Work From Home During the COVID-19 Outbreak: The Impact on Employees' Remote Work Productivity, Engagement, and Stress

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Running Head: WFH AND COVID-19: PRODUCTIVITY, ENGAGEMENT, STRESS

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Abstract

Objective: The COVID-19 pandemic made Working From Home (WFH) the new way of working. This study investigates the impact that family-work conflict, social isolation, distracting environment, job autonomy, and self-leadership have on employees' productivity, work engagement, and stress experienced when WFH during the pandemic.

Methods: This cross-sectional study analyzed data collected through an online questionnaire completed by 209 employees WFH during the pandemic. The assumptions were tested using hierarchical linear regression.

Results: Employees' family-work conflict and social isolation were negatively related, while self-leadership and autonomy were positively related, to WFH productivity and WFH engagement. Family-work conflict and social isolation were negatively related to WFH stress, which was not affected by autonomy and self-leadership.

Conclusion: Individual- and work-related aspects both hinder and facilitate WFH during the COVID-19 outbreak.

Keywords: Working from home, remote working, COVID-19, family-work conflict, work engagement, job productivity, stress

1. Introduction

The COVID-19 outbreak has made working from home (WFH) the new way of working for millions of employees in the EU and around the world. Due to the pandemic, many workers and employers had to switch, quite suddenly, to remote work for the first time and without any preparation. Early estimates from Eurofound[1] suggested that due to the pandemic, approximately 50% of Europeans worked from home (at least partially) as compared to 12% prior to the emergency. Currently, these numbers are approximately the same, with many employees and organizations possibly opting for WFH even after the pandemic[2].

To contain the spread of the virus, Italy quickly adopted home confinement measures which, since the Spring of 2020, were renewed for several months and are still, as in some other European countries, ongoing also during Spring 2021.

As all organizational changes, WFH too has some advantages and disadvantages[3]. Usually, adopting this flexible way of working has been presented as a planned choice that requires a period of design, preparation, and adaptation to allow organizations to effectively support employees' productivity and ensure them better work-life balance[4–6]. However, the COVID-19 outbreak has substantially forced most organizations to adopt this way of working, often without providing employees with the necessary skills required for remote work[7–9]. As previously mentioned, studies have reported both advantages and disadvantages related to remote work[10]. Its effects, therefore, have been quite explored[6]. On the other side, the need to examine how WFH, as a "new way of working"[11,12], has affected the well-being and productivity of employees with no prior remote work experience and to identify specific work conditions affecting remote work during the COVID-19 crisis[9] is imperative.

To achieve these goals, the present study considered the Job Demands-Resources (JD-R) model[13,14] as a theoretical framework. The JD–R model is a well-established theoretical model in the field of occupational health psychology, which suggests that work conditions, categorized into job demands and job resources, affect employees' wellbeing and performance. Job demands refer to the physical, psychological, or socio-organizational aspects of the work whose energy-depleting process induces people to experience energy loss and fatigue, leading to stress, burnout, and health impairment. On the contrary, job resources refer to the physical, psychological, social, or organizational aspects of the job that reduce job demands while stimulating work motivation, personal growth, and development[15]. In addition, personal resources have been introduced in the JD-R model defining them as "aspects of the self that are generally linked to resilience and refer to individuals' sense of their ability to control and impact upon their environment successfully"[16], thus stimulating optimal functioning and lessening stress.

According to the JD-R model, every occupation and work has its own specific job demands and job resources; hence, the present study considered some job demands, one job resource and one personal resource to investigate how much they affect employees' work engagement, job-related stress, and job performance.

The model we developed for this study considered some characteristics of remote work as job demands: the difficulty of adequately reconciling private and work commitments[17], the decrease or lack of the social context that employees normally experience in the workplace and that is related to the perception of being more socially isolated[18], and the difficulty of arranging a suitable workstation at home for carrying out their work activities[19]. One of the most prominent job resources when WFH is job autonomy[5,20–22]. Finally, we considered self-leadership, defined as a self-influence process to behave and perform by setting one's own goals and monitoring their fulfilment[23], as a personal

resource that may potentially contribute to efficient remote work.

The present study integrates research on remote work during the COVID-19 pandemic[8] highlighting some job demands and resources that may affect negative (work stress) and positive (work engagement and job productivity) outcomes of employees' remote work. Furthermore, since the trend toward remote work is expected to increase even after the pandemic, this study may provide useful information on the individual- and work-related consequences of remote work during and after the pandemic.

Analyzing more in detail the above-mentioned variables, the difficulty of reconciling private and work commitments is often described in the literature as family-work conflict, which is a condition when employees' participation in work duties is complicated by the involvement of family-related activities[24]. Family-work conflict is usually considered a gender-dependent phenomenon[25] because, in most cultures, the primary responsibility for caregiving and housework tasks[26] lies with women, who are more penalized than men in times of crisis[27]. However, COVID-19 has forced millions of people to stay home, breaking down the distinction between private and work life regardless of age or gender. Therefore, we argue that family-work conflict can be an issue that may potentially affect not only women but men alike when WFH. On the contrary, previous studies hypothesized that remote work can simultaneously reduce family-work conflict as well as amplify it[4,6], nullifying the benefits of WFH[28]. Besides, the confinement that was imposed in the early period of the pandemic may also accentuate this conflict, with family commitments interfering with work commitments.

At home, the presence of partners and children (especially if still in their childhood) engaged in work and school activities, the disruption of child-care and education services observed during the pandemic, and having to contribute towards household chores greatly affected remote workers[19]. For example, employees have to regularly prepare meals three times a day (breakfast, lunch, and dinner) for the whole family, assisting children to connect with their online distance teaching in the morning, assisting with their homework in the afternoon, and spending some quality time with them when their homework is completed. As a result, employees have to work with greater family-work conflict, which we believe negatively affects their job productivity and work engagement while impacting on stress related to the remote work pending completion, in line with the previous literature[4,5].

Workplace isolation is another important key feature of WFH during the pandemic[18]. Although previous research highlighted that social isolation is one of the main drawbacks of remote work[29–32], its incidence has inevitably increased during this period. The pandemic has exposed people to social confinement and thus higher levels of loneliness[8,33], which may correlate with declining work satisfaction and performance as well as stress enhancement[4,18].

Prior to COVID-19, studies found a negative correlation between time spent telecommuting and

individual and team performance[9]. Furthermore, the amount of time spent teleworking and the extent of face-to-face interaction were found to moderate, respectively negatively and positively, the relationship between professional isolation and job performance[34]. In line with previous research[35], the use of digital technologies to communicate may only partially mitigate the isolation experienced by workers in comparison to the social contacts that are usually experienced by individuals in their workplaces as well as in social life, such as attending the gym or meeting friends. Therefore, as the social confinement observed in this study was extended for many weeks, with no in-presence contact with colleagues, we believe that social isolation is a relevant job demand related to WFH in times of COVID-19. Drawing on this statement, we argue that social isolation is significantly and negatively associated with WFH outcomes concerning job productivity and engagement and positively associated with WFH stress-related levels.

Another peculiarity of WFH during the pandemic is that employees have to share their workspace with family members, such as the partner and/or school-age children engaged in distance-learning primarily. Therefore, it should be noted that WFH during the pandemic has brought about many difficulties in the Italian population as well as in other European countries where social confinement has been adopted for several weeks. The houses were often unsuitable to host more people engaged in study and work activities[19], thus generating a distracting environment. A previous study conducted on teleworkers[36] highlighted that control on the work environment is positively related to job satisfaction, whereas distractions while working generates work environment dissatisfaction. Studies suggested that a positive full-time WFH experience is associated with the quality of the workspace, such as control on light and acoustic isolation[37] and a workspace that is sufficiently separated from the living space[38]. When this separation is not possible, working in a space with environmental distractions may represent an additional and relevant job demand. Specifically, we hypothesized that environmental distractions are negatively associated with productivity and engagement in remote work and positively with stress.

According to the JD-R model[13,14], job and personal resources affect employees' well-being and productivity. One of the most prominent job resources of remote work is job autonomy[13,14], which is the extent of independence and discretion permitted while performing professional tasks[39]. Job autonomy positively associates with the number of hours performed remotely. Furthermore, it positively influences remote workers' engagement, satisfaction, and performance but negatively affects their stress[5,20–22]. Job autonomy is a major job resource for employees and, in the right doses, it encourages profitable innovations at work[40]. We argue that the positive effects of job autonomy can be observed or even accentuated during the enforced WFH due to the pandemic. WFH was an unforeseen phenomenon necessitated by the outbreak of the pandemic, and many employees had to

cope with this new situation and coordinate with colleagues and supervisors to manage the unprecedented autonomy associated with the remote work. For this reason and in line with the literature[5,10], we posit that autonomy positively associates with productivity and engagement but negatively with stress experienced when WFH during the pandemic.

Finally, in our model, we included one personal resource that is particularly helpful in times of change as it enables employees to actively shape their own job practices and work environment[41]. Unfortunately, there is limited evidence on the effects of personal resources when WFH. Nonetheless, especially in unprecedented times such as this, it is important to investigate the role of work-related personal resources because, differently from personal traits (e.g. personality), they can be trained[11]. In the present study, we considered self-leadership, measured in its facets of goal setting and self-observation because among the most salient aspects of WFH, as well as one the mutual consequence of the other (the observation of one's work helps to establish goals, and their achievement must in turn be monitored), as an important resource when WFH. Through self-leadership, individuals regulate and control their behavior, influencing and leading themselves using specific sets of behavioral and cognitive strategies[42]. Self-leading individuals efficaciously monitor their actual performance and the standard they set for themselves thus regulating their own motivation. In this vein, it has been evidenced how self-leadership behaviors facilitate higher psychological functioning, which in turn influences work engagement[43,44]. A recent study yielded promising results showing that goal-setting behaviors, a component of self-leadership behaviors, may sustain job satisfaction especially when WFH[21]. In light of this, the present study aims to extend the literature by considering self-leadership and evaluating its relationship with WFH engagement and productivity, as well as with stress levels. According to the JD-R model[13,14], we assumed self-leadership as a personal resource for WFH that positively affects employees' productivity and work engagement, and negatively affects stress.

2. Methods

2.1. Participants and procedure

A study on the work-life quality of remote workers during COVID-19 was conducted using a self-report questionnaire administered online from May to July 2020, using the Qualtrics platform. At the time of data collection, all the participants were WFH full-time in Italian public and private organizations. Participation in the research was voluntary, anonymous, and without any reward. Prior to filling the questionnaire, the respondents signed informed consent. The research was conducted in

accordance with the Declaration of Helsinki and all ethical guidelines on social research were followed. The study was approved by the Bioethics Committee of the University of Bologna.

The study included 209 employees (71.3% women and 28.7% men). The average age of the participants was 49.81 years (standard deviation 9.4, minimum 25, maximum 65). Approximately 70% of the respondents reported having at least one child, and 32% of them reported having children younger than 14 years old. Only 9.1% of the employees in the sample reported being involved in WFH prior to the COVID-19 emergency, suggesting that 91.9% of them were WFH for the first time.

2.2. Measures

The job demands related to WFH were measured using three different scales. The first scale was measuring family-work conflict, which consists of three items from the scale developed by Netemeyer et al.[45], describing the interference that family life has on work when WFH (e.g., "Family stress interferes with my ability to perform work-related tasks"). Perceived social isolation was assessed using four items of the scale by Golden et al.[34], which measures a sense of isolation and lack of support experienced by workers (e.g., "I miss face-to-face contact with colleagues"). Finally, the scale of the distracting working environment consists of three items developed by Lee and Brand[36], which measures the level of distraction experienced during WFH (e.g., "In my working area, I experience acoustic distractions").

Job autonomy was assessed using four items developed by Morgeson and Humphrey[39]. These items measured both the possibilities of autonomy in scheduling work activities and taking work-related autonomous decisions (e.g., "My job allows me to make my own decisions about how to schedule my work").

Self-leadership was assessed using four items of the Revised Self-Leadership Questionnaire[23] measuring both the employees' behaviors of setting job-related goals and self-observation of their work (e.g., "When I work, I always keep my tasks in mind").

Perceived WFH productivity was measured in a section of the questionnaire requiring to compare the current situation of WFH with that one of the traditional office, experienced in the past, through a single item, already used in a remote work context[18], whose formulation is "When I work remotely, I am more productive."

WFH engagement was measured using the 3-item version of the Utrecht Work Engagement Scale[46] adapted to the WFH context (e.g., "When I work from home, I feel full of energy").

Finally, stress experienced during WFH was measured through the four items previously adopted by Weinert et al.[47] aimed to measure workers' perception of exhaustion and fatigue due to WFH (e.g., "I feel exhausted from working from home").

All the above measures were evaluated using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Socio-demographic variables, such as age, gender, caring responsibility, and remote work experience were considered as control variables, as literature recognizes them as possible confounders in the relationships under study[5,8,48]. Specifically, gender (0 = M; 1 = F), caring responsibility (0 = not having children younger than 14 years old; 1 = having children older than 14 years old), and WFH experience (0 = no; 1 = yes) were coded as dummy variables. Furthermore, since this research was conducted during the first phase of the COVID-19 pandemic, subjective perceptions and concerns regarding the COVID-19 may also have an impact on the experiences and well-being of the participants[18]. Therefore, fear of COVID-19 was used as a control variable and assessed using the seven items of the Italian version of the Fear of Covid-19 Scale[49]. For example, "I am very afraid of COVID-19".

2.3. Data analysis

Prior to data analysis, the validity and reliability of the scales were evaluated. In particular, the technique of Confirmatory Factor Analysis (CFA) was used to assess the dimensionality of the scales. The reliability and convergent validity of the measures were then evaluated by computing Composite Reliability (CR) and Average Variance Extracted (AVE) values, while the discriminant validity was assessed by calculating Maximum Shared Variance (MSV) values.

Once established that all the measures in this study had reliability and validity values following the cut-offs usually adopted in research[50], descriptive statistics and correlations among the major study variables were calculated. Finally, hierarchical multiple regressions evaluated which job demands and job resources influenced the three dependent variables of our study. In the three separated hierarchical regressions performed, one for each dependent variable, the stepwise method was used. In the first step, we included the control variables of gender, age, presence of children younger than 14 years old, WFH condition, and fear of COVID-19. In the second step, we added job demands, namely family-work conflict, social isolation, and distracting work environment. Finally, in the third step, we included the resources of job autonomy and self-leadership behaviors. All the data were analyzed using IBM AMOS and SPSS statistics version 26.

3. Results

3.1. Test of Measurement Model

First, two CFAs were conducted to compare an eight-factor model, one for each construct of this study, with a model in which all the items were grouped into a single dimension. The eight-factor model showed a greater fit to data (χ^2 = 503.54; df = 272; χ^2/df = 1.85; Comparative Fit Index [CFI] = 0.93; Incremental Fit Index [IFI] = 0.93; Root Mean Square Error of Approximation [RMSEA] = 0.06; and Standardized Root Mean Square Residual [SRMR] = 0.06) compared to the model with a single factor grouping all the items (χ^2 = 2147.77; df = 299; χ^2/df = 7.18; CFI = 0.46; IFI = 0.46; RMSEA = 0.17; and SRMR = 0.16). The fit values of the eight-factor model were good, and each item loaded into its factor with saturation values greater than 0.40. With the only exception of job productivity, measured through a single item, we then calculated the values of Composite Reliability (CR), Average Variance Extracted (AVE), and Maximum Shared Variance (MSV) for each scale. CR values for each dimension were greater than 0.70, giving evidence of the reliability of the scales. All the AVE values were above the cut-off of 0.50, while each MSV was lower than AVEs, indicating that the study measures had both convergent and discriminant validity. Table 1 reports the results of these analyses.

--- INSERT TABLE 1 ABOUT HERE ---

3.2. Descriptive statistics and correlations

Descriptive statistics, Cronbach's alphas, and correlations among variables are shown in Table 2. All the variables correlated in the expected direction. Job demands were found to be negatively associated with WFH job productivity and work engagement and positively related to WFH stress. The resources of job autonomy and self-leadership were positively related to work productivity and work engagement, but their relationships with stress, although negative, were not significant. Moreover, the two resources were not related to the three job demands.

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3.3. Regression Analysis for WFH employees' productivity, work engagement, and stress

Table 3 shows the results of the multiple regression analyses. Following the steps described in the Method paragraph, the first regression tested WFH productivity as dependent variable. For what concerns control variables, although in step 2 the experience with WFH resulted to be significant, its influence in step 3 revealed to be no more significant while, at step 3, age (β = -0.14; $p < 0.05$) and

fear of COVID-19 ($\beta = 0.25$; $p < 0.01$) resulted, respectively, to affect negatively and positively WFH productivity. In step 2, when job demands were entered, a significant increase in explained variance ($ADjR^2 = 0.27$; $\Delta R^2 = 0.24$; $p < 0.01$), over and above the variance explained by control variables, was observed. At this step, both family-work conflict ($\beta = -0.29$; $p < 0.01$) and social isolation ($\beta = -0.29$; $p < 0.01$), were significantly and negatively associated to WFH productivity, whereas distracting work environment was not significantly associated to it ($\beta = -0.05$; $p > 0.05$). In step 3, job autonomy and self-leadership showed a significant improvement in explained variance ($ADjR^2 = 0.32$; $\Delta R^2 = 0.05$; $p < 0.01$). At this step, both the job demands of family-work conflict ($\beta = -0.29$; $p < 0.01$) and social isolation ($\beta = -0.29$; $p < 0.01$), were negatively related to WFH productivity, whereas both job autonomy ($\beta = 0.14$; $p < 0.05$) and self-leadership ($\beta = 0.17$; $p < 0.01$) were positively related to WFH productivity. Distracting work environment was not significantly associated with it ($\beta = -0.02$; $p > 0.05$).

The second regression tested remote work engagement as a dependent variable. About the control variables, also in this case, in step 2, the experience with WFH resulted to be significant, while in step 3 its impact was no longer significant. Furthermore, in this case, fear of COVID-19 ($\beta = 0.19$; $p < 0.01$) positively and significantly affected remote work engagement even after inserting variables at steps 2 and 3.

In step 2, when entering job demands, a significant increase in variance was observed ($ADjR^2 = 0.37$; $\Delta R^2 = 0.31$; $p < 0.01$), over and above the variance explained by control variables in the first step. Specifically, step 2 of this regression shows that all the three job demands of family-work conflict ($\beta = -0.19$; $p < 0.01$), social isolation ($\beta = -0.36$; $p < 0.01$) and distracting work environment ($\beta = -0.18$; $p < 0.05$) negatively affected work engagement. At step 3, both the resources of autonomy ($\beta = 0.19$; $p < 0.01$) and self-leadership ($\beta = 0.23$; $p < 0.01$) positively affected work engagement. All the three job demands of family-work conflict ($\beta = -0.19$; $p < 0.01$), social isolation ($\beta = -0.36$; $p < 0.01$) and distracting work environment ($\beta = -0.14$; $p < 0.05$) were still negatively associated to work engagement, and an increase in the explained variance ($ADjR^2 = 0.44$; $\Delta R^2 = 0.10$; $p < 0.01$) was observed.

Finally, our focus shifted to the impact of WFH on workers' well-being. Using WFH stress as a dependent variable, the third hierarchical regression did not show any effect of the control variables on this outcome. At step 2, both family-work conflict ($\beta = 0.31$; $p < 0.01$) and social isolation ($\beta = 0.47$; $p < 0.01$), but not distracting work environment ($\beta = 0.05$; $p > 0.05$), were positively related to stress showing a significant increase in explained variance ($ADjR^2 = 0.45$; $\Delta R^2 = 0.44$; $p < 0.01$). At step 3, both family-work conflict ($\beta = 0.31$; $p < 0.01$) and social isolation ($\beta = 0.48$; $p < 0.01$), but not distracting work environment ($\beta = 0.05$; $p > 0.05$), were positively associated with stress. On the

contrary, neither autonomy nor self-leadership had a significant impact on WFH stress. Therefore, no significant increase in explained variance was observed ($ADjR^2 = 0.44$; $\Delta R^2 = 0.00$; $p > 0.05$).

--- INSERT TABLE 3 ABOUT HERE ---

4. Discussion

The present study examined employees' well-being and productivity when WFH during the pandemic. We addressed this issue by using the JD-R model[13,14] as a framework and by investigating the effect that specific WFH job demands and resources have on WFH outcomes. Among the job demands, we examined the effects of family-work conflict, social isolation, and distracting environment. Job autonomy was evaluated as a job resource, and self-leadership as a personal resource. The JD-R model[13,14] has also practical implications since it not only allows to focus on job-related risk prevention strategies (by decreasing job demands) but also on benefit promotion (by increasing job resources and, when possible, personal resources) to sustain employees' productivity and work engagement and decrease the stress experienced when WFH for the long periods required from the pandemic. In a time in which employees had to adapt quickly to WFH, the identification of obstacles, as well as of enablers, to well-being and job performance is a priority for many organizations, and this study contributes to this purpose. Overall, findings observed in the present study are in line with the assumptions developed following the theoretical framework of the JD-R model[13,14] and also consistent with the literature related to remote work.

Social isolation and family-work conflict were associated with all the three tested outcomes, in the direction we envisioned, thus proving to be important job demands of remote work that can significantly decrease productivity and work engagement on the one hand and increase job stress on the other. These results are in line with previous studies[4,8,18] and also improve extant knowledge concerning the relationship with productivity, engagement, and stress experienced during WFH. Findings suggest that organizations and employees should consider these factors and develop guidelines on how to better manage them to observe the positive outcomes typically expected from remote work. In particular, increasing opportunities to communicate with colleagues and superiors represents the first strategy for organizations, HR officers, and employees, because communications can decrease social isolation perceptions. The available technological resources can do a lot in this direction: although lean communications, such as e-mails, allow an exchange of information often functional for work, the social exchange between human beings takes place through "richer" forms of interactions, among which the face-to-face interaction represents the "gold standard"[51]. Many

companies accelerated the acquisition and use of technologies and software that offer interactive experiences that imitate the face-to-face or group interactions among people. The other side of the coin, however, concerns the issue of the digital privacy defense and the fear of digital surveillance[52,53] that the massive use of technologies may increase. At the same time, managers and HR officers should also effectively reflect on the frequency, timing, and structure of such communicative exchanges to avoid the risk of excessive interruptions and distractions of workers.

The theme of distractions is, in fact, another major issue related to WFH. The results of this study capture the deleterious role that family-work conflict and a chaotic environment, characterized by visual and acoustic distractions and lack of privacy, play on WFH outcomes. Distracting environments, while fortunately proving not to be predictors of reduced productivity and increased stress, seem to exert a negative influence on the motivational drivers of people. Employees may decrease their engagement, with weakened work motivation when their work setting becomes more distracting. The family-work conflict, instead, has shown significant and unfavorable effects on every dependent variable of this study. Probably, its centrality - already known in research on telework[4] - is also increased by the contingent situation related to the COVID-19 pandemic: in this period, workers' homes are often "crowded" by cohabitants grappling with their work and educational commitments. A crowded home further complicates the family and work-life balance, a learning process that previous studies suggested to require one year of WFH experience[5].

Learning how to manage remote work can decrease the perception of family-work conflict. In addition, organizations should support employees' time management skills, enabling them to divide the two spheres and give each of them the right attention at the right time, with a view to the right to disconnection and physical and mental recovery of each worker.

The importance of personal work management skills is also underlined by the resources tested in this study. Our findings show that autonomy and self-leadership have a positive relationship with productivity and work engagement. So, they may represent two relevant resources, able to sustain WFH productivity and engagement during the COVID-19 pandemic, and to potentially bring favorable outcomes for both organizations and employees. In practical terms, promoting autonomy and self-leadership may be a solution to improve the efficacy of remote work programs and related implications in terms of WFH engagement. In light of this, training interventions may be supplied to WFH employees to develop self-observation strategies and to promote the schedule of work-related goal-based deadlines and priorities. Furthermore, these findings call attention to new work processes supporting the work autonomy of individuals, leveraging the specific skills of individuals, and providing functional tools for job management in the new context of remote work. Advancements in this sense seem fully compatible with work visions that are increasingly geared to working towards

objectives and less based on directive leadership processes, and instead more participatory[54]. Consequently, organizations should empower workers through training courses aimed at developing self-leadership behaviors.

No significant relationship has been observed between resources and stress levels. In the JD-R model, job and personal resources are expected to directly impact well-being and motivational processes or to moderate the impact of job demands on stress and ill-health[16]. These results suggest that future studies should investigate the buffering role of specific WFH jobs and personal resources on the relationship between WFH demands and stress.

Other notable findings should be outlined. Our results suggest that remote work can be a useful solution especially for people concerned about COVID-19. In line with the previous literature[18], the perceptions of people about the COVID-19 virus seem to play an important role in work during the pandemic. Our findings show that the fear for this pathogen is positively associated with higher levels of productivity and engagement. In other words, people emotionally affected by COVID-19 also reported being more productive and motivated when WFH. This suggests that, consistently with the literature[55,56], this way of working may also play a protective, anxiety-relieving role for workers, since they were not asked to go to work, and thus be exposed to possible contagion by leaving home. On the other hand, we also observe that perception of lower productivity is associated with the increasing age of workers, a result probably explained both through the difficulties that these employees may have with technological tools, and their potential less ability to adapt to changes[57], especially if they take place quickly.

There are some implications for future research in this field that derive from the present study. Indeed, our model, although including many variables, gives only a small account of the many dynamics that underlie the complex phenomenon of the WFH. Based on this, we believe it is important that future studies take into consideration, with a more specific research design and a more representative sample, other constructs, particularly among the job and personal resources. In particular, we point out that the PsyCap, a psychological state consisting of the dimensions of self-efficacy, optimism, resilience, determination[58], applied both at the personal and team level, can open important horizons for future studies, which still have much to investigate on the complex reality of remote work and its outcomes in terms of employees' well-being and health.

We also point out some of the limitations of this study, as well as some suggestions for future studies. One limitation of this study is its cross-sectional design, which allows us to trace associations between the investigated constructs but on the other hand does not allow determining causal relationships between the variables. Furthermore, we also believe that to generalize the results may be not possible, since our sample was a convenience sample, susceptible to biases, including the fact

that the data collection took place online, among people accustomed to the use of digital technologies.

5. Conclusion

In this study, we investigated if WFH-related job demands and job resources are related to remote work productivity and work engagement as well as on stress. We found that the empirical results we analyzed and discussed, except for the relationships between distracting working environment and the outcomes of productivity and stress, and the relationships between both autonomy and self-leadership and stress, mostly confirmed our assumptions.

We believe that this study contributes to the literature concerning remote work and the well-being of remote workers that, during the COVID-19 pandemic, which is marked with relevant emotional and health implications. Furthermore, the implications of this study are of further importance as they provide information concerning the needs of workers who have had to adapt to enforced full-time WFH due to the pandemic, most of whom have no prior WFH experience. Managers, HR officers, and workers engaged in remote activities should consider family-work conflict, social isolation, and distracting work environments as potential obstacles and job autonomy and self-leadership as potential enablers of WFH engagement. In times of pandemic, such as the COVID-19, where containing the spread of the disease is crucial, WFH is a key opportunity and can give a competitive advantage to sustain and improve performance of organizations.

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Table 1

Table 1: Values of reliability (CR) and convergent (AVE) and discriminant (MSV) validity

	CR	**AVE**	**MSV**
F-W CONFLICT	.88	.64	.47
SOCIAL ISOLATION	.94	.79	.47
DISTRACTING WORK ENVIRONMENT	.89	.73	.32
AUTONOMY	.81	.53	.12
SELF LEADERSHIP	.80	.58	.68
WORK ENGAGEMENT	.79	.57	.28
STRESS	.89	.67	.11

Table 2

Table 2: Descriptive statistics, Cronbach's alphas and correlations among the variables

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. F-W CONFLICT	*(.89)*	.43**	.46**	-.05	-.12	-.40**	-.39**	.50**
2. SOC ISOLATION		*(.88)*	.37**	-.09	-.08	-.42**	-.51**	.62**
3. DISTR W ENVIR			*(.77)*	-.13	-.14	-.27**	-.38**	.36**
4. AUTONOMY				*(.89)*	.17**	.18**	.27**	-.03
5. SELF LEADERSHIP					*(.79)*	.26**	.34**	-.10
6. PRODUCTIVITY							.70**	-.39**
7. W ENGAGEMENT							*(.80)*	-.47**
8. STRESS								*(.94)*
M	2.18	3.07	2.39	3.85	4.10	3.56	3.57	2.43
SD	1.14	1.12	1.07	.85	.69	1.08	.83	1.19

Cronbach Alphas between brackets. *$p < .05$, **$p < .01$.

Table 3 (It integrates former tables 3, 4, 5)

Table 3: Regression parameters: standardized coefficients and overall changes in R^2 for WFH job productivity, work engagement and stress

Step		**Productivity** Beta (SE)	**Work Engagement** Beta (SE)	**Stress** Beta (SE)
1				
	1. Gender	-.14 (.17)	-.05 (.13)	.11 (.19)
	2. Age	-.04 (.01)	.11 (.01)	-.09 (.01)
	3. WFH Experience	.12 (.26)	.15 (.2)*	-.03 (.29)
	4. Children < 14	-.07 (.16)	.03 (.13)	-.06 (.18)
	5. Fear Covid-19	.20 (.08)**	.14 (.07)*	.01 (.09)
	ADjR^2	.04	.03	.02
	ΔR^2	.06	.05	.02
	R^2	.06	.06	.02
2				
	1. Gender	-.04 (.15)	.06 (.11)	-.01 (.14)
	2. Age	-.12 (.01)	.02 (.01)	.02 (.01)
	3. WFH Experience	.13 (.22)*	.16 (.16)**	-.03 (.21)
	4. Children < 14	-.02 (.15)	.05 (.11)	-.10 (.14)
	5. Fear Covid-19	.23 (.07)**	.17 (.05)**	-.04 (.07)
	6. W-F Conflict	-.29 (.07)**	-.19 (.05)**	.31 (.06)**
	7. Social Isolation	-.29 (.06)**	-.36 (.05)**	.48 (.06)**
	8. Distractive W. Env.	-.05 (.07)	-.18 (.05)**	.05 (.06)
	ADjR^2	.27	.34	.44
	ΔR^2	.24**	.31**	.42**
	R^2	.31	.37	.46
3				
	1. Gender	-.03 (.15)	.08 (.10)	-.01 (.14)
	2. Age	-.14 (.01)**	-.01 (.00)	.02 (.01)
	3. WFH Experience	.09 (.22)	.10 (.15)	-.03 (.22)
	4. Children < 14	-.02 (.14)	.06 (.10)	-.10 (.14)
	5. Fear Covid-19	.25 (.07)**	.19 (.05)**	-.03 (.07)
	6. W-F Conflict	-.29 (.07)**	-.19 (.05)**	.31 (.06)**
	7. Social Isolation	-.29 (.07)**	-.36 (.05)**	.48 (.06)**
	8. Distractive W. Env.	-.02 (.07)	-.14 (.05)*	.05 (.06)
	9. Job Autonomy	.14 (.08)*	.19 (.05)**	.03 (.07)
	10. Self-Leadership	.17 (.09)**	.23 (.06)**	-.03 (.09)
	ADjR^2	.32	.44	.44
	ΔR^2	.05**	.10**	.00
	R^2	.36	.47	.46

Method: enter. ∗p < .05; ∗∗ p<.01; Gender: 0 = M, 1 = F; WFH Experience: 0 = No, 1 = yes; Children < 14: 0 = no, 1 = yes.

Clinical Significance

The COVID-19 pandemic has caused people to work from home, in most cases without any preparation. Our results help identify factors associated with employee well-being, charting ways to follow to make sure people at home can work without negatively impacting their health.