"A good night's sleep!" How do remote workers juggle work and family during lockdown? Some answers from a French mixed-methods study

Valentina Dolce[1] · Chiara Ghislieri[2] · Monica Molino[2] · Émilie Vayre[3]

Abstract

This study, based primarily on job demands–resources model in the context of recovery, uses a mixed methods approach to examine the role that some work and family demands and boundary management tactics play in explaining work-nonwork balance and some related constructs, while also accounting for gender inequalities. The research involved 553 remote workers during the first lockdown in France caused by the COVID-19 pandemic. The results confirmed that a high number of work-related emails or phone calls outside of working hours and the constant presence of children at home were risk factors; conversely, good supervisor support was positively related to recovery experiences and negatively related to work-family conflict and insomnia. Women reported higher levels of insomnia symptoms and had more difficulty disengaging from work and restoring their energy than men. The use of effective tactics– planning, having your own space to work, coordinating with your partner - was made more difficult by workload, use of technology, demands at home, the size of the home and, for women, likely gender inequalities.

Keywords Insomnia · Work-family conflict · Remote working · Use of Information and Communication Technologies (ICTs) · Recovery · JD-R model · LMX leadership

Introduction

The organization of work was profoundly disrupted by the COVID-19 pandemic when a lockdown was imposed in many countries, including France, in 2020 to contain the spread of the virus. Under unprecedented conditions and very short deadlines, many work organizations have resorted to 100% emergency remote work. As a result, the number of remote workers has increased significantly, exceeding all pre-pandemic forecasts; especially in France, where in 2017 only 3% of French employees worked remotely, while by the end of March 2020 this figure had already risen to 25% (DARES, 2019, 2020). Remote work during the first lockdown was different from the remote work that was common before the COVID-19 health crisis. These emergency situations often blurred the boundaries between work and family by reinforcing the question of the ability and opportunity to recover from work and balance work and non-work (Allen et al., 2021). Furthermore, as suggested by Mandel-korn and colleagues (2021), sleep quality has dramatically deteriorated for many people in several countries.

Therefore, a mixed-methods approach was used in this study to extend knowledge about work-nonwork balance, managing work-life boundaries, and insomnia among remote workers under lockdown conditions. The comparison and combination of quantitative and qualitative results would indeed make it possible to develop a more comprehensive view (Plano Clark, 2017). Therefore, it is important to explore the dynamics that promote or hinder the relationship between life domains and sleep quality: The pandemic situation provided an exceptional but useful context to identify patterns and trends that define the new normal (Sinclair et al., 2020). Using the framework of the job demands-resources model (JD-R, Bakker & Demerouti, 2007; Demerouti & Bakker, 2023) in the context of recovery (Kinnunen et al., 2011), this study examines the relationship

✉ Monica Molino
monica.molino@unito.it

1 Research Group in Societal Psychology (GRePS), Institute of Psychology, Lyon 2 University, Bron, France

2 Department of Psychology, University of Turin, Turin, Italy

3 Unité INSERM U1296 Radiations: Défense, Santé, Environnement, Institute of Psychology, Lyon 2 University, Via Verdi 10, Bron 10124, France

between a specific demand (interference with technology for work purposes outside working hours; Ghislieri et al., 2017), an important resource (supervisor support; Lott & Abendroth, 2022), recovery as a mediator, and work-family conflict, both a mediator and as a particularly salient outcome during the pandemic (Ghislieri et al., 2021). The study also analyzes the impact on a secondary outcome such as insomnia, controlling for some variables related to family caregiving burden.

By using a mixed research approach (Mauceri, 2016), the study also considers boundary management strategies (Allen et al., 2014; Clark, 2000) during remote working, which are analyzed through qualitative findings (Beigi & Shirmohammadi, 2017).

In this scenario, the quantitative and qualitative data analysis took into account gender differences and the burden of family childcare. The crisis and the health measures taken made gender inequalities particularly evident (e.g. Shockley et al., 2021), as the unequal distribution of domestic tasks and responsibilities (Feng & Savani, 2020) was linked to the poorer conditions of teleworking for women, who were more likely than men to have to manage the double burden of work and care at the same time, as they had no quiet spaces.

In relation to previous work, there are at least two innovative elements: We decided to gain a better understanding of insomnia by considering work-related aspects (resources and demands) in the context of an emergency, and we also incorporated a qualitative component to learn more about the strategies used to balance work and life during lockdown by examining whether they are considered effective or ineffective. From a practical impact perspective, this paper explores the use of technology and the relationship with work-life balance and wellbeing to better manage it, also with a view to being able to deal with it with more knowledge in future emergencies. A particular focus is also placed on the issue of management, with support from supervisor seen as a key resource.

Work and family interface during pandemic

Even before the pandemic emergency, interest in understanding the relationship between remote work and the interface between work and family was growing in the European Union (EU). Research findings in this area remain mixed (Allen et al., 2015; Chambel et al., 2022). As the study by Vayre and Pignault (2014) with 24 teleworkers in France (the same country in which the study was conducted) shows: workers sometimes acknowledge the positive role of remote work in terms of work-life balance, as it reduces travel time and sometimes makes it possible to combine work and care. At the same time, however, they often mention the difficulty

of drawing a line between their different spheres of life. Indeed, remote workers work longer hours, exert more effort, are more responsive and available, which increases potential tensions, role conflicts as well as interference with family and friends or colleagues and superiors and affects psychophysical well-being (Vayre & Pignault, 2014).

During the pandemic, the relationship between remote work and work-family conflict (WFC) became even more complicated: technology enabled workers to work from home, but also represented a potential source of disruption to personal activities (Ghislieri et al., 2022), as work and family schedules constantly overlapped without, in many cases, a dedicated space for work (e.g. Feng & Savani, 2020).

Although some people reported that they benefited from being able to spend more time with their children, the constant presence of school- and preschool-aged children at home during this emergency situation also provided an important source of family demands that is positively related to WFC (e.g., Dugan & Barnes-Farrell, 2020) and affects the ability to restore energy expended during the day (Shockley et al., 2021).

Although there are numerous studies on this topic (Feng & Savani, 2020), understanding the processes that lead to difficulties in the relationship between work and family is of great importance for deepening knowledge of organizational phenomena and aligning practices.

Among the most studied constructs for analyzing the negative interference of work in family life is WFC, a role conflict that, in the work-to-family direction, is mainly due to the demands of the work domain.

Greenhaus and Beutell's (1985) theory of work-family conflict states that involvement in a work (or family) role can make it more difficult to be active and effective in the family (or work) context. In this study, we use the job demands- resources model (JD-R; Bakker & Demerouti, 2007) to explain WFC and insomnia (Barnes et al., 2012; Buxton et al., 2016).The JD-R and the more specific work-home resources model (Ten Brummelhuis & Bakker, 2012), inspired by the conservation of resources model (COR, Hobfoll, 1998), is frequently used in studies on these topics due to its adaptability to different scenarios and its strength in explaining processes. WFC occurs when the demands of work - physical, psychological, social, or organizational aspects of work that place significant physical and/or psychological demands - deplete personal resources. Personal and organizational resources can play a positive role in this process by reducing work demands and promoting growth, learning and development (Bakker & Demerouti, 2007). Kinnunen et al. (2011) further integrated the JD-R model to include recovery as an important mediator in the relationship between demands/resources and outcomes. As

postulated in the effort-recovery model (Meijman & Mulder, 1998), job demands are not always harmful, but if they are too high, they hinder the appropriate recovery process (Meijman & Mulder, 1998). Furthermore, according to the COR model (Hobfoll, 1998), individuals attempt to defend and maintain these resources and acquire new resources to protect themselves from stress through a range of activities outside of work: the recovery experiences (Sonnentag & Fritz, 2007). Sonnentag and Fritz (2007) identified four main recovery experiences: (1) psychological detachment from work, through which workers mentally disengage from work, (2) relaxation, which allows people to reduce the high activation associated with stressful work situations, (3) mastery which refers to all activities outside of work that present an individual challenge to learn something new, and finally (4) control, which occurs when people have control over their leisure time. As empirical research shows, excessive job demands have a negative impact on the recovery process (Derks et al., 2014) and increase the risk of WFC (e.g., Ghislieri et al., 2017).

Given the emergency nature of remote work, the often not well-managed practices and the lack of specific training in the use of technology, remote workers can be inundated with emails, private messages and video conferencing, requiring a constant use of resources at work, limiting the opportunity for recovery and increasing the risk of WFC (Ghislieri et al., 2017). This seems to be especially true for so-called "always-on" organizational cultures, in which certain behaviors, such as leaving the cell phone on after work or saving email notifications on personal devices, are so entrenched that they are perceived as the norm (McDowall & Kinman, 2017). In line with the theoretical framework presented, we assume that:

H1. The frequency of receiving e-mails or phone calls outside working hours was (a) negatively related to recovery experiences and (b) positively related to WFC.

In addition, the comparative study by Solís (2017), conducted before the pandemic, showed that teleworking helps to reduce the perception of WFC among those who have fewer family and household responsibilities. In contrast, those who have one or more dependents at home or work at home in the presence of a third person perceive more conflict (Solís, 2017). Consistent with the -home resources model (Ten Brummelhuis & Bakker, 2012), while it is true that some individuals reported having benefited from being able to spend more time with their children, in this emergency situation, the constant presence of school- and preschool-age children at home in the absence of other informal support (relatives work helping to care for the children when parents are at work) also provided an important

source of family demands that is positively related to WFC (e.g., Dugan & Barnes-Farrell, 2020; Hong et al., 2021) and affects the ability to restore energy expended during the day (Shockley et al., 2021). Therefore, we hypothesized that:

H2. The presence of children at home during lockdown was (a) negatively related to recovery experiences and (b) positively related to WFC.

In addition to the workplace and family demands mentioned above, there are also some resources that can help improve recovery experiences and reduce work-family conflict. Leadership is one of them (Tummers & Bakker, 2021). Recently, Tummers and Bakker (2021) analyzed 139 research studies dealing with leadership in the JD-R model. The authors pointed out inherent limitations of the research conducted - which need to be overcome in future research - and indicated that leadership can influence people's experiences in three main ways: through a direct effect on demands and resources; through an effect on the impact of demands and resources on well-being; through enhancing job crafting or self-undermining. In addition, some key position papers in the field of organizational research related to remote work have emphasized the importance of paying special attention to the role of leadership, both in emergencies and in the coming "new normal" (Sinclair et al., 2020). Nevertheless, little work has examined the relationship between leadership and recovery, and very little is known about the relationship with WFC under lockdown conditions. Therefore, in this paper, we aim to address this gap by examining the role of positive leadership in the dynamics of recovery (again, as a process of resource maintenance/generation) and in its relationship with WFC.

Within the broad domain of positive leadership, we focused on leader-member exchange theory (LMX; Graen & Uhl-Bien, 1995), which views leadership as a dyadic relationship between leader and followers in terms of positive social exchange (Ilies et al., 2005). Leadership as LMX has been associated with in-role and out-of-role performance, constructive attitudes and psychological states, reduced role conflict, well-being and turnover (Ilies et al., 2005). Sonnentag and Schiffner (2019) pointed out that leaders can influence the stress symptoms of subordinates not only through their leadership behavior at work, but also through detachment processes in their free time. Among other findings, Vaziri et al. (2020) pointed out that the role of positive supervision for the interface between work and family is also important during the first lockdown. In line with this work, we postulate the following:

H3. LMX is (a) positively related to recovery experiences and (b) negatively related to WFC.

Insomnia symptoms during lockdown

In addition, the pandemic, which often occurs during stressful events, has further affected the quality of sleep of many people in several countries (Mandelkorn et al., 2021). Insomnia is now considered one of the most common sleep disorders and health problems among workers. Although it plays an important role in mental health, this problem has long been underestimated in research on workers' health.

According to the effort-recovery model (Meijman & Mulder, 1998), an effective recovery process is required after physiological activation and fatigue in order to avoid health problems. On this basis, we can assume that adequate recovery in the evening reduces the risk of sleep problems, and indeed, successful recovery has been shown to improve sleep quality and lead to a reduction in fatigue and a restoration of resources. For example, Grandey and colleagues (2021) recently examined the association between pandemic-related COVID-19 work reduction or absenteeism and short-term health changes and found that mastery, a recovery experience, was positively associated with immediate positive mood and negatively associated with insomnia. Therefore, we hypothesize that:

H4. Recovery experiences mediate the association between (a) LMX, (b) frequency of receiving emails or calls outside of working hours, (c) presence of children at home during lockdown and insomnia symptoms.

Among the stressors that may contribute to sleep problems, time-based WFC may mean that time for sleep is sacrificed in order to cope with the conflict, affects sleep duration and bedtime (Barnes et al., 2012). Buxton and colleagues (2016) found in their work that WFC was associated with poorer sleep quality, less adequate sleep, shorter sleep duration, more insomnia symptoms, and greater inconsistency in sleep duration and bedtime. Based on the preceding assumptions, we therefore hypothesize that WFC plays a mediating role in the relationship between resources and demands and symptoms of insomnia:

H5. Work-family conflict mediates the relationship between (a) LMX, (b) frequency of receiving emails or phone calls outside working hours, (c) presence of children at home during lockdown and insomnia symptoms.

Gender differences

Prior to the COVID-19 crisis, empirical work addressing gender inequalities in remote work was sparse and scattered. According to Eddleston and Mulki (2017), the fact that working from home was associated with higher work-life conflict, which led to an increase in work stress, was moderated by gender. Women experienced an imbalance due to their inability to disengage from work, while men experienced greater conflict due to the integration of work and family life. Other studies have found gender differences among remote workers.

Thulin et al. (2019) demonstrated that women and mothers with young children at home experienced greater time pressure and less control over time use among teleworkers employed by six Swedish government agencies. Other studies have highlighted that women who telework perceive a psychological overlap between work and home life, have greater difficulty recovering, and report more stress and mental and physical fatigue than men (e.g., Kim et al., 2020).

In addition, the comparative study by Lyttelton et al. (2022) has shown that teleworking before the pandemic in the USA has led to greater gender differences in housework, but may have evened out the differences in childcare: Mothers who telecommute do relatively more housework and are more likely to work when a child is present than fathers who telecommute; however, remote working also increases the amount of time fathers spend on childcare, especially when mothers work full-time (Lyttelton et al., 2022). During the pandemic, mothers who teleworked were less likely to reduce their work hours because of family and consistently reported more anxiety and feelings of depression (Lyttelton et al., 2022).

Given these specific conditions that affected workers' well-being, we hypothesized that:

H6. Women reported fewer (a) recovery experiences, (b) more WFC, and more (c) insomnia symptoms than men.

Boundaries management

To cope with WFC, people tend to create, maintain or change boundaries between different domains (Allen et al., 2014; Kreiner et al., 2009). In the work-family literature, boundary theory addresses the cognitive, physical, and/or behavioral boundaries that exist between the domains of work and family, separating the two domains (Ashforth et al., 2000).

The boundaries can be thin, so that work and family intermingle, or thick, so that the two spheres remain separate. In each sphere, people play different roles, and boundaries help delineate the expected behaviors associated with those roles. However, boundaries can also be sources of conflict, particularly when the pressures of one role in one domain impact on the other (Allen et al., 2014).

When role boundaries are impermeable and inflexible, when segmentation is high (Clark, 2000), the risk of role blurring is lower, but micro and macro transitions between roles are perceived as more difficult (Allen et al., 2014). In contrast, when role boundaries are more flexible and permeable, when integration is high (Clark, 2000), role transitions tend to be easier, but the risk of role blurring is higher (Ashforth et al., 2000). The choice of boundary management strategy (integration or segmentation) and its effectiveness depend on the match between individual preferences and the characteristics of the job and the organization, which is consistent with person-environment fit theory (Kreiner, 2006, p. 486). "Just as individuals vary in the degree they want to segment or integrate work and home, workplaces vary in the degree to which they create an environment that promotes either segmentation or integration" (Kreiner, 2006, p. 486).

In their review of qualitative studies, Beigi and Shirmohammadi (2017) pointed out that the choice of strategies and trade-offs for coping with limitations is more limited for women. The review studies also suggest that informal solutions (planning, alternating roles, time management, downsizing roles and expectations, delegation of duties) appear to be more effective than structured organizational measures.

Following the conclusions of Beigi and Shirmohammadi (2017), who emphasize the importance of qualitative research in capturing the complex dynamics of managing the work-life interface, in our study we looked at respondents' reasoning regarding the effectiveness (or ineffectiveness) of their boundary management strategies during remote work in an emergency.

Method

Study design

Quantitative and qualitative data were used in this study. More specifically, a simultaneous mixed-methods design with a quantitative dominance and a supporting qualitative phase was chosen (Mauceri, 2016). As Beigi and Shirmohammadi (2017) note, it is important to explore issues related to the work-life interface and boundary management through qualitative studies, which are still scarce. With this in mind, the present study is situated within a mixed methods approach (Onwuegbuzie & Johnson, 2006), which proposes to utilize the complementarity of qualitative and quantitative methods (Johnson et al., 2007). A self-report questionnaire was used for this purpose. Some measures were scaled responses to specific questions, others were open-ended descriptions. The items aimed to measure work-family conflict, insomnia symptoms, recovery experiences, use of technology outside of working hours, and supportive behaviors from responsible as well as organization of daily personal and work activities.

Sample and procedure

A total of 553 remote workers took part in this study, which was conducted during the first COVID-19 lockdown in France (between March and April 2020). Among them, 68% were women, 92% French nationality, just over half of them had children (53%). The participants had an average age of around 36 years with a standard deviation (SD) of around 11 years (min=20, max=66). Regarding their job, 67% were employed in the private sector, in half of the cases in companies with less than 250 employees, and in most cases they worked full-time (86%) and had a permanent contract (70%). Their seniority was around 8 years (SD=9.32), and in 45% of cases they were employed as middle managers. Regarding cohabitation during lockdown, 41% lived with their partner, 37% with their partner and children, 16% with their parents and 6% alone with their children.

Participation in the current study was voluntary and unrewarded, and confidentiality of data was emphasized when contacting subjects. The questionnaire was aimed at employees from different occupational sectors who reported work from home. The self-report questionnaire was available via the Google Form platform and the link to the questionnaire was mainly sent via social media messaging with a detailed accompanying text and extensive availability for further information.

The present study is in accordance with the Declaration of Helsinki (World Medical Association, 2001): No treatments or other procedures were administered that could adversely affect the psychological or social well-being of the participants. The research project was approved by the Bioethics Committee of the University of Turin (document no. 150,561, April 03, 2020).

Instruments

Participants were asked to complete a French self-report questionnaire containing a variety of items. Some of these items were scale-rated responses to specific questions, but there was also a free-text item that was of additional interest for the present study. The constructs measured with self-ratings scales are described below.

Leader-member-exchange was assessed with five items (Graen & Uhl-Bien, 1995; Leader Member Exchange scale). Response options ranged from 1 (never) to 5 (always); a sample item is: "My supervisor uses his or her influence to help me solve my problems at work".

The frequency of receiving emails or phone calls outside of working hours was assessed with six items (Ghislieri et al., 2023). The response options ranged from 1 (never) to 5 (always); an example item is: "receiving business phone calls after the work day". We indicated that the person had to think about the lockdown period. This scale has already been used in a similar study with remote workers (e.g. Ghislieri et al., 2023).

Recovery was assessed using the 12 items of the Recovery Experience Questionnaire (Sonnentag & Fritz, 2007). Participants were asked to reflect on recovery experiences after a working day and answered all items on a scale from 1 (strongly disagree) to 5 (strongly agree). Four dimensions defined the factor structure of this scale: Detachment (e.g. "I forget about work"), Relaxation (e.g. "I kick back and relax"), Mastery (e.g. "I seek out intellectual challenges") and Control (e.g. "I determine for myself how I will spend my time"). We indicated that the person should think about the last ten days of working. This scale has already been used in similar cross-sectional studies (e.g. De Wijn & Van der Doef, 2020).

WFC was measured with the scale by Netemeyer and colleagues (1996), which consists of 5 items on a Likert scale from 1 to 5. A sample item is "Things you want to do at home do not get done because of the demands your job puts on you."

Insomnia was measured with the three items (Broman et al., 2008) on a scale from 1 (never) to 5 (always). An example item is: "I have problems with falling asleep".

As for the qualitative data, we obtained it starting from a dichotomous question: "During the agile work days, did you manage to separate work and personal activities and organize the time of your day effectively (work hours, breaks, time for personal activities,…)? Then we asked the participants to indicate the reasons for their answer. Note that in the free response questions, participants were not asked to give a retrospective report, as the questions referred to ongoing events.

Data analysis

For the quantitative data, the software SPSS 26 and Mplus 7 were used for the analysis.

First, some psychometric properties of the measurement variables contained in the questionnaire were checked. Specifically, Cronbach's alpha coefficient was calculated in order to check the reliability of the individual scales. This was carried out for the entire sample and for the subgroups of female and male employees. Inter-item correlations values between the items were also checked in accordance

with Briggs and Cheek (1986); we assume that the optimal mean correlation values between the items are between 0.2 and 0.4. To test the measurement model, a confirmatory multi-group factor analysis (CFA) was conducted using Mplus7. We addressed the risk of common method variance by testing Harman's single factor (Podsakoff et al., 2003) considering that the total variance extracted by one factor must not exceed 50% (Aguirre-Urreta & Hu, 2019). To detect multicollinearity between predictors by applying a linear regression on SPSSS in which the dependent variable was insomnia, we examined Variance Inflation Factor (VIF) and tolerance coefficients. Finally, since the study compared women and men and involved participants with children at home during lockdown and other without children, we tested for these groups' measurement invariance: first we evaluated configural invariance, then metric invariance and finally scalar and strict invariance. We assessed measurement invariance using the following cut-off indices: $\Delta CFI < 0.010$, $\Delta TLI < 0.010$, and $\Delta RMSEA < 0.015$ (Cheung & Rensvold, 2002; Ferro & Boyle, 2013).

Second, the authors performed a descriptive data analysis and calculated correlation coefficients to verify the existing relationships between the variables. Third, full multi-group structural equation modeling (MG-SEM) was tested using Mplus7 to estimate the hypothesized relationship. Age was used as a control variable. Fourth, an analysis of variance (independent test of students) was performed to compare the means of the variables considering gender as a grouping variable.

The maximum likelihood (ML) method was used for both the CFA and th; e SEM. Following the literature (Hooper et al. 2008), the model was assessed using several goodness-of-fit criteria. The $\chi2$ goodness of fit statistic, where a non-significant result indicates a good model fit. However, as this statistic is sensitive to sample size (Bentler & Bonnet, 1980), other criteria were evaluated. The Root Mean Square Error of Approximation (RMSEA), where a value ≤ 0.05 indicates a good fit, and a value between 0.05 and 0.08 indicates an adequate fit. The Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI) should be greater than 0.90. The Standardized Root Mean Square Residual (SRMR) should be less than 0.05 for a good fit, while values up to 0.08 are acceptable. For reasons of parsimony, the item parceling technique was applied to the four recovery dimensions. Finally, a bootstrapping procedure was used to test mediation (2000 new samples were extracted from the original sample).

For the qualitative data collected via open-ended question in the questionnaire, a template analysis (Brooks et al., 2015) was used to analyze the reasons given by participants as to why they were or were not able to effectively organize their time between work and personal demands. Template

analysis is a form of thematic analysis that emphasizes the use of hierarchical coding, but combines a relatively high degree of structure in the process of textual data analysis with the flexibility to adapt it to the needs of a particular study (Brooks et al., 2015). The analysis process involved an initial step of reading a third of the participants' responses. The researcher underlined anything in the text that might contribute to understanding and matched the content of the responses to the appropriate previous theme. The previous themes were defined by analyzing tactics for planning personal and professional activities, considering the temporal, physical, and psychological boundaries that delineate the different life domains (Kreiner et al., 2009), along a continuum from segmentation to integration of these boundaries (Allen et al., 2014; Clark, 2000). A third step consisted of an initial modeling of the emerging themes. A preliminary model was created that was applied to another two-thirds of the data and then modified. In effect, the researchers examined the new data and if they identified elements that were potentially relevant to the study, they considered whether any of the themes defined in the original model could be used to represent it. If the existing themes did not readily fit the new data, the model had to be modified. New themes were added and existing themes were redefined or even deleted. Instead of redesigning the template after examining each new transcript, the researchers worked through several transcripts, noted possible changes, and then created a new version of the template. Two researchers conducted the analysis separately with an inter-coder rate of greater than 80% and then discussed the case assignments until they could agree on all case assignments. A $\chi 2$ test was also conducted to test for possible differences between women and men.

Results

Table 1 shows descriptive statistics, correlations and alpha coefficients for all variables included in the model. The frequency of receiving emails or calls outside working hours was negatively correlated with recovery ($r = -0.26, p < 0.01$) and positively correlated with WFC ($r = -0.35, p < 0.01$) and insomnia ($r = 0.14, p < 0.01$). Leader-member-exchange was positively associated with recovery ($r = -0.30, p < 0.01$) and negatively associated with WFC ($r = -0.09, p < 0.05$). Recovery was significantly associated with WFC ($r = -0.31, p < 0.01$) and insomnia ($r = -0.20, p < 0.01$), just as WFC was significantly associated with insomnia ($r = -0.25, p < 0.01$). The presence of children at home was negatively associated with recovery ($r = -0.18, p < 0.01$) and positively associated with WFC ($r = 0.24, p < 0.01$).

Confirmatory factor analysis, common method bias test, multicollinearity test and measurement invariance

Before testing the hypothesized SEM, we performed a multi-group CFA to verify the measurement model. It showed a good solution: $X^2(474) = 1175.62$, $p < 0.001$; RMSEA = 0.07 (0.06, 0.07); CFI = 0.90; TLI = 0.90; SRMR = 0.06, with a correlation between the residuals of two items of frequency of receiving emails or phone calls outside of working hours. As regards Harman's single factor test, the CFA results showed that one factor did not explain the variance in the data, thus excluding common method variance ($X^2(504) = 5674.33$, $p < 0.001$; RMSEA = 0.19 (0.19, 0.20); CFI = 0.28; TLI = 0.28; SRMR = 0.22). By using SPSS Harman's single-factor method to test the common method bias, the total variance extracted by one factor is 23.74% and it is less than the recommended threshold of 50%.

Furthermore, to examine multicollinearity, by using SPSS we applied a linear regression in which the dependent variable is insomnia: VIF indices were less than 5 as

Table 1 Descriptive, correlations analysis and Cronbach's alpha in the whole sample ($N = 553$)

	M	SD	1	2	3	4	5	6	7
1. Fr. Tech	2.36	0.99	0.88						
2. LMX	3.34	1.02	0.07	0.92					
3. Recovery	3.39	0.82	-0.26**	0.30**	0.90				
4. WFC	2.51	1.04	0.35**	-0.09*	-0.31**	0.91			
5. Insomnia	2.76	1.0	0.14**	0.05	-0.20**	-0.25**	0.69		
6. Age	36.21	11.81	0.02	-0.06	-0.04	0.03	-0.02		
7. Presence of children	-	-	0.07	-0.02	-0.18**	0.24**	0.01	0.41**	-

On the diagonal in italics the Cronbach's alphas

LMX Leader-Member Exchange, *rec.* Recovery, *WFC* Work-family conflict, *Fr. Tech* Frequency of receiving emails or phone calls outside of working hours, *child* Presence of children at home

**$p < 0.01$; *$p < 0.05$

well as tolerance indices were higher than 0.20 (VIF for each predictor varies from a minimum of 1.03 and a maximum of 1.25 and tolerance for each predictor varies from a minimum of 0.80 and a maximum of 0.85) indicating a low correlation of that predictor with other predictors (Menard, 1995; Mason et al., 1989).

Finally, the strict invariance was supported across the male and female sample, indeed the CFI, TLI and RMSEA coefficients of the scalar and strict model do not differ ($\triangle$CFI = 0.003, $\triangle$TLI = 0.002, ΔRMSEA = 0.001). The scalar invariance was supported across participant with children during lockdown and without children at home during lockdown ($\triangle$CFI = 0.009, $\triangle$TLI = 0.005, ΔRMSEA = 0.002).

Multi-group full structural equation modeling

The full multi-group SEM fitted to the data well: $X^2(568) = 1157.502\ p < 0.001$; RMSEA = 0.06 (0.06, 0.07); CFI = 0.92; TLI = 0.91; SRMR = 0.07. The latent variables were all defined with factor loadings of the observed variables between 0.48 and 0.93. The final solution showed the covariance between the residuals of three couple of items of the scale measuring the frequency of receiving emails

or phone calls outside of working hours. As Fig. 1 shows, the results confirmed the first hypothesis: the frequency of receiving e-mails or calls outside of working hours was negatively and directly related to recovery experiences [women: β = -0.20, $p < 0.001$; men: β = -0.22, $p < 0.001$] and positively related to WFC [women: β = 0.22, $p < 0.001$; men: β = 0.25, $p < 0.001$]. In addition, consistent with the second hypothesis, the presence of children at home during lockdown was directly negatively related to recovery experiences [women: β = -0.18, $p < 0.001$; men: β = -0.19, $p < 0.001$] and positively related to WFC [women: β = 0.19, $p < 0.001$; men: β = 0.21, $p < 0.001$] for both women and men. The model showed a significant direct positive relationship between LMX and recovery experiences among women [β = 0.32, $p < 0.001$] and men [β = 0.34, $p < 0.001$], yet no other direct relationship was found for WFC, partially confirming the third hypothesis. In addition, recovery experiences were directly and negatively related to WFC [women: β = -0.29, $p < 0.001$; men: β = -0.30, $p < 0.001$] and insomnia [women: β = -0.19, $p < 0.001$; men: β = -0.19, $p < 0.001$]. Finally, WFC was positively related to insomnia [women: β = 0.25, $p < 0.001$; men: β = 0.23, $p < 0.001$]. As assumed, age was not related to the variables.
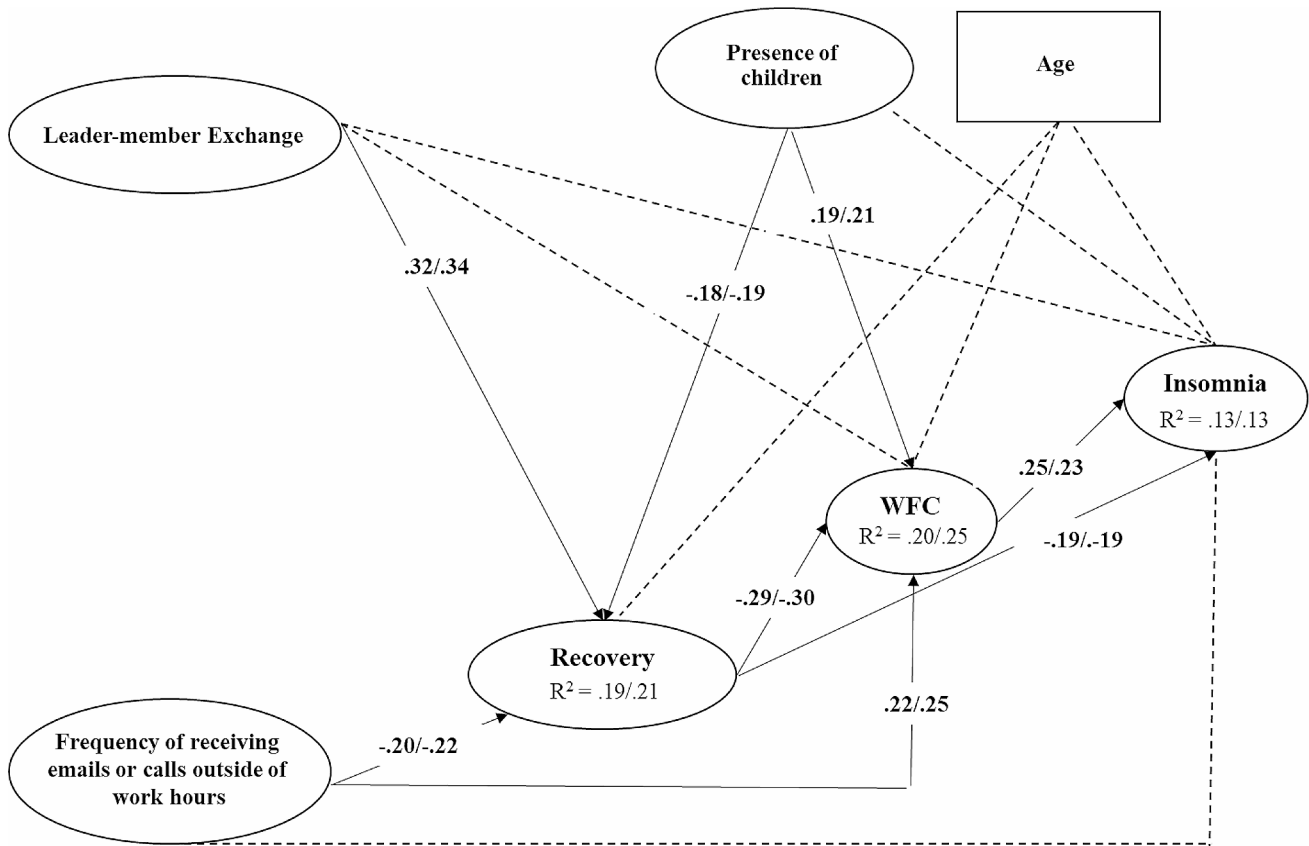
Fig. 1 Full multi-group structural equation modeling. Model Fit: X2(568) = 1157. 502 p = 0.000; RMSEA = 0.06 (0.06, 0.07); CFI = 0.92; TLI = 0.91; SRMR = 0.07. Note: Women (n = 378) /Men (n = 175); WFC: work-family conflict

Table 2 Indirect effects using bootstrapping (2000 replications) for the female subsample

Indirect effects - female sample	Est.	S.E.	p	CI (95%)
LMX → rec. → WFC → insomnia	-0.02	0.01	0.004	(-0.03, -0.01)
Fr. tech. → rec.→ WFC → insomnia	0.01	0.01	0.011	(0.01, 0.04)
Child. → rec. → WFC→ insomnia	0.01	0.01	0.013	(0.01, 0.04)
LMX → rec. → insomnia	-0.06	0.02	0.009	(-0.08, -0.01)
Fr. tech. → rec.→ insomnia	0.04	0.02	0.024	(0.01, 0.10)
Child. → rec. → insomnia	0.04	0.02	0.024	(0.01, 0.11)
LMX → WFC → insomnia	0.00	0.01	0.907	(-0.02, 0.02)
Fr. tech. → WFC → insomnia	0.05	0.02	0.004	(0.03, 0.12)
Child. → WFC → insomnia	0.05	0.02	0.006	(0.02, 0.13)

LMX Leader-Member Exchange, *rec.* Recovery, *WFC* Work-family conflict, *Fr. Tech* Frequency of receiving emails or phone calls outside of working hours, *child* Presence of children at home

Table 3 Indirect effects using bootstrapping (2000 replications) for the male subsample

Indirect effects - male sample	Est.	S.E.	p	CI (95%)
LMX → rec. → WFC → insomnia	-0.02	0.01	0.004	(-0.03, -0.01)
Fr. tech. → rec.→ WFC → insomnia	0.02	0.01	0.015	(0.01, 0.04)
Child. → rec. → WFC → insomnia	0.01	0.01	0.017	(0.01, 0.04)
LMX → rec. → insomnia	-0.06	0.02	0.010	(-0.08, -0.01)
Fr. tech. → rec.→ insomnia	0.04	0.02	0.029	(0.01, 0.10)
Child. → rec. → insomnia	0.04	0.02	0.030	(0.01, 0.11)
LMX → WFC → insomnia	0.00	0.01	0.907	(-0.02, 0.02)
Fr. tech. → WFC → insomnia	0.06	0.02	0.006	(0.03, 0.12)
Child. → WFC→ insomnia	0.05	0.02	0.009	(0.02, 0.13)

LMX Leader-Member Exchange, *rec.* Recovery, *WFC* Work-family conflict, *Fr. Tech* Frequency of receiving emails or phone calls outside of working hours, *child* Presence of children at home

The mediating paths and indirect effects were tested by a bootstrap analysis with 2000 resamples. As shown in Tables 2 and 3, there was a double full mediation of rest and WFC explaining the indirect association between LMX, the frequency of receiving emails or calls outside working hours, and the presence of children at home during lockdown and, on the other hand, and insomnia on the other. Independently of mediation by WFC, recovery also mediated the association between, LMX, frequency of receiving emails or phone calls outside working hours and the presence of children at home during the lockdown on the one hand, and insomnia on the other. In contrast, WFC did not mediate the relationship between LMX and insomnia without the mediation of recovery, but it did mediate the indirect relationship between the frequency of receiving emails or phone calls outside working hours and the presence of children at home during lockdown and insomnia.

T-test

As shown in Table 4, the results partially confirmed the last hypothesis. The results show that women suffer from insomnia more frequently than men. With regard to recovery experiences, the analysis of variance showed that the general level of recovery was higher for men than for women; in particular, the two dimensions of mastery and detachment showed significant differences between the two groups. The results showed no significant differences between the two subsamples for the other variables.

Qualitative data

The presentation of the results follows a hierarchical coding and describes segmentation and integration (Allen et al., 2014; Clark, 2000) (see Fig. 2), analyzing the different tactics used by individuals to manage the boundaries between work and home during lockdown (Kreiner et al., 2009), assuming a greater permeability of boundaries (Clark, 2000) than under "normal" conditions.

Table 4 Item means (*M*), item standard deviations (*SD*), analysis of variance and Cronbach's Alpha coefficients for the male and female subsamples

	Female (*n* = 378)			Male (*n* = 175)			t-test
	M	*SD*	α	*M*	*SD*	α	
Insomnia	2.84	1.00	0.70	2.57	0.97	0.66	$t(550) = 2.968, p < 0.01$
WFC	2.56	1.06	0.91	2.43	0.98	0.89	$t(550) = 1.331, p = 0.184$
Recovery	3.33	0.84	0.90	3.52	0.77	0.88	$t(551) = -2.606, p < 0.01$
Detachment	2.76	1.18	0.90	3.00	1.21	0.91	$t(551) = -2.231, p < 0.05$
Relax	3.67	1.09	0.93	3.78	0.98	0.91	$t(550) = -1.145, p = 0.253$
Mastery	3.17	1.06	0.84	3.43	0.97	0.82	$t(550) = -2.785, p < 0.01$
Control	3.72	1.08	0.89	3.88	0.96	0.86	$t(549) = -1.672, p = 0.095$
LMX	3.35	1.07	0.92	3.32	1.07	0.91	$t(548) = 0.262, p = 0.793$
Fr. Tech	2.37	0.99	0.88	2.35	1.00	0.89	$t(547) = 0.258, p = 0.797$

LMX Leader-Member Exchange, *WFC* Work-family conflict, *Fr. Tech* Frequency of receiving emails or phone calls outside of working hours

Fig. 2 Summary of results and coding processing

Themes		First-order codes	Samples reponses	
Temporal tactics	Segmentation	Retention of the classical working hours.	To be successful, I start at the same time as my work, take my breaks at the same time, and also take my lunch break so as not to mix my professional and personal work.	Work-family balance
		Regular and independent planning of personal breaks and time management.	I use the quiet in the morning for activities that require concentration, and for that phone or video calls and the afternoon for school follow-up of my daughters.	
	Integration	Hierarchization of priorities according to needs and flexible time management.	I organize my day according to the calls I have. I have to prepare lunch, follow my older son's homework, feed my younger son.	
		Absence of a specific temporal organization and/or completely emergency-dependent operation.	For example, my lunch breaks don't last that long because I've emergencies, I don't take frequent breaks.	
Physical tactics	Segmentation	Physical separation by an isolated space	My work space was defined from the start of the lockdown. I'm fortunate to be in a spacious house. A space for relaxation and communal living has been reserved in the house	Work-family balance
	Integration	Absence of a physically isolated space for work.	It is difficult to separate work and personal time because I live in a small apartment and the office is in the living room.	
Behavioural tactics	Segmentation	Inter-individual adjustment.	We exchange with my husband to schedule according to each other's availability to take care of the little one.	Work-family balance

In line with the literature (Kreiner et al., 2009), three types of boundary management tactics were identified: temporal, physical and behavioral. In contrast to Kreiner et al. (2009), no information on the use of communication tactics was provided by the remote workers. All tactics range from those that reinforce boundaries to those that weaken boundaries.

In terms of temporal tactics, four different types were identified. The first tactic involved around 15% of participants who reported repeating the same work routine during lockdown, successfully balancing work and non-work demands. Other participants (28% of the total) reported that they did not maintain the traditional work routine, but instead scheduled regular breaks, maintained an individualized schedule for completing work and family tasks, and maintained a separation between the two. In other cases (about 8%), and more often among men than women ($p < 0.001$), organization and scheduling were more variable and more regulated by situational variables such as work tasks and workload, which increased the likelihood of merging two domains. Finally, 1 in 10 remote workers reported that they were unable to balance work and family because there was no scheduling or scheduling was based on emergencies without adequate control of the situation. This critical aspect was more common among women than men ($p < 0.05$). Most responses included complaints about a job that was too demanding with a heavy workload and too many tasks to manage, as well as too many solicitations via technologies. Two women spontaneously stated that these multiple requests and cross-role interruptions triggered feelings of guilt.

In terms of managing physical boundaries and adapting related tactics, we identified two main profiles of remote workers: those who can benefit from having their own workspace (7% of participants) and those who cannot. Some participants, albeit few, specifically cited the lack of a separate workspace as a cause of WFC and the inability to use this tactic to separate work and family due to environmental constraints. These remote workers complained about the multiple demands of work and family leading to cross-role interruptions.

Finally, in terms of behavioral tactics, some participants, though few, reported that conflict risk was mainly resolved through interindividual adjustment and regulation thanks to partner support.

Discussion

The aim of this study was to improve the understanding of the balance between work and non-work (Allen et al., 2021) and some associated health outcomes by considering

environmental and personal variables. First, this study examined the relationships between recovery experiences, WFC, and insomnia symptoms in a sample of workers who had switched to remote work due to the pandemic. We considered three critical situational variables as antecedents: the role of frequency of receiving emails or calls outside working hours, the presence of children at home during lockdown, and remote supervision by a "good" leader. Second, we examined the tactics used by remote workers in juggling work and family during lockdown (Clark, 2000; Kreiner et al., 2009). In addition, the current context provided an opportunity to examine possible gender inequalities.

In detail, the results confirmed the first hypothesis (H1): The frequency of receiving emails or calls outside of work hours was (a) negatively related to recovery experiences and (b) positively related to WFC. Although new technologies enable many organizations to maintain business activities during lockdown, if not managed well, they can pose a risk to employee well-being (Ghislieri et al., 2022) by interfering with the recovery process (Derks et al., 2014) and increasing WFC (e.g., Ghislieri et al., 2017).

Furthermore, the results confirmed the second hypothesis (H2): The presence of children in the household is a source of resource depletion due to lack of recovery experiences and is related to WFC. As also evident from the qualitative findings, individuals' difficulties in reconciling the two spheres during the pandemic emergency appear to be related to the permeability and blurring of roles (Clark, 2000), which is exacerbated by childcare. Without proper management of the temporal, physical and psychological boundaries between the two spheres of life at an individual and organizational level, the difficulties of disengaging from work, focusing and recovering are greater, as is the risk of experiencing feelings of guilt, pressure, discomfort and WFC (Jostell & Hemlin, 2018).

On the other hand, the results also shed light on the positive role of leaders and partially confirm the third hypothesis (H3): LMX was positively related to recovery experiences and indirectly to WFC. This finding supports the fact that recovery is not an individual phenomenon related to the strategies of the individual, but an integrated element in a broader organizational context (Bennett et al., 2016; Sonnentag & Schiffner, 2019).

The results also confirmed the fourth hypothesis (H4) suggesting the importance of recovery experiences in the prevention of psychophysical well-being: recovery experiences mediate the relationship between (a) LMX, (b) frequency of receiving emails or calls outside working hours, (c) presence of children at home during lockdown and insomnia symptoms. The results partially confirmed the mediating role of WFC (H5): It mediated the relationship between (b) frequency of receiving emails or calls outside

working hours, (c) presence of children at home during confinement and insomnia symptoms, but no significant mediation was found for (a) LMX.

Finally, the results partially confirmed the sixth hypothesis (H6), as the pooled results confirmed gender inequalities (Shockley et al., 2021). Insomnia symptoms were more common in women, and conversely, recovery was lower compared to men. In particular, the quantitative results showed that women had more difficulty disengaging from work and finding other activities to restore the energy lost at work. Qualitative data can contribute to at least a partial explanation of the results: the perception of not being able to find balance because it is impossible to make plans or having to constantly adapt to emergencies seems to apply more to women than to men. We can hypothesize that women are more overwhelmed than men due to workload and overload (Eddleston & Mulki, 2017) and probably due to the persistence of beliefs about the roles of women and men. Further quantitative studies should be conducted to confirm these assumptions.

By merging the qualitative and quantitative data, we were able to show that the difficulties in implementing workers' preferred tactics go beyond individual workload, use of technology, living conditions (e.g., a small apartment and the constant presence of children), and gender inequalities in the context of a pandemic emergency. Consistent with other recent findings (Vayre & Pignault, 2014), the summary results showed that having a dedicated workspace, support from a partner to manage family responsibilities, and support from a supervisor at work had positive effects for remote workers. The lack of breaks during the working day and the inability to plan activities, which in the context of remote working is also related to the lack of physical, informal interaction and social isolation, were often associated with high workload and poorer work-life balance.

In summary, the results have shown that the quality of work-life balance and opportunities for recovery depend, at least in part, on an individual's ability to adopt effective tactics for managing work-life boundaries. However, the lack of appropriate tactics is not only related to individual preferences and abilities, but is also influenced by broader organizational issues. The misuse of technology, the quality of leadership (Lott & Abendroth, 2022) and the presence of an 'always-on' culture (McDowall & Kinman, 2017) can hinder the use of tactics that promote the separation of the two spheres and have potentially negative consequences for psychological well-being. The quality and health effects of remote work depend on both the resources activated by organizations and the remote workers themselves.

Limitation and future research

The study has some limitations. The first is its cross-sectional nature, which does not allow any causal conclusions to be drawn. This includes the fact that it is not able to capture day-to-day variations in variables such as recovery experiences or the frequency of receiving emails and phone calls outside working hours. Longitudinal or diary studies would be needed to overcome these weaknesses. In addition, the study included only self-report measures, whereas objective, physiological, or otherwise collected indicators might be useful to reduce the risk of common-method variance. Especially with regard to the use of the scale to measure insomnia, it might be better for future studies to use a scale that is more comprehensive (with a larger number of items) and has a higher internal consistency between items.

Another limitation relates to the sample, which includes employees from different sectors and working conditions. Observing the dynamics in the specific organizations examined in this study could help to identify more contextual practical implications. The generalizability of the results is also limited by the small sample size and the crisis situation in which the study was conducted.

We might also ask ourselves whether the mechanisms at work here, in particular the nature and role of management practices, would be identical in other cultures (close to French culture or, on the contrary, far removed from it). Finally, in our study we only considered remote workers who spent their lockdown with their relatives, but it would be interesting to also consider the point of view of those who lived alone.

In terms of variables, further limitations can be noted. Recovery was considered a unique construct; however, it would be interesting to investigate the role of different recovery experiences (Siltaloppi et al., 2011). In addition, a multilevel approach would be more appropriate for studying leadership qualities, and a measurement that can capture leadership characteristics in the specific context of home and remote work is needed. To fully understand the impact of teleworking on the professional domain but also on other life domains, further work should be conducted by adopting an approach based on triangulation methods and juxtaposing viewpoints (i.e. leadership, middle and local management, non-teleworkers within the organization, but also personal and family environments). Finally, by using a mixed methods approach, it is possible to compare and merge quantitative and qualitative results to develop a more complete analysis (Onwuegbuzie & Johnson, 2006; Johnson et al., 2007).

Conclusion

From a practical point of view, the results suggest that refraining from the use of technological devices for work purposes during non-work time, supervisor support, and the use of appropriate work-life balance strategies should help maintain the recovery process that impacts WFC and insomnia symptoms.

In particular, having a dedicated workspace, scheduling activities to delineate work hours, and renegotiating boundaries between work and "non-work" within the family unit are essential to work remotely under favorable conditions (Vayre & Pignault, 2014). As shown, some of these practices are not self-evident and require employers to implement skills and awareness through training, but also management support. In addition, developing a "work-life" organizational and managerial culture that takes parenthood into account, supports practices compatible with professional equality, and aims to avoid dissymmetry between different life domains is a critical success factor for remote work (Vayre & Pignault, 2014) In addition, managers themselves should switch off from work to set a good example or at least be able to protect employees from the contagion effect (Sonnentag & Schiffner, 2019) and communicate clearly about the need to refrain from constant connectivity in order to recover (Schlachter et al., 2018; Sonnentag & Schiffner, 2019). These recommendations are all the more important as the management styles and organizational cultures in many countries, particularly in France, which are based on bureaucratic organizations, presenteeism and control, are likely to exacerbate the potentially harmful effects of teleworking (Ghislieri et al., 2022). "Always-on cultures" generate a mechanism of control and normative pressure internalized by managers and colleagues and likely reinforce the phenomenon of over-commitment of remote workers (Bathini & Kandathil, 2019). Conversely, organizational cultures based on norms and values that promote work-life balance are more conducive to the successful deployment of remote working (Beham et al., 2015).

Promoting work-life balance policies and measures is also a way to encourage men and women to share domestic and parental responsibilities equally. Remote work enforced by regulations on boundaries and physical distance warns us of the risk of regression in gender equality, and the remote work of the future must not hinder efforts to promote diversity and inclusion in work organizations.

Declarations

The present study involved human participants in accordance with the Declaration of Helsinki (World Medical Association, 2001): No treatments or other procedures were performed that could affect the psychological or social well-being of the participants. The research project was approved by the Bioethics Committee of the University of Turin (Document No. 150561, April 03, 2020). Participation in the current study was voluntary and not associated with any reward, and data confidentiality was emphasized when subjects were contacted. Informed consent was obtained from all individual participants included in the study. No funds, grants, or other support was received. The authors have no relevant financial or non-financial interests to disclose.

Ethics approval The research project was approved by the Bioethics Committee of the University of Turin (Document No. 150561, April 03, 2020).

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