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Satisfaction with one's job and working at home in the COVID-19 pandemic: A two-wave study

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Abstract

As greater numbers of people have worked at home during the COVID-19 pandemic, workers, organisations and policy makers have begun considering the benefits of a sustained move towards homeworking, with workers' satisfaction with homeworking often cited as a key driver. But is satisfaction with homeworking that relevant to workers' overall job satisfaction? In this study, we examine whether job and homeworking satisfaction are predicted by different demands and resources, namely, those well established in the job design literature (workload, job autonomy and social support) for the former and those specific to the context of homeworking (loneliness, work–nonwork interference, work–nonwork interference and adequacy of homeworking environment) for the latter. We also explore whether homeworking satisfaction mediates the relationship between homeworking demands and resources and job satisfaction. Findings of a study of university workers during the COVID-19 pandemic ($N = 753$ in Phase 1, 471 in Phase 2) support our expectations about the domain-specific nature of the predictors of job and homeworking satisfaction,

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autonomy is positively related to job satisfaction, while loneliness, nonwork-to-work interference and inadequate homeworking environment are negatively related to homeworking satisfaction. Results also support the argument that satisfaction with homeworking mediates the relationship between homeworking factors and job satisfaction, reinforcing the value of differentiating the two concepts.

KEYWORDS

Bayesian methods, homeworking, homeworking satisfaction, job demands, job resources, job satisfaction, teleworking

INTRODUCTION

Working at home where feasible was a core element of the strategies of governments throughout the world for mitigating the COVID-19 pandemic during 2020 and 2021. Soon into the pandemic, it was predicted that working at home would become more prevalent. Judgements were made that it could be a win–win for employers and employees, typically on the basis that employees were satisfied with homeworking and their performance had not suffered and may even have been superior to on-site working. However, the evidence base was weak and, at least initially, support for the virtues of homeworking was largely based on anecdotal or prepandemic evidence (e.g. Bloom et al., 2015). In such discussions, satisfaction with homeworking and job satisfaction are typically conflated or not differentiated. However, just because an employee is satisfied with their homeworking situation does not automatically mean they would be satisfied with their job as a whole. Moreover, just as it has been established that the factors affecting home–life satisfaction and job satisfaction differ (Casper et al., 2018; Ten Brummelhuis & Bakker, 2012), so too might those affecting satisfaction with homeworking and with one's job.

In this paper, we report research designed from the perspective of the job demands–resources (JDR) model (Demerouti et al., 2001) and the matching hypothesis (De Jonge & Dormann, 2003; Frese, 1999) that demands and resources have most impact on outcomes when they are of the same type. The research assesses whether homeworking-specific demands and resources are the dominant influence on homeworking satisfaction while job characteristics are dominant in the case of job satisfaction. Moreover, through examining the link between homeworking satisfaction and job satisfaction and drawing on spillover theory (Eby et al., 2010; Staines, 1980), we explore if homeworking demands and resources have an indirect influence on job satisfaction through homeworking satisfaction. We first outline our conceptual framework, before reporting on a study designed to test our hypotheses. The study is based on data collected within two universities in England, at two points in time: in May 2020, when working at home was mandatory, and in September 2020, when some restrictions were relaxed but working at home remained the norm for university employees. This allows us to assess if adaptation to homeworking over time changed its effects and perhaps reduced its relevance for determining job satisfaction.

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Our research contributes to the literature in several ways. First, it examines homeworking satisfaction and its relationship with job satisfaction, and in so doing adds to research on job satisfaction among homeworkers, which prior to the pandemic had figured strongly as an employee outcome in research (Allen et al., 2015; Suh & Lee, 2017). The results are not compounded by self-selection issues or weekly variations in the extent of homeworking, as mass homeworking was mandated. Moreover, the collection of data across two waves, separated by several months, facilitates a test of the endurance of the influence on homeworking satisfaction and on job satisfaction. Second, the study adds to our understanding of the conceptual and empirical distinction between satisfaction with one's job and working at home. Despite its prominence in the prepandemic literature, job satisfaction has been not been a focal construct in the COVID-19 pandemic literature (Yu & Wu, 2021 is an exception; studies that focus on other outcomes include Allen et al., 2021; Bolisani et al., 2020; Graham et al., 2021; Ipsen et al., 2021; Kitagawa et al., 2021; Wang et al., 2021; Wood et al., 2021). To our knowledge, homeworking satisfaction has not been studied in this literature. Finally, our study has implications for policy decisions about the future of homeworking. Wang et al. (2021) argue that the general principles of work design based on the JDR theory should be applied to homeworking. However, the danger in the term work design is that it underestimates what makes homeworking unique and drives the intensity of its challenges: that the work is embedded within the home and family domains. This means designing homeworking is not solely about the design of work but embraces the home and its interface with work. The notion of work design may lead to a neglect of how the work transforms the home.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

In framing the predictors of job satisfaction, we follow Wang et al. (2021) by applying the JDR model (Bakker & Demerouti, 2017; Demerouti et al., 2001). This provides a framework for explaining how job characteristics are linked to well-being and attitudinal work outcomes including work engagement and job satisfaction. JDR theory classifies job characteristics into (a) demands (e.g. high work pressure, workload and emotionally demanding work), which are associated with poor well-being and reduce job satisfaction and work engagement, and (b) resources (e.g. autonomy, skill variety and opportunities for growth), which are associated with higher well-being, job satisfaction and work engagement (Bakker & Demerouti, 2017; Demerouti et al., 2001).

The JDR perspective has been applied beyond the on-site work context by researchers interested in the interface between work and home, to explore how demands and resources associated with the home domain (e.g. family support, childcare demands and being able to decide how spend leisure time) shape nonwork outcomes, such as relationship quality, having a secure home, family–role performance and investment of time in the nonwork domain (De Bloom et al., 2020; Kerman et al., 2022; Ten Brummelhuis & Bakker, 2012). In the present paper, we extend this application by distinguishing between two sets of work-related demands and resources: those pertaining directly to the job (i.e. job demands and resources) and those pertaining specifically to the homeworking context (i.e. homeworking demands and resources).

Following the matching hypothesis, demands and resources of the same type will have more impact on outcomes than dissimilar ones. For example, physical job demands (e.g. heavy

lifting) are more likely to influence a physical outcome, such as physical exhaustion, than a cognitive outcome, such as mental fatigue. In De Jonge and Dormann's (2006) research, they distinguished between cognitive, emotional and physical demands, resources and outcomes. Here, we apply the principle to the domain in which demands, resources and satisfaction originate. That is, our core argument is that job demands and resources will primarily shape job satisfaction, whereas homeworking demands and resources will principally influence homeworking satisfaction. We now define job satisfaction and homeworking satisfaction and review the existing literature on satisfaction among people working at home and then develop our hypotheses.

Satisfaction among homeworkers

Job satisfaction is defined as 'the overall evaluative judgment one has about one's job' (Judge et al., 2017, p. 358), which summarises how satisfied one is with one's job as a whole. Similarly, we define homeworking satisfaction as a global, affective evaluation about working at home, capturing overall satisfaction with working at home. We conceptualise job satisfaction and homeworking satisfaction as distinctive evaluative judgements and argue that each type of satisfaction is influenced by different demands and resources, namely, those connected to the overall job and those specific to homeworking, respectively.

The literature on homeworking, as we term it, has featured across multiple research clusters, with different names assigned to the process (Raghuram et al., 2019). For example, the terms homeworking, virtual working, remote working, teleworking and telecommuting are all used in the literature, and the research that accompanies these terms often have slightly differing foci; for example, those who study virtual working tend to have greater interest in the use of technology and the role this plays, whereas homeworking researchers tend to focus more on the location of work (Raghuram et al., 2019). Across these different research clusters, job satisfaction has featured in several prepandemic studies focusing on homeworkers, sometimes in conjunction with productivity (Rudolph et al., 2021). These studies typically compare employees who chose to work at home either permanently or for the purpose of an experiment (Bloom et al., 2015) with those who work in the office. Most studies report that employees who work at home are more satisfied with their job (Allen et al., 2015; Bloom et al., 2015; Fonner & Roloff, 2010; Gajendran & Harrison, 2007; Rupietta & Beckmann, 2018) and life more generally (e.g. Bloom et al., 2015; Virick et al., 2010; Wheatley, 2017) compared to permanent office workers, although some studies report null effects (e.g. Bellmann & Hübler, 2021).

The one study on job satisfaction and homeworking in the COVID-19 pandemic, by Yu and Wu (2021) used a qualitative analysis to study the influence of a combination of general job-related (e.g. autonomy) and homeworking-specific (e.g. home workspace suitability) influences on Chinese workers' job satisfaction. Another study by Kerman et al. (2022) considered the home and work domains separately, asked participants who worked at home during the pandemic about their satisfaction with the amount of time they devoted to their job versus their private life but did not measure job satisfaction directly.

Similarly, satisfaction with working at home has been under-researched in the prepandemic homeworking literature. A study by DuBrin (1991) asked 'in-house' and homeworking employees to assess their job satisfaction and satisfaction with work arrangements (e.g. freedom to schedule one's own working hours, opportunity to take care of family and personal

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responsibilities) but did not directly include questions about homeworking satisfaction. More recently, O'Neill et al. (2009) explicitly distinguished between 'satisfaction at work versus at home' (p. 151), asking whether remote workers were satisfied while teleworking and whether office-based workers were satisfied with their current job. However, their studies did not explicitly capture whether those working remotely were satisfied with homeworking per se as opposed to whether they were satisfied with their work while working at home.

Job demands and resources

The core thesis in our model is that distinctive features of one's work will influence job and homeworking satisfaction, with factors relating to the job as a whole being more dominant in explaining job satisfaction and those specific to homeworking being the key predictors of homeworking satisfaction. In considering factors relevant to the job, we focus on three core job characteristics that are well established as predictors of job satisfaction in the JDR literature: the demand of workload and the resources of autonomy and of social support from co-workers. Workload is negatively related to job satisfaction, as higher workloads are thought to impede goal achievement and reduce the ability to master tasks (Crawford et al., 2010). Autonomy and social support provide valuable resources that bolster job satisfaction, allowing for greater latitude over decision making and fulfilling the fundamental need for self-direction, and affording aid from others while fulfilling employees' need for belonging (Karasek & Theorell, 1990; Ryan & Deci, 2000).

We thus predict:

H1. Workload is negatively associated with job satisfaction.

H2. Social support and autonomy are positively associated with job satisfaction.

Homeworking demands and resources

An often-cited demand associated with homeworking is coping with social isolation from colleagues, customers and others who one mixes within the workplace and the loneliness it can induce (Charalampous et al., 2019; Gajendran & Harrison, 2007; Rook, 1984). While working at home might provide some employees with greater opportunities to interact with one's family or household members, employees who are working at home have to cope with the lack of face-to-face contact with colleagues and others they may typically see in the workplace. Additionally, the quality of work-related interactions via the telephone or internet may be deficient, resulting in feelings of emotional deprivation (Ayazlar & Güzel, 2014; Golden, 2006; Moretta & Buodo, 2020) and exhaustion (e.g. Bennett et al., 2021; Nesher Shoshan & Wehrt, 2022). We thus treat loneliness as an emotional demand on homeworkers during the pandemic.

Interference between work and home domains may likewise form homeworking demands that detract from employees' satisfaction with homeworking. Following Greenhaus and Beutell (1985), we differentiate between work-to-nonwork interference, wherein one's work life intrudes on one's nonwork life, and nonwork-to-work interference, wherein the demands of one's nonwork life interfere with work. The demands of work-to-nonwork interference are likely to have been intensified during the pandemic, as working at home in this context was

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mandatory and total, meaning that employees had limited opportunities to regulate work–nonwork boundaries through spatial separation, as they might when working from the office for a few days a week. Nonwork-to-work interference can similarly be construed as a homeworking demand in the pandemic context, because the home was each employee's full-time workplace during this period. Particularly salient in the pandemic were distinctive forms of nonwork-to-work interference, arising from the difficulties of fulfilling, for example, home schooling and caring demands, shopping and medical needs (Ipsen et al., 2021).

The mandatory and sudden introduction of working at home further meant that many employees were ill-prepared for actually engaging in homeworking (Shockley et al., 2020; Vaziri et al., 2020). Having adequate facilities in terms of one's working environment—space, furniture and IT—provides valuable resources that ought to enhance satisfaction with homeworking. Conversely, absence of good working conditions and computing facilities would be expected to detract from employees' homeworking satisfaction, akin to a hindrance demand (Crawford et al., 2010). We thus hypothesise:

H3. Loneliness, work-to-nonwork interference and nonwork-to-work interference are negatively associated with homeworking satisfaction.

H4. Adequacy of homeworking environment and adequacy of computing facilities are positively related to homeworking satisfaction.

The indirect effect of homeworking demands and resources on job satisfaction

Based on the theoretical premise that job-related factors directly shape satisfaction with the job, while homeworking factors are more directly relevant to homeworking satisfaction, we argue that homeworking demands and resources do not influence job satisfaction directly. However, homeworking factors may shape job satisfaction indirectly, because, although distinct constructs, homeworking and job satisfaction are likely to be related via spillover processes. Spillover theory (Staines, 1980) suggests that experiences in the work domain can influence experiences in the nonwork domain and vice versa (Eby et al., 2010), even if their determinants are limited to the domain in which they occur. Numerous studies have provided evidence for spillover effects (e.g. Heller et al., 2006; Heller & Watson, 2005; Ilies et al., 2009), including those between job and life satisfaction (Rain et al., 1991). Being unhappy with working at home is likely to lower job satisfaction through the spillover of negative affect, especially in the context of working at home during the pandemic, where boundaries between domains were blurred. Conversely, being happy with working at home might increase job satisfaction, even though it will not alter features of one's job with which one is happy or unhappy.

Studies and reviews of research have reported that some of the factors we consider to be homeworking demands are direct contributors to job satisfaction (e.g. research on work–nonwork interference; Casper et al., 2018; Fisher et al., 2009). However, in the context of homeworking during the pandemic, we expect that these demands (as well as homeworking resources) will primarily influence satisfaction with homeworking and that any link to job satisfaction will be indirect, via homeworking satisfaction spilling over to job satisfaction. We thus test:

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H5. Loneliness, work-to-nonwork interference and nonwork-to-work interference (demands) indirectly affect job satisfaction via homeworking satisfaction.

H6. Adequate workspace and computing (resources) indirectly affect job satisfaction via homeworking satisfaction.

METHOD

We designed a study to test our hypotheses simultaneously. We depict our conceptual model that combines them in Figure 1.

Sample

We used data from employees across all occupations at two universities, academics and nonacademics, in England, one in the Midlands and one in the South of the country. Potential participants were initially approached through an email sent to all employees via university- and college-wide communication methods which invited them to be involved in a project on work–life balance in the pandemic, this study being one element of this. We initially acquired demographic measures in an introductory survey distributed in the third and fourth weeks of April 2020, which was completed by 784 of the 3900 employees in the Midlands university and 389 out of 4950 employees in the Southern university (total of 1173 respondents across both universities). This was followed by the two phases of data collection, which yielded usable responses from a total of 753 participants in first phase and 471 in the second. A larger proportion of this final sample was from the Midlands university (65%) and the majority of participants were female (74%). The mean age is 44 years, ranging from 22 to 76 years.

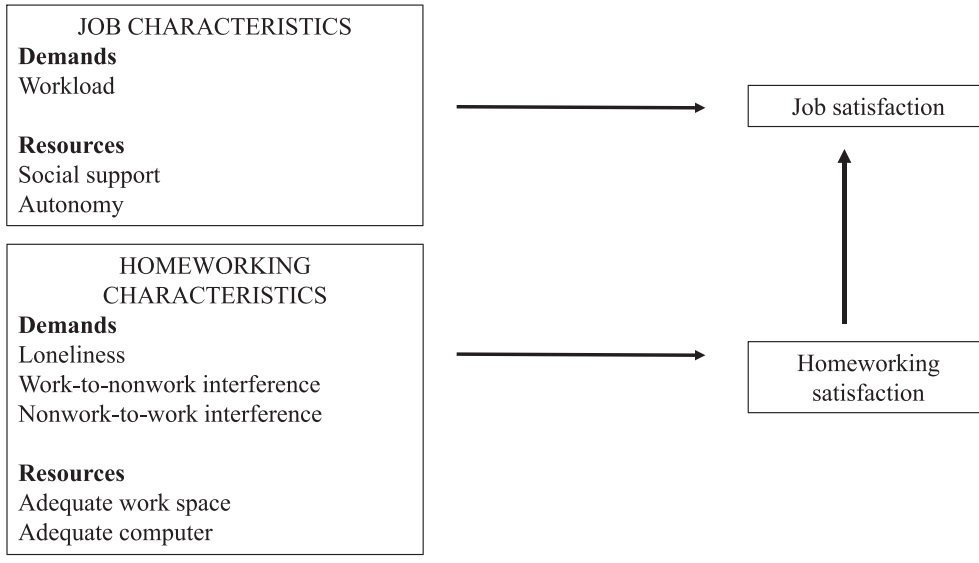

FIGURE 1 Conceptual model

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Design

We used a survey design and collected data on all variables at two phases of the pandemic, in order to explore whether similar factors explain satisfaction in different time points in the pandemic. The first phase of survey was in May 2020 in the Midlands university and early June 2020 in the Southern one, as the spread of the virus from its epicentre in London was earlier in the former location. England was in a full lockdown during these times. The second phase in both locations was in September 2020 when there was no blanket national lockdown, though national guidelines on appropriate behaviour existed, for example, on social distancing, and additional local restrictions were in place in some localities. Working at home wherever possible remained the diktat from government in both periods but restrictions were eased to some extent in the universities to allow some access to laboratories or internet access where home access was unstable. The vast majority of employees were working at home in both periods.

In each of the two study phases, we administered two surveys, 1 week apart. In the first of these surveys, participants responded to a series of questions capturing demands and resources associated with their job and homeworking (our independent variables). In the second of these surveys, participants indicated their job satisfaction and homeworking satisfaction (the dependent variables). This design is what Maxwell et al. (2011) call a 'half-longitudinal' mediation study. The 1-week interval between our predictors and dependent variables was chosen to reflect the 7-day cycle of employees' work and home activities, and questions asked about their experience in this time frame. Respondents were given the following guidance: 'Most questions are about the last 7 days which in this case correspond to the days between [x date] and [y date]; ideally, we would like you to complete it as soon as possible'. All questionnaires were distributed via email for completion online. They were sent at midday Friday, with a reminder email on the following Tuesday.

Measures

Workload was captured using a three-item measure based on asking respondents the extent to which they agreed (on a 5-point scale from *strongly disagree* to *strongly agree*) with the following statements about their work in the 7 days: 'My work required that I work very hard', 'I never seem to have enough time to get my work done' and 'I was asked/needed to do an excessive amount of work' ($\alpha = .86$, Phase 1; $\alpha = .89$, in Phase 2). The first two items are from Britain's Workplace Employee Relations Survey employee questionnaire (https://www.gov.uk/government/collections/workplace-employment-relations-study-wers), and the third was created for this survey.

Autonomy was measured by a three-item scale derived from Morgeson and Humphrey (2006), which asked respondents the extent to which they agreed (on a 5-point scale from *strongly disagree* to *strongly agree*) with the following statements about their work in the past 7 days: 'I could plan how to do my work', 'I could make a lot of decisions on my own' and 'I could decide on my own how to go about doing my work' ($\alpha = .74$, in both phases).

Social support was measured by a four-item scale developed by Schreurs et al. (2012) asking respondents the extent to which they agreed (on a 5-point scale from *strongly disagree* to *strongly agree*) with the following statements about their experience in the past 7 days: 'My colleagues showed that they liked me', 'My colleagues showed that they appreciated the way I do

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my work', 'My colleagues gave me advice on how to handle things' and 'My colleagues helped me with some tasks' ($\alpha = .83$, in both phases).

Loneliness was measured by asking, 'Please rate the extent to which you felt lonely in the last 7 days' on a 5-point scale: *never*, *occasionally*, *some of the time*, *most of the time* and *all of the time*.

Work-to-nonwork interference and *Nonwork-to-work interference* were measured using questions from Wood and Michaelides (2016), which were adapted from Voydanoff (1988): 'How often in the last 7 days did you feel work interfered with nonwork activities?' and 'How often in the last 7 days did you feel nonwork interfered with work activities?' The response options were: *never*, *seldom*, *sometimes*, *often* and *very often*.

Adequacy of the working environment and *Adequacy of computing facilities* were each measured with a single item that asked participants 'To what extent do you agree that the following were adequate for you to do university work at home', with 'your working environment' and 'your computer' listed underneath. Response options were on a 5-point scale ranging from *strongly disagree* to *strongly agree*.

Job satisfaction was measured by a single-item scale as the object is intended to be a singular concept, an overall evaluation of the job, asking respondents, 'Please rate the extent to which you felt or experienced job satisfaction in the last 7 days', on a 5-point scale, *never*, *occasionally*, *some of the time*, *most of the time* and *all of the time*. The validity of such single-item measures of job satisfaction when the aim is to capture the job in its totality has been well established (Dolbier et al., 2005; Wanous et al., 1997), and single-item measures of job satisfaction have been used in prepandemic homeworking studies (e.g. Allen et al., 2020). The validity of using one-item indices to capture singular constructs is increasingly accepted in psychological and organisational sciences (Allen et al., 2022; Matthews et al., 2022).

Homeworking satisfaction was also measured with a single item, as we conceptualise homeworking satisfaction, like job satisfaction, to be a singular construct that represents a person's global affective evaluation of homeworking. In our study participants were asked 'How satisfied are you with working at home so far in the pandemic?', using a 5-point scale from *extremely dissatisfied* to *extremely satisfied*. There is strong support for the use of such a summary measure of homeworking satisfaction from 11 focus groups that we conducted on a subsample of our respondents who summarised their lived experience of working at home in terms of summary statements such as 'I am very satisfied with working from home', 'I love working at home' or 'I am not keen on working at home'. These summary statements were then connected to their decisions about how much homeworking they would like in the future.

Control variables were selected on the basis of their observed effect in prior studies on job satisfaction (e.g. Rottinghaus et al., 2009; Warr, 2007; Wong & Cheung, 2020) and included age, gender, education and occupation (academic/nonacademic). We also controlled for the university in which the person was employed (Midlands/Southern) to account for any effects due to differences in policies for managing the pandemic.

Analysis procedure

A single model was used to analyse the data from both waves simultaneously. Each wave involved lagged effects with homeworking and job satisfaction measured a week after the predictors. The two waves were combined by pooling the data and using a dummy variable for the phase in the study to evaluate differences between the outcomes in the first and second waves.

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The model was tested using a Bayesian analysis performed with Markov Chain Monte Carlo simulation. Researchers in the organisational sciences are increasingly advocating for the use of Bayesian methods of analysis, which offer several advantages over traditional methods of analysis that rely on null-hypothesis significance testing (e.g. regression), known as 'frequentist' techniques. Kruschke et al. (2012) outline many of these advantages, which include that they offer researchers a distribution that specifies the credibility of every possible combination of parameter values based on a dataset. Bayesian methods provide estimates of the full distribution of parameter values rather than the fixed-point estimates that frequentist methods offer, which are less easily interpretable and susceptible to change based on design decisions made by the researcher in terms of testing and sampling. They are thought to offer advantages even for relatively simple analyses but are particularly powerful when dealing with complex datasets, such as multilevel datasets like ours (Gelman et al., 2020). Moreover, because Bayesian methods provide estimates of the full posterior distribution of the parameters, they bypass the need for bootstrapping, which itself is a frequentist technique, when evaluating mediation hypotheses (Yuan & MacKinnon, 2009).

The analysis was performed with Stan (Stan Development Team, 2020) and the brms package (Bürkner, 2018) in R (R Core Team, 2021). For all the model parameters we used weakly informative priors. Because strongly informative priors may direct a model too much (such that the influence of the data itself on the findings is reduced), weakly informative priors tend to be recommended (e.g. Gelman et al., 2013; Lemoine, 2019). They provide some information about the expected results and exclude any unreasonable estimates but at the same time are sufficiently flexible to allow for a wide range of possible outcomes. For all the regression coefficients, we used normal distributions with location 0 and scale 5 used. All the model errors (for person level and residuals) were based on a half Student's t distribution with 3 degrees of freedom, 0 location and 2.5 scale. After 2000 iterations using four simulation chains, the model converged as indicated by traceplots and the potential scale reduction factor $\widehat{R}$ which was below 1.01 for all model parameters (Vehtari et al., 2021).

There were 173 responses in Phase 1 and 151 in Phase 2 with missing values in one or more of the variables. These were imputed using Bayesian imputation, which treats missing values as parameters to be estimated from the available data. Thus, for the outcome variables, all predictors and control variables are used in the estimation of the missing values. Reanalysing the model with listwise deletion of missing values showed that the results were consistent with those obtained using Bayesian imputation.

RESULTS

Means and standard deviations for variables and correlations for both phases are presented in Table 1. The directions of the correlations are all as expected, with the exception of workload which is positively, rather than negatively, correlated with job satisfaction in Phase 1. In both phases, the correlation between job satisfaction and homeworking satisfaction was moderate (Phase 1: .29, Phase 2: .20), supporting the argument that the two types of satisfaction are related but distinct.

The posterior predictive probability (ppp; Gelman, 2013) for homeworking satisfaction and job satisfaction was neither close to 0 nor 1, indicating a good model fit. This was estimated using both the mean ($ppp_{Mean} = .50$) and the standard deviation ($ppp_{SD} = .61$) of the posterior

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TABLE 1 Descriptive statistics and correlations for all variables at Phases 1 and 2

		Phase 1		Phase 2												
		Mean	***SD***	**Mean**	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1	Age	43.70	11.13	44.76	11.22	1.00	.08	−.01	−.12	−.12	.04	−.07	.01	−.16	.03	.10
2	Workload	3.15	1.10	3.63	1.05	.07	1.00	−.18	−.04	.00	−.04	−.05	.58	.12	.06	−.01
3	Autonomy	4.07	.74	4.04	.72	.00	−.09	1.00	.23	−.12	.23	.17	−.19	.01	.19	.24
4	Social support	3.51	.82	3.52	.79	−.17	.01	.17	1.00	−.28	.12	.09	−.09	.01	.11	.23
5	Loneliness	1.98	1.06	2.06	1.10	−.17	−.01	−.11	−.15	1.00	−.06	−.15	.13	.09	−.30	−.19
6	Adequate environment	3.76	1.10	3.79	1.07	.11	−.02	.16	.10	−.09	1.00	.42	−.12	−.14	.28	.08
7	Adequate computer	3.98	1.18	4.02	1.15	−.05	.03	.10	.11	−.08	.45	1.00	−.16	−.01	.21	.14
8	Work-to-nonwork interference	2.54	1.26	2.80	1.24	.06	.58	−.15	.00	.04	−.06	−.06	1.00	.31	−.16	−.12
9	Nonwork-to-work interference	2.34	1.26	2.23	1.07	−.12	.09	−.09	−.01	.07	−.17	−.05	.41	1.00	−.23	−.02
10	Homeworking satisfaction	3.89	1.04	4.05	1.00	.00	.07	.23	.07	−.25	.35	.20	−.05	−.22	1.00	.20
11	Job satisfaction	3.10	0.99	3.10	0.95	.06	.09	.25	.26	−.22	.13	.18	−.02	−.07	.29	1.00

Note: Correlations below the diagonal are for Phase 1 and above the diagonal for Phase 2. Phase 1 $N = 753$, $|r| > .08$, $p < .05$. Phase 2 $N = 471$, $|r| > .10$, $p < .05$.

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predictive distribution. The Bayesian R^2 (Gelman et al., 2019) was .19 for homeworking satisfaction and .19 for job satisfaction.

The model parameters for all the control variables and predictors in our analysis are shown in Table 2. Of the control variables tested on job and homeworking satisfaction, only three effects were significant. Age has a significant effect on job satisfaction such that older employees were more satisfied. Occupation had a significant effect on both homeworking satisfaction and job satisfaction but in opposing directions; nonacademics had a higher level of homeworking satisfaction but a lower level of job satisfaction than academics. The effect of phase was significant and positive for homeworking satisfaction, indicating that homeworking satisfaction was higher in the second phase. Job satisfaction, however, did not change significantly over time.

With regard to the first hypothesis, workload was significantly related to job satisfaction, but contrary to the hypothesis, the relationship was positive rather than negative. The second hypothesis, that work resources have a positive association with job satisfaction, was supported for both social support and autonomy.

TABLE 2 Model coefficients for homeworking and job satisfaction

	Homeworking satisfaction			Job satisfaction		
	B	**95% CI**		***B***	**95% CI**	
Intercept	3.33***	2.80	3.88	0.58	−0.18	1.34
Age	0.00	−0.01	0.00	0.01*	0.00	0.01
Gender (male)	0.06	−0.09	0.22	0.04	−0.11	0.19
Education (postgraduate)	0.01	−0.23	0.25	0.03	−0.19	0.24
Education (undergraduate)	0.04	−0.18	0.26	−0.02	−0.21	0.19
Occupation (academic/nonacademic)	0.18*	0.00	0.35	−0.18*	−0.35	−0.01
University (Southern/Midlands)	−0.03	−0.17	0.11	−0.05	−0.18	0.07
Phase (2nd)	0.16***	0.07	0.24	−0.05	−0.16	0.04
Workload				0.08*	0.01	0.15
Autonomy				0.19***	0.10	0.27
Social support				0.23***	0.15	0.31
Loneliness	−0.17***	−0.23	−0.12	−0.07*	−0.13	−0.02
Work-to-nonwork interference	0.03	−0.02	0.08	−0.05	−0.12	0.01
Nonwork-to-work interference	−0.12***	−0.18	−0.07	−0.01	−0.07	0.05
Adequate environment	0.26***	0.19	0.33	−0.05	−0.11	0.02
Adequate computer	0.04	−0.02	0.11	0.09**	0.02	0.15
Homeworking satisfaction				0.17***	0.11	0.23
Between level *SD*	0.68	0.62	0.75	0.56	0.48	0.63
Residual *SD*	0.63	0.59	0.68	0.68	0.64	0.74
R^2	.19	.15	.23	.19	.14	.23

Abbreviation: CI, credible intervals.

*$p < .05$.

**$p < .01$.

***$p < .001$.

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TABLE 3 Indirect effects on job satisfaction via homeworking satisfaction

	B	95% CI	
Loneliness	−0.03*	−0.04	−0.02
Work-to-nonwork interference	0.00	0.00	0.01
Nonwork-to-work interference	−0.02*	−0.03	−0.01
Adequate environment	0.04*	0.03	0.06
Adequate computer	0.01	0.01	0.02

Abbreviation: CI, credible intervals.
*$p < .001$.

The third hypothesis concerning the effect of homeworking demands on homeworking satisfaction was partially supported: Loneliness and nonwork-to-work interference were negatively associated with homeworking satisfaction, as expected, but work-to-nonwork interference was not. In respect of the fourth hypothesis, involving homeworking resources, we found that an adequate working environment had a positive association with homeworking satisfaction but the adequacy of one's computer was not a predictive factor.

H5 and H6 propose that homeworking satisfaction is a mediator of the relationship between homeworking demands and homeworking resources on job satisfaction. Homeworking satisfaction is positively related to job satisfaction, meaning that all homeworking demands and resources that were significantly related to homeworking satisfaction could potentially be indirectly related to job satisfaction. The mediation analysis, presented in Table 3, shows that in line with the fifth hypothesis, there were negative indirect effects on job satisfaction, via homeworking satisfaction, for two of the three homeworking demands: loneliness and nonwork-to-work inference. In partial support of the sixth hypothesis, there was also a positive indirect effect for having an adequate work environment.

DISCUSSION

The objective of this study was to understand how satisfaction with one's job and homeworking satisfaction are related and whether these are influenced by different job and homeworking factors. Conceptualising these two types of satisfaction as distinct constructs, our study has confirmed several hypotheses. Our findings support the division between job and homeworking-specific characteristics and their associations with job and homeworking satisfaction and are in line with the matching hypothesis (De Jonge & Dormann, 2003; Frese, 1999), which suggests that factors relating to one domain will have a greater impact on outcomes in the same domain than those in other domains. For example, of the job characteristics, social support was only associated with job satisfaction and not with homeworking satisfaction. Meanwhile, of the homeworking factors, nonwork-to-work interference and loneliness were only associated with homeworking satisfaction and not with job satisfaction. We also expected that the homeworking factors would indirectly shape job satisfaction, via their influence on homeworking satisfaction, and this was the case for nonwork-to-work interference, loneliness and having an adequate work environment.

Nevertheless, not all findings conformed to expectations. First, we found that workload had a positive effect on job satisfaction, such that a higher workload was associated with higher job

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satisfaction. The positive impact of workload may reflect the possibility that meeting demands was a challenge rather a hindrance to workers (Crawford et al., 2010), and their fulfilment of workload demands increased satisfaction especially in the potentially suboptimal situation. Whether this relationship existed before the pandemic or will continue when it subsides we cannot know.

Second, we observed an unanticipated cross-domain (De Jonge & Dormann, 2003) effect from one of the homeworking factors, as adequacy of computing facilities was negatively related to job satisfaction rather than to homeworking satisfaction. This is explicable since having an adequate computer directly affects one's ability to do one's job, regardless of where one is working. The lack of impact on homeworking satisfaction may reflect the fact that the adequacy of the work environment is more salient in people's evaluation of it.

Third, of the homeworking demands, loneliness had a direct negative relationship with job satisfaction as well as a mediated effect via homeworking satisfaction. This indicates that loneliness might influence employees' attitudes towards their job independently of their feelings towards homeworking.

Finally, we found that while nonwork-to-work interference was negatively related to homeworking satisfaction, the same was not true for work-to-nonwork interference. One possible explanation is that people's work-to-nonwork interference was at a similar level to prepandemic levels so it had little bearing on their evaluations of homeworking. We further found that neither of the two interferences between work and nonwork had a direct relationship with job satisfaction. While this was in line with our predictions, this finding contrasts with prepandemic studies showing that job satisfaction has a direct relationship with work–nonwork balance (e.g. Casper et al., 2018) and work interference with private life (Fisher et al., 2009), which highlights the importance of differentiating satisfaction with one's job as a whole from satisfaction with homeworking in future studies of homeworking.

We included two phases of data collection in our analysis in order to explore whether satisfaction with homeworking and the influence of particular homeworking factors would change as people became more accustomed to homeworking during the pandemic. Our findings suggest some degree of habituation, with satisfaction with homeworking slightly reducing in its level of influence on job satisfaction, and the adequacy of the work environment also reducing in importance in explaining homeworking satisfaction. The latter result might also be due to changes made during the pandemic to accommodate homeworking, such as the creation of more private space to work or purchasing a desk, as it became a potentially permanent feature of people's working lives rather than a short-term emergency response.

Theoretical and practical implications

Theoretically, an important implication of our study is that satisfaction with working at home and one's job should be treated as distinct constructs. Across both phases, the two constructs were only moderately correlated, and our study suggests that satisfaction with working at home serves as a mediator between resources and demands specific to the homeworking context and job satisfaction. Our study therefore shows how job satisfaction might be indirectly influenced by homeworking demands and resources and provides support for the argument that there is a spillover effect (Staines, 1980) from homeworking satisfaction to job satisfaction.

Our results that job and homeworking factors have distinctive patterns of connection to job and homeworking satisfaction, respectively, further help to develop our theoretical

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understanding of demands and resources and their implications. They contribute to discussions about demands and resources across different domains (De Bloom et al., 2020; Ten Brummelhuis & Bakker, 2012) and extend such discussions by differentiating the job and homeworking, as opposed to work and life, as previous models have done. The study provides evidence that the matching hypothesis in relation to demands/resources and outcomes applies beyond the nature of demands or resources and outcomes (e.g. physical versus cognitive; De Jonge & Dormann, 2006) to the domain in which these constructs reside (the job or the homeworking context). More broadly, it has been assumed that the same demands and resources as proposed by the JDR model can simply be applied in the homeworking context (e.g. Wang et al., 2021). Our results challenge this perspective in highlighting that there are some distinctive features of homeworking that ought to be considered in future iterations and applications of JDR theory as homeworking gains in popularity, so that a more nuanced picture of relevant demands and resources for homeworkers can be developed.

In practical terms, the finding that loneliness was a significant predictor of satisfaction with homeworking and job satisfaction has implications for designing hybrid working, whereby organisations have work arrangements that allow employees to work at home part of the time. Organisational policies need to consider how to design jobs and working arrangements in order to prevent isolation of employees who prefer to work at home most of the time. Ensuring people do not feel lonely demands the conscious design of measures to increase the integration of people into the organisation and their sense of community and belonging (Snell, 2017). This should be part of a more general high-involvement approach to management (Lawler, 1986; Wood, 2021), which involves employees in the discussions on how to design hybrid working. In designing such arrangements, care should be taken to avoid situations in which people are onsite on different days so that the benefits of social interaction do not materialise. Discussing homeworking may also be a catalyst for 'rethinking' organisational practices and norms more generally, as Kim et al. (2017) illustrate.

The implication of our research for public policy is that it needs to include the location of work more than it typically has when considering the effects of work. For example, the models for risk analysis of stress developed by public health and safety bodies tend to focus on general job factors and a reappraisal of these in the light of increased homeworking is required. There will also be issues of the balance for governments between regulation or advice and guidance. This will be particularly acute if the issue is about how employees should or should not operate in their homes given its status as a private space.

Strengths, limitations and future research

A strength of our study is that we examined the association between demands and resources with satisfaction across two phases, when working at home was mandatory or strongly encouraged and the default mode of working. Our results are therefore not confounded by factors such as self-selection and specific arrangements between individual employees and employers. The two-phase design allowed us to account for changes that reflect adaptation to working at home. The university setting also means that the results are not confounded by income decline or large reductions in work demands during the pandemic lockdowns. A further strength is our lagged half-longitudinal design (Maxwell et al., 2011). Half-longitudinal models have the advantage that one of the paths in the hypothesised mediation chain involves temporally separated data, allowing more confidence in causal inferences (Cole & Maxwell, 2003), as well as alleviating

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concerns around common method bias that might otherwise arise in a study reliant on self-reported data. However, a limitation in this regard is that one step of our hypothesised mediation chain (that involving the link between homeworking satisfaction and job satisfaction) involves measures taken at the same point in time, meaning that future studies could aim to measure these constructs longitudinally.

Other limitations of our study include that we were unable to measure job demands and resources in prepandemic times. Furthermore, we did not assess career and promotional prospects or turnover intentions and the effects that satisfaction with homeworking may have on these. Future research could investigate these negative effects as they have been found in previous studies that examined homeworking (Bloom et al., 2015; Charalampous et al., 2019). We excluded these variables because when we designed the study we did not anticipate the length of the pandemic would be long enough for them to materialise.

Future research could extend this study by seeking to explore how both homeworking and job satisfaction contribute towards life satisfaction, whether distinctive resources and demands influence all three forms of satisfaction, and whether there is a three-stage spillover process, wherein homeworking satisfaction influences job satisfaction and in turn life satisfaction. Furthermore, our theory and analysis presuppose that aspects of one's work can be divided into 'job factors' and 'homeworking factors'. However, some factors, such as the suitability of one's job for working from home, might reside between these domains. Future research could explore this, to determine if such interdomain factors predict both job satisfaction and homeworking satisfaction, as we might anticipate.

Tracking those who were new to homeworking during the pandemic but who have continued this working practice could also produce pertinent insights into whether the influence of homeworking satisfaction on job satisfaction reduces over time (we saw evidence of some habituation in our study) and also whether workers adopt compensatory strategies to overcome homeworking-specific demands like loneliness. It will also be interesting to determine whether homeworking characteristics exert the same effects on homeworking satisfaction and in turn job satisfaction when employees are working at home by choice rather than in an enforced manner (Anderson & Kelliher, 2020; Kaduk et al., 2019).

Studies testing the model in other settings, and particularly other countries, would be invaluable. For example, such studies would be helpful in states where higher levels of job discretion are expected (comparing United Kingdom with coordinated economies, Holman et al., 2009), where social structures that affect home life are different (cf. Middle East and South-East Asia), where internet provision is less extensive or reliable (e.g. Mexico, Nigeria and Bangladesh), or with a different political system (cf. China). Consideration of regional differences within countries (e.g. the north and south of Brazil) or between rural and big metropolitan areas with long commutes (e.g. Mexico City and Tokyo) would also be welcome.

CONCLUSIONS

Our study on homeworkers' job satisfaction and homeworking during the pandemic can help inform evidence-based decision making in organisations and future policies that will shape employment in what is likely to be a new normal. Our research has suggested that two policies are crucial to facilitate satisfaction in hybrid work arrangements that involve being in the workplace and some maintenance of homeworking: to design jobs with high levels of autonomy (and avoid overcontrolling homeworkers) and to develop measures that enable employees to

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connect with co-workers and the organisation to reduce loneliness. Employee participation in decisions about homeworking is recommended, as due to different roles, tasks and personal circumstances, 'one-size-fits-all' approaches might not be optimal and risk limiting employees' satisfaction with homeworking and their job satisfaction.

CONFLICT OF INTEREST

The authors declare no conflict of interest. The funders had no role in the design or execution of the study, in the writing of the manuscript or decision to publish the results.

ETHICS STATEMENT

The study was approved by the Research Ethics Committee of the Universities of Leicester (number 1105) and Exeter (eUEB003208 v2.0), and it was conducted according to the UKRI Research Concordant, the General Data Protection Regulation (2018) and the Declaration of Helsinki.

DATA AVAILABILITY STATEMENT

The data will be available on request for users.

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