ORIGINAL RESEARCH

Homeworking and Employee Job Stress and Work Engagement: A Multilevel Analysis from 34 European Countries

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Abstract

Working from home (WFH) has had both positive and negative impacts on the work conduct. To maximise the benefits of homeworking, previous literature mainly focuses on creating self-help strategies for homeworkers to reduce work stress and maintain work engagement. However, fewer studies take on the policymaker perspective and evaluate optimal working conditions in the homeworking context. Using the Job Demands-Resources (JD-R) model, this study evaluates the effects of various work characteristics (job demands and resources) on the stress and engagement of infrequent and frequent homeworkers. Using the sixth European Working Conditions Survey 2015 which contains 5090 participants from 34 European countries, we studied 6 job demands and 5 job resources via Exploratory Factor Analysis. After testing the model's fitness using Confirmatory Factor Analysis, multiple mixed-effects models were used to test the job demands and resource effects on worker stress and engagement. Dominance Analysis was then used to identify the relative importance of each job demand and resource when explaining employee stress and engagement. We found emotional demands, time pressure, and workload to be the top three demand factors that cause work stress across the groups. Other than daily homeworkers, a positive and fair social climate is the most prominent resource able to boost job engagement across all of the other groups. By identifying the homeworkers' most influential demands and resources, this study will help managers better understand the steps to take to provide healthy job conditions for homeworkers.

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Abbreviations

ANOVA	Analysis of variance
CFA	Confirmatory Factor Analysis
CMC	Computer-mediated communications
DA	Dominance analysis
EFA	Exploratory factor analysis
EWCS	European Work Conditions Survey
FWA	Flexible work arrangement
GPD	Gross Domestic Product
JD-R	Job Demand-Resource Model
VIF	Variance Inflation Factor
WFH	Working from Home

1 Introduction

Due to the outbreak of Covid-19, more firms pivoted toward a crisis response by shifting from office-based working to home-based working during the lockdowns. The global-wide application of WFH has escalated it to becoming one of the hottest research topics. Unfortunately, WFH is not all sunshine and rainbows. Research findings show that work location flexibility, including WFH, has paradoxical outcomes on employee stress and engagement (Mann & Holdsworth, 2003; Richman et al., 2008; Song & Gao, 2020).

While many factors could contribute to this result, WFH imposes drastic changes to one's work conduct and characteristics and essentially influences how employees perceive their job demands and resources (Van Steenbergen et al., 2018). On the bright side, working virtually grants the employees more **job resources** by giving them better autonomy in terms of adjusting their work schedules, in turn encouraging them to be more productive (Etheridge et al., 2020). The lack of a daily commute also guarantees them more resources such as time, money, and energy (Brynjolfsson et al., 2020). On the negative side of things, WFH can reduce their resources by decreasing the possibility of professional development (Van Steenbergen et al., 2018), creating role ambiguity due to reduced feedback, and reducing the level of work engagement due to a lack of emotional support (Sardeshmukh et al., 2012). Some of the past teleworking (also known as a form of work location flexibility) literature has also pointed out how location flexibility could **increase the job demands** due to the heightened home-to-work conflict (Delanoeije et al., 2019; Golden et al., 2006), resulting in overwork due to the expectation of constant availability and long working hours (Weinert et al., 2014), and social isolation (De Vries et al., 2019; Golden et al., 2008; Mann & Holdsworth, 2003).

To address the impacts of the changing job demands and resources on employees, recent studies have provided strategies for teleworkers and homeworkers to use to cope with stress and improve their engagement. For instance, setting similar boundaries to the office environment such as working hours and having a dedicated office space at home (Basile & Beauregard, 2016), as well as enhancing their time management skills by scheduling tasks (Rudnicka et al., 2020).

However, less studies have been done on what managers can do to facilitate the creation of a conducive home working environment for their workers. While it is good

to help users learn about the coping strategies available to handle job demands and to utilise job resources effectively, the presence of job demands and resources are both still mainly controlled by the employer/policymaker. An employee has a limited say on what resources they are getting and only have so much leeway to reject undesirable demands. Policymakers, on the other hand, have the leadership and authority to change the company's structure and alter the organisational culture. If they are equipped with information on the job demands and resources among the homeworkers, WFH could be changed to result in more benefits being provided to the employees. This study aims to inform policymakers of the job resources and job demands that are the most influential on employee stress and engagement.

To identify the job conditions, WFH must be understood first. Most teleworking studies, including recent homeworking research, focus only on the dichotomous status of homeworking. In other words, most of them put the participants to a binary category: they are either treated as office workers or homeworkers. They less frequently tend to zoom in further and investigate employees engaged in different homeworking frequencies. This is not sufficient. As revealed by the qualitative study by de Klerk et al. (2021), most employees prefer to have the flexibility to alternate their work locations (between the office and home) over exclusively homeworking. Based on this understanding, Bloom (2020) also predicted that future companies will be filled with employees who opt to work from home at varying frequencies. This situation affirms that studies where there is a dichotomous homeworking status are insufficient, and that it necessitates an evaluation focusing on employees with varying homeworking frequencies.

Thus, this study responds to the call from Rudnicka et al. (2020) for more researchers to develop strategies to maintain employee wellbeing (i.e., reducing employee stress and improving job engagement) in a hybrid future of work. Building on the perspective of the employer, this study investigates how various job conditions can influence homeworker stress and engagement based on their homeworking frequency. The aim is to identify and rank the job conditions that maximise homeworker engagement and minimise their stress. To do this, we employed the data collected from the latest round of European Working Conditions Survey (EWCS) conducted in 2015 and categorised the homeworkers into five different groups ranging from "non-homeworkers" to "daily homeworkers." We then tested the various factors, informed by the JD-R model, that affect their stress and engagement. We adopted the popular Job Demands-Resources (JD-R) theory (Bakker & Demerouti, 2007) to select the potential job conditions from the dataset. Finally, 11 factors were selected and their effect on stress and engagement were tested. This process was repeated for each of the five groups of homeworker.

With this design, the contributions of the current study are fourfold. Theoretically, the first contribution is being one of the first studies that tests the antecedents of stress and engagement among employees who vary in their frequency of homeworking using the JD-R model.

Second, using the EWCS database which contains representative data from 34 European countries, this study compensates for most of the literature studying the JD-R model and teleworking which has often relied on single-country samples Sardeshmukh et al., 2012; Jamal et al., 2021). This database is also taken from the most recent wave (2015) prior to the pandemic that preserves the voluntary practice of FWA. This resembles the post-pandemic workforce where home-bound working is no longer a must but an option.

Third, the study contributes empirically by including an underrated analysis technique, Dominance Analysis (DA), to rank the relative importance of each job condition in relation to stress and engagement (Hakanen et al., 2019). DA compensates for the multiple linear

regression analysis that lacks accuracy when reflecting the rank of each predictor (Luo & Azen, 2013), which suits the model well.

Finally, this study contributes practically. Our findings can potentially be a guideline for policymakers to provide managerial implications with employee outcomes as the priority.

2 Literature Review

WFH is a type of location flexibility given by employers to allow employees to perform selected work tasks at home. As suggested by Bolisani et al. (2020), a more popular term in the previous research to represent this kind of location flexibility is "teleworking" or "telecommuting." However, teleworking is a complex concept that lacks a universal definition (Bolisani et al., 2020; Nakrošienė et al., 2019). It should not be equalised to homeworking as teleworking could mean working from locations other than home such as a satellite station or a client's workplace. Homeworking can be regarded as teleworking that limits the employees to working from home.

2.1 Theoretical Background of the Job Demand-Resource Model (JD-R model)

Knowing the potential adverse effects of homeworking, organisations want to establish desirable working conditions to maintain or even enhance the psychological state of any homeworkers. The well-known JD-R model is relevant and useful in this case because it assumes that the employees' wellbeing is a result of balancing the positive (resource) and negative (demand) job characteristics (Schaufeli & Taris, 2014). The central idea of the model relies on two psychological processes. Job demands first activate an energy depletion process and gradually exhaust the employees' physical and emotional resources as they input more effort to meet their work goals (Crawford et al., 2010). In other words, job demands are the psychological, social, organisational, or physical aspects of a job that require sustained mental or physical effort (Schaufeli & Bakker, 2004).

The second process is motivational; job resources buffer the adverse effect due to the job demands or directly reduce the job demands. Job resource is defined as the psychological, social, organisational, or physical aspects of a job that do one of the following tasks: (1) reduce the job demands and its resource cost, (2) improve the effectiveness when completing work goals, or (3) aid in self-growth and skill development (Schaufeli & Bakker, 2004). This motivating effect increases the employees' willingness to engage in their work roles (Crawford et al., 2010).

Building on this understanding, we proposed the following hypotheses:

H1 Job demands increase work stress.

H2 Job resources increase engagement.

H3 The job demand-work stress link is stronger than the job demand-engagement link. Similarly, the job resource-engagement link is stronger than the job resource-work stress link.

2.2 WFH, Job Demands and Stress

Some studies found homeworkers to have a higher level of work stress than office-based workers (Mann & Holdsworth, 2003; Song & Gao, 2020). This is a red light for the homeworking practice as work stress has a range of detrimental effects on the employees' mental and physical health (Narainsamy & Van Der Westhuizen, 2013). The rise in stress after transiting to homeworking could be explained by the increased job demands.

There are a wide range of job demands that can induce work stress among homeworkers. **Workload** and **emotional demand** are two job demands that have received sufficient empirical support in terms of their effect on work stress (Ariza-Montes et al., 2016; Bakker et al., 2003). In the study of the JD-R model conducted by Gabel-Shemueli and Dolan (2014), work-family role conflict is regarded as a job demand because of the incompatibility between job pressures and family role demands. Based on this understanding, we suggest that **interruption from family members** could be another relevant job demand for homeworkers. Lastly, we introduce a few less-researched job demands that we consider to be relevant to homeworkers, including **job insecurity**, **long working hours,** and **time pressure**.

2.2.1 Workload

Work overload is defined as a situation when employees are given task demands that exceed their motivated coping capacity (MacDonald, 2003). When the employees' ability does not align with the task demand, it can put them into a state of "psychosocial hazard" that contributes to the development of stress. Workload is a demand with a positive and well-established link with stress (Bakker et al., 2003; Crawford et al., 2010; Hakanen et al., 2019; McVicar, 2016). The transition of WFH could potentially increase the workload given as employers may unintentionally delegate more work tasks to WFH employees in attempt to compensate for their physical absence. Computer-mediated communications, unlike face-to-face communications, may take more effort and time which also increases the homeworkers' workload due to the increased number of online meetings.

2.2.2 Emotional Demand

It is defined as a requirement of one's job to deal with strong feelings such as anger, frustration, and anxiety (Gabel-Shemueli & Dolan, 2014). They could be handling angry or verbally abusive clients or maybe their job typically requires them to hide their feelings. Emotional demand is related to many negative mental health outcomes (Ariza-Montes et al., 2016; Bakker et al., 2003; Crawford et al., 2010), and it is regarded as one of the most prominent factors that contribute to work stress (McVicar, 2016). To date, there is no clear empirical link between emotional demand and WFH. It is expected that WFH may reduce the impact of emotional demand due to the use of delayed communication and less direct confrontations with people.

2.2.3 Familial Interruption

Many studies on the JD-R model included "work-family interference" as a job demand without specifying its direction (Gabel-Shemueli & Dolan, 2014; Gan & Gan, 2014;

McVicar, 2016). Since homeworkers are our focus in this study, working in the presence of other family members could open up the door to family-to-work interruptions more so than work-to-family interruptions (Delanoeije et al., 2019). These non-work disturbances may cause delays in the scheduled work and further lead to work stress.

2.2.4 Job Insecurity

Recent global economic crises have led to an unstable labour market. As a result, job insecurity is gaining more research attention recently as a stressor (Hu et al., 2021). It is defined as a "sense of powerlessness to maintain desired continuity in a threatened job situation" (Greenhalgh & Rosenblatt, 1984, p. 438). WFH can threaten career advancement and possibly reduce an individual's competency compared to their office co-workers due to the "out-of-sight, out-of-mind" syndrome (Lim & Teo, 2000).

2.2.5 Working Hours

Working for extended hours is a well-researched factor known to cause work stress (Ebrahimi & Kargar, 2018) but it is not a popular job demand in the JD-R model. The working hours of homeworkers typically extend into the evening, nights, and weekends (Tavares, 2017), and they are generally working longer hours than office workers (Baruch, 2000). This phenomenon is not too surprising. On one hand, an employer may expect homeworkers to be available all the time given how no time is needed for commuting. On the other hand, the employees may feel obligated to spend longer hours working on their job as they benefit from the WFH arrangement. Another justification for their long working hours could be the tendency of homeworkers to fit their personal tasks into their work schedule and working for prolonged hours (Arntz et al., 2020; Bolisani et al., 2020).

2.2.6 Time Pressure

When employees are given a limited amount of time to process information and make work-related decisions, they experience time pressure. Most of the past research focus on occupations like nurses (Vehko et al., 2019) and physicians (Linzer et al., 2000) who experience a high level of time pressure that stems from the emergencies that they handle. In this case, homeworkers are equipped with more time reallocation periods and a reduced commute time (Peters & van der Lippe, 2007; Sardeshmukh et al., 2012), meaning that they should be less stressed due to their longer working time frame.

2.3 WFH, Job Resources and Job Engagement

Besides stress, job engagement is also another important employee outcomes as it is defined as "a positive, fulfilling, affective-motivational state of work-related well-being that is characterized by vigour, dedication, and absorption" (Bakker et al., 2008, p.187). The link between homeworking and engagement is less defined in the literature and it is somewhat paradoxical. A general belief is that WFH improves the level of worker engagement (Vyas & Butakhieo, 2020). This is because permission to work from home is often perceived as a resource that signals organisational trust and support, at least in the pre-pandemic period, that in turn leads to greater work engagement levels as a reciprocal response by the employees (Richman et al., 2008). On the contrary, the findings of De Vries et al.

(2019) suggest that the work engagement levels of homeworkers and office workers are not significantly different. Work engagement may be lower among homeworkers because they have decreased resources such as shorter face time with their co-workers and reduced direct support and feedback (Sardeshmukh et al., 2012).

We found there to be six job resources including the ***opportunity for development***, ***decision latitude***, and ***social support (from co-workers and managers)*** that are consistently associated with job engagement (Bakker et al., 2003; Gabel-Shemueli & Dolan, 2014). The remaining job resources are ***management quality*** and ***social climate*** which are the necessary antecedents of employee engagement but under-researched in the JD-R model.

2.3.1 Opportunity for Development

Self-development and skill advancement are essential processes when seeking to improve employee capability. They also effectively help employees cope with more job demands (Crawford et al., 2010). Working environments that provide learning opportunities such as professional training improve the employees' likelihood of learning new behaviours and knowledge which in turn fosters the employees' work passion and engagement (Bakker et al., 2003). It is expected that homeworkers may miss their access to on-the-job trainings and slow down their development process.

2.3.2 Decision Latitude

The freedom to make decisions, and perform and organise their work tasks is known as job autonomy or decision latitude. Being autonomous is associated with a sense of organisational trust, and it induces many positive emotions such as feeling valued, respected, and influential (Frank et al., 2017). This indirectly improves employee job involvement (Crawford et al., 2010). It is generally agreed that homeworkers have a higher decision latitude or perceived autonomy than office workers due to less managerial oversight (Sardeshmukh et al., 2012).

2.3.3 Social Support From Their Co-workers and Manager(s)

It is defined as "the overall level of helpful social interaction available on the job from both co-workers and supervisors" (Karasek & Theorell, 1990, Harter, 2014). In the presence of social support, employees perceive themselves to be cared for and assisted in terms of their career development, work-related needs, and routine tasks. Social support is a resource beyond those directly associated with the work itself, and it is commonly used in the JD-R model (Crawford et al., 2010; Gabel-Shemueli & Dolan, 2014; Gan & Gan, 2014). A previous study substantiates the idea that homeworkers feel socially isolated compared to their office co-workers (Lal & Dwivedi, 2008). In this study, we observe the influence of social support provided by two parties, specifically co-workers and managers.

2.3.4 Leadership/Management Quality

According to Social Exchange Theory, a reciprocal beneficial exchange relationship is established when employees receive favourable treatment from their company (Blau, 1968). Employers who are in a position of authority are leader figures and can influence their followers' behaviour through their leadership and management skills. When

employees are greeted with effective feedback, respect, and recognition, they will compensate the company by being more engaged with their job. This mechanism should apply to both office and home workers. The option to WFH may be seen as a signal of trust from the management and could enhance the reciprocal behaviour of homeworkers (Tsen et al., 2021).

2.3.5 Social Climate

Although it has been less studied in the past, social climate is an important predictor of work engagement as it represents the psychosocial environment of the work setting. Hakanen et al. (2006) used it as a social-level job resource and found that the teachers' work engagement improved significantly when they were in a positive social climate. However, the idea behind social climate is complex. Allodi (2010) suggested that a social climate can include interpersonal relationships, communication style, and group processes. Based on this definition, social climate in our study is measured by the organisational or workplace culture. This includes several components that make up a company's atmosphere including their relationships with their co-workers, the perceived fairness of the management style, and management trust. Limited research that has been done on the homeworkers' perception of social climate but we assume that a positive office climate would benefit office workers more since they are more immersed within the psychosocial environment.

The following figure shows the conceptual framework of this study (Fig. 1).
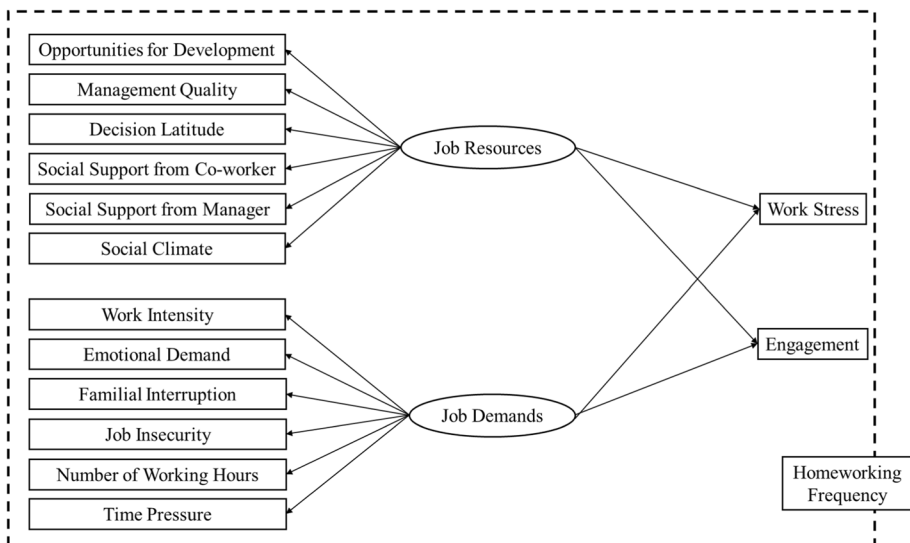

Fig. 1 Conceptual framework

3 Research Methodology

3.1 Data Source and Sample

We used the data collected from the sixth EWCS from 2015 with representative data from 34 European countries to test the hypotheses. EWCS has collected information about the working conditions, workplace practices, and the employee health of European working adults every five years since 1990. Previous researchers have widely used this database to test the JD-R model (Hakanen et al., 2019; Radic et al., 2020). EWCS used a multi-stage, stratified clustered random sampling design. The data was drawn at the country level, geographic region level, urbanisation level, and finally at the household level. Subsequently, the residential addresses were generated randomly. The final sample size was reduced to 5,090 including only the respondents who were actively working full-time. The following table represents the demographic information of the sample (Table 1).

3.2 Measurements

Homeworking frequency was assessed using Question 35e which asks about the frequency of working at home. The response options range from 1 being "Daily", 2 being "Several times a week", 3 being "Several times a month", 4 being "Less often," and 5 being "Never". The responses were reverse coded to ease the interpretation.

One of the dependent variables, **work stress**, was measured using Q61m "You experience stress in your work" on a five-point Likert scale with 1 being "Always" to 5 being "Never." A higher score resembles a higher stress level after we reverse coded the responses.

Table 1 Demographic information of the sample from EWCS

Demographic Information	Homeworking frequency				
	Never (n = 3330)	Less often (n = 704)	Several times a month (n = 399)	Several times a week (n = 376)	Daily (n = 281)
Gender					
Female	2036	416	230	242	161
Male	2387	453	272	234	172
Age					
< 30 years old	844	149	65	46	32
31–40 years old	1224	258	129	135	97
41–50 years old	1209	244	170	160	105
51–60 years old	976	177	120	109	87
> 60 years old	170	41	18	26	12
Sector					
Private	2829	533	292	221	143
Public	1600	305	193	229	175
Joint	211	42	30	20	14
Non-profit organization	32	15	4	4	4
Others	29	6	6	9	4

Another dependent variable, ***engagement***, contained three items from Q90. An example is "I am enthusiastic about my job." They were measured on a five-point Likert scale with options ranging from Never to Always. We created a composite index with the three questions, and it had a Cronbach Alpha value of 0.69. The responses were reverse coded to link a higher level of engagement with higher scores.

Job demands consists of six indicators: workload, emotional demand, familial interruption, time pressure, job insecurity, and working hours. We reverse-coded all responses to make the higher scores linked with a higher job demand. The details can be observed in Tables 2 and 4.

Job resources was measured using six indicators: the opportunity for development, decision latitude, management quality, social support from co-workers, social support from managers, and the social climate. Again, we reverse-coded all scores (except for decision latitude) to associate higher scores with higher values of resources. The question wording and answer scales can be found in Tables 2 and 4 respectively. Responses consisting of "Don't Know" and "No Answers" were treated as missing data, and only the participants that answered all relevant questions were included in this study.

The participants' highest education level, gender, age, income, and the sector they work in (private/public) were controlled for in all models. A national macro variable, GDP per capita, was also controlled for in this study.

3.3 Analysis Techniques

All statistical tests in this study were conducted using Stata BE 17. One-way ANOVA tests were used to assess the stress and engagement level of the employees based on their homeworking frequency. This step was in order to assess the general link between homeworking frequency, stress, and engagement to ease the interpretation.

Four types of analyses were used to test the main hypotheses (H1-H3). First, we used exploratory factor analysis (EFA) to confirm that all questions representing the job conditions are loaded on their respective variables. A cut-off point of 0.55 was chosen based on the suggestion from Maridal (2017) that 0.5 is a common cut-off point for social science studies. Questions that were loaded on two factors were removed to avoid complexity when interpreting the results. On top of that, a VIF was used to test the multicollinearity of the variables with more than two questions and the results are provided in the Appendix.

Second, we verified the model fit using confirmatory factor analyses (CFA). We fitted a null model and JD-R model to see if the goodness of fit was improved by categorising the variables into "job demands" and "job resources." The null model assumes that the models' indicator variables (e.g., workload) and latent variables (e.g., job demands) are uncorrelated.

Third, multilevel analysis was used to analyse the effect of the job conditions on employee stress and engagement. A multilevel model was chosen because of the hierarchical structure of the data. Respondents nested within the same cluster (in this case, country) are more likely to be similar than the respondents from other clusters. There is sufficient evidence that shows that results generated under the ignorance of nesting level can be biased (Van Landeghem et al., 2005). Hence it is more appropriate to use multilevel analysis to avoid the violation of the assumption of independence of the observations. We assigned all within-country observations as level-1 while countries were set at level-2, while the random intercepts from level-2 were estimated from the data. We centred all continuous control variables, the dependent variables, and all variables concerning job

demands and job resources at their country-level mean except for GDP per capita, which is centred at its grand mean. The results of the multilevel regression are presented with their regression coefficients (*b*) and confident intervals (*CI*).

Level 1 Equation (Job demand model)

$$\begin{aligned}
WS_{ij} \text{ or } JE_{ij} = \ & \beta_{0j} + \beta_{1j}\left(\text{Workload}_{ij}\right) + \beta_{2j}\left(\text{Emotional Demand}_{ij}\right) \\
& + \beta_{3j}\left(\text{Familial Interruption}_{ij}\right) + \beta_{4j}\left(\text{Job Insecurity}_{ij}\right) \\
& + \beta_{5j}\left(\text{Working Hours}_{ij}\right) + \beta_{6j}\left(\text{Time Pressure}_{ij}\right) \\
& + \beta_{7j}\left(\text{Highest Education Level}_{ij}\right) + \beta_{8j}\left(\text{Age}_{ij}\right) \\
& + \beta_{9j}\left(\text{Sex}_{ij}\right) + \beta_{10j}\left(\text{Income}_{ij}\right) + \beta_{11j}\left(\text{Sector}_{ij}\right) \\
& + \beta_{12j}\left(\text{GDP per Capita}_{ij}\right) + r_{ij}
\end{aligned}$$

Level 1 Equation (Job resource model)

$$\begin{aligned}
WS_{ij} \text{ or } JE_{ij} = \ & \beta_{0j} + \beta_{1j}\left(\text{Opportunity for Development}_{ij}\right) \\
& + \beta_{2j}\left(\text{Management Quality}_{ij}\right) + \beta_{3j}\left(\text{Decision Latitude}_{ij}\right) \\
& + \beta_{4j}\left(\text{Social Support from Co}-\text{Workers}_{ij}\right) \\
& + \beta_{5j}\left(\text{Social Climate}_{ij}\right) + \beta_{6j}\left(\text{Highest Education Level}_{ij}\right) \\
& + \beta_{7j}\left(\text{Age}_{ij}\right) + \beta_{8j}\left(\text{Sex}_{ij}\right) + \beta_{9j}\left(\text{Income}_{ij}\right) \\
& + \beta_{10j}\left(\text{Sector}_{ij}\right) + \beta_{11j}\left(\text{GDP}_{ij}\right) + r_{ij}
\end{aligned}$$

where WS refers to Work Stress, JE refers to Job Engagement, *i* refers to the person, *j* refers to the country, β_0 refers to the average work stress/ job engagement for the *j*th group country (intercept) and r_{ij} refers to individual error.

Level 2 Equation (Job demand model)

$$\begin{aligned}
\beta_{0j} = \ & \gamma_{00} + \gamma_{01}\left(\text{Workload}_j\right) + \gamma_{02}\left(\text{Emotional Demand}_j\right) \\
& + \gamma_{03}\left(\text{Familial Interruption}_j\right) + \gamma_{04}\left(\text{Job Insecurity}_j\right) \\
& + \gamma_{05}\left(\text{Working Hours}_j\right) + \gamma_{06}\left(\text{Time Pressure}_j\right) \\
& + \gamma_{07}\left(\text{Highest Education Level}_j\right) \\
& + \gamma_{08}\left(\text{Age}_j\right) + \gamma_{09}\left(\text{Sex}_{ij}\right) + \gamma_{10}\left(\text{Income}_j\right) \\
& + \gamma_{11}\left(\text{Sector}_j\right) + u_{0j}
\end{aligned}$$

Level 2 Equation (Job Resource Model)

$$\begin{aligned}
\beta_{0j} = \ & \gamma_{00} + \gamma_{01}\left(\text{Opportunity for Development}_j\right) + \gamma_{02}\left(\text{Management Quality}_j\right) \\
& + \gamma_{03}\left(\text{Decision Latitude}_j\right) + \gamma_{04}\left(\text{Social Support from Co}-\text{Workers}_j\right) \\
& + \gamma_{05}\left(\text{Social Climate}_j\right) + \gamma_{06}\left(\text{Highest Education Level}_j\right) \\
& + \gamma_{07}\left(\text{Age}_j\right) + \gamma_{08}\left(\text{Sex}_{ij}\right) + \gamma_{09}\left(\text{Income}_j\right) \\
& + \gamma_{10}\left(\text{Sector}_j\right) + u_{0j}
\end{aligned}$$

Lastly, we used Dominance Analysis (DA) to rank the predictive power of each predictor to determine the outcomes. DA is an underrated technique in hierarchical linear

regression models (Hakanen et al., 2019) that evaluates the relative importance of the chosen predictors of a model. It has been argued that the standardised coefficient in the multiple linear regression is not an appropriate measure to reflect the relative importance of each predictor (Luo & Azen, 2013). To address this issue, DA ranks each predictor depending on their additional contribution to the variance of the whole model. We used a mixed-effect model in DA to test the relative importance of each predictor by putting "country" at the second level. We report the rank of each predictor by their proportion of explained variance and dominance value (%) to show how the contribution of each predictor.

4 Results

4.1 Descriptive Statistics

Table 2 below covers the correlations between all variables in this study. All job demands and resources are significantly correlated with work stress and engagement except for workload, which does not correlate with engagement.

4.2 ANOVA Tests

Two one-way ANOVA tests were done to measure the employees' work stress and engagement levels at five different homeworking frequencies. The results support the statement that the work stress (F (4,4) = 4.30, p = 0.018) and engagement (F (4,4) = 9.47, $p < 0.001$) levels of these employees are significantly different. Based on the mean values of stress from the different groups, the stress level increases when the homeworking frequency increases. Homeworking frequency is also a significant predictor of engagement. However, the relationship between the workers' engagement and their homeworking frequency is more complex. The means for engagement show that a higher engagement level is found when an employee works from home more frequently. Still, this effect does not apply to the daily homeworkers whose engagement is slightly lower than the engagement of the employees who are homeworking several times a week.

4.3 Exploratory Factor Analysis

The results from the factor loading indicate that all items are loaded as expected except for social support from managers. This question "There is good cooperation between you and your colleagues" was cross loaded under the same factor with questions from "management quality" with a factor loading value of 0.43. We conducted further analysis and found that social support from managers and management quality are highly correlated. We decided to take Tonidandel and LeBreton's (2011) suggestion to drop the social support from managers variable because we do not want this construct redundancy to reduce the relative importance of the other predictors in the DA test later.

Another question in the social climate variable was removed due to the low value of the factor loading (0.35). The final results from the EFA are presented in Table 3.

Table 2 Descriptive statistics of job demands, job resources, stress and engagement

Variables	M	SD	Range	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13
Stress	3.174	1.03	1–5	1	5	–												
Engagement	3.985	0.63	1–5	1	5	–0.09**	–											
Opportunity for Development	3.813	0.96	1–5	1	5	–0.05**	0.21**	–										
Management Quality	3.986	0.86	1–5	1	5	–0.15*	0.32**	0.29**	–									
Decision Latitude	2.227	1.05	0–3	0	3	–0.04*	0.17**	0.03	0.15**	–								
Social Support from Co-Workers	4.142	0.89	1–5	1	5	–0.09**	0.20**	0.17**	0.32**	0.08**	–							
Social Climate	3.843	0.82	1–5	1	5	–0.23**	0.37**	0.36**	0.61**	0.14**	0.36**	–						
Workload	3.252	1.53	1–7	1	6	0.33**	0.02	–0.00	–0.10**	–0.15**	–0.01	–0.13**	–					
Emotional Demand	2.682	1.44	1–7	1	7	0.37**	–0.05*	0.00	–0.11**	–0.02	–0.04*	–0.17**	–0.18**	–				
Familial Interruption	1.757	0.74	1–5	1	5	0.21**	–0.17**	–0.03	–0.12**	–0.01	–0.12**	–0.14**	–0.11**	0.18**	–			
Job Insecurity	1.894	1.22	1–5	1	5	0.07**	–0.14**	–0.01	–0.13**	–0.15**	–0.11**	–0.12**	–0.08**	0.06**	0.10**	–		
Working Hours	41.015	7.33	1–100	3	100	0.14**	–0.03*	–0.01	–0.03*	–0.02	–0.04*	–0.03*	–0.14**	0.04*	0.11	0.03	–	
Time Pressure	2.274	1.00	1–5	1	5	0.20**	–0.15**	–0.14**	–0.23**	–0.05*	–0.16**	–0.31**	–0.27**	0.17**	0.20**	0.04*	0.12**	–

$*p < 0.05$, $**p < 0.001$, n = 5090

Table 3 Results of exploratory factor loading for job demands and resources

Constructs/items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Resources							
Opportunity for development (Cronbach Alpha=0.70)							
The training has helped me improve the way I work		0.65					
I feel that my job is more secure because of my training		0.76					
I feel my prospects for future employment are better		0.73					
Management quality (Cronbach Alpha=0.89)							
Your immediate boss encourages and supports your development	0.81						
Your immediate boss provides useful feedback on your work	0.80						
Your immediate boss is helpful in getting the job done	0.73						
Your immediate boss is successful in getting people to work together	0.69						
Your immediate boss gives you praise and recognition when you do a good job	0.72						
Your immediate boss respects you as a person	0.59						
Decision latitude (Cronbach Alpha=0.72)							
Are you able to choose or change your speed or rate of work				0.60			
Are you able to choose or change your methods of work				0.64			
Are you able to choose or change your order of tasks				0.65			
Social support from co-workers							
Your colleagues help and support you							
Social climate (Cronbach Alpha=0.84)							
In general, employees trust management		0.75					
The work is distributed fairly		0.59					
Conflicts are resolved in a fair way		0.69					
The management trusts the employees to do their work well		0.67					
Employees are appreciated when they have done a good job		0.57					
Demands							
Workload (Cronbach Alpha=0.76)							
Does your job involve working at very high speed					0.70		

Table 3 (continued)

Constructs/items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Does your job involve working to tight deadlines					0.73		
Emotional demand (Cronbach Alpha = 0.66)							
Does your main paid job involve handling angry clients, customers, patients, pupils etc							0.62
Does your main paid job involve being in situations that are emotionally disturbing for you							0.62
Familial interruption (Cronbach Alpha = 0.71)							
How often in the last 12 months, have you found it difficult to concentrate on your job because of your family responsibilities						0.65	
How often in the last 12 months, have you found that your family responsibilities prevented you from giving the time you should to your job						0.65	
Job insecurity							
I might lose my job in the next 6 months							
Working hours							
How many hours do you usually work per week in your main paid job?							
Time pressure							
You have enough time to get the job done							

4.4 Comparison Between Measurement Models

Table 4 shows that the JD-R model has a better model fit than the null model. All fit indices improved in the JD-R model where the SRMR is lower than 0.08, RMSEA is lower than 0.08, and CFI is higher than 0.9. The AIC value of the JD-R model is also lower. Since all relationships are as predicted, we conclude that this model's job demands and resources can be statistically differentiated.

4.5 Multiple Regression Analyses

Based on the results from the two mixed-effect multilevel modelling concerning work stress (Table 5), all job demands—workload, emotional demand, familial interruption, job insecurity, working hours, and time pressure—are associated with higher work stress. Only two job resources—opportunities for development and the social climate—are found to be significantly related to work stress. This result generally supports H1. As a job resource, having a positive and fair social climate could reasonably reduce the employees' stress. Surprisingly, opportunities for development, which is widely considered to be a job resource, could increase work stress. Employees may expect an increase in workload or task difficulty after having access to training or the trainings provided may be tiring and less relevant to their tasks. Hence, these factors overcome the benefits of attending training and impose a higher level of stress.

Table 5 shows that all job resources, including opportunities for development, management quality, decision latitude, social support from co-workers, and the social climate, increase the level of employee engagement at work, supporting H2. The three job demands of familial interruption, job insecurity, and time pressure are found to have a negative relationship with engagement and one job demand, workload, is found to unexpectedly increase engagement. As Gabel-Shemueli and Dolan (2014) argued, work overload could also be perceived as a challenge that fosters employee development and improves their job involvement and engagement, which could explain why the increase in workload improves work engagement.

In general, job demand has a stronger link to work stress than engagement and job resource has a stronger link to engagement than work stress. Supporting the theoretical assumption of the JD-R model, this finding also supports H3. To simplify the interpretation, we only tested the links between job demand-work stress and job resource-engagement in the following DA tests.

Table 4 Comparison between measurement models

Model	χ^2	df	SRMR	RMSEA	CFI	AIC
Null Model	12,725.36	441	0.144	0.062	0.833	434,262.9
JD-R Model	4090.57	452	0.042	0.040	0.931	429,162.6

χ^2 = chi-square; df = degrees of freedom; SRMR = standardized root-mean-square residual; TLI = Tucker–Lewis Index; RMSEA = root-mean-square error of approximation; CFI = Comparative Fit Index; AIC = Akaike information criterion

Table 5 Multilevel modelling results between job demands and job resources (separately in the models) with work stress and engagement

| | Work stress | | | | | | Engagement | | | | | |
| | Job resource model | | | Job demand model | | | Job resource model | | | Job demand model | | |
	B	LLCI	ULCI	B	LLCI	ULCI	B	LLCI	ULCI	B	LLCI	ULCI
Controls												
Highest Education Level	0.029**	0.019	0.040	0.017**	0.008	0.026	0.005*	−0.001	0.011	0.014**	0.008	0.020
Age	−0.001	−0.003	0.002	0.002	−0.001	0.004	0.004***	0.002	0.005	0.002*	0.001	0.004
Sex	0.133**	0.077	0.189	0.054*	0.003	0.106	0.068**	0.036	0.100	0.067**	0.032	0.102
Income	0.000	0.000	0.000	0.000	0.000	0.000	0.000*	0.000	0.000	0.000*	0.000	0.000
Sector[a]												
Public	−0.028	−0.089	0.032	−0.030	−0.086	0.026	0.025	−0.009	0.060	0.015	−0.023	0.054
Joint private and public	−0.004	−0.141	0.134	0.019	−0.105	0.142	0.049	−0.029	0.127	0.031	−0.053	0.115
NGO	−0.127	−0.441	0.188	−0.103	−0.384	0.177	−0.006	−0.184	0.173	0.113	−0.079	0.304
Others	0.046	−0.286	0.378	0.038	−0.259	0.334	0.023	−0.167	0.212	0.022	−0.181	0.225
GDP per capita	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Job resources												
Opportunity for Development	0.014*	0.003	0.024				0.026**	0.018	0.034			
Management Quality	−0.008	−0.015	0.000				0.016**	0.011	0.021			
Decision Latitude	−0.006	−0.033	0.022				0.048**	0.028	0.067			
Social Support from Co-Workers	−0.025	−0.063	0.013				0.047**	0.027	0.068			
Social Climate	−0.275**	−0.330	−0.219				0.186**	0.160	0.212			
Job demands												
Workload				0.068**	0.056	0.080				0.019**	0.013	0.025
Emotional Demand				0.092**	0.077	0.106				−0.002	−0.009	0.005
Familial Interruption				0.063**	0.044	0.083				−0.058**	−0.070	−0.047
Job Insecurity				0.031*	0.003	0.059				−0.058**	−0.079	−0.038
Working Hours				0.010**	0.006	0.013				0.002	−0.002	0.005
Time Pressure				0.163**	0.124	0.203				−0.101**	−0.126	−0.075

$**p < .001$, $*p < .05$

[a] Sector is measured as a categorical variable by using private sector as its base value

4.6 Dominance Analyses

Table 6 shows the ranking of job demands in predicting work stress across the employees with different homeworking frequencies. The three job demands of emotional demand, time pressure, and workload consistently contribute the most to work stress among the different groups of homeworkers. Furthermore, we noticed that the stress induced by emotional demand generally decreases with the increase in homeworking frequency. That is, employees who work from home more often have a lesser tendency to be stressed by the emotional demand of their jobs. Also as expected, the effect of familial interruptions on work stress is the most salient among the daily homeworkers (11.93%) who perform all work tasks in the presence of their family members compared to other groups of employees. The influence of job insecurity is noticeable when homeworking increases, suggesting that the more an employee works from home, the more he/she can be stressed by the fear of losing his/her job.

Focusing on the relationship between job resources and producing job engagement, Table 7 demonstrates that employees with different homeworking frequencies seek different job resources. Social climate is the most influential predictor of job engagement, except for daily homeworkers. In general, we notice that the effectiveness of social climate in predicting job engagement decreases where there is an increase in homeworking frequency. For daily homeworkers, the most impactful predictor of their job engagement is management quality (34.55%). The same predictor is ranked second for non-homeworkers (25.36%) and employees who work from home several times a week (23.51%). Daily

Table 6 Dominance analysis matrix between job demands and work stress among different groups of homeworkers

Variables	Homeworking frequency									
	Never (n=3330)		Less Often (n=704)		Several times a month (n=399)		Several times a week (n=376)		Daily (n=281)	
	Rank	R^2 (%)	Rank	R^2 (%)	Rank	R^2 (%)	Rank	R^2 (%)	Rank	R^2 (%)
Controls										
Highest education level	12	−0.27	7	0.68	12	0.21	12	0.01	9	0.28
Age	9	0.48	10	0.30	8	1.18	9	0.71	8	0.48
Sex	8	0.50	8	0.58	4	3.43	8	3.39	11	0.16
Income	11	0.19	6	2.00	5	2.74	11	0.41	7	1.56
Sector	10	0.24	12	0.18	6	2.71	10	0.57	10	0.26
GDP per capita	6	0.97	11	0.30	11	0.45	6	3.85	12	0.15
Job demands										
Workload	2	26.28	3	23.44	3	21.30	1	34.76	1	24.96
Emotional demand	1	40.28	1	31.81	1	34.66	2	29.48	3	24.51
Familial interruption	4	8.64	5	4.61	9	1.10	4	6.63	4	11.93
Job insecurity	7	0.56	9	0.38	10	0.53	7	3.52	5	8.09
Working hours	5	3.96	4	8.82	7	2.38	5	4.52	6	2.98
Time pressure	3	18.18	2	26.89	2	29.32	3	12.15	2	24.63

R^2 = Variance explained

Table 7 Dominance analysis matrix between job resources and engagement among different groups of homeworkers

Variables	Homeworking frequency									
	Never (n=3330)		Less often (n=704)		Several times a month (n=399)		Several times a week (n=376)		Daily (n=281)	
	Rank	R^2 (%)	Rank	R^2 (%)	Rank	R^2 (%)	Rank	R^2 (%)	Rank	R^2 (%)
Controls										
Highest education level	6	3.03	10	−0.20	9	0.12	11	0.14	10	0.24
Age	7	2.29	6	1.46	2	16.94	9	0.25	9	0.35
Sex	9	1.28	8	0.12	10	0.03	6	8.15	6	5.88
Income	11	−1.01	11	−2.50	8	1.21	7	4.05	8	0.36
Sector	10	0.48	9	0.10	11	−0.23	8	2.50	11	0.08
GDP per capita	8	1.85	7	0.62	7	4.95	10	0.22	7	2.00
Job resources										
Opportunity for development	3	11.33	2	17.11	3	13.65	4	10.52	4	13.40
Social climate	1	40.84	1	51.70	1	39.52	1	26.71	3	15.11
Management quality	2	25.36	3	15.03	4	11.66	2	23.51	1	34.55
Decision latitude	5	6.37	5	4.77	6	5.60	5	9.73	2	21.78
Social support from co-workers	4	8.18	4	11.79	5	6.54	3	14.20	5	6.23

R^2 = Variance explained

homeworkers also seek decision latitude, ranking second in making up their job engagement (21.78%). This finding is very different from the other groups of employees as decision latitude typically ranks fifth in terms of what builds their job engagement. In terms of development opportunities, its relative importance is quite stable across the different homeworking frequencies. Surprisingly, co-worker social support does not make up a large part of the daily homeworkers' engagement (6.23%) despite their lack of connection with the office.

5 Discussion

This study applies the JD-R model among employees with different homeworking frequencies to examine the impact of various job conditions on their work stress and job engagement. Based on the data from 34 European countries, employees are generally more stressed but also more engaged when they increase their homeworking frequency. Furthermore, we found strong evidence supporting the positive association between job resources and worker engagement and the negative association between job demands and work stress. This is in line with the prepositions of the JD-R model (Bakker & Demerouti, 2007) and the previous empirical studies (Bakker et al., 2003; Sardeshmukh et al., 2012). We also observe that the strength of the relationships between job conditions (job demands and job resources) and employee stress and engagement are different depending on the employees' homeworking frequency.

5.1 Job Demands and Stress

Among the six job demands, emotional demands, time pressure, and workload remain the top three job demands causing work stress. This is consistent with the findings of McVicar (2016) who suggests that emotional demands and workload have the most reliable association with stress. These effects can be further differentiated between low-frequency homeworkers (who never, less often or only work from home a few times a month) and high-frequency homeworkers (who work from home daily or a few times a week). Low-frequency homeworkers are more sensitive to the **emotional demands** of their job. Common emotional work demands include handling angry clients, deep acting to modify one's inner emotions, or experiencing other emotional episodes. These are more likely to be encountered by office workers instead of homeworkers. High-frequency homeworkers receive less of a direct impact following an emotional event due to the home-based nature of their work environment. Typically, most of them engage in computer-mediated communication (CMC) such as phone calls, teleconferencing, and emails. The lack of verbal cues reduces the effect of the emotions behind the messages. Email communication, for example, allows more time to type and the ability to re-read what has been written before sending. This helps homeworkers regulate their emotions slightly better than office workers (Derks & Bakker, 2010).

For high-frequency homeworkers, **workload** contributed the most to their work stress, followed by time pressure and emotional demands. Consistent with the previous findings of the JD-R model, Bakker et al. (2003) and Crawford et al. (2010) found work overload to be a significant job demand causing work stress. Undoubtedly, when the tasks given exceed one's ability to cope, it can cause physical and emotional exhaustion, leading to stress.

Next, both time-related job demands, specifically **time pressure** and **working hours**, are found to increase employee tension. It is commonly believed that teleworkers commonly experience the expectation from their direct boss to stay constantly available, thus teleworkers often find themselves with tight deadlines and working overtime (Baruch, 2000; Weinert et al., 2014). To test this "common belief", we ran a one-way ANOVA to test the time pressure and working hours across different homeworking frequencies. Interestingly, the time pressure of the high frequency homeworkers is higher than that of the non-homeworkers, and their working hours are also significantly longer but these time-related job demands do not influence the stress level of high frequency homeworkers that much. In fact, the influence of time pressure on stress is stronger among non-homeworkers than those who are homeworking several times a week. Despite performing under a higher level of time pressure and experiencing long working hours, the findings indicate that high-frequency homeworkers seem to be coping with the time-related job demands well. This contradicts the results of Mann and Holdsworth (2003) who suggest that these job demands increase the stress felt among teleworkers. Meanwhile, it supports the stance of Sardeshmukh et al. (2012). They suggest that teleworking allows employees to lessen the time pressure on their work tasks due to the lack of commute and time flexibility.

We also observe the increasing influence of **job insecurity** on stress as the homeworking frequency increases. This matches the proposition by Lim and Teo (2000) where employees with a higher location flexibility have a fear of potential job loss because their office presence is low. Besides the "out-of-sight, out-of-mind" factor, homeworkers may be insecure because they typically have a weaker bond with their co-workers and direct boss. They may also feel that their work outcomes are less visible (Sewell & Taskin, 2015). It is empirically well-supported that teleworkers are more prone to social isolation (Lal & Dwivedi, 2008), and that their co-worker relationships may not be as strong. Poor workplace friendships can make the employees feel threatened about their employment (Jiang et al., 2019).

Lastly, it is not surprising that **familial interruption** has the highest impact on full-time homeworker stress than the other groups. As full-time homeworkers are working without physical and temporal boundaries with their family, this opens up the door for other family members to make non-work interruptions (Delanoeije et al., 2019). This can easily lead to work delays and poor work performance, inducing stress in the homeworkers (Harris, 2003).

5.2 Job Resources and Engagement

The group differences in the job resources-engagement link are more salient than those in the job demands-stress link, especially for daily homeworkers. For instance, the **social climate** is the job resource that contributes the most to the job engagement of all types of homeworker except for daily homeworkers. This study measures social climate in a similar manner to organisational culture including interpersonal relationships, perceived fairness, and management style. These findings suggest that a supportive and fair social climate is the most effective resource to keep most employees engaged, especially for low-frequency homeworkers where this job resource contributes almost half of their job engagement. This result supports the findings of Brenyah and Obuobisa-Darko (2017) who suggest that a "support culture" (a culture with limited management control and high mutual trust) can improve employee engagement.

For daily homeworkers, the **quality of the company management** has the highest impact when determining their engagement level. While the social climate provides employees with resources via a supportive and fair culture, daily homeworkers who spend less time at the office are less concerned with or exposed to the overall work climate. Instead, they are more passionate and committed when their management supports, recognises, and respects them. A few reasons have the potential to explain this observation.

First, homeworking can act as a "welcome escape" from office-based interpersonal relationships (Collins et al., 2016). Fonner and Roloff (2012) found that employees, when they are teleworking voluntarily, may actively seek less contact with their office co-workers to shut off the chance of interruption. Second, home-based working is usually granted based on mutual trust between homeworkers and the management, but not co-workers. Based on Social Exchange Theory, employees may reciprocate the permission to do homeworking with a greater level of work input which can be seen as a surge in their level of job engagement (Blau, 1968). Third, Collins et al. (2016) found that teleworkers value their co-worker relationships less than office-based workers do. Hence, management quality that only considers social support and leadership from the management but not the social climate and the general organisational culture would find it more relevant and effective when determining the high-frequency homeworkers' engagement. This line of reasoning also explains the results where **social support from their co-workers** has the least impact on the daily homeworkers' engagement. In conclusion, homeworkers who are reported to have higher professional isolation (Lal & Dwivedi, 2008) and lower job inclusion (Morganson et al., 2010) still tend to seek out some of the social resources at their workplace to keep themselves engaged. However, they are more concerned about the support and respect received from their management than that of their co-workers.

Furthermore, **opportunities for development** such as on-the-job training and career advancements also contribute to employee engagement, and its importance remains quite stable across the groups. Helping employees to grow and develop their character is widely considered to be essential for engaging employees in their jobs (Crawford et al., 2010). Especially for teleworkers, initial training in time management and computer-mediated communication (CMC) systems is a common request (Tremblay, 2002). However, in some cases, repetitive training that does not lead to any real career opportunities or a substantial boost in personal resources may be perceived as a new form of workload intensification (Valsecchi, 2006).

The contribution of **decision latitude** to engagement generally increases with the homeworking frequency and its relative importance peaks among daily homeworkers. Dima et al. (2019) argue that autonomy predicts the ability to telework. The freedom to make job-related decisions is vital for homeworkers as they usually work by fitting non-work activities around their work tasks. This freedom guarantees that they can juggle their work and non-work roles at their own pace and perform at their most productive hours (Nakrošienė et al., 2019).

5.3 Limitations and Future Recommendations

This study has some limitations. First, we did not consider the participants' homeworking experience before the data collection. Some recent studies have shown that transiting to homeworking without any prior experience can create greater stress than that experienced by long-term remote workers (Hayes et al., 2020; Wolor et al., 2020). This indicates that

the stress associated with homeworking may diminish as they become familiar with this work mode.

Second, this correlational study does not make any cause-and-effect assumptions; it could be that highly work-engaged employees deliver positive emotions to other work units and improve the overall social climate of the workplace. Also, stressed employees might amplify the negative emotions received and perceive their jobs to involve higher emotional demands. Therefore, this model could not avoid the potential of reverse causality where an experimental model enforcing a WFH policy for a specific group of employees may be able to confirm the causal effects between job demands/resources and stress/engagement.

Third, the conceptualisation of WFH in this study is based on homeworking frequency as there is no clear definition of "WFH." As a result, some participants may consider "bringing work home" to be a form of homeworking. To date, there is no universal agreement on the elements that determine the "quality" or "experience" of homeworking. Measuring just the homeworking frequency may neglect other relevant aspects such as the homeworker's freedom to decide their working schedule. Thus, a universal definition of homeworking is needed to conceptualise this variable more consistently and precisely.

5.4 Implications

This paper contributes theoretically by validating the JD-R model in the homeworking context. The results show that employees at varying homeworking frequencies have different preferred job conditions. A match between the desired job conditions and their homeworking frequency could maximize the employees' engagement and minimize their stress. Additionally, this study also contributes empirically by using a mixed effect model to control for the country effects in a clustered data and DA to rank the predictors according to their relative importance. Lastly, by measuring homeworking frequency at five different frequencies, this study fills the research gap where most of the past teleworking literature only put the employees into binary categories of office workers and teleworkers. This step is essential to mimic the hybrid nature of the post-pandemic working arrangements.

Meanwhile, for practical managerial implication, we have observed how the impacts of the job conditions on employee stress and engagement differ based on the employees' homeworking frequency. Overall, if a company offers different homeworking options for their employees, we suggest that employers devise different management strategies based on their employees' homeworking frequency. For instance, employees who work from home less than several times a week are more stressed when under the influence of emotional demands, and they are more engaged when their workplace's social climate is healthy and positive. For this group of employees, organisations could arrange training on emotional support and productivity that assists them to be resilient while working from home. This is different from frequent homeworkers who are more prone to feeling stressed due to an increased workload and job insecurity. The engagement level of frequent homeworkers also increases more effectively if they are equipped with decision latitude or perceive strong social support from their management. We also observe that mutual trust between homeworkers and management is crucial for WFH to achieve good results. As such, line managers should frequently engage with their team members virtually to ensure the bonding and relationship building is established. Where the homeworkers trust their management, the insecurity of being physically absent from office is eliminated. Likewise, managers who trust their teleworkers are less likely to feel the need to constantly monitor

their employees and are more inclined to provide support by setting an optimal workload and respecting their personal boundaries. We believe that for both homeworkers and office-workers, a broad acceptance of hybrid working is the key to making the plan work.

5.5 Conclusions

In conclusion, this study employed a large-scaled European dataset from 34 countries to test the relationships between 11 job conditions (six job demands and five job resources) and employee stress and engagement using a sample of employees working at different homeworking frequencies. The main finding is that both job resources and demands impact employee stress and engagement in the expected directions. Job resources are more relevant when it comes to keeping employees engaged, and the job demands should be kept low to minimize work stress. The Covid-19 pandemic has introduced many to homeworking and hybrid working looks to be the future. This paper provides important managerial insights to help build an enabling and engaging job environment for a hybrid workforce.

Appendix 1

See Table 8.

Table 8 VIF values for EFA

Question	VIF	1/VIF
Decision latitude 1	1.450	0.689
Decision latitude 2	1.440	0.693
Decision latitude 3	1.320	0.759
Management quality 1	1.710	0.586
Management quality 2	2.120	0.471
Management quality 3	2.040	0.490
Management quality 4	1.750	0.572
Management quality 5	2.210	0.452
Management quality 6	2.620	0.382
Opportunity for development 1	1.540	0.651
Opportunity for development 2	1.890	0.530
Opportunity for development 3	1.760	0.568
Social climate 1	1.710	0.586
Social climate 2	1.650	0.606
Social climate 3	1.840	0.542
Social climate 4	1.540	0.651
Social climate 6	1.930	0.517

Dependent variable: engagement

Appendix 2

See Table 9.

Table 9 Descriptive statistics for homeworking frequency

Homeworking frequency	Stress		Engagement	
	M	SD	M	SD
Never	3.13	1.09	3.96	0.66
Less often	3.18	0.87	4.00	0.57
Several times a month	3.25	0.88	4.01	0.55
Several times a week	3.28	0.90	4.07	0.52
Daily	3.47	1.01	4.06	0.59

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