleagues, require an effort that some sick workers may not be able to make (Tavares, 2017). In telework, these actions disappear, and being presentist becomes easier. Moreover, there is no risk of contagion being

presentist in HBT, unlike in classic presentism, where employees put their colleagues at risk in the case of contagious diseases (Irvine, 2011).

Further, some firms may directly or indirectly impose presenteeism. In HBT, the justification for sickness absence depends entirely on workers' reporting since no one can observe whether they are ill (Mann and Holdsworth, 2003). For this reason, when confidence is low, workers may fear that the company does not believe in their illness and decide to continue working. With this practice, they will try to avoid losing a promotion or even their job (Aronsson and Gustafson, 2005; Hirsch et al., 2017). When the information regarding the health condition is asymmetric, presenteeism can thus signal their engagement with the firm (Miraglia and Johns, 2016).

Finally, in line with social exchange theory, presenteeism may also develop as a sign of reciprocity (Steidmüller et al., 2020). Sick people may voluntarily decide to work to avoid overburdening the company or colleagues with additional work. Also, workers who know that others depend on them or that their company will suffer if they miss work are likelier to work while sick (Miller, 2008; Sinclair et al., 2020). In the case of HBT, this support to the company or colleagues is more manageable, so it may also be more frequent. In many cases, sick workers stop coming to the workplace but do not stop working, so situations of presenteeism are more likely to occur.

We thus propose the following hypothesis:

**Hypothesis 2a.** *HBT has a positive effect on presenteeism.*

Previous studies have shown the negative effect of working while sick on the mental health of workers (Johns, 2010; 2011; McGregor et al., 2018; Miraglia and Johns, 2016). The recovery model (Meijman and Mulder, 1998) stresses that workers need adequate rest after exerting themselves at work to recover both physically and psychologically. If a person returns to work without recovering sufficiently, he or she

must increase his or her effort to cope with work demands. This is especially important when a person is sick since that is when they need recovery time the most. Working while ill deprives people of being able to recover from illness, does not allow them to replenish the resources needed to overcome the state of illness and implies having fewer resources to cope with their work, thus promoting an accumulation of their workload and therefore increasing job stress (Lu et al., 2014).

Thus, our next hypothesis is:

**Hypothesis 2b.** *Presenteeism negatively affects job stress.*

### 3.3. The mediation effect of home-based teleworkers' work extension on job stress

The mediation model depicted in Figure 1 proposes that the independent variable (HBT) influences the mediating variables (working in free time and presenteeism), which in turn affects the dependent variable (job stress). The model therefore assumes that HBT is directly and indirectly related to job stress through the effect on two mediators: working in free time and presenteeism.

[Insert Figure 1 about here]

**Hypothesis 3**. *Working in free time and presenteeism mediate the relationship between HBT and job stress.*

## 4. METHOD

### 4.1. Sample

The database comes from the sixth EWCS, conducted by the European Foundation for the Improvement of Living and Working Conditions between February and December 2015. The EWCS sample is representative of those employed during the fieldwork period in each of the countries covered. Except in larger countries, such as Spain and Germany, the target sample was 1,000 workers with 15 years or more in 35

countries. However, as the manuscript's main aim is to analyse telework's impact, we need to do so using a homogeneous sample. To achieve this, we have taken into account employment status and excluded the self-employed since, unlike employees, they own the entire output of their effort, so their incentives are different, and it is not possible to distinguish the place of work where they perform their job. Also, we have eliminated employees who do not use ICT, since they are not susceptible to telework as they do not meet the technological requirement.

We have also operationalised the telework variable proposed by Eurofound and ILO (2017) and used in previous empirical research (Curzy et al., 2020; Rodríguez-Modroño and López-Igual, 2021), based on the reported use of ICT (Q30) and the main place of work (Q35). Four types of workers can be distinguished among those who use ICT always or almost all of the time. First, home-based teleworkers are employees working from home regularly (working from home at least several times a month). Second, high-mobile teleworkers are employees working in several places regularly, with a high level of mobility. Third, occasional teleworkers are employees occasionally working in one or more places outside the employer's premises. Finally, the fourth type are face-to-face employees, that are those who work always at the employer's premises.

Table 1 shows the sample distribution of employees using ICTs

[Insert Table 1 about here]

We have chosen two homogeneous types from these four groups, which differ in the place where they perform their work: home-based teleworkers versus the control group of face-to-face workers. After eliminating missing data, the reference sample had 5,244 observations.

### 4.2. Variables

#### *4.2.1. Job stress*

In line with the theoretical framework, the dependent variables measured stress. Concretely, we used a question that measured on a 5-point Likert scale the frequency with which employees experienced stress in their work, ranging from 1 “never” to 5 “always” (Q61m), a question which has been used in previous studies (Curzi et al., 2020; Guerci et al., 2022; Steiber and Pichler, 2015).

*4.2.2. Home-based telework*

Considering all the above mentioned in the definition of the sample, the independent variable, HBT, takes value one for home-based teleworkers and zero for face-to-face employees using ICT.

*4.2.3. Work extension*

In selecting measures of work extension, we intentionally focused on two types of employee behaviours that can potentially impact job stress. First was an item indicating the frequency with which employees work in free time. Specifically, working in free time (Curzi et al., 2020) considered on a 5-point Likert scale how often employees worked in their free time to meet work demands, from 1 “never” to 5 “daily”.

Second was a ratio indicating the propensity of presenteeism. We estimated it using two questions of the survey. First, the number of days of presenteeism was measured using a question related to the number of working days the respondent worked when they were sick in the last year in a free-response format, a measure preferable to more common Likert-type responses (Caverley et al., 2007). Second, the number of days of absenteeism was measured using a question that asked how many days in total over the past 12 months the employees were absent from work due to sick leave. Then, we created a variable reflecting the propensity to presenteeism as the days of presenteeism divided by the number of days of illness (the sum of the days of presenteeism plus the days of absenteeism) (Gerich, 2016). This variable could take values from zero,

indicating that employees never worked when sick, to one, indicating that employees always worked when sick.

Table 2 shows the mean and standard deviation of the dependent, independent and mediator variables.

[Insert Table 2 about here]

*4.2.4. Control variables*

Finally, in accord with the previous literature, we included a series of control variables that may affect job stress. Specifically, we added the personal and social characteristics of the individual (gender, age, education, seniority and health status), labour characteristics (temporary contract, income, job position, number of working hours and empowerment), and company characteristics (size, economic sector and public sector).

**4.3. Methodology**

The proposed model was a multiple mediation model (Preacher and Hayes, 2008). In Figure 1A, we can see the direct effect of HBT on job stress. In the model proposed in Figure 1B, we established that HBT (X) affects job stress (Y) directly (path c') and indirectly through two mediating variables (M), working in free time and presenteeism. The main advantages of this multiple mediation model over several simple mediation models were that it allowed us to determine the magnitude of the specific indirect effects of each of the mediators, as well as the total indirect effect, and that it reduced the possibility of parameter bias due to omitted variables and therefore biased estimates (Judd and Kenny, 1981). The direct and indirect effects of HBT stemmed from two different linear models.

First, since we estimated a multiple mediator model, the estimation of the direct and indirect effects required two models, one for each of the mediating variables from HBT (X),

$$M_j = i_M + a_1X + e_M \quad (1)$$

Second, a model in which the simultaneous estimation of HBT (independent variable), working in free time and presenteeism (mediating variables) on job stress (dependent variable) was performed,

$$Y = i_Y + c_1'X + b_1M_1 + b_2M_2 + e_Y \quad (2)$$

The direct effect of HBT on job stress was estimated with c1' in equation (2). The specific indirect effect of HBT on job stress through each of the mediators is the product of the two unstandardised paths linking HBT to stress through that mediator ($a_1b_1$ and $a_2b_2$). Therefore, the total indirect effect of HBT on job stress is the sum of the specific indirect effects ($a_1b_1+a_2b_2$). The total effect of HBT on job stress is the sum of the direct effect and the two specific indirect effects. This total effect ($c_1$) can be estimated by regressing HBT on stress directly.

$$Y = i_{Y*} + c_1X + e_{Y*} \quad (3)$$

from which $c1 = c_1' + (a_1b_1 + a_2b_2)$.

Moreover, also in finite samples, such as the one used in this study, the indirect effect was rarely normal; we used bootstrapping with 1000 repetitions to obtain the indirect effects (Shrout and Bolger, 2002). This method was the most efficient to obtain confidence intervals (Preacher and Hayes, 2008). Using this method implied in our case taking 1,000 subsamples and repeating the estimates of the specific and total indirect effects of X on Y. Unlike normal Confidence Intervals (CIs) bootstrap percentile CIs can be asymmetric since they are not based on the assumption of normality of the sampling distribution (Briggs, 2006; Williams and MacKinnon, 2008). Moreover, in

terms of the hierarchical structure of the data, where lower-level observations and individuals are nested within higher-level observations (countries), models were estimated using Moulton's (1990) correction to prevent the problems derived from biased standard errors.

*4.3.1. Common method variance*

We performed the Harsman's one-factor test twice to calibrate the effect of common method variance, resulting in nine factors with eigenvalues greater than one in both cases. The variance explained by the first factor was 11.00%. These results together with some features of the survey (anonymity and different format and scales of variables used) and the fact that questions belong to unrelated questionnaire sections indicated that common method variance was not a significant limitation (Podsakoff et al., 2003).

## 5. RESULTS

Table 3 shows the multiple mediation model estimated to analyse the mediating effect of working in free time and the propensity to presenteeism on the relationship between HBT and job stress.

[Insert Table 3 about here]

To check the effect of HBT on the mediating variables, we look at the first two column in Table 3. The relationship between HBT and working in free time was positive, thus verifying Hypothesis H1a. The impact of HBT on the presenteeism was also significant, in line with Hypothesis H2a.

The last column of Table 3 shows the effect of the mediating variables on work job stress. First, we observed that both mediating variables had a positive and significant

impact on job stress by increasing it, a result that supported hypotheses H1b and H2b. Furthermore, the results indicated the strength of the mediation of these variables.

Concerning the mediating effect on job stress, the mediating variables made the effect of HBT negative and significant, thereby supporting Hypothesis 3. Therefore, with the introduction of mediating variables, the impact of HBT was negative. This result suggests the effect of HBT on job stress was mediated (to a large extent) by working in free time and presenteeism.

[Insert Table 4 about here]

In Table 4, we can see that all the indirect effects estimated using bootstrapping were significant, both the specific indirect effects of each of the mediating variables and the total indirect effect. In all cases, the results indicated that zero was not included in the lower and upper confidence intervals, thus confirming that specific indirect effects and total effect were significant, thereby providing statistical support for mediation.

## 6. DISCUSSION

### *6.1. Theoretical contribution*

Job stress has negative implications for people's quality of life, for business productivity and health costs and as such should be included in human resource management (Guest, 2017; Stahl et al. 2020). Previous literature analyzing the impact of telework on stress is scarce (Allen et al., 2015; Tavares, 2017) and can be grouped into two broad blocks. Some articles have found that HBT's effect on stress benefits the worker, while others find the opposite. Academic research places the question in the realm of the undefined. With which of the two groups then do our results align? Our main theoretical contribution is that we posit that the effect of HBT on stress, which a priori is observed to be undefined, is mediated by work extension.

The confirmation of Hypothesis 3 provides the main novel insight of our paper. HBT does not pose an inherent risk for job stress but causes a change in the employees' behaviour, increasing working in free time and presenteeism and thus job stress. Moreover, our mediation model indicates that once these behaviours are controlled, the effect of HBT is to reduce stress.

Returning to the results, Hypotheses 1a and 2a support that home-based teleworkers work more in their free time and are more likely presentist than their counterparts working on the employer's premises with ICT. Although the use of ICT has changed the working conditions of all workers, work extension is more pronounced for home-based teleworkers than for their counterparts working face-to-face. In line with the autonomy paradox (Mazmanian et al., 2013; Putnam et al., 2014), HBT implies freedom and control, which means that telework may be an indirect empowerment formula that, occasionally, is not implemented in an orderly way. Changes in working conditions, especially the flexibility to carry out the job "anywhere" or "anytime", enable work extension. However, as we argued above following Kelliher and Anderson (2010), these behaviours can be imposed by the company or developed voluntarily by employees. The two measures we use in this paper most likely manifest an overly committed, or even obsessive, attitude toward work. The same workers who choose or are forced to work in their free time may have the urge to work sick and even take on heavy workloads and responsibilities. Some concepts in the literature, such as "workaholism", describe addictive pathologies towards work (Schaufeli et al., 2008). Hypotheses 1b and 2b confirm that working in free time and presenteeism have a detrimental effect on job stress. This result is familiar and is in line with many previous studies that we have mentioned previously (Dettmers, 2017; Miragla and Johns, 2016). Although a priori, companies may think that the extension of work may benefit the company because they

obtain higher levels of effort from their workers, the problem arises when these behaviours are developed continuously over time, according with the Effort-Recovery Model (Meijman and Mulder, 1998). Previous studies have demonstrated that working in free time increases several risks for the company (Arlinghaus and Nachreiner, 2014). Similarly, being on call continuously and in the case of serious illness leads to significant productivity losses (Koopman et al., 2002; Naoum, 2016). Presenteeism has a detrimental effect on future health status (Bergström et al., 2009) and generates more costs and loss in productivity than absenteeism (Hemp, 2004).

*6.2. Practical implications*

Identifying the causes of job stress associated with HBT is crucial, primarily to design effective actions to prevent it. Our study indicates that to understand the real impact of HBT on job stress, behaviours like working in free time and presenteeism should be considered. Besides, to improve employees' job stress, those behaviours should be avoided. This has HRM implications both for the company and for the home-based teleworkers.

First, regarding job design, both employer and employees need to adjust expectation, workflows, and leadership styles (Ahmad et al., 2022). Firms need to design HBT with people in mind. Issues such as the right to privacy or digital disconnection should be as relevant as work equipment or digital devices when a company is considering introducing HBT. Besides, to avoid working in their free time, it is important that between the company and the future teleworkers organize the work, plan the working time and evaluate the correct development of their functions. This will allow companies to not interfere in the employees' free time, respecting and encouraging digital disconnection. At the same time, home-based teleworkers must use

internal discipline to schedule their working period (Tieztze and Musson, 2002), which will allow them to clarify the boundaries between home and work.

Second, regarding the evaluation and measurement of job performance, one of the critical questions for firms is how HBT should be monitored to prevent workers from exerting excessive efforts to signal their commitment. To do so, firms must also establish mechanisms that favour trust and results-based monitoring. The recent study by Kim et al. (2021) highlights that, in telework, results-based monitoring and trust substantially improve organisational performance. In any case, there is not much research or best practice guides specifically addressing the critical issue of performance-based monitoring. Being a relevant issue for any kind of HR function, we understand that the proper design of these performance assessment systems is crucial for the proper implementation of HBT. As such, we believe this area is a priority target for future HR research.

Third, the health risks of HBT are not only safety risks (displacement, ergonomic, or unprotection) but also include psychosocial risks like job stress. From this reason, Occupational Health and Safety (OHS) systems needs to evolve from a traditional approach, where the priority was safety and hygiene, to a more modern approach focusing on psychosocial risks. In order to establish mechanism for health promotion, OHS should highlight the potential risks of job stress. To do so, OHS need to pay attention to non-obvious workers behaviours such as presenteeism and working in free time and monitor workers' health regularly (Authors, 2023).

In this sense, firms may contribute to achieve all this with specific training for teleworkers and supervisors. Training programs designed for teleworkers should not only include ergonomics, digital skills, transversal skills, but also digital communication mechanisms, time management at work, self-discipline and decision-making, as well as

training to prevent psychosocial risks. Even more, it should be needed to establish training programs for supervisors on new forms of leadership, consistent and effective with telework, and on new performance evaluation systems.

Finally, in the regulation field, we argue that, in some instances, the good human resource practices discussed in the previous paragraph may not be sufficient to correct the effects of telework on employee welfare. Some companies may not have the necessary resources or may ignore the problem. For this reason, and because it is a problem that affects the workers' health and their rights, the administration has begun to regulate this practice. Some countries are already regulating aspects such as employee availability, business time and attendance systems, or the proportion of face-to-face and non-face-to-face work (Sanz de Miguel et al., 2021).

*6.2. Limitations and future directions*

Our analysis presents some limitations that may guide future research in this field. First, the use of secondary data poses some limitations, such as the number and type of measures we could employ. This circumstance prevents us, for example, from delving into questions such as whether all types of work extensions (imposed or voluntary) have the same impact on stress. Future studies should use data specifically designed to study the effects of telework and telecommuting and the different circumstances in which they occur.

Second, we use data from a single source. Although we have shown that this is not a problem in our data, it would be interesting to have information from several sources. Thus, for example, data could be collected from teleworkers and employers, which would provide information on how telework is designed, how it is regulated, how it is monitored and the perceived effects on job stress.

Thirdly, the data used are cross-sectional, which has some drawbacks, such as not being able to analyse causality in the relationship and endogeneity bias. The use of panel data in future research would allow a more detailed analysis of the effects of HBT on job stress across time.

Finally, we would like to highlight the moment of opportunity for research in this field. As we have already mentioned, with the pandemic, many companies and workers have experienced their first taste of telework. Since then, many organizations have been reorganizing themselves into hybrid structures where face-to-face and remote modes coexist, even in the work schedule of the same worker. Questions such as: which workers should work remotely? How many hours? Which activities should be face-to-face? What impact do these hybrid forms of work have on the health of employees? Are all questions to be resolved.

## 7. CONCLUSIONS

Given that previous literature has not reached conclusive results on the impact of HBT on job stress, this paper investigates the mediating role of work extension. Work extension can be reflected in working in free time and presenteeism. According to our results, HBT does not per se pose an inherent risk to job stress. However, factors associated with teleworking cause workers to increase working in free time and presenteeism, thereby increasing job stress. Concretely, our analysis reveals that the adverse job-stress effects of HBT are essentially the result of employee behaviour.

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**Table 1.**

Sample distribution of employees using ICTs

| Category | Pace of work | Observations |
|---|---|---|
| Home- based teleworkers (HBT) | Mainly from home, at least several times a month | 1,097 |
| High-mobile teleworkers | In at least two locations, several times a week | 1,789 |
| Occasional mobile teleworkers | One or more places outside the employer's premises, with a lower degree of mobility than the highly mobile group, occasionally | 1,205 |
| Always at the employer's premises (face-to-face) | Always at the employer's premises | 7,330 |

**Table 2.**

Main descriptive statistics of dependent, independent and mediating variables

| | **Mean / %** | ***St. Dev.*** |
|---|---|---|
| **Dependent variables** | | |
| Job stress | 3.080 | *1.021* |
| Never | 7.97 % | |
| Rarely | 17.30 % | |
| Sometimes | 43.48 % | |
| Mosto f the time | 18.57 % | |
| Always | 12.68 % | |
| **Independent variable** | | |
| HBT | 13.57 % | |
| Always at the employer's premises | 86.25 % | |
| **Mediating variables** | | |
| Working in free time | 1.857 | *1.041* |
| Never | 49.18 % | |
| Less often | 26.96 % | |
| Several times a month | 15.05 % | |
| Several times a week | 6.64 % | |
| Daily | 2.17 % | |
| Presenteeism | 30.28 % | |

**Table 3.**

*Estimation of the multiple mediation model of the effect of home-based telework on job stress*

| | Working in free time | | | Preseenteism | | | Job stress | | |
|---|---|---|---|---|---|---|---|---|---|
| Working in free time | | | | | | | 0.151 | *** | *0.017* |
| Preseenteism | | | | | | | 0.309 | *** | *0.032* |
| HBT | 0.790 | *** | *0.076* | 0.068 | *** | *0.016* | -0.136 | *** | *0.039* |
| Female | 0.030 | | *0.035* | 0.060 | *** | *0.011* | 0.098 | ** | *0.034* |
| Age | -0.004 | * | *0.001* | -0.002 | ** | *0.001* | -0.009 | *** | *0.002* |
| Seniority | 0.002 | | *0.002* | 0.000 | | *0.001* | 0.003 | | *0.002* |
| Primary education | 0.431 | | *0.233* | 0.011 | | *0.104* | 0.500 | * | *0.246* |
| Secondary education (omitted) | | | | | | | | | |
| Tertiary education | 0.228 | *** | *0.041* | 0.011 | | *0.015* | 0.018 | | *0.034* |
| Health status | -0.066 | ** | *0.023* | -0.045 | *** | *0.010* | -0.209 | *** | *0.025* |
| Temporary contract | 0.073 | | *0.068* | -0.002 | | *0.023* | -0.057 | | *0.054* |
| Income | 0.000 | | *0.000* | 0.000 | | *0.000* | 0.000 | | *0.000* |
| Managers | 0.522 | *** | *0.060* | 0.046 | | *0.029* | 0.080 | | *0.052* |
| Professionals & technicians | 0.291 | *** | *0.032* | 0.007 | | *0.013* | 0.031 | | *0.039* |
| Clerical (omitted) | | | | | | | | | |
| Skilled craft plant | 0.141 | * | *0.065* | 0.028 | | *0.033* | -0.041 | | *0.084* |
| Non-skilled workers | -0.003 | | *0.095* | 0.091 | * | *0.039* | -0.011 | | *0.190* |
| Number working hours | 0.017 | *** | *0.002* | 0.002 | * | *0.001* | 0.008 | *** | *0.002* |
| Empowerment | 0.090 | *** | *0.014* | 0.004 | | *0.007* | -0.080 | *** | *0.021* |
| Agriculture | 0.033 | | *0.088* | -0.047 | | *0.052* | -0.437 | *** | *0.094* |
| Manufacture (omitted) | | | | | | | | | |
| Construction | 0.108 | | *0.091* | -0.048 | | *0.036* | -0.026 | | *0.087* |
| Services | 0.106 | ** | *0.038* | -0.008 | | *0.017* | -0.014 | | *0.036* |
| Public sector | 0.077 | * | *0.032* | 0.003 | | *0.013* | -0.065 | | *0.035* |
| 1-9 employees | -0.072 | | *0.047* | 0.007 | | *0.028* | -0.193 | *** | *0.044* |
| 10-249 employees (omitted) | | | | | | | | | |
| 250-more employees | -0.076 | | *0.041* | 0.027 | | *0.015* | 0.028 | | *0.044* |
| Cons | 1.053 | *** | *0.175* | 0.397 | *** | *0.043* | 3.488 | *** | *0.153* |
| N | 5,244 | | | | | | | | |
| Log pseudolikelihood | -139533.44 | | | | | | | | |

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

**Table 4.**

*Boostrap results to calculate confidence intervals of indirect effects*

| | Observed Coef. | Bootstrap Std.Err. | Z | | CI [95%] | |
|---|---|---|---|---|---|---|
| Specific indirect effect for working in free time | 0.170 | *0.015* | 11.22 | *** | | |
| Normal CI | | | | | 0.1403 | 0.1997 |
| Percetile CI | | | | | 0.1399 | 0.2008 |
| Bias-corrected CI | | | | | 0.1414 | 0.2024 |
| Specific indirect effect for presenteeism | 0.022 | *0.006* | 3.78 | *** | | |
| Normal CI | | | | | 0.0107 | 0.0338 |
| Percetile CI | | | | | 0.0113 | 0.0338 |
| Bias-corrected CI | | | | | 0.0121 | 0.0350 |
| Total indirect effect | 0.192 | *0.017* | 11.57 | *** | | |
| Normal CI | | | | | 0.1597 | 0.2249 |
| Percetile CI | | | | | 0.1604 | 0.2254 |
| Bias-corrected CI | | | | | 0.1609 | 0.2264 |

*** p< 0.001

**Figure 1.**

*Model proposed of the effect of home-based telework on job stress*