

ORIGINAL ARTICLE

Gender and Employment: Recalibrating Women's Position in Work, Organizations and Society in Times of COVID-19

# Has the COVID-19 pandemic changed gender- and parental-status-specific differences in working from home? Panel evidence from Germany

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## Abstract

Has COVID-19 changed gender- and parental-status-specific differences in working from home? To answer this question, we used data from the Institute for Employment Research High-Frequency Online Personal Panel collected in Germany in the early stages of the pandemic (May–August 2020). Regression analyses revealed changes in pre-pandemic gender- and parental-status-specific differences in remote working—not only when strict social distancing measures were in place, but also after they were lifted: Fathers were no longer more likely than childless men and women to work remotely, and women were no longer more likely than men to work more hours from home when using this arrangement. Further, the results suggest that cultural barriers in organizations to working from home—which were especially prevalent for mothers before the pandemic—have decreased.

## KEYWORDS

COVID-19, gender, parental status, remote working, working from home

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## 1 | INTRODUCTION

The COVID-19 pandemic has led to a large increase in remote working to avoid infection risks at work sites and during commutes (Arntz et al., 2020; Brynjolfsson et al., 2020; von Gaudecker et al., 2020). As organizations suddenly had to give large proportions of their employees in different ranks and jobs the possibility of working from home, this may have altered the views of both employers and employees on the advantages and disadvantages of remote working. While structural constraints on working remotely—that is, the necessity to work on site, for example, in care jobs (Arntz et al., 2020; Dingel & Neiman, 2020)—are likely to have persisted, experiences with remote work during the pandemic may have reduced presence cultures and the corresponding cultural barriers in work organizations to working from home. Both structural and cultural barriers to remote work have been prevalent especially for women, who not only tend to work in jobs that can be performed only on site, but who have also reported in the past that remote working was either not permitted or was stigmatized as being associated with lower productivity (Leslie et al., 2012; Lott & Abendroth, 2020; Munsch, 2016). Similarly, universal experiences with remote working during the pandemic may have increased its attractiveness not only among mothers who wish to use it to better integrate work and family (Arntz et al., 2020). Following on from this, we ask: Has the COVID-19 pandemic changed gender- and parental-status-specific patterns of the use of remote work?

A common explanation for existing gender differences in the use of remote work is the persistence of the traditional gendered division of unpaid work (Leslie et al., 2012; Lott & Abendroth, 2020; Munsch, 2016). Women's continued role as primary caregiver (Trappe et al., 2015) increases the likelihood that they will want to use remote work as a family friendly workplace arrangement (Arntz et al., 2020). However, it also increases the likelihood that they will face cultural barriers in organizations where remote work is either not permitted or is stigmatized because employers assume a conflict between productivity and women's responsibilities as primary carers, especially while working from home (Leslie et al., 2012; Lott & Abendroth, 2020; Munsch, 2016; Williams et al., 2013). By contrast, men—irrespective of their parental status—have been found to use remote work to meet high work demands, thus reducing the likelihood that they will encounter cultural barriers to this arrangement (Lott & Chung, 2016). Indeed, existing research has shown that men use remote work more often than women (Chung & van der Lippe, 2020) and are less likely to report that this work arrangement is not allowed or is stigmatized (Leslie et al., 2012; Lott & Abendroth, 2020; Munsch, 2016).

To answer our research question, we draw on data from four waves of a German national probability sample survey, the High-Frequency Online Personal Panel (HOPP), that were collected between May and August 2020 by the Institute for Employment Research (IAB; Haas et al., 2021; Volkert et al., 2021). The terms *remote working* and *working from home* are used interchangeably in this paper and are understood to refer to work performed by employees at home on a regular or occasional basis as a substitute for or a supplement to regular work performed at the employer's premises (see Eurofound & the International Labour Office, 2017).

There are two reasons why Germany is particularly well suited to assessing the impact of the COVID-19 pandemic on the gender- and parental-status-specific patterns of the use of remote work. First, despite some progress during the last decades, the country is still characterized by high levels of gender inequality (OECD, 2017). Because women continue to perform the lion's share of unpaid care and household work, they are especially likely to want to work remotely in order to be better able to integrate work and family. Women have also been found to encounter greater cultural barriers to the use of this work arrangement than men do (Lott & Abendroth, 2020). Second, there was great variation over time in the use of remote work in Germany during our observation period. Before the outbreak of the pandemic in early 2020, the rate of remote working was relatively low in Germany: Only around 12% of employees reported working regularly from home (Arntz et al., 2020). However, the rate of remote working in Germany increased considerably in March 2020, when the German government introduced strict measures to contain the spread of the novel coronavirus. These measures included the closure of schools and daycare facilities, restaurants, and shops, and a ban on gatherings with non-household members. During the first wave of the pandemic, more than a quarter of employees worked entirely from home, and more than one third did so at least partly (Arntz et al., 2020).

According to a study by Arntz et al. (2020), these proportions are just slightly smaller than the entire share of jobs in Germany that can potentially be performed from home. In May 2020, first containment measures were lifted, but schools did not reopen until June, and in some federal states until after the summer break (Arntz et al., 2020; Czymara et al., 2020; Moehring, Weiland, et al., 2021).

The present study contributes to the literature in two important ways. First, by examining differences in the rate of remote working not only by gender but also by parental status, we extend the insights from previous research on this topic that did not differentiate between childless women and men and mothers and fathers (e.g., Arntz et al., 2020; Moehring, Weiland, et al., 2021; Moehring, Reifenscheid, & Weiland, 2021). Investigating the intersection between gender and parental status allows us to assess the extent to which gender differences in working from home hinge on the gendered nature of parenthood. Second, this is one of the first studies to investigate whether the COVID-19 pandemic has changed gender-specific *patterns* of the use of remote work. By examining not only gender-specific use of remote work but also the hours worked from home and the reasons for not working from home, the findings of our study extend the insights from previous research that investigated the share of jobs that can be performed from home (Arntz et al., 2020; Brynjolfsson et al., 2020; von Gaudecker et al., 2020; Moehring, Reifenscheid, & Weiland, 2021), the increase in the use of remote work during the pandemic (Alipour et al., 2021; Brynjolfsson et al., 2020; von Gaudecker et al., 2020), and its consequences for the gendered division of labor (Zoch et al., 2021). By examining both changes in the use and reasons for the non-use of remote work, our study assesses (a) differences in the use of this arrangement before and during the pandemic among mothers, fathers, childless men, and childless women; and (b) whether these differences align with changes in perceived cultural barriers to and changing desires for remote work. By examining the number of hours that male and female employees worked from home, our study provides detailed insights into the gendered use of remote work and explores potential gender differences in the motives for working from home, such as catching up on work outside regular work hours (Kim et al., 2019) or better aligning work and family (den Dulk et al., 2012).

## 2 | BACKGROUND AND EMPIRICAL PREDICTIONS

### 2.1 | Gender and parenthood differences in working from home

Due to the gendered division of paid and unpaid work, working from home is an especially attractive work arrangement for mothers who experience challenges in integrating high work and family demands (Arntz et al., 2020). This finding is in line with the resource perspective in work–family research, which emphasizes that remote work helps employees to reorganize their work in order to make it more compatible with family obligations. This enables them to respond to family demands, be they everyday activities or unpredictable occurrences (Schieman et al., 2009; van der Lippe & Lippényi, 2020).

However, organizations are the place where the use of remote work is negotiated and perceived to be legitimate, or not. When organizations expect high time investment and on-site presence, this is known to create cultural barriers to the use of remote work, which is then either not allowed or is stigmatized as being less productive (Lott & Abendroth, 2020; Williams et al., 2013). Cultural barriers to the use of remote work can take the form of a lack of permission to work from home, the way meetings are scheduled, or supervisors' expectations that their staff be physically present. Cultural barriers can also become evident in the flexibility stigma, which causes workers to shy away from remote work for fear that they will be perceived as less committed to their work or they will suffer career penalties (Konrad & Yang, 2012; Lott & Chung, 2016; Williams et al., 2013). Signaling theory (Spence, 1973) suggests that employers interpret employees' use of remote work as a signal of lower commitment because they assume a conflict between productivity and other responsibilities at home (Konrad & Yang, 2012).

Existing research further indicates that women are more likely than men to encounter cultural barriers to remote work. This decreases the likelihood that they will use this work arrangement—despite the fact that their interest in

and need for it is greater. Drawing on arguments from statistical discrimination theory (Phelps, 1972), remote work might be perceived to signal lower commitment and productivity, especially when used by mothers. This has been attributed to the fact that women do a greater share of unpaid work (Reskin, 2000; Ridgeway & Correll, 2004) and therefore more often use remote work to integrate work and family. But even when women do not have children, supervisors have been found to perceive them to be less committed and productive than men due to gendered status perceptions (Ridgeway & Correll, 2004). As a result, they are also more likely to be stigmatized as less productive when working remotely (Leslie et al., 2012; Munsch, 2016). On the other hand, men—irrespective of their parental status—more often use remote work to meet high work demands, for example, to work just a couple of hours at home in order to catch up on work (Lott & Chung, 2016). One reason for this pattern is that men more often hold high status positions that involve high work demands that can be met in part by working from home (Schieman et al., 2009). Indeed, first evidence shows that women in particular face cultural barriers to the use of remote work (Leslie et al., 2012; Lott & Abendroth, 2020; Munsch, 2016).

In sum, we expect that childless women and—even more so—mothers used remote work less often than men before the COVID-19 pandemic due to the cultural barriers that they face in work organizations, but that when they did work remotely, they worked more hours from home, presumably because they used this arrangement to better align work and private demands. Thus, we hypothesize:

**H1a** Before the COVID-19 pandemic, childless women and, even more so, mothers were less likely than childless men and fathers to work from home.

**H1b** When childless women and mothers used remote work before the pandemic, they worked more hours from home than childless men and fathers who used this arrangement.

## 2.2 | The COVID-19 pandemic and normative and economic pressures on organizations to offer remote work options

Societal dynamics can put pressure on work organizations to offer workers the option to work from home, and this might change the assumed gender- and parenthood-specific patterns of its use described above. According to neo-institutionalist perspectives (DiMaggio & Powell, 1983), organizations respond to normative pressures from their environment—for example, expectations from policymakers and the public—in order to gain or maintain legitimacy. Before the outbreak of the COVID-19 pandemic, normative pressures on employers to offer their employees the possibility of working from home stemmed from expectations from policymakers and the public that work organizations should be more family friendly (den Dulk & de Ruijter, 2008).

Following rational choice arguments (den Dulk et al., 2012), organizations should also be more likely to give workers the option to work from home when it benefits them economically. Before the outbreak of the pandemic, investment in remote work as a family friendly workplace arrangement had the economic advantage that it helped to sustain the employability of workers with family responsibilities and made it easier to attract qualified personnel. From this perspective, remote work was a business case rather than a social responsibility (den Dulk et al., 2012). In pre-pandemic times, these economic incentives to invest in remote working technologies and infrastructure applied mainly to work organizations with a large share of employees with high family responsibilities and/or to organizations who competed for personnel. In line with this, existing research has found considerable variation in the use of remote work across work organizations (den Dulk et al., 2012).

With the outbreak of the COVID-19 pandemic, however, new normative and economic pressures to offer remote work options arose. To curb the spread of the virus, organizations were asked and expected to offer workers the option to work from home. The pandemic also added an additional layer to the economic rationale for providing remote work options: COVID-19 infections within an organization could slow down work processes and require entire departments to shut down. For many work organizations, giving all employees who can perform their jobs

from home the option to work remotely has thus been a strategy to sustain work and maintain productivity during the pandemic.

Neo-institutionalist and rational choice arguments therefore provide an explanation for existing research findings showing a large increase in remote working at the beginning of the pandemic (e.g., Arntz et al., 2020). We argue that this large increase also disrupted gender- and parenthood-specific cultural barriers because it was applied as an instrument to reduce infection rates rather than as a family friendly workplace arrangement with the potential to trigger gendered stereotypes of work and family roles. Similarly, differences in preferences for working from home as a family friendly workplace became irrelevant for its use, as the work arrangement was put in place to reduce infection rates, and was therefore of similar interest to mothers, fathers, and childless men and women.

However, the aforementioned normative and economic pressures on organizations to offer remote work decreased when infection numbers went down, social distancing measures were eased, and organizations developed hygiene concepts to contain the spread of the virus at the workplace. Similarly, the common interest in using remote work changed when the risk of infection on site decreased. Nonetheless, we argue that both employers' and employees' experiences with remote work during the pandemic reduced the gendered cultural barriers to this arrangement and increased preferences for remote work among a broader group of workers.

There are several reasons why the pandemic may have changed cultural barriers to remote work encountered especially by mothers. First, new provisions for remote work in the first stage of the pandemic made it more difficult for employers and supervisors to argue that this arrangement was no longer possible or allowed, and provided disadvantaged groups of workers with the possibility of claiming equal rights and entitlements. Second, the use of remote work during the pandemic allowed employers to gain initial experience with this arrangement among a much more diverse group of workers, which may have reduced the flexibility stigma associated with working from home (Barrero et al., 2021; Chung et al., 2020). Previous research has found, for instance, that working from home often involves higher rather than lower organizational commitment and productivity (de Menezes & Kelliher, 2011; Deole et al., 2021). If supervisors experience this themselves, that is likely to affect the larger workplace culture. Thus, employees would no longer be afraid of the flexibility stigma, as working from home would be "the new normal" for large segments of the population. All of this suggests a weakening of cultural barriers to the use of remote work and a reduction in gender- and parenthood-related differences in its use—not only at the beginning of the pandemic.

Moreover, the perspective of adaptive preferences (Kan, 2007; Leahy & Doughney, 2006) implies that new experiences with the use of remote work during the pandemic may have changed preferences in this regard. Studies have shown that fathers who were able to work from home during the pandemic took on more care work, although their time investment in care work was still lower than that of women (Arntz et al., 2020; Chung et al., 2020; Hupkau & Petrongolo, 2020). Fathers' higher time investment in care work may have increased their interest in using remote work to better align work and family responsibilities, even after restrictions were eased. Accordingly, the perspective of adaptive preferences suggests that fathers who work more hours from home compared with the pre-pandemic situation do so because they no longer use this work arrangement mainly to meet high work demands but also for better work-family integration. This is also in line with the mechanism of role exposure, which suggests that fathers' exposure to new family roles can change their preferences and lead to them becoming more involved in the family (Gangl & Ziefle, 2015; Grunow et al., 2018). For childless men and women, experiences with remote work may have further increased their interest in a work design that can be more easily adapted to their private situations (Kan, 2007; Leahy & Doughney, 2006). Indeed, first evidence shows that a majority of workers would like to work more hours from home compared with the pre-pandemic situation (Aczel et al., 2021; Baert et al., 2020; Barrero et al., 2021; Chung et al., 2020). Caligiuri and De Cieri (2021) found that having children in the household did not affect employees' desire to continue to work from home after the first peak of the pandemic. Based on the arguments that gender- and parenthood-specific cultural barriers and interest in working from home have changed during the pandemic, we hypothesize:

- H2a** Gender- and parental-status-specific differences in the use of remote work decreased after the onset of the COVID-19 pandemic.
- H2b** Gender- and parental-status-specific differences in the number of hours worked from home decreased after the onset of the COVID-19 pandemic.
- H3** Gender- and parental-status-specific differences in cultural barriers to remote work, in particular lack of permission and the flexibility stigma, decreased after the onset of the COVID-19 pandemic.
- H4** Gender- and parental-status-specific differences in preferences for working from home decreased after the onset of the COVID-19 pandemic.

### 3 | EMPIRICAL STRATEGY

#### 3.1 | Data and sample

The data on which our study was based stem from the HOPP study “Life and Work Situations in Times of Corona,” a project conducted by the German Institute for Employment Research (IAB; Bellmann et al., 2021; Haas et al., 2021; Volkert et al., 2021). Compared with other countries, the gendered division of paid and unpaid labor in Germany is highly unequal (OECD, 2017) and has not been improved substantially by the parental leave reforms of the past decade. Couples' division of labor has been found to be retraditionalized after childbirth, making one-and-a-half-earner families a more common family model than dual-earner/dual-carer families (Grunow & Evertsson, 2016).

Based on a proportionally stratified random sample of the Integrated Employment Biographies (IEB), the IAB repeatedly invited respondents to participate in the online survey, which was designed to map changes in people's social and working lives during the COVID-19 pandemic. If respondents gave their consent, their personal survey data can be linked to register data of the Federal Employment Agency (BA) processed in the IEB.<sup>1</sup> In this way, information can be obtained, for example, about their employment histories and characteristics of their employers.

The first wave of data collection was in May 2020, when the initial lockdown was still in place and incidence rates were relatively high. Respondents were followed on a monthly basis up to August 2020, when public life in Germany had almost returned to normal, with relatively low COVID-19 incidence rates and few government restrictions. Information about respondents' pre-pandemic work status and living situation was derived from the BA's registry data or from retrospective questions. The data used are available to the international research community via the Research Data Centre of the Federal Employment Agency at the Institute for Employment Research. There are two data versions. One version includes only survey data, the other is linked to administrative data. For our research, we used a preliminary processed data set corresponding to the HOPP-ADIAB (Bellmann et al., 2021). The analytic sample for the present study comprised only individuals who were employed in Wave 1—namely, 6850 respondents for analyzing *use of remote work* and 1721 respondents for analyzing *number of hours worked from home* among those working remotely. Across all four waves, the sample comprised 21,952 person-waves for the use of remote work and 8408 person-waves for the number of hours worked from home. Due to item nonresponse and panel attrition, we did not impose any other exclusion criteria and we used an unbalanced sample in our analyses to minimize selection bias. In Wave 4, the reasons for the non-use of remote work before the pandemic were observed for 1763 employees, and the reasons for its non-use during the pandemic were observed for 1441 employees. This information was part of a module on remote work in Wave 4. Because the use of remote work increased during the pandemic, the number of observations for non-use was higher before than during the pandemic.

### 3.1.1 | Dependent variables

Our first dependent variable was *use of remote work*, that is, work that was carried out at home. Throughout all four waves, remote work was assessed with the following two questions: (1) "Is there an opportunity for you to work from home?" (original survey question: Besteht für Sie die Möglichkeit, von zu Hause aus zu arbeiten?); (2) "When you think about your last work week: How many hours did you work at home?" (original survey question: Wenn Sie an Ihre letzte Arbeitswoche denken: Wie viele Stunden haben Sie zu Hause gearbeitet?) Respondents were assigned the value 1 if they reported that they had the opportunity to work from home, and if they had worked at home for at least 1 hour during the last work week. They were assigned the value 0 if they did not have the option to work from home and/or did not work at home for at least 1 h during the last work week. Pre-pandemic remote work ( $t_0$ ) was coded 1 for respondents who had worked at least 1 hour a week from home before the COVID-19 crisis. The retrospective survey question for pre-pandemic remote working was: "Thinking about the time before the corona crisis: How many hours a week did you regularly work from home before the crisis?" (original survey question: Wenn Sie an die Zeit vor der Corona-Krise denken: Wie viele Stunden wöchentlich haben Sie vor der Krise regelmäßig von zu Hause aus gearbeitet?) The *number of hours worked from home*—our second dependent variable—was measured with the above-mentioned questions regarding the number of hours per week worked at/from home and was treated as a continuous variable.

The cultural barriers that explain the non-use of remote work were our two outcomes of interest. As cultural barriers encompass several aspects, we used the relevant response categories of the following two questions from Wave 4 to create two dummy variables: (1) "For what reasons did you not work from home before the corona crisis?" and (2) "For what reasons did you not work from home during the past work week?" The first cultural barrier referred to lack of permission and was based on the response categories "My employer does (did) not allow it." / "My supervisor does (did) not allow it." The second cultural barrier captured the flexibility stigma associated with working from home and was based on the categories "I am (was) afraid that this would worsen my chances for promotion." / "Presence at work is (was) very important to my supervisors." The preference not to use remote work was our third outcome of interest. Again, respondents were asked: (1) "For what reasons did you not work from home before the corona crisis?" and (2) "For what reasons did you not work from home during the past work week?" The preference not to work from home was measured with two items: "I wanted to separate my work and my personal life," and "I preferred to work at my workplace."

Questions on the reasons for the non-use of remote work were asked, first, if the respondents answered "no" to the question of whether they had the opportunity to work from home, and second, if they reported that they had the opportunity but had not used this work arrangement.

### 3.1.2 | Explanatory variables

The variable *gendered parental status* distinguished between childless men, childless women, fathers, and mothers. To be classified as a parent, respondents had to have children under the age of 18 living in their household. We included the following time points to account for the variation before and during the COVID-19 pandemic as well as variation in the lockdown intensity and social distancing measures: (a)  $t_0$  with pre-COVID-19 situation; (b)  $t_1$ : May 2020; (c)  $t_2$ : June 2020; (d)  $t_3$ : July 2020; (e)  $t_4$ : August 2020.

### 3.1.3 | Covariates

To account for alternative explanations for the use of remote work, we included the following eight control variables in our analyses:

### *Type of tasks*

This variable was chosen because previous research has found great variation in remote working based on the tasks that individuals perform in their jobs (Arntz et al., 2020; Dingel & Neiman, 2020). In our analyses we therefore accounted for five different types of tasks (“non-routine analytical,” “non-routine interactive,” “routine cognitive,” “routine manual,” and “non-routine manual”; Dengler et al., 2014). This variable was generated from the expert database (BERUFENET of the Federal Employment Agency) for the German Classification of Occupations at the 2-digit level, which contains information from 2018.

### *Occupational status, pre-pandemic*

This variable was chosen because higher-status employees have more access to flexible working arrangements (Schieman et al., 2009). Occupational status was drawn from the latest available information from the administrative data (IEB) and was approximated by the respondents' job tasks, which in turn were assessed with the help of the Classification of Occupations 2010 (KldB 2010), which was developed by the IAB and has been valid since January 1, 2011. The KldB 2010 realistically reflects the current occupational landscape—that is, the occupational structures—in Germany. Another advantage of the KldB 2010 is its high compatibility with the 2008 International Standard Classification of Occupations, which significantly improves the international comparability of occupational information in official statistics and research (Paulus & Matthes, 2013). The categorical variable for pre-pandemic occupational status distinguished between four levels ranging from “helper activity” to “highly complex activity.” This variable was drawn from the BA's registry data and generated from the KldB 2010. The KldB comprises five digits; the fifth digit indicates the requirement level of the occupation.

### *Weekly working hours, pre-pandemic*

This variable was chosen because (a) access to the option to work from home before the pandemic depended on job status (Felstead et al., 2002), and (b) the cultural schema of work devotion suggests that workers who work longer hours are more valued employees (Williams et al., 2013). Weekly working hours were observed retrospectively at t1 because working hours may have been reduced during the pandemic due to the receipt of short-time work benefits, which have been an important labor market policy measure to prevent unemployment in Germany during the crisis.

### *Occupational sector and enterprise size*

These variables were chosen because the option to work from home is unequally distributed across occupations and enterprises (Chung, 2019). They were drawn from the administrative data (IEB). The occupational sector variable was generated from the KldB 2010—Revised Version 2020 at the 2-digit level. The pre-pandemic enterprise size variable was based on aggregated operating information. *Enterprise size* had three categories: “less than 51 employees,” “51–250 employees,” and “more than 250 employees.”

### *Living with a partner, age, and migration background*

The household dummy variable, *living with a partner*, was chosen because use of remote work tends to be influenced by the partner (Del Boca et al., 2020). We controlled for *age* (and *age squared*) because the need and the willingness to work from home may vary with age-specific preferences. And finally, we controlled for *migration background* because ethnic minorities have been found to often be excluded from remote working arrangements (Felstead et al., 2002). We generate the migration background with two items, whether the respondent was not born in Germany or either of her/his parents were born outside Germany. Table 1 provides an overview of all the variables and their distributions by gender and parental status (pooled over all four survey waves).



TABLE 1 Summary of statistics for all study variables by gender and parental status

	Childless men		Fathers		Childless women		Mothers		
	M/Prop.	SD	N	M/Prop.	SD	N	M/Prop.	SD	N
Use of remote work	0.47	0.48	2845	0.57	0.45	696	0.39	0.47	2609
No. of hours worked from home in past week	29.16	14.42	1442	27.53	13.72	454	24.74	13.35	1131
Occupational status, pre-pandemic									
Un-/semi-skilled tasks	4.36	20.42	2845	2.87	16.72	696	6.71	25.02	2609
Skilled tasks	41.79	49.33	2845	30.89	46.24	696	52.93	49.92	2609
Complex tasks	23.66	42.50	2845	28.59	45.22	696	19.20	39.40	2609
Highly complex tasks	30.19	45.92	2845	37.64	48.48	696	21.16	40.85	2609
Type of tasks									
Non-routine analytical	16.06	36.73	2845	20.55	40.43	696	8.85	28.41	2609
Non-routine interactive	4.96	21.71	2845	6.90	25.36	696	11.88	32.36	2609
Routine cognitive	56.59	49.57	2845	56.90	49.56	696	55.96	49.65	2609
Routine manual	10.47	30.63	2845	7.33	26.08	696	3.83	19.20	2609
Non-routine manual	11.92	32.40	2845	8.33	27.66	696	19.47	39.61	2609
Weekly working hours, pre-pandemic	41.13	8.39	2845	41.48	7.74	696	34.63	11.23	2609
Occupational sector									
Production of goods	33.67	47.27	2845	32.04	46.70	696	7.86	26.91	2609
Personal services	11.63	32.07	2845	10.06	30.10	696	30.36	45.99	2609
Business administration	33.57	47.23	2845	35.78	47.97	696	53.70	49.87	2609
IT-sector and the natural ...sciences	11.85	32.32	2845	17.10	37.68	696	4.37	20.45	2609
Commercial services	9.28	29.02	2845	5.03	21.87	696	3.72	18.92	2609
Enterprise size									
<51 employees	27.66	44.74	2845	25.14	43.42	696	35.45	47.85	2609
51–250 employees	27.63	44.72	2845	29.31	45.55	696	28.13	44.97	2609
>250 employees	44.71	49.73	2845	45.55	49.84	696	36.41	48.13	2609

(Continues)

TABLE 1 (Continued)

	Childless men			Fathers			Childless women			Mothers		
	M/Prop.	SD	N	M/Prop.	SD	N	M/Prop.	SD	N	M/Prop.	SD	N
Living with a partner	72.48	44.67	2845	97.27	16.31	696	71.52	45.14	2609	88.43	32.01	700
Age (years)	47.24	11.77	2845	45.13	7.81	696	46.86	11.63	2609	42.94	6.76	700
Migration background	15.29	36.00	2845	13.51	34.20	696	12.99	33.63	2609	15.29	36.01	700
Remote work not allowed												
Before the pandemic	14.95	35.69	582	19.56	39.75	225	17.58	38.09	660	20.61	40.52	296
During the pandemic	11.56	32.01	467	19.13	39.44	183	14.42	35.16	548	15.23	36.00	243
Remote work detrimental for career												
Before the pandemic	16.49	37.15	582	16.00	36.74	225	13.33	34.02	660	15.20	35.97	296
During the pandemic	5.57	22.95	467	6.01	23.83	183	4.38	20.48	548	6.58	24.85	243
Remote work not desired												
Before the pandemic	20.10	40.11	582	16.89	37.55	225	13.94	34.66	660	14.86	35.63	296
During the pandemic	16.49	37.15	467	14.75	35.56	183	14.96	35.70	548	16.87	37.53	243
N	2845			696			2609			700		

Note: The numbers of observations (N) refer to Wave 1.

Abbreviation: Prop., proportion.

### 3.2 | Analytic approach

We estimated logistic regressions to assess gender- and parental-status-specific differences in the use of remote work and the reasons for not working from home

$$\ln\left(\frac{p_{it}}{1-p_{it}}\right) = \alpha + \beta_1 X_{1it} + \dots + \beta_k X_{kit} + \varepsilon_{it},$$

and we estimated ordinary least squares (OLS) regressions to assess differences in time spent working from home

$$Y_{it} = \alpha + \beta_1 X_{1it} + \dots + \beta_k X_{kit} + \varepsilon_{it},$$

where  $p_{it}$  refers to the probability of the use of remote work for individual  $i$  at time point  $t$  and the probability of naming one of the different reasons for not working from home;  $y_{it}$  is the weekly hours individual  $i$  at time point  $t$  reported to be working from home;  $\beta_1$  to  $\beta_k$  are the coefficients for the covariates included in the analyses.

All regressions were estimated with clustered robust standard errors at the level of the individual on a pooled sample, and gendered parental status was interacted with time point. The panel structure of our data allowed us to explore the use of remote work over time. We could thus compare the time before (t0) with the time during the first strict lockdown (t1), and the times when social distancing restrictions had been relaxed, and both employees and organizations had increasingly adapted to the situation (t2, t3, and t4). We estimated unadjusted and adjusted results in order to see whether possible gender- and parenthood-specific differences could be attributed to workplace/job and other characteristics that are less likely to have changed during the pandemic. For reasons of comparison across models, we estimated predicted probabilities and values based on the regression models and the predictive margins using the margins command in Stata. The complete regression tables are presented in the online Appendix (Tables A1, A2, and A3).

Whereas use of remote work was measured in each of the four waves, the question about the reasons for its non-use was part of the above-mentioned module on working from home implemented in Wave 4. To assess the reasons for non-use, we therefore estimated logistic regression models with clustered robust standard errors using data from t4 with questions on the current and the pre-pandemic situation (t0).

As we included a wide range of covariates in our analyses, we refrained from using calibration weights. However, as a sensitivity test, we re-ran all analyses with weights. The results of these analyses are provided in the online Appendix (Tables A4a, A4b, A5a, A5b, and A6). The inclusion of the weights changed only the size of the coefficients but not the overall patterns found with the unweighted regressions. As an additional sensitivity test, we also re-ran all analyses with a balanced sample. The results of this more selective sample can also be found in the online Appendix (Tables A7 and A8).

## 4 | RESULTS

### 4.1 | The use of remote work

Tables 2 and 3 display the predicted probabilities of working from home by gendered parental status group without and with covariate adjustment, respectively (for the results of the logistic regression analyses, see Table A2 in the online Appendix). Table 2 shows that before the pandemic (i.e., at t0), fathers were more likely than women without children and mothers to work from home (differences of 20 and 15 percentage points [pp], respectively). Fathers were also more likely to work from home than childless men (14 pp difference), who in turn were more likely to work remotely than childless women (6 pp difference) but not statistically significantly more likely to do so than mothers (1 pp difference).

TABLE 2 Use of remote work, gender-parental status interaction only

	t0	t1	t2	t3	t4
Men w/o children	0.26*** [0.25,0.28]	0.49*** [0.48,0.51]	0.44*** [0.41,0.47]	0.41*** [0.38,0.45]	0.42*** [0.39,0.45]
Fathers	0.40*** [0.36,0.43]	0.62*** [0.58,0.66]	0.55*** [0.51,0.59]	0.56*** [0.51,0.60]	0.51*** [0.46,0.56]
Women w/o children	0.20*** [0.19,0.22]	0.42*** [0.40,0.44]	0.36*** [0.33,0.38]	0.32*** [0.29,0.35]	0.34*** [0.30,0.37]
Mothers	0.25*** [0.22,0.29]	0.50*** [0.47,0.54]	0.46*** [0.42,0.51]	0.42*** [0.38,0.47]	0.39*** [0.34,0.43]
N	6850	6850	3147	2697	2408

Note: Ninety-five percentage confidence intervals in brackets.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

TABLE 3 Use of remote work, full model

	t0	t1	t2	t3	t4
Men w/o children	0.25*** [0.23,0.26]	0.48*** [0.46,0.50]	0.42*** [0.39,0.45]	0.39*** [0.36,0.42]	0.38*** [0.35,0.41]
Fathers	0.31*** [0.28,0.34]	0.52*** [0.48,0.55]	0.45*** [0.41,0.48]	0.44*** [0.40,0.48]	0.41*** [0.37,0.45]
Women w/o children	0.24*** [0.23,0.26]	0.47*** [0.46,0.49]	0.40*** [0.37,0.42]	0.37*** [0.34,0.40]	0.37*** [0.34,0.40]
Mothers	0.28*** [0.25,0.31]	0.53*** [0.50,0.56]	0.49*** [0.45,0.53]	0.44*** [0.40,0.48]	0.41*** [0.36,0.45]
N	6850	6850	3147	2697	2408

Note: Ninety-five percentage confidence intervals in brackets.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

After covariate adjustment (Table 3), the pre-pandemic difference (at t0) between childless women and men was much smaller and no longer statistically significant, which indicates that the observed gender difference in the use of remote work was driven mostly by job and workplace characteristics. However, after covariate adjustment, fathers were still statistically significantly more likely than both childless men (difference of 6 pp) and childless women (difference of 7 pp) to use remote work. The predicted probability for mothers (28%) was only slightly smaller than those for fathers (31%), but the values were not statistically significantly different. These findings only partly confirm hypothesis H1a, which assumed that before the pandemic, childless women and, even more so, mothers were less likely than childless men and fathers to use remote work.

Looking at the adjusted results for the time following the outbreak of the pandemic (Table 3), the use of remote work increased across all groups, particularly during the first weeks after school and workplace closures in Germany (t1). Moreover, at t1, no significant gender differences in the use of remote work remained, which supports the argument that gender- and parental-status-specific patterns of the use of this arrangement were disrupted when infection numbers were high and strict social distancing measures in place. The differences were only slightly smaller for childless men and women; investigating the increase from t0 to t1 shows that the differences were most pronounced for mothers (25 pp), followed by childless women/men (23 pp), and fathers (21 pp), which yielded a more similar pattern of the use of remote work across all groups.

Investigating changes in remote work use as of August 2020 (t4), when public life in Germany was almost back to normal, we found a decrease in its use among all groups of workers, but not to pre-pandemic levels. Moreover, the gender- and parental-status-specific patterns of use that had been visible before the pandemic did not return. The use of remote work among childless men and women continued to be only slightly lower than among mothers and fathers, who no longer differed in their rates of use of this arrangement. This provides confirmation for hypothesis H2a: Gender- and parental-status-specific differences in the use of remote work decreased after the onset of the COVID-19 pandemic.

## 4.2 | Number of hours worked from home

Tables 4 and 5 display the predicted number of hours worked from home by gendered parental status group without and with covariate adjustments, respectively (for the full OLS regression, see Table A2 in the online Appendix). In the unadjusted regression results in Table 4, we observed only small differences in the number of hours worked from home before the COVID-19 outbreak (t0). However, after covariate adjustment (Table 5), gender differences in the number of hours worked from home at t0 were larger. Once we accounted for work hours and other characteristics, mothers and childless women worked between 2 and 3 h more from home than childless men and fathers. The differences between childless men and fathers and the differences between childless women and mothers were not statistically significant. We can thus conclude that gender rather than parenthood drove the pre-pandemic differences in the number of hours worked from home. When differences in job characteristics were taken into account, women, and especially mothers, worked more hours from home when they used remote work before the pandemic, compared with childless men and fathers. Although fathers were most likely to work from home before the pandemic, women with and without children worked more hours from home than childless men and fathers who used this arrangement. Hypothesis H1b is thus confirmed.

After the onset of the pandemic (t1–t4), the number of hours worked from home increased considerably across all groups, and gender differences became less pronounced. This is due to the stronger increase in hours worked from home among men—both with and without children (+19 h/week between t0 and t1)—than among women and mothers (+13 and + 14 h/week, respectively, between t0 and t1). At t4, childless men and fathers still worked 15 h more per week from home than at t0, whereas childless women still worked 11 h per week and mothers 9 h per week more from home compared with t0. Interestingly, at t4, mothers even worked around 3 h less per week from home

TABLE 4 Numbers of hours worked from home, gender–parental status interaction only

	t0	t1	t2	t3	t4
Men w/o children	12.25*** [11.39,13.10]	30.93*** [30.16,31.70]	27.50*** [26.17,28.83]	26.84*** [25.36,28.31]	27.10*** [25.55,28.65]
Fathers	11.61*** [10.26,12.95]	30.63*** [29.29,31.97]	28.39*** [26.70,30.08]	26.87*** [25.01,28.74]	27.33*** [25.25,29.42]
Women w/o children	12.22*** [11.29,13.15]	26.47*** [25.62,27.32]	25.68*** [24.28,27.08]	23.63*** [21.99,25.27]	24.87*** [23.14,26.60]
Mothers	10.02*** [8.87,11.17]	22.35*** [21.08,23.63]	22.53*** [21.02,24.03]	20.96*** [19.18,22.75]	19.10*** [17.32,20.87]
N	1727	3256	1366	1098	961

Note: The variable *number of hours worked from home* refers to the number of hours per week worked from home. Ninety-five percentage confidence intervals in brackets.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

TABLE 5 Number of hours worked from home, full model

	t0	t1	t2	t3	t4
Men w/o children	10.73*** [9.83,11.63]	29.81*** [29.06,30.56]	26.52*** [25.21,27.84]	25.82*** [24.39,27.26]	25.82*** [24.30,27.33]
Fathers	9.94*** [8.52,11.36]	29.20*** [27.87,30.52]	26.96*** [25.32,28.60]	25.41*** [23.59,27.23]	25.68*** [23.64,27.72]
Women w/o children	13.68*** [12.68,14.68]	27.78*** [26.96,28.59]	26.61*** [25.32,27.89]	24.47*** [22.94,26.00]	25.08*** [23.46,26.70]
Mothers	12.60*** [11.20,14.00]	25.58*** [24.23,26.92]	25.37*** [23.87,26.87]	23.83*** [22.01,25.64]	22.18*** [20.40,23.96]
N	1727	3256	1366	1098	961

Note: The variable number of hours worked from home refers to the number of hours per week worked from home. Ninety-five percentage confidence intervals in brackets.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

compared with the other three groups, but this difference was significant only compared with men without children. This provides confirmation for hypothesis H2b: Gender- and parental-status-specific differences in the hours worked from home decreased after the onset of the pandemic.

### 4.3 | Reasons for the non-use of remote work

Our results show that during the pandemic, gender differences in both the use of remote work and the number of hours worked from home decreased. Thus, the question that arises is whether this development was due to a weakening of gendered cultural barriers to remote work in work organizations and to gendered preferences for the use of this arrangement. To answer this question, we first investigated the different types of cultural barriers to the use of remote work that were reported by respondents. To comprehensively assess the different aspects of cultural barriers, we differentiated between two reasons for the non-use of telework: (a) employer/supervisor does/did not allow remote work, and (b) stigmas surrounding work from home.

Table 6 displays the predicted probabilities of different reasons for the non-use of remote work by gender and parental status before (t0) and during (t4) the COVID-19 pandemic after covariate adjustment. In pre-pandemic times, the likelihood of not using remote work due to lack of permission was higher for women, especially mothers, than for men with and without children. However, after the onset of the pandemic, this likelihood decreased, most notably for mothers (13% at t4 compared with 21% at t0). Table 6 also shows that before the pandemic, the fear of a flexibility stigma for using remote work was similarly widespread among men and women, independent of parental status, and that this fear decreased to similar degrees across all groups over time. After the onset of the pandemic, cultural barriers seem to have been weakened to some extent. The flexibility stigma became less pronounced for childless women and men as well as for parents, and it was mainly mothers who reported "not allowed" less often during the pandemic than before it. This suggests that the higher level of use of remote work at t4, and disrupted gender- and parental-status-specific patterns of use compared with the pre-pandemic situation, were due in part to a decrease in cultural barriers as a result of employers' experiences with its use during the pandemic. Thus, support is provided for hypothesis H3, which suggested that gender- and parental-status-specific differences in cultural barriers to remote work decreased after the onset of the pandemic.

As Table 6 shows, the predicted probabilities of a lack of desire to work from home did not differ statistically significantly among the gendered parental status groups before and during the pandemic. Hypothesis H4 is thus not

**TABLE 6** Predicted probabilities of reasons for non-use of remote work options (before and during the COVID-19 pandemic)

	Not allowed (t0)	Not allowed (t4)	Flexibility stigma (t0)	Flexibility stigma (t4)	Not desired (t0)	Not desired (t4)
Male without children	0.15*** [0.11,0.18]	0.13*** [0.09,0.16]	0.15*** [0.12,0.18]	0.05*** [0.03,0.07]	0.18*** [0.15,0.22]	0.15*** [0.12,0.18]
Father	0.16*** [0.12,0.21]	0.18*** [0.12,0.23]	0.13*** [0.09,0.17]	0.05*** [0.02,0.08]	0.14*** [0.09,0.18]	0.12*** [0.07,0.16]
Female without children	0.19*** [0.16,0.23]	0.15*** [0.12,0.18]	0.15*** [0.12,0.18]	0.05*** [0.03,0.07]	0.16*** [0.13,0.19]	0.17*** [0.14,0.20]
Mother	0.21*** [0.16,0.26]	0.13*** [0.09,0.17]	0.17*** [0.12,0.22]	0.09*** [0.04,0.14]	0.16*** [0.12,0.21]	0.19*** [0.13,0.24]
N	1763	1441	1763	1441	1763	1441

Note: Ninety-five percentage confidence intervals in brackets.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

confirmed: No gender- and parental-status-specific differences in lack of desire as a reason for not using remote work could be found either before or during the pandemic.

## 5 | DISCUSSION

The outbreak of the COVID-19 pandemic, and the lockdown measures implemented by national governments, had the potential to fundamentally alter the organization of work. Virtually overnight, workplaces had to be closed, and organizations had to give their employees the option of working from home. Our analyses showed that—once we accounted for men's and women's different jobs and workplaces—gender- and parental-status-specific differences in the use and extent of remote work decreased during the first wave of the pandemic. This change could be observed for the time point when the incidence rate was high and strict social distancing measures were in place as well as for the time points when infection numbers decreased and restrictions were eased. In particular, the large difference between fathers and childless men and women decreased considerably during the first wave of the pandemic. Moreover, women were no longer more likely to work more hours from home than men.

We further conclude that the pandemic contributed to a disruption of cultural barriers in work organizations to the use of remote work. The flexibility stigma as a reason for the non-use of remote work was reported much less often across all gendered parental status groups during the pandemic than before it. Furthermore, women, and especially mothers, were more likely to report “not allowed” as a reason for the non-use of remote before the pandemic than in August 2020. We argue that the disruption of presence cultures and the reduction of cultural barriers to the use of remote work in organizations during the pandemic was due to normative and economic pressures on organizations as well as to the positive experiences with its use. The gender-specific cultural barriers before the pandemic revealed by our analyses are in line with previous studies on pre-pandemic times that identified presence cultures (Williams et al., 2013) and cultural barriers to remote work especially for women (Leslie et al., 2012; Lott & Abendroth, 2020; Munsch, 2016). Gender difference in cultural barriers to remote work have been attributed to the gendered division of labor and the corresponding stereotypes whereby women face a conflict between work and family responsibilities, especially when working from home.

When we investigated “no desire” as a reason for the non-use of remote work, we did not find the gender- and parental-status-specific preferences for remote work that we had expected based on the gendered division of labor.

However, the results on the number of hours worked from home suggest gender-specific differences in the purposes for which remote work is used, which seem to have changed during the pandemic. Considering the hours worked remotely, childless men and fathers worked fewer hours from home before the pandemic than women with and without children. The higher number of hours worked from home by women is in line with previous research that showed that there is a gendered pattern of use of this arrangement, and that women—irrespective of whether they have children or not (Peper et al., 2005)—rather than men use flexible arrangements for work–life balance (Lott & Chung, 2016). However, this gendered pattern seems to have decreased during the pandemic. This can be explained with the general expansion of remote work across all groups during the pandemic. However, it might also indicate that experiences with the use of remote work, and new experiences in caring roles, at least for fathers, contributed to increasing interest in the use of this work arrangement to better align work and family. In fact, first evidence shows that not only mothers but also fathers have spent more time on childcare during the pandemic (Arntz et al., 2020; Chung et al., 2020; Hupkau & Petrongolo, 2020)—especially when working from home (Chung et al., 2020; Del Boca et al., 2020; Zoch et al., 2021). Thus, more equal hours of working from home might indicate that men no longer use remote work only to meet high work demands but also for better work–life integration.

Before concluding this paper, we would like to raise a few issues that warrant discussion and may inspire future research. First, we accounted for the suitability of jobs for remote work by using the type of task, the occupational status, and the occupational sector as covariates. However, this information might not be all-encompassing and does not fully account for differences in teleworkability among jobs. However, because the pandemic has not changed whether or not a job can be performed remotely, our results showed that gender differences in working from home were indeed driven by the suitability of jobs for remote work. This aligns with findings by Moehring, Reifenscheid, and Weiland (2021) revealing that the fact that women had a higher probability of working on site than men was partly explained by the larger share of the female workforce in low-income jobs. Whether or not work tasks can be performed remotely is a very important criterion and must be taken into account in more detail with more extensive data.

Second, and relatedly, future research should closely examine whether cultural barriers are indeed less consequential than structural barriers for gendered patterns of use of remote work. The results of our study revealed that mothers were most likely to face cultural barriers but not least likely to work from home. Job- and workplace-specific differences in the use of remote work may thus not necessarily reflect only differences in the suitability of the job for remote work but also the fact that differences in investments in remote work in typical male and female jobs and workplaces are part of gender-specific cultural barriers to the use of this arrangement.

Third, in this study, we used only quite a broad indicator for occupational status and seniority. More detailed measurements are needed that capture the importance of negotiation power—inherent in status and seniority—for the use of remote work. Fourth, more information about the motives for working from home is needed. It is also the task of future research to study whether our finding on changing gendered patterns of the use of remote work and a disruption of cultural barriers to and gendered preferences for working from home persists after the pandemic. Another task of future research is to study whether our findings carry over to other countries with different national institutions and cultural barriers. Similarly, more research is required that also takes the regional and institutional contexts into account to assess whether changing gendered patterns in the use of remote work during the pandemic are also context dependent. And finally, due to data limitations, this study could not differentiate between eastern and western Germany, although differences in the division of labor and in gender-role attitudes still persist between the two regions (Trappe & Sorensen, 2006; Vidal et al., 2020). Future research needs to take these differences into account.

Despite these limitations, this research provides important insights into gendered patterns of the use of remote work and how they have changed since the onset of the pandemic. The long-term change in workplace culture and the increased access to remote work suggested by our results are of great importance for gender inequalities, as the use of remote work enables women to work longer hours and to have higher monthly earnings and to return to the labor market more quickly after childbirth (Chung & van der Horst, 2018).



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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Institute for Employment Research (IAB). Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the author(s) with the permission of Institute for Employment Research (IAB).

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## ENDNOTE

<sup>1</sup> The register data of the Federal Employment Agency (BA) stem from different sources. The various sources are processed by the IAB's Data and IT Management Department in a data product on an individual basis called the IEB (the version we used was IEB V14.04.00-190927). Administrative data are available on a lagged basis, which means that the information we used covered the period up to December 31, 2018.

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