

Covid-19 created a gender gap in perceived work productivity and job satisfaction: implications for dual-career parents working from home

Gender gap in
perceived
work
productivity

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Abstract

Purpose – This paper aims to examine gender gaps in work-related outcomes in the context of Covid-19. The authors hypothesized that the Covid-19 pandemic would create a gender gap in perceived work productivity and job satisfaction. This is because when couples are working from home the whole day and when schools are closed, women are expected to devote more time to housework and childcare.

Design/methodology/approach – The authors used a sample of employed women and men from dual-career families who were working from home since Covid-19 lockdowns started. In total, 286 US-resident full-time employees participated in this study. Participants were asked to report their work productivity and job satisfaction before and since Covid-19 lockdowns.

Findings – It is found that before the Covid-19 pandemic, there were no gender differences in self-rated work productivity and job satisfaction. However, during the lockdown, women reported lower work productivity and job satisfaction than men.

Research limitations/implications – Participants retrospectively reported their work productivity and job satisfaction before Covid-19. However, there are unlikely to be systematic gender differences in retrospective reports of these measures. Further, the authors only sampled opposite-sex dual career parents. Future research needs to examine the effects of lockdowns on women and men in other types of households.

Practical implications – Given the nature of the Covid-19 pandemic, many regions might experience multiple periods of lockdown, and many workplaces have already adopted or are likely to adopt long-term work-from-home policies. The findings indicate that these long-term changes in the workplace might have long-term negative effects on women's perceived productivity and job-satisfaction in dual-career families.

Social implications – The findings suggest that society needs provide additional support to women working from home and taking care of children or other dependents, particularly during lockdowns or during times when schools and daycare centers are closed.



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Originality/value – The current research is one of the first to claim that despite the greater amount of time that women spend in housework and childcare than men, during normal times, they are as productive and as satisfied with their job as men. However, the Covid-19 pandemic increased women's housework and childcare beyond a threshold, thereby creating a gender gap in work productivity and job satisfaction.

Keywords Telecommuting, Gender gap, Job satisfaction, Covid-19, Work productivity

Paper type Research paper

Introduction

As soon as she began planning to work from home, Saba Lurie knew she would need to make major adjustments in how she operates her private psychotherapy practice, from counseling patients through a screen to managing her staff remotely. She also quickly realized that, because her husband earns a higher salary, the bulk of the domestic work would fall on her. The aggravations added up quickly: Her bathroom became an emergency office. "It's the one place I can close the door and lock it," she said. Her husband, unaccustomed to balancing his workday schedule with hers, forgot to tell her about some of his conference calls, leaving Ms. Lurie scrambling to figure out how to tend to their two daughters, ages 4 and 1[. . .].

—The New York Times (Medina and Lerer, 2020)

We are almost seven weeks into the lockdown and we will be into the lockdown for a few more weeks. And I'm sure most of them are working mothers multitasking – juggling between household chores, travelling between office work managing kids, managing their studies, cooking, baking, cleaning, mopping, and everything. In the first few days, all the family members came together and said that "oh now that we are in the household together, we are going to help each other and we are going to distribute work and all" but all the euphoria, believe me, has died down and the ownership is back on us, to take care of many of the things if not all.

—Rachana Lokhande, Co-CEO of Kinetic India (Sharma, 2020)

There are continued gender gaps in the workplace and at home. At work, *women* get paid less and receive fewer promotions than men (Bolotnyy and Emanuel, 2018; Fransen *et al.*, 2012; Ibarra *et al.*, 2010); they are also underrepresented in corporate leadership positions (Acker, 2006; Cook and Glass, 2014; Glass and Cook, 2016). At home, women spend more time on domestic tasks such as housework and childcare (Geist, 2010). Although these gender gaps might suggest lowered work productivity and job satisfaction in women compared to men, the literature documents little or no gender differences in these work-related outcomes (Aryee *et al.*, 2005; Banerjee and Perrucci, 2010; Bönthe and Krabel, 2014; Robb and Watson, 2012; Roth *et al.*, 2012; Westover, 2012). This is arguably because women draw help from various sources (e.g. childcare facilities), to deal with housework and childcare without sacrificing their work productivity and job satisfaction (cf. Aryee *et al.*, 2005; Chung and Van der Horst, 2018; Chung and Van der Lippe, 2018; Etzion, 1984). Indeed, governments in many countries have initiated work–life balance programs to help women juggle work and family (NFAW, 2017; OECD, 2017; Phua, 2020), thereby narrowing gender gaps in job-related outcomes among working parents.

With the outbreak of Covid-19 pandemic, however, we predicted that a gender gap would emerge among dual-career parents given the sudden increase in housework and childcare. To contain the Covid-19 pandemic, many countries instituted lockdowns (Kraemer *et al.*, 2020; Maier and Brockmann, 2020). That is, all people working in non-essential jobs were ordered to stay at home at all times, allowing only a small percentage of employees in essential services (e.g. food, healthcare, delivery) to go to work. Most or all schools were closed, and children's learning moved online. Companies instituted work-from-home policies

for all employees whose work could be completed remotely. Therefore, given the closure of schools and childcare facilities during lockdowns, professional working parents working from home would also have to take care of their children during office hours.

Although telecommuting practices typically provide more flexibility (Gajendran and Harrison, 2007, p. 1524), they can give rise to more housework – particularly during the Covid-19 pandemic. Given that all family members are now staying home the entire day, the house would likely become more unkempt with everyone eating and playing at home (Chowdhury, 2020; Frazier, 2020). Due to the unavailability of domestic help, couples who were before fortunate enough to hire domestic help would now have to do all the domestic work themselves (Chowdhury, 2020). Given the closure of schools, daycare centers and the restriction of house visits by nannies, the situation is made even more difficult for working parents, who now also have to take care of their children while juggling daily work tasks. For affected families, parental burnout is a common outcome arising from managing the logistics and time commitment of home schooling and distance learning (Grose, 2020).

In a gender-equal world, the additional housework and childcare created by Covid-19 lockdowns would be equally shouldered by men and women. Yet as the opening quotes suggest, the newly created housework and childcare are likely to primarily fall on women. This is consistent with gender role theory (Bem, 1993; Gutek *et al.*, 1991), which posits that society defines the family role as central to women's but not men's social identity. These societal norms, in turn, lead women to shoulder a substantial majority of housework and childcare. Drawing on gender role theory, we propose that although under normal circumstances, women can handle a bigger share of housework and childcare than men without experiencing a decline in their self-reported work productivity and job satisfaction, the additional housework and childcare created by Covid-19 would push them beyond their threshold, and therefore create a gender gap in perceived work productivity and job satisfaction. Specifically, we hypothesize that before the Covid-19 pandemic, there would be no gender gap in perceived work productivity and job satisfaction. Conversely, during the Covid-19 pandemic, women would have lower perceived work productivity and job satisfaction than men.

Our study makes several contributions to the literature. First, we contribute to the gender gap literature by identifying work-from-home practices as a novel factor that can affect gender gaps in work-related outcomes. Whereas prior research has shown little or no gender differences in work outcomes such as work productivity and job satisfaction (Aryee *et al.*, 2005; Banerjee and Perrucci, 2010; Bönte and Krabel, 2014; Robb and Watson, 2012; Roth *et al.*, 2012; Westover, 2012), our study documents that a gender gap is created when dual-career parents are both working from home and schools are closed during the Covid-19 pandemic. By investigating the effect of Covid-19 on gender gaps in work outcomes, our study advances a nuanced understanding of gender disparity in the workplace. Furthermore, it cautions managers and policy makers about unexpected consequences of lockdowns on work-related outcomes.

Second, we contribute to the work-family interface literature by uncovering a novel method – cross-setting approach – to examine how family interferes with work. Prior research on this topic has mainly adopted a between-setting approach to investigate the interference between family and work (Demerouti *et al.*, 2007; Major *et al.*, 2002; Valcour, 2007; Casper *et al.*, 2007, for discussions). That is, researchers have examined work-family interference while assuming that the work setting and the family setting are separate and thus do not closely interface within an overarching setting. Departing from this approach, our study examines work-family interference using a cross-setting approach, wherein the work setting and the family setting interface closely within the work-from-home

environment. Given continued lockdowns and given the long-run work-from-home policies instituted by many organizations, this overlap and interference between the work setting and home setting is likely to dramatically increase in the near future.

Third, we contribute to the telecommuting literature by identifying gender and Covid-19 as boundary factors for the beneficial effects of telecommuting. To cater to changing environments and labor needs (Igbaria and Guimaraes, 1999), more and more organizations have employed telecommuting practices that provide employees with more flexibilities to juggle between work and life (Gajendran and Harrison, 2007). Extant research has found that telecommuting has positive consequences for employees, such as enhanced fit between work and family life, increased control over work demands and lower work-family conflict (Gajendran and Harrison, 2007; Golden *et al.*, 2006; Kugelmass, 1995; Rau and Hyland, 2002). Our study, however, demonstrates that telecommuting during lockdowns can be particularly harmful for women in dual-career families. This finding provides a more nuanced understanding of the unintended consequences of telecommuting while also answering the call by researchers to explore boundary factors for the beneficial effects of telecommuting on employees (Allen *et al.*, 2015). Moreover, our study suggests to managers that telecommuting is not universally beneficial for all types of employees. All employees are likely to welcome telecommuting as an option. However, if the entire office is asked to work from home in the long run, managers need to consider the possibility of differential effects on different segments of employees.

Theoretical grounding and hypothesis development

Gender gap in work outcomes

Extensive research has documented the gender gap in various work domains. Because of discrimination (Moss-Racusin *et al.*, 2012; Steinpreis *et al.*, 1999), and other factors such as higher performance standards (Lyness and Heilman, 2006) and lack of career mentoring (Blake-Beard, 2001; Hoobler *et al.*, 2014), women are often underrepresented in leadership roles (Hoyt, 2010; Schuh *et al.*, 2014). Women on average earn considerably less than men (Blau and Kahn, 2003, 2007). Most recently, for every \$1 that men earn, women earn 82 cents for the same job (U.S. Census Bureau, 2019). In the family domain, despite a narrowing gender gap over the past half century, women in dual-career families still take on a majority of household chores and childcare work (Geist, 2010).

These gender gaps in work and family domains would lead to the expectation that women would have lower perceived work productivity and job satisfaction than men because their higher household demands would interfere with work. However, the research has documented little to no gender differences in work outcomes such as work productivity and job satisfaction (Aryee *et al.*, 2005; Banerjee and Perrucci, 2010; Bönthe and Krabel, 2014; Robb and Watson, 2012; Roth *et al.*, 2012; Westover, 2012). The lack of a gender gap in these work outcomes suggests that women simply accomplish more work than men in the same amount of time, often by sacrificing their leisure time (Mattingly and Blanchi, 2003).

We propose that natural disasters, such as the Covid-19 pandemic, can upend women's ability to balance their office work and household work, particularly in dual-career households, and therefore, make gender parity in work productivity and job satisfaction hard to sustain. This problem is particularly acute for working mothers. They have the added struggle of juggling between organizational expectation for professional employees to work from home and the need to take care of their children at home during working hours as most schools and daycare facilities are closed during Covid-19 lockdowns. Given that Covid-19 is unlikely to be contained in the near future, working from home is likely to become a new norm for many organizations (Haag, 2020).

Influence of the Covid-19 pandemic on the gender gap

Lockdowns during the Covid-19 pandemic blur the line between workplace and home for many professionals. Given the effectiveness of lockdowns in curbing the spread of the SARS-CoV-2 virus (Kupferschmidt and Cohen, 2020), many countries and states have issued stay-at-home orders to halt the transmission of the virus (Kraemer *et al.*, 2020; Maier and Brockmann, 2020). During lockdowns, people are required to stay at their home at all times, with only those who work in essential industries (e.g. health care, food, public transportation and utilities) allowed to work on site. While employees whose jobs could not be conducted from home (e.g. factory workers, retail workers) were out of work, employees whose work could be conducted from home (e.g. most professionals) were asked to continue working from home. Because working from home allows work to seep into home life, it blurs the boundary between work and family, thus increasing work-family interference (Noonan and Glass, 2012).

Drawing on gender role theory (Bem, 1993; Gutek *et al.*, 1991), we propose that the work-family interference due to working from home during the Covid-19 pandemic would be particularly detrimental for women in heterosexual dual-career families. This would consequently create a gender gap in perceived work productivity and job satisfaction. Gender role theory argues that women are more likely than men to perceive the role of a family member as central to their identity (Bem, 1993; Gutek *et al.*, 1991). Even as more women enter the workplace over the past century, society still expects them to fulfill their family role (Hochschild, 1999; Schor, 1991). As suggested by Stephanie Coontz, a historian of family studies, people have been socialized over hundreds of years to expect women to take on the bulk of family responsibilities without even talking about it. She argued that the outbreak of Covid-19 pandemic brought forward this fact more starkly than in the past (McCarthy *et al.*, 2020, for details). Indeed, both research and popular press articles have revealed that in times of crises, women take on the majority of family work even when both couples are working full time (Billhult and Segesten, 2003; Strauss, 2020).

Working from home gives rise to “additional family demands resulting from greater proximity and accessibility” (Golden *et al.*, 2006, p. 1340). That is, if employees are at home the whole day, others at home will make more demands on their time, attention and affection. Moreover, working from home and eating at home will undoubtedly create additional housework in terms of additional grocery shopping, cooking, and cleaning. As men have started contributing more to housework over the past few decades (Altintas and Sullivan, 2017; Coltrane and Adams, 2008), it is theoretically possible that men might take on all the additional housework created due to working from home. Yet given gender role theory, we do not expect this to happen. Instead, the increased housework might – at best – be equally divided between women and men (Kan, 2008). Yet, even in this situation, given that women are already shouldering a majority of the housework and childcare, the additional time and energy spent on housework might be particularly detrimental for women. More specifically, although women can handle, say, an additional hour or two of housework each day than men by sacrificing their leisure time and without affecting work, an additional hour or two of housework on top of that might exceed a critical threshold and end up interfering with women’s work. However, as men spend less time on housework to begin with, an additional hour or two of housework might not have as big of a negative effect on their work. Consistent with our arguments, when work–family interference is high, women are more likely than men to experience lower work productivity and job satisfaction (Bruck *et al.*, 2002; Grandey *et al.*, 2005; Hunter and Leahey, 2010; Kossek and Ozeki, 1998). Therefore, we hypothesize the following:

- H1. The gender gap in perceived work productivity will be bigger after the start of the Covid-19 pandemic, such that women will have lower perceived work productivity than men during the Covid-19 pandemic but not before the Covid-19 pandemic.
- H2. The gender gap in job satisfaction will be bigger after the start of the Covid-19 pandemic, such that women will have lower job satisfaction than men during the Covid-19 pandemic but not before the Covid-19 pandemic.

Method

Participants and procedures

The study was conducted between April 15, 2020 and May 4, 2020, when a lockdown was instituted in most of the USA. We posted a survey on Amazon's Mechanical Turk (MTurk), seeking 300 US-resident full-time employees who were living with a romantic partner, and whose partner was also employed full-time. Participants and their partners had to be employed both before and after the Covid-19 pandemic, and both had to be working from home at the time of the study (see [Appendix](#) for the screening questions).

MTurk is an appropriate source of participants as participants recruited on this platform are more diverse in terms of demographics such as age, race and countries than traditional convenience samples, and findings obtained from MTurk samples are typically similar to those obtained from other samples, such as standard internet samples and typical American college samples ([Buhrmester et al., 2011](#); [Yuan et al., 2018](#)). Further, a meta-analytic study found that conventional data collection sources and online panels (including MTurk) are of comparable quality. To ensure the quality of our sample, we set up several prerequisites, such as requiring participants to have a minimum of 97% approval rate, automatically excluding IP addresses outside the USA, and preventing participants with identical MTurk IDs from taking our survey. In addition, we included several attention-check questions at the beginning of our survey ([Appendix](#)), and excluded participants who failed them.

Overall, we received 286 usable responses (i.e. participants who passed our attention checks and completed the survey; $M_{\text{age}} = 38.35$, $SD_{\text{age}} = 9.61$; 49.3% women; $M_{\text{organizational tenure}} = 8.37$, $SD_{\text{organizational tenure}} = 24.17$; 29.4% hold a middle-management position in the organization). In the survey, participants were asked to rate their work productivity and job satisfaction both before and after the Covid-19 pandemic, as well as answer a few demographic questions. Although we did not specifically select parents, all our participants had children living at home ($M = 2.37$ children, $SD = 1.05$, range 1 to 7).

Both men and women reported spending more hours per day on housework and childcare during Covid-19 than before Covid-19; however, the increase was about 27% larger for women ($M_{\text{before}} = 4.37$, $SD_{\text{before}} = 3.96$, $M_{\text{after}} = 6.93$, $SD_{\text{after}} = 5.32$, increase = 2.56 h; $t(140) = 7.95$, $p < 0.001$) than for men ($M_{\text{before}} = 3.60$, $SD_{\text{before}} = 3.45$, $M_{\text{after}} = 5.61$, $SD_{\text{after}} = 4.64$, increase = 2.01 h; $t(144) = 6.84$, $p < 0.001$). Although the hours spent on housework increased similarly for men and women, women reported spending more hours than men on both occasions. Further, extensive research shows that men over-report their hours spent on housework ([Geist, 2010](#); [Kan, 2008](#); [South and Spitze, 1994](#)), so these self-reported findings likely under-estimate the actual gender gap in the hours spent on housework and childcare.

Measures

Perceived work productivity. We measured participants' work productivity using [Riordan and Shore's \(1997\)](#) work group productivity scale. As the original four-item scale was used to evaluate employees' perceptions of their work group's productivity, we modified this scale to assess participants' perceptions of their own work productivity. We also dropped

one item that was not applicable to our research context (i.e. “Most of the time my work group cuts unnecessary costs whenever possible”). Participants were asked to rate their work productivity before (“Before the Covid-19 pandemic, most of the time I tried new ways to improve my productivity”, “Before the Covid-19 pandemic, most of the time I produced high-quality work” and “Before the Covid-19 pandemic, most of the time I worked efficiently”; $\alpha = 0.74$) and during the Covid-19 pandemic (e.g. “Right now, most of the time I try new ways to improve productivity”; $\alpha = 0.81$). They were asked to respond on a seven-point scale ranging from “1 = strongly disagree” to “7 = strongly agree”.

Job satisfaction. We measured participants’ job satisfaction with a four-item scale developed by Spector (1997). Participants were asked to rate their job satisfaction before (“Before the Covid-19 pandemic, I felt my job was meaningful”, “Before the Covid-19 pandemic, I liked doing the things I did at work”, “Before the Covid-19 pandemic, I felt a sense of pride in doing my job”, and “Before the Covid-19 pandemic, my job was enjoyable”; $\alpha = 0.92$) and during the Covid-19 pandemic (e.g. “Right now, I feel my job is meaningful”; $\alpha = 0.92$). They were asked to respond on a seven-point scale ranging from “1 = strongly disagree” to “7 = strongly agree”.

Control variable. Given number of children influences working parents’ productivity and job satisfaction (Fox, 2005; Hunter and Leahey, 2010; Roxburgh, 1999), we controlled this variable in our analyses to rule out its confounding effect on our results. We measured number of children by asking participants to answer the question: “How many children are living with you right now?”.

Results

The descriptive statistics, correlations, and reliabilities for the variables included in our study are displayed in Table 1. To test *H1*, we conducted a 2 (before versus during the Covid-19 pandemic) \times 2 (men versus women) repeated measures ANCOVA on perceived work productivity, with number of children included as a covariate. As shown in Table 2, we found a significant interaction, $F(1, 301) = 5.12, p = 0.024, \eta^2 = 0.018$. We conducted contrast analyses to interpret the interaction. Before the Covid-19 pandemic, women’s perceived work productivity ($M = 5.85, 95\% \text{ CI } [5.69, 6.02], SD = 0.96$) was as high as men’s ($M = 5.94, 95\% \text{ CI } [5.82, 6.06], SD = 0.77$), $t(284) = 0.82, p = 0.411$; Cohen’s $d = 0.10, 95\% \text{ CI } [-0.003, 0.20]$; however, during the Covid-19 pandemic, women ($M = 5.25, 95\% \text{ CI } [5.04, 5.46], SD = 1.26$) were less productive than men ($M = 5.63, 95\% \text{ CI } [5.47, 5.80], SD = 1.02$), $t(284) = 2.84, p = 0.005$; Cohen’s $d = 0.34, 95\% \text{ CI } [0.21, 0.47]$. Therefore, these results support *H1* that the Covid-19 pandemic created a gender gap in perceived work productivity.

We conducted similar repeated measures ANCOVA on job satisfaction to test *H2*. As shown in Table 2, the interaction between phase (i.e. before versus during the Covid-19

| Variables | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 |
|--|----------|-----------|--------|-------------|----------------|----------------|----------------|---|
| 1. Gender | 0.51 | 0.50 | | | | | | |
| 2. Number of children | 2.37 | 1.05 | 0.07 | | | | | |
| 3. Perceived work productivity (before Covid-19) | 5.89 | 0.87 | 0.05 | 0.07 (0.75) | | | | |
| 4. Perceived work productivity (during Covid-19) | 5.44 | 1.16 | 0.17** | 0.07 | 0.43*** (0.82) | | | |
| 5. Job satisfaction (before Covid-19) | 5.69 | 1.10 | -0.01 | 0.05 | 0.43*** | 0.28*** (0.92) | | |
| 6. Job satisfaction (during Covid-19) | 5.25 | 1.35 | 0.12* | 0.05 | 0.23*** | 0.55*** | 0.63*** (0.92) | |

Table 1.
Means, standard
deviations,
reliabilities and
correlations among
variables

Notes: $N = 286$. Reliability estimates (Cronbach’s alpha) are presented along the diagonal in parentheses (based on data with gibberish exclusion); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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pandemic) and gender was significant, $F(1, 301) = 7.51, p = 0.007, \eta^2 = 0.026$. We performed contrast analyses to interpret the interaction. Before the Covid-19 pandemic, women ($M = 5.70, 95\% \text{ CI } [5.51, 5.88], SD = 1.06$) were as satisfied with job as men ($M = 5.68, 95\% \text{ CI } [5.49, 5.86], SD = 1.15$), $t(284) = 0.13, p = 0.893$; Cohen's $d = 0.02, 95\% \text{ CI } [-0.11, 0.14]$; however, during the Covid-19 pandemic, women ($M = 5.08, 95\% \text{ CI } [4.83, 5.31], SD = 1.39$) were less satisfied with job than men ($M = 5.41, 95\% \text{ CI } [5.20, 5.62], SD = 1.28$), $t(284) = 2.09, p = 0.038$; Cohen's $d = 0.25, 95\% \text{ CI } [0.09, 0.40]$. Thus, these results support $H2$ that the Covid-19 pandemic created a gender gap in job satisfaction.

Our results remain statistically indistinguishable even when we do not control for the number of children. See [Table 3](#) for details.

Discussion

Although the extant literature documented little to no gender differences in job performance and job satisfaction, we found that a gender gap in these outcomes emerges when dual-career parents are working from home and do not have access to childcare services. Using a sample of full-time employees who were living with an opposite-sex partner and at least one child, and whose partner was also employed full-time, we found support for our hypothesis. Specifically, the Covid-19 pandemic brought about a gender gap in perceived work productivity and job satisfaction. While women reported similar work productivity and job satisfaction as men before the pandemic, women were less productive and less satisfied with job than men after the outbreak. Overall, these findings offer important theoretical and practical implications and also provide valuable directions for future research.

Table 2. Repeated measures ANCOVA results for perceived work productivity and job satisfaction after controlling for number of children

| Variables | <i>df</i> | Mean square | <i>F</i> | η^2 |
|------------------------------------|-----------|-------------|----------|----------|
| <i>Perceived work productivity</i> | | | | |
| Phase | 1 | 5.69 | 9.28** | 0.032 |
| Phase \times number of children | 1 | 0.05 | 0.09 | 0.000 |
| Phase \times gender | 1 | 3.14 | 5.12* | 0.018 |
| <i>Job satisfaction</i> | | | | |
| Phase | 1 | 4.47 | 7.78** | 0.027 |
| Phase \times number of children | 1 | 0.00 | 0.00 | 0.000 |
| Phase \times gender | 1 | 4.32 | 7.51** | 0.026 |

Notes: Phase indicates before versus during the Covid-19 pandemic; * $p < 0.05$, ** $p < 0.01$

Table 3. Repeated measures ANOVA results for perceived work productivity and job satisfaction without controlling for number of children

| Variables | <i>df</i> | Mean square | <i>F</i> | η^2 |
|------------------------------------|-----------|-------------|----------|----------|
| <i>Perceived work productivity</i> | | | | |
| Phase | 1 | 29.36 | 48.08*** | 0.145 |
| Phase \times gender | 1 | 3.20 | 5.25* | 0.018 |
| <i>Job satisfaction</i> | | | | |
| Phase | 1 | 28.28 | 49.35*** | 0.148 |
| Phase \times gender | 1 | 4.33 | 7.56** | 0.026 |

Notes: Phase indicates before versus during the Covid-19 pandemic; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Theoretical implications

First and foremost, our study contributes to the gender gap literature. Past research has documented that while there are wide gender gaps in the domains of leadership position and work pay (Blau and Kahn, 2003, 2007; Hoyt, 2010; Schuh *et al.*, 2014), there are little to no gender gaps in work-related outcomes, such as job performance and job satisfaction (Aryee *et al.*, 2005; Banerjee and Perrucci, 2010; Bönthe and Krabel, 2014; Robb and Watson, 2012; Roth *et al.*, 2012; Westover, 2012). However, these findings were obtained under normal circumstances. We found that in times of crises like the Covid-19 pandemic, work-from-home orders and lack of childcare services create a gender gap in both work productivity and job satisfaction in dual-career families. Our research therefore advances the field's understanding of how novel factors, such as the Covid-19 pandemic in general and working-from-home practices in particular, influence gender differences in work outcomes such as work productivity and job satisfaction.

Furthermore, given the likelihood of repeated waves of the pandemic, and given that firms enjoy lower real estate costs if employees work from home, it is likely for the widespread work-from-home policies instituted to become the norm. Indeed, many organizations, such as Twitter Inc., have already announced indefinite work-from-home policies. Dozens of other large companies have also declared that employees can work from home indefinitely (Kelly, 2020). More generally, remote working arrangements are likely to be quickly adopted during other crises and natural disasters, as long as people have electricity. Our findings suggest that these shifts in the workplace can reverse the trends toward greater gender equality in a number of work domains. Thus, the current findings have implications that go well beyond Covid-19.

Second, our study contributes to the work-family interface literature. The extant work-family interface research has primarily employed a *between-setting approach* to examine how family and work interfere with each other (Demerouti *et al.*, 2007; Major *et al.*, 2002; Valcour, 2007). For instance, when investigating the interference of work with family and its consequent effect on people's distress, researchers took a retrospective method by asking people to recall how their work interferes with their family lives and then to report their experienced distress (Major *et al.*, 2002). This method is limited in that people's experienced work-family interference happens in two separate settings, namely, the work setting and the family setting, which do not closely interface within an overarching setting. Given the nature of close interfaces embedded in the construct of work-family interference, we depart from the extant literature by adopting a novel *cross-setting approach* to examine the interfaces between work and family. Specifically, our research investigates how people's work experiences are influenced when they are in a mode of working from home, whereby the work setting and the family setting interface closely within the telecommuting environment.

Third, our study contributes to the telecommuting literature. The extant literature has primarily documented the benefits of working from home for employees, such as increased fit between work and family life, greater control over work demands and lower work-family conflict (Gajendran and Harrison, 2007; Golden *et al.*, 2006; Kugelmass, 1995; Rau and Hyland, 2002). However, our findings provide a more nuanced understanding of the differential consequences of telecommuting on employees of different genders, such that women might be less likely than men to benefit from telecommuting during times of crises. By identifying gender as an important boundary factor that influences the efficacy of work-from-home arrangements during the Covid-19 pandemic, our study also answers the recent call for more research on exploring boundary factors for the beneficial effects of telecommuting on employees (Allen *et al.*, 2015). Moreover, given that companies are

increasingly embracing telecommuting work arrangements for even after Covid-19 lockdowns are lifted, our study highlights that future research needs to consider the possibility of differential effects of telecommuting on different segments of employees.

Limitations and future directions

In spite of these theoretical contributions, our study has a number of limitations that also provide opportunities for future research. First, we used the retrospective method to assess people's work productivity and job satisfaction before Covid-19. It is possible that people's retrospective reports of their work productivity and job satisfaction might not be reliable and accurate. People are likely to forget what happened in their past and may also reinvent the past to cater to their current needs and goals (Ross, 1989; Squire, 1989). However, prior research has found that the validity of retrospective data is particularly problematic when researchers seek retrospective reports about psychological states, event frequencies and event dates (Henry *et al.*, 1994). On the contrary, our retrospective reports about past work productivity and job satisfaction do not fall into these categories. Moreover, due to the unexpected occurrence of Covid-19, it was not possible to plan a before-after study with Covid-19 lockdowns intervening in between. Further, these limitations apply uniformly across gender and would not predict the before-during Covid-19 \times gender interaction that we found in our results. Thus, this limitation is unlikely to undermine our key findings.

Second, we asked for participants' self-report on their work productivity. The main concern about self-report data lies in that people might not provide accurate ratings of work productivity due to their social desirability bias (Chung and Monroe, 2003). Nevertheless, prior research shows that the influence of social desirability on self-reports is limited (Moorman and Podsakoff, 1992; Ones *et al.*, 1996; Spector, 2006). Further, we focused on a subjective rather than an objective measure of work productivity for several reasons. First, when people are working from home during lockdowns, their objective work productivity cannot be easily discerned by other people, such as their supervisor. For example, an employee might finish their task for the day, but might take either 6 or 10 h to do so, and their supervisor is unlikely to be aware of the exact hours that the employee was working on the task. Moreover, research suggests that managerial ratings of performance might be equally biased as self-ratings of performance (Levy and Williams, 2004). Second, although employees' perceived work productivity might not perfectly capture their actual work productivity because their perceptions may be biased, perceived work productivity has been demonstrated to be a reliable and valid measure of work performance (Baruch, 1996). Self-rated productivity has also been widely used in research on telecommuting (Baker *et al.*, 2007; Baruch, 2000; Duxbury *et al.*, 1998). Third, self-rated work productivity is highly correlated with objective measures of work productivity ($0.38 < r < 0.65$; Boroom and Ramsey, 1995; Forth and McNabb, 2008). For these reasons, people themselves are a good source of assessing their work productivity during lockdowns. However, future research can collect more objective data about employee work productivity. For example, scholars can ask companies that institute work-from-home arrangements to develop remote tracking systems so as to record their employees' work productivity.

Third, our study focuses on heterosexual dual-career couples with children. Although there has been a rapid increase in the proportion of dual-earner families, it is also important to examine gender gaps in other types of households. For instance, although our sample consisted of parents, future research can examine couples without children. The overall increase in housework due to lockdowns is likely to be smaller in such households, but it is likely that most of that increase would be borne by women, and thus we would expect similar gender gaps in work outcomes. Further, recent years have seen a growing trend in

the proportion of women-breadwinner families in which the wife earns more than the husband, or the wife is employed, whereas husband is unemployed (Blom and Hewitt, 2020). Future research can examine whether men are more likely to take on the extra housework and childcare in such families, thereby stalling drops in women's work outcomes, or whether women in such families still end up experiencing a drop in work outcomes given the overall increase in housework and childcare. Finally, research can also examine the effects of adults living with roommates, flatmates or family. Although these arrangements involve less interdependence than romantic partnerships, it is likely that women might end up shouldering more work even in such situations. For example, past work has found that adult men living at home increase their mother's but not their father's housework (indicating that they do not do their fair share of housework), whereas adult women reduce both parents' housework (indicating that they do more than their fair share of housework; South and Spitze, 1994). Future research can test whether these dynamics might be exacerbated during times of crises.

Finally, it is possible that Covid-19 lockdowns were particularly detrimental to women because schools and childcare centers were closed. What will happen if schools and childcare centres reopen while employees are still working from home? Although couples would have to spend overall less time on housework and childcare in such a situation, it is likely that overall housework would increase if couples are staying at home the whole day and taking meals at home. This extra burden is likely to fall on women, meaning their work outcomes can suffer even in the absence of extra childcare. Future research can examine this question once schools and childcare centres reopen while most offices are still closed.

Practical implications

Our study has implications for managerial practices. We have demonstrated that women suffer more than men when working parents are working from home during the Covid-19 lockdowns. This finding suggests that when managers institute work-from-home practices, they should consider the differential effects of this work mode on male and female employees. Given the gender gap in productivity and job satisfaction during working from home, organizations should provide more support (e.g. flexible work assignment, flexible deadlines and social support) to female employees to help relieve the pressure brought about by the telecommuting work mode.

Overall, our research suggests that unexpected crises can create a gender gap in work outcomes when none existed previously. Given that the Covid-19 pandemic is unlikely to be resolved in the near future, the gender gaps that we identified are likely to persist. Even after the pandemic, if organizations adopt widespread work-from-home policies, such gender gaps might continue to persist. More broadly, decades-long trends toward gender equality in the workplace might be reversed due to these changes. Our research suggests that management researchers and practitioners need to pay careful attention to this issue.

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Appendix

Attention-check questions:

- (1) Which of the following words is most related to "moody"?
 - Distant
 - Stable
 - Fantastic
 - Emotional
- (2) Which of the following words is most related to "distracted"?
 - Thoughtful
 - Unfocused
 - Generous
 - Beautiful
- (3) Which of the following words is most related to "persevere"?
 - Persist
 - Tame
 - Forgetful
 - Lucky
- (4) Which of the following words is most related to "sympathy"?
 - Compassion
 - Sociable
 - Trustful
 - Honest

Screening questions:

Gender gap in
perceived
work
productivity

- (1) What was your work status before the Covid-19 pandemic?
 - Student working part-time
 - Student not currently working
 - Working full-time for a company (35 h or more per week)
 - Working part-time for a company (less than 35 h per week)
 - Self-employed working full-time
 - Self-employed working part-time
 - Unemployed
 - Other

(Note: Only Options 3–6 qualify)
- (2) Do you have a spouse/romantic partner/significant other?
 - No, don't have one
 - Yes, but NOT currently living with me right now
 - Yes, and currently living with me right now

(Note: Only Option 3 qualifies)
- (3) What was your spouse's/romantic partner's/significant other's work status before the Covid-19 pandemic?
 - Student working part-time
 - Student not currently working
 - Working full-time for a company (35 h or more per week)
 - Working part-time for a company (less than 35 h per week)
 - Self-employed working full-time
 - Self-employed working part-time
 - Unemployed
 - Other

(Note: Only Options 3–6 qualify)
- (4) What is your spouse's/romantic partner's/significant other's work status right now?
 - Student working part-time
 - Student not currently working
 - Working full-time for a company (35 hours or more per week)
 - Working part-time for a company (less than 35 hours per week)
 - Self-employed working full-time
 - Self-employed working part-time
 - Unemployed
 - Other

(Note: Only Options 3–6 qualify)
- (5) What is YOUR work status right now?
 - Student working part-time
 - Student not currently working
 - Working full-time for a company (35 h or more per week)
 - Working part-time for a company (less than 35 h per week)

GM

- Self-employed working full-time
- Self-employed working part-time
- Unemployed
- Other

(Note: Only Options 3–6 qualify)

(6) Are you working from home right now?

- No
- Yes

(Note: Only Option 2 qualifies)

(7) Is your significant other working from home right now?

- No
- Yes

(Note: Only Option 2 qualifies)

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