Gendering digital labor:
Work and family digital communication across 29 countries

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Yang Hu
Department of Sociology, Lancaster University, UK
Email: yang.hu@lancaster.ac.uk

Yue Qian
Department of Sociology, University of British Columbia, Canada
Email: yue.qian@ubc.ca

DATA STATEMENT

The data used in this study are provided by the European Social Survey (https://www.europeansocialsurvey.org), and prepared and made available by the Norwegian Centre for Research Data (NSD). Neither the European Social Survey team nor NSD is responsible for the analyses and interpretation of the data presented here. Publicly available data on the COVID-19 stringency index, curated as part of the Oxford COVID-19 Government Response Tracker, were obtained through Our World in Data (https://ourworldindata.org/covid-stringency-index).

AUTHOR INFORMATION

Yang Hu is Professor of Global Sociology at Lancaster University, UK. His research focuses on family and work inequalities in a global context. Since the COVID-19 pandemic, he has been researching the social and mental health impacts of COVID-19, with particular attention to the implications of these impacts for persistent and new inequalities. Yang is the author of the book *Chinese-British Intermarriage – Disentangling Gender and Ethnicity*. His recent research has appeared in journals such as *Nature Human Behaviour*, *European Sociological Review*, *Journal of Marriage and Family*, and *Gender & Society*. More information can be found at https://www.yanghu.co.uk.

Yue Qian is Associate Professor of Sociology at the University of British Columbia, Canada. Her research concerns inequality at the intersection of gender, family, and work. Currently, this work focuses on two lines of inquiry: (1) how assortative mating and couple dynamics in intimate relationships reflect and shape gender inequality in the broader society; and (2) how social and mental health inequalities manifest and evolve in the COVID-19 pandemic. Her recent research has appeared in journals such as *Nature Human Behaviour*, *American Sociological Review*, *Social Forces*, and *Journal of Marriage and Family*.

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Abstract

With rapid digitalization, people increasingly use information and communication technologies (ICTs) in work and family lives. Nevertheless, it remains under-researched how the labor of using ICTs for digital communication is gendered across the domains of work and family, especially in a cross-national context. Analyzing data from Round 10 of the European Social Survey, this study examines gender differences in digital communication across work and family domains in 29 countries. Using latent profile analysis, we identify five distinctive profiles of work-family digital communication – dual-medium (most prevalent), dual-low, high work-only, dual-high, and high family-only (least prevalent) digital communication – with notable gender differences. Compared with men, women are less likely to have high work-only digital communication but are more likely to have high family-only and dual-high work-family digital communication. Multilevel models reveal that among those with better digital literacy and among those who work from home more often, there are wider gender gaps whereby women are more likely than men to juggle dual-medium work-family digital communication. Moreover, in countries where people use the internet more intensely, women are more likely than men to specialize in family-only and juggle dual-high work-family digital communication. These results suggest that as digital literacy, working from home, and internet use intensity increase further in society, women may disproportionately take on family-related digital communication and also suffer from a "digital double burden" in work-family life. The findings call attention to new forms of gender inequality in the division of labor in the digital era.

Keywords: Communication, digitalization, family, gender, internet, work.

INTRODUCTION

With rapid digitalization, individuals increasingly use information and communication technologies (ICTs) in their work and family lives, and this trend has been accelerated by the COVID-19 pandemic (Amankwah-Amoah et al., 2021; Treas & Gubernskaya, 2012). Before the pandemic, ICTs such as mobile devices, messaging applications, audio chats, and video calls had already gained popularity in everyday communication (Cabalquinto & Hu, 2023; Dworkin et al., 2019; Gubernskaya & Treas, 2016). During the pandemic when in-person interactions were considerably curtailed, digital communication using ICTs became an essential lifeline for many people to maintain contact with non-residential family members and carry out day-to-day work duties (Freedman et al., 2022; Nguyen et al., 2020). Rapid digitalization has given rise to burgeoning studies that examine digital communication for work *or* for family (e.g., Bick et al., 2023; Freedman et al., 2022; Hu & Qian, 2021; Mazmanian et al., 2013; Sullivan & Lewis, 2001). Building on previous research, our study is motivated by a need to develop a cross-domain and multilevel understanding of interlinked work *and* family digital communication and gender inequality therein. To do so, we address three specific research questions to advance existing research.

First, we ask how individuals' digital communication is interlinked across the domains of work and family. Separate lines of research have examined employees' ICT use at work (Fan & Moen, 2023; Marsh et al., 2022) and people's digital communication with family members (Abel et al., 2021; Cabalquinto & Hu, 2023; Freedman et al., 2022; Hu & Qian, 2021). A cross-domain view of digital communication in both work and family lives is scarce yet important because the gender division of labor is largely predicated on the notion of work-family specialization (Becker, 1981). Key concepts capturing unequal responsibilities between working women and men, such as the "second shift" and "(work-family) double burden" (Hochschild & Machung, 1989; Jacobs & Gerson, 2005), are also

developed from a cross-domain view of both work and family realms. Our study, therefore, seeks to bring theories of work-family gender specialization and work-family double burden into the digital era by identifying distinct profiles of work-family digital communication.

Second, integrating a gender lens into research on digitalization, we examine what gender differences exist in the cross-domain profiles of work-family digital communication. There is now an emerging consensus that using ICTs for work and family communication constitutes a distinctive form of digital labor that demands time, resources, and effort (Eklund & Sadowsk, 2023; Gregg & Andrijasevic, 2019). As such digital labor, especially in the family realm, is easily conflated with personal consumption and leisure in popular understanding, it is often invisible and goes unrecognized (Peng, 2022). Against this backdrop, a key objective of our study is to render visible the labor of maintaining work-family digital communication by extending the long tradition of research on labor division into the digital realm. In doing so, our study draws much-needed attention to the uneven participation in digital communication between women and men across work and family domains as a matter of gender inequality in the division of paid and unpaid labor.

Third, we scrutinize how gender inequality in work-family digital communication is configured by key factors underpinning processes of digitalization – namely, digital literacy, working from home, the stringency of COVID-19 restrictions, and the intensity of internet use in a population. Increasing digital literacy is a key prerequisite for individuals to keep pace with rapid technological developments and undertake digital labor (Radovanović et al., 2020; van Dijk, 2020). During the COVID-19 pandemic, unprecedented containment measures curtailed in-person interactions with non-household members, which precipitated widespread working from home and fueled ICT uptake for family communication (Fan & Moen, 2023; Galanti et al., 2021; Hu & Qian, 2021; MacLeavy, 2021; Yavorsky et al., 2021). ICT use also hinges on broader, country-specific contexts of digitalization, such as the

diffusion and intensifying use of the internet and digital tools (Acilar & Sæbø, 2023; Gubernskaya & Treas, 2016). In this study, applying the multilevel framework of the digitalization of family life (Qian & Hu, 2024), we adopt a cross-national approach to examining how key individual- and country-level factors underpinning digitalization configure the gendered pattern of work-family digital communication. Notably, because the trends toward increasing digital literacy, working from home, and intensifying internet use in society are expected to continue beyond the pandemic (Bick et al., 2023; Fan & Moen, 2023; Pawlicka et al., 2023), they are pertinent for grasping not only the present state but also future developments in gendered digital labor.

In sum, our study aims to theorize and identify distinct profiles of work-family digital communication, uncover gender differences in the prevalence of these profiles, and examine how the gender differences vary with digital literacy, working from home, the stringency of COVID-19 restrictions, and country-level internet use intensity. Our empirical analysis draws on data from the latest European Social Survey (Round 10) across 29 countries, supplemented by data on the stringency of COVID-19 restrictions. Our findings reveal considerable gender inequalities in the labor of sustaining digital communication in work and family lives, and they point toward the potential exacerbation of such inequalities as digital literacy, working from home, and the intensity of internet use in society continue to increase.

THEORETICAL CONSIDERATIONS

Digital communication in work and family lives: A cross-domain approach

Rapid digitalization has changed how people communicate with one another in work and family lives (Amankwah-Amoah et al., 2021; Madianou & Miller, 2013). At work, digital communication has become integral to day-to-day tasks, as colleagues increasingly rely on emails and digital platforms such as Zoom and Slack to connect and coordinate with one

another (Bick et al., 2023; MacLeavy, 2021; Marsh et al., 2022). In transnational and translocal families, ICTs, including phone calls, social media, text messaging, chat groups, and video calls, were already widely used to sustain a sense of familyhood at a distance before COVID-19 (Abel et al., 2021; Cabalquinto & Hu, 2023; Gubernskaya & Treas, 2016). During the pandemic, containment measures, such as social distancing and lockdowns, heightened digital communication for work and also with local, non-residential family members (Chung & Booker, 2023; Freedman et al., 2022; Hu & Qian, 2021). Beyond the pandemic, digital communication remains a "new norm" of interpersonal interactions, which augments rather than replaces in-person interactions (Bick et al., 2023; Fan & Moen, 2023; Livingston & Blum-Ross, 2020).

Existing research tends to focus on digital communication either for work (e.g., Fan & Moen, 2023; Marsh et al., 2022) *or* for family (e.g., Hu & Qian, 2021; Peng, 2022). As observed by Ollier-Malaterre and colleagues (2019) in their review article, seldom has research looked at digital communication in both work and family lives; consequently, little is known about cross-domain interconnections in work and family digital communication. Yet, there are good reasons to examine such interconnections. On the one hand, literature on digital exclusion suggests that people lacking digital literacy and access are likely locked out of digital technology use and have a low level of digital engagement across multiple life domains (Helsper & Reisdorf, 2017). By contrast, people with ready digital access and a good command of digital know-how may have frequent digital communication in both work and family lives (Helsper & Reisdorf, 2017; Radovanović et al., 2020). Existing studies, therefore, suggest that people's digital communication across life domains may be closely interconnected and aligned.

On the other hand, as digital communication constitutes a core part of paid work and domestic labor (Gregg & Andrijasevic, 2019; Peng, 2022), individuals' specialization and

differential engagement in market and household labor likely lead to different levels of digital communication for work and for family. Although working from home blurs the physical boundary between work and family lives, it has not eroded the ideal worker norm that expects workers to devote wholeheartedly to their work without attending to other responsibilities (Chung, 2022; Mazmanian et al., 2013; Putnam et al., 2014). This entrenched norm has long been found to reinforce the separation of and gender specialization in work and family domains (Cha, 2010). Recent literature on work-family boundary management further suggests that many people attempt to segment their technology use at work and at home, in order to keep the two life domains separate and reduce potential work-family spillover and conflict (Ollier-Malaterre et al., 2019). Thus, research on work-family specialization (Becker, 1981) and the separation of work and family lives (Ollier-Malaterre et al., 2019) points toward a possible disconnect between people's digital communication at work and at home.

Drawing on the above discussion of potential alignment and disconnect in digital communication between the domains of work and family, our first objective is to identify distinct cross-domain profiles of work-family digital communication. Should the levels of digital communication align between the domains of work and family, it could take the forms of dual-low and dual-high work-family digital communication. Should individuals separate out their work and family lives and specialize in either work or family digital communication, we expect to see high work-only and high family-only digital communication.

Gendering digital labor: Work-family specialization and double digital burden

Conceptualizing digital communication as a form of labor invites consideration of gender differences in the performance and division of such labor (Gregg & Andrijasevic, 2019). Given persistent gender segregation in both market and household labor, digital communication in work and family lives is likely imbued with gendered meanings (Acilar &

Sæbø, 2023; Peng, 2022). Therefore, gendered sociocultural norms surrounding work and domesticity may give rise to gendered patterns of digital communication across different life domains.

Gender specialization theory posits that given gender differences in comparative advantages, men tend to specialize in market production, whereas women tend to specialize in home production (Becker, 1981). Despite long-term progress toward gender parity in paid work participation (England et al., 2020; Sullivan et al., 2018), the cultural construction of technology as "masculine" and structural barriers for women to enter technology sectors and occupations are still visible, contributing to male-domination in jobs and tasks involving heavy technology use (Smith, 2013). Meanwhile, as the gender revolution in family life lags behind progress toward gender equality in the labor market, women still shoulder the lion's share of domestic labor (Sullivan et al., 2018). As emerging evidence shows, the gender division of domestic labor has extended into the digital realm including digital parenting, care provision, and online grocery shopping (Peng, 2022; Schwanen et al., 2014). Should gender specialization in paid work and domestic labor extend to digital communication, we expect to see gender differences in the cross-domain profiles of work-family digital communication as specified in Hypothesis 1A.

> **Hypothesis 1A** (gender specialization): Compared with men, women are more likely to have high family-only digital communication, but less likely to have high work-only digital communication.

As a result of the uneven gender revolution between the domains of work and family (England et al., 2020; Sullivan et al., 2018), the prevalence of work-family "double burden" has increased among women since the 1980s (Hochschild & Machung, 1989; Jacobs & Gerson, 2005). Despite women's increased labor force participation, working women still undertake a disproportionately large share of domestic labor, thus suffering from a "second

shift" that follows paid work hours and the double burden of work and family responsibilities (Hochschild & Machung, 1989; Jacobs & Gerson, 2005). By comparison, working men generally undertake much less domestic labor compared with working women (Sullivan et al., 2018). Should the gendered work-family double burden extend to digital communication, we expect Hypothesis 1B to hold:

> **Hypothesis 1B** (gendered double burden): Compared with men, women are more likely to juggle dual work-family digital communication.

Research on the gender digital divide suggests that women may be more likely than men to have a low level of digital technology use (Acilar & Sæbø, 2023). In contexts where digital access is considered a scarce, privileged resource, such resource is often prioritized for men over women (Acilar & Sæbø, 2023). Moreover, traditional masculinization of technology use and expertise can also create a cultural barrier for women to engage with digital technology (van Djik, 2020). Insofar as some people still endorse the masculinized construction of digital technology use and women's disadvantaged socioeconomic status relative to men limits their access to and use of digital tools (Acilar & Sæbø, 2023), women may be more likely than men to withdraw or be excluded from digital communication both at work and at home, as summed up in Hypothesis 1C.

> **Hypothesis 1C** (gendered digital exclusion): Compared with men, women are more likely to have dual-low work-family digital communication.

Key dimensions of digitalization

Gender dynamics in digital communication may be configured by a few prominent factors that underpin and shape processes of digitalization – digital literacy (van Dijk, 2020), working from home (Bick et al., 2023; Kley & Reimer, 2023), restrictions implemented to contain the COVID-19 pandemic (Hu & Qian, 2021), and the intensity of internet use in a

country (Chinn & Fiarlie, 2010). Although processes of digitalization are also shaped by other factors (e.g., digital infrastructure, social policies, and legislation), these four focal factors are among the ones that feature most prominently in ongoing academic conversations and policy developments (Rodríguez-Modroño et al., 2022; van Dijk, 2020; Yin et al., 2023).

First, research on the gender digital divide shows a gender lag whereby digital literacy and technology adoption were more prevalent among men than women at an early stage of digitalization, with women catching up with men in recent years, especially in advanced economies (DiMaggio et al., 2004; van Dijk, 2020). As women's digital literacy increases and catches up with that of men, women tend to shoulder the lion's share of digital labor associated with kin-keeping and childrearing at home (Acilar & Sæbø, 2023; Eklund & Sadowsk, 2023; Peng, 2022). With increased digital literacy, women are also increasingly likely to undertake day-to-day digital labor at work (Arcy, 2016; Yin et al., 2023). As a result, we expect increasing digital literacy to exacerbate gender gaps in work-family digital communication, as specified in Hypothesis 2A.

> **Hypothesis 2A** (digital literacy): Gender gaps whereby women are more likely than men to specialize in family-only and juggle dual work-family digital communication are wider among people with a higher level of digital literacy.

Second, working from home often necessitates ICT use as people communicate with employers and colleagues at a distance (Galanti et al., 2021). Before the pandemic, evidence indicates that telework was less prevalent among European women than men (Kley & Reimer, 2023), but this gender gap has narrowed and even reversed in some contexts during and after the pandemic (Bick et al., 2023; Remery et al., 2022). Women and men may also experience working from home in different ways. As working from home tends to increase women's, but not necessarily men's, domestic burden (Chung and Booker, 2023; Yavorsky et al., 2021), it may exacerbate the gender gap in family-related digital communication.

Furthermore, since working from home is more often adopted by women than by men to juggle work and family responsibilities (Bick et al., 2023), it may exacerbate women's double burden of dual work-family digital communication. These considerations are summed up in Hypothesis 2B.

> **Hypothesis 2B** (working from home): More frequent working from home is associated with wider gender gaps whereby women are more likely than men to specialize in family-only and juggle dual work-family digital communication.

Third, the COVID-19 pandemic and associated social distancing and lockdown measures have accelerated processes of digitalization, including precipitating a drastic shift toward remote work and elevating the need for digital communication with family (Fan & Moen, 2023; Hu & Qian, 2021). Under tighter pandemic control policies, people may have relied more on ICTs to communicate with work contacts and family members, due to curtailed in-person interactions (Hu & Qian, 2021; Nguyen et al., 2020). If stringent COVID-19 restrictions necessitated remote work and intensified ICT use in the feminized labor of kin-keeping (Abel et al., 2021; Peng, 2022; Yavorsky et al., 2021), such restrictions may heighten the dual work-family digital burden for women more than for men.

> **Hypothesis 2C** (COVID-19 restrictions): The gender gap whereby women are more likely than men to juggle dual work-family digital communication is wider under more stringent COVID-19 restrictions.

Finally, both the level of digital communication and its associated gender inequality vary with broader digital diffusion in society (van Dijk, 2020). In places with limited access to the internet and digital technologies, men tend to enjoy the privilege of accessing these "rare resources" (Acilar & Sæbø, 2023). Departing from the early stage of digitalization, rapid developments in internet coverage and digital infrastructure have led to a "feminization" of digital labor as women increasingly use ICTs in everyday life (Arcy, 2016;

Bishop & Duffy, 2020; Peng, 2022). This is reflected in the contrast between men's monopoly of digital technology in countries with limited internet coverage and use vs. an increasing burden of digital labor associated with kin-keeping and care provision on women in countries where people use the internet intensely (Acilar & Sæbø, 2023; Gubernskaya & Treas, 2016). Meanwhile, digitalization has been found to bolster women's labor force participation and their ICT use for work, particularly as they undertake remote work to accommodate their care responsibilities (Chung, 2022; Yin et al., 2023). As internet coverage rates are relatively high in most countries included in our study (European Commission, 2023), the intensity of people's internet use better captures and differentiates the level of digitalization across our focal countries. If a higher level of digitalization is associated with women's increased ICT use at work and particularly in family life, we expect Hypothesis 2D to hold.

> **Hypothesis 2D** (country-level internet use intensity): Higher country-level internet use intensity is associated with wider gender gaps whereby women are more likely than men to specialize in family-only and juggle dual work-family digital communication.

METHODS

Data and sample

We analyzed data from Round 10 of the European Social Survey (ESS), which was fielded during the COVID-19 pandemic between September 2020 and September 2022. The full dataset includes 59,685 respondents from 31 countries. Launched in 2002, the ESS is a biennial repeated cross-sectional and cross-national survey that covers a wide range of social research topics. The ESS provides a nationally representative sample of all residents aged 15 or over in each participating country. While the 10th round of ESS collected data through

face-to-face computer-assisted personal interviews in 22 countries, it was conducted via online or paper self-completion in the other 9 countries due to COVID-19 restrictions. The use of postal paper questionnaires ensured that those who had limited internet access or digital literacy were able to take part in the survey. For the first time, the ESS Round 10 included a dedicated module on people's digital communication with colleagues and family members. The dataset, therefore, is ideally suited for analyzing people's digital communication both at work and at home. Because comparable information on the stringency of COVID-19 restrictions is not available for Montenegro and North Macedonia, we excluded these two countries from our analysis (n = 56,978).

We first restricted our analytical sample based on the design of the digital communication measures. In the survey, information on digital communication with colleagues was only collected from working respondents. Only respondents with children aged 12 or above and those with at least one living parent were asked about their digital communication with children aged 12 or above and parent(s), respectively. Notably, building on the premise that coresident family members can also have digital communication with one another (Dworkin et al., 2019), the ESS asked respondents to report their digital communication with children/parents regardless of whether or not the respondents lived with them at the time of survey, though we have controlled for the coresident status of children and parents in our analysis. Given the survey design and our focus on both work and family digital communication, we limited our sample to working respondents with at least one child aged 12 or above and at least one living parent (n = 8,493).

Next, we deleted respondents aged 60 or above to exclude those beyond the (early) retirement age and avoid mortality bias, and we excluded those aged below 30 as hardly any under-30s had children aged 12 or above (n = 7,472). We then listwise deleted respondents with missing information on digital communication with colleagues, children aged 12 or

above, and parents (n = 6,984). Finally, we listwise deleted 4.7% of respondents with missing values for the covariates. A Little's test showed that the missing patterns for the covariates were at random (Li, 2013). The final analytical sample contains 6,654 working respondents aged 30–59 with at least one child aged 12 or above and at least one living parent across 29 countries. See Table 1 for the characteristics of the analytical sample and Appendix Table A1 for a list of the countries included in our study.

[Insert Table 1 Here]

Key measures

Work and family digital communication. For work-related digital communication, the ESS asked separate questions regarding how often respondents spoke with colleagues via each of the following three channels: (1) phone calls, (2) text, email, or messaging apps, and (3) video calls. Similarly, for family-related digital communication, the survey asked how often respondents spoke with children aged 12 or above via each of the three channels of digital communication; and the three questions were repeated for respondents' digital communication with their parents. The response to each question was recorded on a seven-point Likert scale ranging from "several times a day," "once a day," "several times a week," "several times a month," "once a month," "less often" to "never." We reverse-coded each of the digital communication measures to range from 1 to 7, with a higher score indicating more frequent communication. The digital communication measures for work (Cronbach's alpha = 0.72, eigenvalue = 1.28) and for family (Cronbach's alpha = 0.60, eigenvalue = 1.25) loaded on two corresponding factors, and the measures within each factor had similar loadings. Thus, we added up the scores for the measures within each factor to capture one's overall level of digital communication for work and for family, respectively. We rescaled the scores

for each of the two factors to range from 0 to 1, with a higher score indicating more frequent work or family digital communication.

Digital literacy. To measure digital literacy, the ESS asked respondents to rate their familiarity with (1) preference settings on a computer, (2) advanced search on the internet, and (3) using portable document files (PDF). The responses were recorded on a five-point Likert scale ranging from "not familiar at all (1)" to "completely familiar (5)." As the items loaded evenly on one factor (Cronbach's alpha = 0.89, eigenvalue = 2.14), we averaged the scores of the three items to yield a digital literacy index ranging from 1 to 5, with a higher score indicating better literacy. Notably, to minimize sample loss, for a small number of respondents ($n < 50$) who did not provide a valid answer to one or two of the three items, we calculated the digital literacy index for these respondents based on their valid answers to the remaining item(s).

Work from home. The survey asked respondents to report how often they worked from home or a place of their choice outside the usual workplace. The responses were recorded on a six-point scale ranging from "every day," "several times a week," "several times a month," "once a month," "less often" to "never." We reverse-coded the measure to range from 1 to 6, with a higher score indicating that one worked from home more often.

COVID-19 stringency index. To measure the stringency of COVID-19 restrictions, we matched the country of residence and the date of survey completion for each respondent to the COVID-19 stringency index derived from the Oxford COVID-19 Government Response Tracker (Hale et al., 2021). The index comprehensively covers multi-dimensional restrictions imposed to contain the spread of COVID-19 that may also shape digital communication for work and for family: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and

international travel controls (Hale et al., 2021). The index ranges from 0 to 100, with a higher score indicating more stringent restrictions.

Country-level internet use intensity. We calculated the average intensity of people's internet use in each country. In the ESS, respondents were asked to report how often they used the internet. The responses were recorded on a five-point scale (1–5) ranging from "never," "only occasionally," "a few times a week," "most days," to "every day." We calculated the average frequency of people's internet use within each country. In this calculation, we used the full (rather than reduced) ESS sample for each country to capture nationally representative population-wide dynamics. Notably, alternative analyses based on subnational region-level rather than country-level intensity of internet use yielded substantive consistent results (Supplementary Table S1).

Gender. We captured respondents' gender using a binary measure distinguishing between women and men. The ESS did not measure people's self-reported gender identification beyond the male-female sex binary.

Control variables

We controlled for a range of variables that may confound the relationship between gender and digital communication for work and family. We accounted for basic sociodemographic variables that tend to shape digital communication patterns (Cabalquinto & Hu, 2023; Hu & Qian, 2021), including age, migrant status (1 = born in a country different from their country of residence when surveyed; 0 = otherwise), a higher education degree equivalent to the International Standard Classification of Education levels 5–6 (1 = yes; 0 = no), and a coresident partner/spouse (1 = yes; 0 = no). We also controlled for whether one lived with at least one child aged 12 or above (1 = yes; 0 = no) and whether one lived with at least one parent (1 = yes; 0 = no). To differentiate the level of work engagement in our sample of

working respondents, we measured the number of hours respondents normally worked each week. Household socioeconomic status was captured using the ESS measure of household income level in a given country ranging from the lowest (1) to the highest (10). Given the high level of missing values for this variable and the need to minimize sample loss, we assigned an income level of 5 to those with a missing value and generated an additional dummy variable to distinguish the missing cases (see Killewald & Gough [2013] for a similar treatment of missing values). Finally, work and family digital communication hinges on individuals' access to the internet (van Djik, 2020). The survey asked whether respondents had access to the internet (1) at work, (2) at home, and (3) on the move. We generated two dummy variables to capture respondents' internet access at work and at home, respectively, in line with our focus on work and family digital communication. Notably, we coded respondents with internet access on the move, for example via mobile devices, as having internet access both at work and at home.

Early in this research, we also experimented with including additional control variables: (suspected) COVID-19 infection in the household (data not collected in France), self-reported health, the presence of children under the age of 18 in the household, the type of region in which one lived (e.g., countryside, suburbs, big city), and whether the survey was completed via interview or self-completion. Nevertheless, because the inclusion of these variables did not affect the results for our key predictors and may lead to further sample loss, they were not included in the final analysis reported here. We also experimented with controlling for one's employment industry based on the first-level 21-category NACE (Nomenclature of Economic Activities) classification, which did not change our substantive results (Supplementary Tables S2–S3). We did not control for industry in our main analyses because it led to small cells and potentially underpowered models.

Analytic strategy

We conducted the analysis in three stages. In the first stage, we used latent profile analysis (LPA) (Nylund et al., 2007) to identify distinct underlying classes of digital communication across the domains of work and family. Departing from previous research treating work and family digital communication as separate dependent variables, LPA enables the assessment of our key premise that the domains of work and family do not exist in isolation but are interconnected. The LPA was conducted using the *gsem* package in Stata version 18. The optimal classification solution was determined based not just on fit indices including log-likelihood, Bayesian information criterion (BIC), and Akaike information criteria (AIC), but also on the conceptual distinctiveness of the classes identified (Nylund et al., 2007).

In the second stage, the typology of work-family digital communication identified in the LPA was taken as the dependent variable. To account for the hierarchical structure of the data (i.e., individuals are nested within countries) (Snijders & Bosker, 2011), we used two-level logit regression models with random intercepts at the country level to test Hypotheses 1A, 1B, and 1C. That is, we assessed gender differences in the distributions of distinct work-family digital communication profiles while accounting for other covariates. Here and below, we clustered standard errors at the country level to account for sample clustering.

In the third stage, we fitted two-level logit regression models to test Hypotheses 2A, 2B, 2C, and 2D by including the interaction effects of gender with digital literacy, working from home, COVID-19 stringency index, and country-level internet use intensity, respectively, in predicting each distinct profile of work-family digital communication. All the models included random intercepts at the country level. In estimating the interaction between individual-level and country-level predictors (i.e., gender × country-level internet use

intensity), we also included random slopes for the individual-level predictor (i.e., gender) at the country level (Heisig & Schaeffer, 2019). Since the COVID-19 stringency index in each country was matched to the specific dates when respondents completed the survey, this variable was treated as an individual-level rather than country-level measure.

The results reported in this article are robust to additional checks. First, a variance inflation factor (VIF) test was conducted to ensure that the regression models were not affected by multicollinearity; and the VIF values for all predictors were below the conservative threshold of 2.5 (Mason & Perreault, 1991). Second, using an alternative multinomial logit specification for the regression models yielded results that were consistent with those from the more computationally efficient binomial logit specification used in the main analysis (Allison, 2012).

RESULTS

A five-fold typology of work-family digital communication

We conducted latent profile analysis (LPA) to identify distinct profiles of individuals' digital communication across the domains of work and family. The model fit indices for the LPA are presented in Table 2. The goal of model selection in LCA is to find a parsimonious solution that is conceptually salient and also deviates as little as possible from the pattern observed in the data (Nylund et al., 2007). To this end, our model selection is guided by both conceptual distinctiveness and model fit indices (BIC and AIC). Both the BIC and AIC penalize the inclusion of parameters that do not contribute proportionately to the model. With the lowest BIC and AIC values, the five-class solution provides the best model fit. Further inspection indicated that the four-class solution missed out conceptually distinctive profiles, and the six-class solution does not provide any new conceptual insights into work-family digital communication but leads to classes that are too small in size for meaningful analysis.

[Insert Table 2 and Figure 1 Here]

Figure 1 depicts the five-fold typology of work-family digital communication (see Appendix Table A2 for specific distributions within each country). Based on their distinctive features, we name the five profiles "dual-medium communication," "dual-low communication," "high work-only communication," "dual-high communication", and "high family-only communication," which are ordered by the size of the profiles from the largest to the smallest. As the largest profile, 44.2% of respondents juggle a medium level of digital communication in both work and family lives, with no statistically significant difference between women (43.7%) and men (44.7%) ($\chi^2 = 0.62$, $p = 0.428$). Around 36% of respondents have low digital communication for both work and family, and women (38.4%) are more likely than men (32.8%) to have dual-low digital communication ($\chi^2 = 22.28$, $p < 0.001$). Approximately 15% of respondents have a high level of digital communication only at work but not in family life, and this profile is skewed toward men (19.6%) as opposed to women (12.1%) ($\chi^2 = 70.96$, $p < 0.001$). The final two profiles are relatively small in size but are conceptually distinctive, and they are also likely to grow in size with further intensification of internet use in everyday life. The dual-high communication profile, including 2.7% of respondents, is characterized by high levels of digital communication in both work and family lives. Compared with men (2.1%), women (3.2%) are more likely to have dual-high digital communication ($\chi^2 = 7.89$, $p < 0.01$). Finally, 1.9% of respondents have high family-only digital communication, and this profile is more likely among women (2.7%) than among men (0.9%) ($\chi^2 = 27.36$, $p < 0.001$). The LPA results highlight the interconnections between work and family digital communication. In fact, 82.8% of the respondents have a low, medium, or high level of digital communication in both work and family lives. By contrast, the specialization in high work-only or high family-only digital communication only applies to about one in six respondents.

Multilevel model results

Table 3 presents the results from two-level random-intercept models estimating the log-odds of belonging to each of the five work-family digital communication profiles. The results support Hypothesis 1A regarding gender specialization in high work-only and high family-only digital communication. After controlling for key sociodemographic covariates, women are 30.5% (1 – exp(–0.364), $p < 0.001$) less likely than men to have high work-only digital communication, but are 2.6 times (exp(0.955), $p < 0.001$) more likely than men to have high family-only digital communication. Supporting Hypothesis 1B, women are 1.6 times (exp(0.494), $p < 0.01$) more likely than men to have dual-high work-family digital communication. Although the LPA results in the preceding section provided descriptive evidence in support of Hypothesis 1C that women are more likely than men to have dual-low digital communication, this gender difference is no longer statistically significant after controlling for the covariates in Table 3 ($B = 0.081$, $p > 0.10$). Our additional analysis shows that this gender gap (i.e., women's higher likelihood of dual-low digital communication) is explained primarily by women's lower digital literacy compared with men.

[Insert Table 3 Here]

The results from Table 3 also reveal the roles of digital literacy, working from home, the stringency of COVID-19 restrictions, and country-level internet use intensity in configuring the profiles of work-family digital communication. Specifically, the profile of dual-low digital communication is less likely, while the other four profiles of digital communication are more likely, among people with high rather than low digital literacy. Compared with individuals who work from home less often, those who work from home more often are less likely to have dual-low and high family-only digital communication but are more likely to have dual-medium, high work-only, and dual-high digital communication.

The stringency of COVID-19 restrictions does not bear a statistically significant association with any of the five profiles of digital communication. In countries with a higher rather than lower intensity of internet use, people are more likely to have high work-only digital communication but less likely to have dual-low and high family-only digital communication.

[Insert Table 4 Here]

Next, we present results from multilevel models including the interaction effects between gender and each of the moderating variables capturing key contexts of digitalization. Table 4 presents the coefficients for the interaction effects. Since the inclusion of the interaction terms hardly changed the results of the control variables reported in Table 3, the results for control variables are omitted from Table 4 to conserve space. To aid interpretation of the interaction effects, the four rows in Figure 2 depict how gender differences in the prevalence of the five profiles of work-family digital communication vary with digital literacy, working from home, the stringency of COVID-19 restrictions, and country-level internet use intensity, respectively. In Figure 2, the marginal effects of gender (i.e., the prevalence of a given profile among women minus that among men) over the distributions of the four moderating variables were calculated by holding all other covariates at their observed values using the *margins* function in Stata (Mize, 2019).

[Insert Figure 2 Here]

The result of the interaction between gender and digital literacy supports Hypothesis 2A. As shown in the first row of Figure 2, only among those with high (but not low) digital literacy are women more likely than men to juggle a medium level of digital communication in both work and family lives. Hypothesis 2B regarding the interaction effect between gender and working from home is also supported, based on the second row of Figure 2. Among people who work from home often, women are more likely than men to have dual-medium work-family digital communication. By contrast, this gender gap is not found between

women and men who seldom work from home. Hypothesis 2C regarding the moderating role of the stringency of COVID-19 restrictions is not supported, according to the third row of Figure 2. There is no statistically significant evidence that gender gaps in the prevalence of the work-family digital communication profiles vary with the stringency of COVID-19 restrictions. Finally, the results support Hypothesis 2D on the moderating role of country-level intensity of internet use. As shown in the bottom-right panels of Figure 2, in countries with more intense internet use, women are more likely than men to have dual-high and high family-only digital communication. Yet, such gender gaps are not found in countries with a low level of internet use intensity. Nevertheless, it is worth noting that the effect sizes of the interactions between gender and country-level internet use intensity are relatively small.

CONCLUSIONS AND DISCUSSION

Maintaining digital communication at work and with family members has become a key part of, but also an onerous task in, everyday life (Arcy, 2016; Cabalquinto & Hu, 2023; Eklund & Sadowsk, 2023). This study integrates a gender perspective and a cross-domain, cross-national approach to understanding digital communication in work and family lives. In doing so, it illuminates the implications of rapid digitalization, accelerated by the COVID-19 pandemic, for new forms of gender inequality in work-family lives. The approach and findings of this study make several contributions to the sociology of families, work, and gender, as we discuss below.

The findings demonstrate the value of developing a cross-domain view of digital communication in the realms of work and family. For five in six people in our study, their levels of digital communication at work and at home are closely aligned. This finding suggests that the digitalization of interpersonal interactions across different life domains

evolves in tandem rather than in isolation, and should thus be understood as interconnected rather than separate social processes.

Our cross-domain approach has provided new insights into gender specialization in digital communication across the realms of work and family. Women are more likely to have high family-only digital communication and men are more likely to have high work-only digital communication, although such specialization only applies to a minority of individuals across the 29 countries included in this study. Our findings further show that women are more likely than men to have dual-high work-family digital communication and thus shoulder a distinctive "digital double burden." Although only a relatively small proportion of respondents in our sample have dual-high work-family digital communication, it is worth recognizing that the absolute scale of this population is sizable and will likely grow in the future as digital technology use further intensifies in work and family lives. These findings indicate that the persistent gender division of market and domestic labor (England et al., 2020; Sullivan et al., 2018) extends into the digital realm. Building on these results, we call attention to gender inequality in the performance of digital labor, as well as a need to bring theories such as gender specialization (Becker, 1981) into the digital era.

As many countries endeavor to increase their residents' digital literacy (Radovanović et al., 2020), our findings on the relationship between digital literacy and work-family digital communication present a gender challenge in building digital capacity. Among people with high rather than low digital literacy, women are more likely than men to juggle the "double burden" of maintaining medium levels of digital communication both at work and at home. Such "double burden" may lead to digital burnout (e.g., "Zoom fatigue") and work-family spillover and conflict (Ollier-Malaterre et al., 2019). While it is undoubtedly important to grow digital literacy in society, our findings underline the importance of ensuring that the

increase in digital literacy does not lead to women undertaking a disproportionately large share of digital labor in work and family lives.

Following theories highlighting the potentially exploitative nature of flexible work arrangements, a growing body of research has shown that working from home can exacerbate gender inequality both at work and at home (Chung 2022; Chung & van der Lippe, 2020; Kurowska, 2020), particularly during the COVID-19 pandemic (De Laat, 2023; Lyttelton et al., 2022; Yavorsky et al., 2021). Our study adds a crucial dimension and new evidence to this literature by highlighting digital communication as a key area where working from home could further entrench gender inequality in the division of paid work and domestic labor. Specifically, among those who frequently work from home, women are more likely than men to juggle medium levels of both work and family digital communication. By contrast, this gendered double burden is not found between women and men who seldom work from home. This finding, again, has implications for women's well-being and potential work-family conflict (Fan & Moen, 2023; Ollier-Malaterre et al., 2019). Joining scholars such as Chung (2022) and Mazmanian et al. (2013), we draw attention to the "paradox" whereby flexible work arrangements such as remote work are often hailed as family-friendly and gender-egalitarian, but they can serve to exacerbate gender inequality in work-family digital labor.

Our findings show that gender inequality in work-family digital communication also varies with broader digital diffusion, as captured by the intensity of people's internet use in a country. In countries with more intense internet use, women are more likely than men to have high family-only and dual-high work-family digital communication, and such gender gaps are not found in countries with a low level of internet use intensity. These results suggest that the intensification of internet use and digitalization in society seems to be associated with greater gender specialization in family-related digital labor and a heightened "digital double burden" for women. While mainstream efforts focus on reducing gender inequality in digital access

and literacy (van Dijk, 2020), our findings urge scholars and policymakers to consider gender equality in the division of digital (communication) labor in national and global agendas to ensure digitalization benefits women and men equally.

Interestingly, the prevalence of each work-family digital communication profile and gender differences in the prevalence of the profiles do not seem to bear statistically significant associations with the stringency of COVID-19 restrictions. However, the conditions of the pandemic may have been more localized and some COVID-19 containment policies were implemented at regional and local levels. The lack of comparable measures capturing the stringency of COVID-19 restrictions at subnational levels thus represents a limitation of our study. Had the null results indeed reflected a lack of association between pandemic restrictions (e.g., lockdown, social distancing) and (gender inequality in) digital communication, then they would suggest that our findings are relevant to understanding work-family digital communication and gender inequality in such digital labor more generally beyond the pandemic context.

Our study has a few limitations. First, our cross-sectional analysis only indicates associations rather than causality, for example, between digital literacy and gender differences in work-family digital communication. Future research could collect longitudinal data to further understand the causal mechanisms that give rise to gender inequality in work-family digital communication. It is also important to collect additional rounds of data to track how the distinct profiles of work-family digital communication evolve in the future. Second, the limited number of higher-level units means that we were only able to include a small number of country-level predictors to conserve statistical power. Relatedly, we were unable to examine finer contextual variations due to sample size considerations and a lack of detailed publicly-available geo-coded information on, for example, the stringency of COVID-19 restrictions. Finally, it is worth noting that we focused on digital communication as a form of

labor, following and extending the emerging research on digital labor (e.g., Arcy, 2016; Gregg & Andrijasevic, 2019; Peng, 2022), but data limitations prevented us from examining the specific content of such communication. Future research could explore in greater detail the specific nature and content of digital communication and how they relate to people's well-being outcomes (e.g., stressful communication at work vs. communication with family that helps relieve the negative impact of family separation).

Despite these limitations, the findings from our study add large-scale evidence to an increasing recognition of digital labor as a new frontier of gender inequality (Arcy, 2016; Gregg & Andrijasevic, 2019; Peng, 2022). The findings suggest that as digital literacy, working from home, and internet use intensity increase further in society, women may disproportionately take on family-related digital labor and also suffer from a "digital double burden" in work-family life. This study thus calls for scholars to mainstream gender theories and analyses into research on digitalization and work-family changes. As the world and day-to-day interpersonal interactions become increasingly digitalized, the insights from this study urge policymakers, work-family practitioners, technological enterprises, and individuals to incorporate gender equality considerations into the design, deployment, and everyday use of digital and communication technologies.

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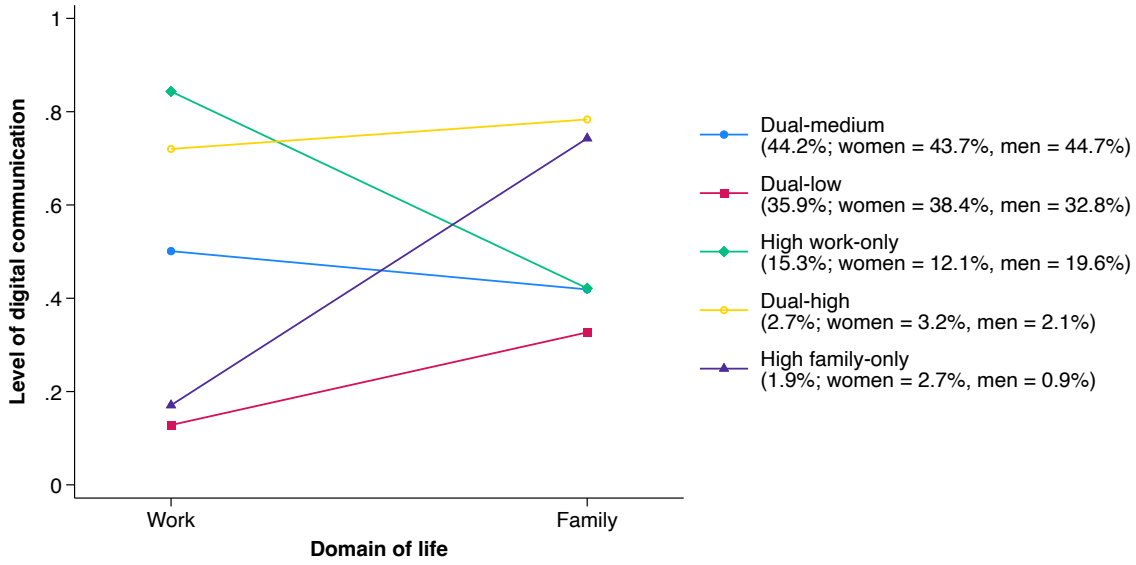

Figure 1. A five-fold typology of work-family digital communication.

Note: See Table 2 for latent profile analysis model fit indices.

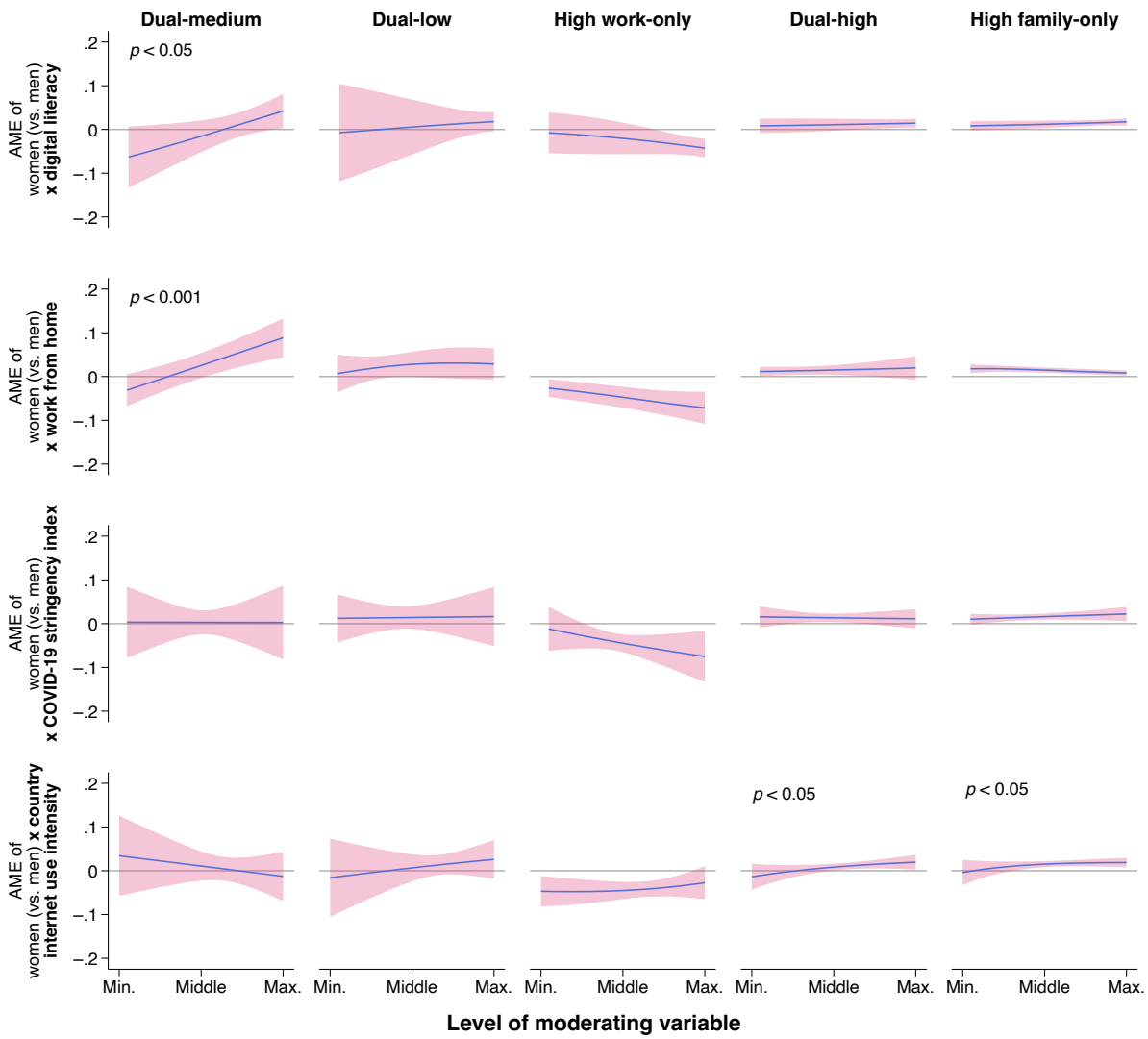

Figure 2. Variations in gender gaps in work-family digital communication with digital literacy, work from home, COVID-19 stringency index, and country-level intensity of internet use.

Note: AME = average marginal effects, holding all other variables at their observed values. Min. = minimum. Max. = Maximum. Interactions are not statistically significant at the 10% level unless the *p*-value is reported in the graph. Coefficients for the interaction effects are presented in Table 4.

Table 1. Sample characteristics (N = 6,654)

	Minimum	Maximum	Mean/ Proportion	Standard deviation
Work-related digital communication	0	1	.42	.28
Family-related digital communication	0	1	.40	.16
Digital literacy	1	5	3.51	1.06
Work from home (high = more frequent)	1	6	2.39	1.82
COVID-19 stringency index (0–100)	5.56	74.31	35.11	12.36
Country-level intensity of internet use (1–5)	3.36	4.83	4.21	0.38
Women (ref. = men)	0	1	.56	
Age	30	59	48.84	6.19
Migrant (ref. = no)	0	1	.09	
Higher education degree (ref. = no)	0	1	.45	
Coresident partner/spouse (ref. = no)	0	1	.80	
Coresident children ≥ 12 (ref. = no)	0	1	.66	
Coresident parent(s) (ref. = no)	0	1	.05	
Hours worked per week	0	80	38.41	13.53
Level of household income	1	10	6.71	2.29
Household income missing (ref. = no)	0	1	.13	
Internet access at work (ref. = no)	0	1	.86	
Internet access at home (ref. = no)	0	1	.98	

Note: Dummy variables have a minimum value of 0 and a maximum value of 1, except for work-related and family-related digital communication, which are continuous variables scaled to range from 0 to 1. Possible ranges for continuous variables are listed in parentheses if the range is not fully covered by the observed minimum and maximum values. The COVID-19 stringency index was matched to the country of residence and the day of the survey for each respondent. Descriptive statistics for country-level intensity of internet use were calculated based on 29 country units.

Table 2. Latent profile analysis model fit indices

# of class	Log-likelihood	Degrees of freedom	Akaike information criterion (AIC)	Bayesian information criterion (BIC)
2	2,268.4	7	–4,522.7	–4,475.1
3	2,390.6	10	–4,761.2	–4,693.1
4	2,360.5	13	–4,695.0	–4,606.6
5 (selected)	**2,475.0**	**16**	**–4,918.0**	**–4,809.1**
6	2,475.1	19	–4,912.2	–4,783.0

Table 3. Two-level logit regression models predicting profiles of work-family digital communication (N = 6,654 respondents across 29 countries)

	Dual-medium	Dual-low	High work-only	Dual-high	High family-only
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Women (ref. = men)	0.013	0.081	–0.364***	0.494**	0.955***
	(0.062)	(0.075)	(0.088)	(0.176)	(0.253)
Digital literacy	0.126***	–0.325***	0.265***	0.232*	0.207
	(0.032)	(0.051)	(0.035)	(0.097)	(0.133)
Work from home (frequency)	0.062**	–0.409***	0.359***	0.108*	–0.340***
	(0.019)	(0.035)	(0.027)	(0.043)	(0.082)
COVID-19 stringency index	0.001	–0.002	–0.005	–0.006	0.001
	(0.003)	(0.004)	(0.005)	(0.008)	(0.009)
Country-level intensity of internet use	0.063	–0.523**	0.891***	–0.311	–0.521+
	(0.100)	(0.172)	(0.183)	(0.470)	(0.284)
Age	–0.007	0.022***	0.004	–0.079***	–0.051***
	(0.004)	(0.005)	(0.008)	(0.014)	(0.015)
Higher education degree (ref. = no)	0.264***	–0.358***	0.156+	0.006	–0.072
	(0.059)	(0.082)	(0.085)	(0.184)	(0.221)
Migrant (ref. = no)	0.071	–0.250**	–0.467***	0.826**	1.259***
	(0.051)	(0.083)	(0.126)	(0.270)	(0.225)
Coresident partner/spouse (ref. = no)	0.031	0.161+	–0.196+	0.194	–0.376+
	(0.073)	(0.084)	(0.114)	(0.240)	(0.213)
Coresident children ≥ 12 (ref. = no)	0.117+	0.003	–0.022	–0.597**	–0.202
	(0.063)	(0.053)	(0.114)	(0.225)	(0.231)
Coresident parent(s) (ref. = no)	–0.128	0.203	0.060	0.161	–0.479
	(0.113)	(0.138)	(0.226)	(0.244)	(0.553)
Hours worked per week	0.003+	–0.011***	0.011**	0.001	–0.012
	(0.002)	(0.002)	(0.004)	(0.004)	(0.008)
Level of household income	0.005	–0.093***	0.174***	–0.040	–0.036
	(0.015)	(0.019)	(0.025)	(0.041)	(0.056)
Household income missing (ref. = no)	–0.245*	0.077	0.669***	–0.072	–0.267
	(0.099)	(0.120)	(0.118)	(0.215)	(0.299)
Internet access at work (ref. = no)	0.349***	–0.349***	0.459*	0.009	–0.312
	(0.084)	(0.087)	(0.205)	(0.218)	(0.263)
Internet access at home (ref. = no)	0.294	–0.017	–0.224	–1.143**	–0.098
	(0.198)	(0.223)	(0.541)	(0.404)	(0.625)
Individual intercept	–1.726**	3.788***	–9.287***	1.526	1.222
	(0.530)	(0.717)	(1.306)	(2.064)	(1.408)
Country random intercept (variance)	0.025+	0.235**	0.151**	0.816**	0.133
	(0.015)	(0.078)	(0.056)	(0.279)	(0.086)

Note: ref. = reference group. SE = standard error clustered at the country level.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4. Coefficients for interaction effects underlying Figure 2 (N = 6,654 respondents across 29 countries)

	Dual-medium	Dual-low	High work-only	Dual-high	High family-only
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Women × digital literacy					
Women (ref. = men)	–0.390+	–0.038	–0.126	0.636	0.979
	(0.204)	(0.296)	(0.395)	(0.545)	(0.770)
Digital literacy	0.066+	–0.344***	0.294***	0.256*	0.212
	(0.040)	(0.050)	(0.050)	(0.104)	(0.232)
Women × digital literacy	0.113*	0.035	–0.061	–0.037	–0.007
	(0.050)	(0.073)	(0.100)	(0.138)	(0.203)
Women × work from home (frequency)					
Women (ref. = men)	–0.231*	–0.027	–0.355*	0.470	0.350
	(0.096)	(0.152)	(0.148)	(0.298)	(0.346)
Work from home	0.006	–0.444***	0.361***	0.102	–0.711**
	(0.026)	(0.058)	(0.031)	(0.076)	(0.271)
Women × work from home	0.100***	0.059	–0.003	0.009	0.428
	(0.024)	(0.058)	(0.029)	(0.096)	(0.267)
Women × COVID-19 stringency index					
Women (ref. = men)	0.015	0.068	–0.050	0.483	0.516
	(0.202)	(0.184)	(0.254)	(0.481)	(0.538)
COVID-19 stringency index	0.001	–0.002	–0.000	–0.006	–0.009
	(0.003)	(0.005)	(0.006)	(0.012)	(0.018)
Women × COVID-19 stringency index	–0.000	0.000	–0.010	0.000	0.012
	(0.005)	(0.005)	(0.007)	(0.013)	(0.015)
Women × country-level intensity of internet use					
Women (ref. = men)	0.599	–0.634	–1.854+	–4.316*	–5.091*
	(0.872)	(1.058)	(1.007)	(2.086)	(2.565)
Country-level intensity of internet use	0.141	–0.617**	0.716**	–1.083+	–1.682**
	(0.135)	(0.199)	(0.263)	(0.623)	(0.601)
Women × country-level intensity of internet use	–0.135	0.162	0.343	1.148*	1.472*
	(0.202)	(0.244)	(0.231)	(0.499)	(0.630)

Note: ref. = reference group. SE = standard error clustered at the country level. The models estimating the interaction between gender and country-level intensity of internet use also included country-level random slopes for the gender dummy variable (not shown). All models presented in this table also included the same control variables as in Table 3. Since the inclusion of the interaction between gender and each of the moderating variables hardly changed the results of the control variables reported in Table 3, the results for control variables are omitted from this table to conserve space.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix

Table A1. Descriptive statistics (means) for key variables across 29 countries

Country	Digital communication (work; range: 0–1)	Digital communication (family; range: 0–1)	COVID-19 stringency index	Country-level intensity of internet use (range: 1–5)
Austria	0.42	0.38	48.87	4.40
Belgium	0.43	0.37	19.79	4.45
Bulgaria	0.33	0.39	36.49	3.74
Cyprus	0.51	0.44	37.84	4.55
Czech Republic	0.32	0.39	41.25	4.20
Estonia	0.40	0.38	28.07	4.13
Finland	0.54	0.40	27.71	4.53
France	0.38	0.37	42.41	4.29
Germany	0.41	0.37	31.33	4.39
Greece	0.26	0.37	67.63	3.97
Croatia	0.34	0.40	35.71	3.86
Hungary	0.30	0.39	31.86	3.60
Ireland	0.48	0.43	10.30	4.14
Israel	0.62	0.54	26.26	4.46
Iceland	0.46	0.43	32.74	4.72
Italy	0.34	0.45	45.49	3.92
Lithuania	0.39	0.43	34.19	3.82
Latvia	0.52	0.45	43.97	4.51
Netherlands	0.55	0.41	41.28	4.78
Norway	0.52	0.44	29.55	4.83
Poland	0.43	0.43	39.83	3.97
Portugal	0.32	0.36	39.78	3.54
Serbia	0.51	0.51	31.44	4.02
Spain	0.48	0.45	36.98	4.32
Sweden	0.52	0.43	16.50	4.67
Switzerland	0.35	0.35	43.24	4.52
Slovenia	0.36	0.35	45.27	4.00
Slovakia	0.35	0.39	44.98	3.36
United Kingdom	0.52	0.44	32.49	4.29

Note: Because we matched the COVID-19 stringency index in each country to the specific dates when respondents completed the survey, the statistics reported in this table are calculated by aggregating individual-level data within each country.

Table A2. Distribution (proportion) of work-family digital communication profiles across 29 countries

Country	Dual-medium	Dual-low	High work-only	Dual-high	High family-only
Austria	0.48	0.35	0.14	0.01	0.01
Belgium	0.49	0.32	0.16	0.00	0.03
Bulgaria	0.41	0.50	0.06	0.01	0.02
Cyprus	0.53	0.21	0.23	0.02	0.02
Czech Republic	0.46	0.46	0.05	0.02	0.02
Estonia	0.43	0.41	0.15	0.00	0.00
Finland	0.52	0.22	0.25	0.00	0.00
France	0.37	0.45	0.14	0.02	0.01
Germany	0.41	0.40	0.17	0.01	0.01
Greece	0.32	0.63	0.02	0.01	0.03
Croatia	0.43	0.44	0.05	0.06	0.02
Hungary	0.39	0.52	0.04	0.04	0.02
Ireland	0.41	0.26	0.21	0.06	0.05
Israel	0.46	0.08	0.31	0.14	0.02
Iceland	0.45	0.29	0.21	0.03	0.02
Italy	0.44	0.42	0.08	0.02	0.05
Lithuania	0.40	0.39	0.13	0.04	0.03
Latvia	0.45	0.21	0.24	0.06	0.04
Netherlands	0.51	0.20	0.27	0.01	0.01
Norway	0.58	0.18	0.23	0.01	0.00
Poland	0.58	0.26	0.10	0.03	0.03
Portugal	0.38	0.47	0.12	0.00	0.02
Serbia	0.52	0.19	0.14	0.13	0.02
Spain	0.45	0.25	0.18	0.09	0.04
Sweden	0.44	0.25	0.28	0.02	0.02
Switzerland	0.42	0.47	0.07	0.02	0.01
Slovenia	0.37	0.46	0.14	0.02	0.02
Slovakia	0.42	0.48	0.05	0.03	0.02
United Kingdom	0.40	0.25	0.30	0.02	0.03

Supplementary Material

for

Gendering digital labor: Work and family digital communication across 29 countries

Table S1. Results for interaction effects, using alternative measure (N = 6,654, across 315 subnational regions)

	Dual-medium	Dual-low	High work-only	Dual-high	High family-only
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Women × region-level (instead of country-level) intensity of internet use					
Women (ref. = men)	0.295	–0.249	–2.224*	–3.596*	–2.670
	(0.621)	(0.734)	(0.989)	(1.712)	(1.953)
Country-level intensity of internet use	0.148	–0.429*	0.517**	–0.760*	–1.239**
	(0.107)	(0.167)	(0.166)	(0.379)	(0.411)
Women × country-level intensity of internet use	–0.067	0.082	0.417+	0.972*	0.855+
	(0.145)	(0.167)	(0.226)	(0.406)	(0.478)

Note: ref. = reference group. SE = standard error clustered at the regional level. All models include control variables, individual intercept, region random intercepts, and random slopes for gender at the regional level. Regions were measured using the NUTS (nomenclature of territorial units for statistics) system at the NUTS2 and NUTS3 levels in most countries, except for Cyprus, Germany, Italy, and the UK, where NUTS level 1 was used in the survey.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table S2. Two-level logit regression models predicting profiles of work-family digital communication, controlling for industry (N = 6,654 respondents across 29 countries)

	Dual-medium	Dual-low	High work-only	Dual-high	High family-only
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Women (ref. = men)	–0.047	0.062	–0.230*	0.556**	0.836**
	(0.066)	(0.081)	(0.094)	(0.182)	(0.273)
Digital literacy	0.127***	–0.308***	0.240***	0.237*	0.229+
	(0.031)	(0.049)	(0.037)	(0.098)	(0.138)
Work from home (frequency)	0.059**	–0.385***	0.355***	0.117**	–0.311***
	(0.018)	(0.036)	(0.029)	(0.042)	(0.084)
COVID-19 stringency index	0.001	–0.002	–0.006	–0.006	0.002
	(0.003)	(0.004)	(0.005)	(0.008)	(0.009)
Country-level intensity of internet use	0.036	–0.500**	0.912***	–0.289	–0.518+
	(0.103)	(0.167)	(0.187)	(0.470)	(0.291)
Age	–0.007	0.023***	0.003	–0.078***	–0.049**
	(0.004)	(0.006)	(0.008)	(0.015)	(0.015)
Higher education degree (ref. = no)	0.197**	–0.381***	0.274**	0.024	0.005
	(0.064)	(0.077)	(0.089)	(0.191)	(0.262)
Migrant (ref. = no)	0.064	–0.215*	–0.499***	0.864**	1.154***
	(0.054)	(0.086)	(0.127)	(0.274)	(0.246)
Coresident partner/spouse (ref. = no)	0.025	0.135	–0.155	0.187	–0.388+
	(0.070)	(0.084)	(0.121)	(0.234)	(0.235)
Coresident children ⩾ 12 (ref. = no)	0.116+	0.013	–0.036	–0.607**	–0.174
	(0.062)	(0.056)	(0.108)	(0.234)	(0.219)
Coresident parent(s) (ref. = no)	–0.129	0.174	0.115	0.187	–0.563
	(0.108)	(0.133)	(0.219)	(0.254)	(0.590)
Hours worked per week	0.004*	–0.012***	0.010**	0.002	–0.011
	(0.002)	(0.002)	(0.004)	(0.004)	(0.008)
Level of household income	0.009	–0.094***	0.159***	–0.038	–0.018
	(0.015)	(0.019)	(0.025)	(0.042)	(0.061)
Household income missing (ref. = no)	–0.243*	0.109	0.588***	–0.106	–0.277
	(0.099)	(0.117)	(0.119)	(0.231)	(0.290)
Internet access at work (ref. = no)	0.325***	–0.335***	0.473*	0.045	–0.274
	(0.082)	(0.087)	(0.198)	(0.220)	(0.263)
Internet access at home (ref. = no)	0.274	–0.031	–0.230	–1.173**	–0.051
	(0.210)	(0.242)	(0.525)	(0.391)	(0.604)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Individual intercept	–1.908**	4.274***	–9.750***	1.178	0.327
	(0.599)	(0.783)	(1.377)	(2.019)	(1.808)
Country random intercept (variance)	0.029+	0.231**	0.139*	0.840**	0.115
	(0.017)	(0.078)	(0.055)	(0.293)	(0.084)

Note: ref. = reference group. SE = standard error clustered at the country level. Industry was measured using the 21-category top-level NACE (Nomenclature of Economic Activities) classification. The inclusion of industry dummies does not alter our substantive findings.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table S3. Results for interaction effects, controlling for industry (N = 6,654 respondents across 29 countries)

	Dual-medium	Dual-low	High work-only	Dual-high	High family-only
	B (SE)	*B (SE)*	*B (SE)*	*B (SE)*	*B (SE)*
Women × digital literacy					
Women (ref. = men)	–0.451*	–0.036	0.047	0.805	0.795
	(0.207)	(0.296)	(0.384)	(0.616)	(0.834)
Digital literacy	0.067+	–0.324***	0.273***	0.279*	0.220
	(0.039)	(0.048)	(0.051)	(0.112)	(0.241)
Women × digital literacy	0.112*	0.029	–0.071	–0.065	0.011
	(0.051)	(0.074)	(0.098)	(0.158)	(0.213)
Women × work from home (frequency)					
Women (ref. = men)	–0.296**	–0.032	–0.180	0.554+	0.241
	(0.103)	(0.154)	(0.163)	(0.305)	(0.372)
Work from home	0.002	–0.416***	0.362***	0.117	–0.671*
	(0.025)	(0.059)	(0.034)	(0.076)	(0.269)
Women × work from home	0.100***	0.051	–0.014	0.001	0.416
	(0.025)	(0.056)	(0.030)	(0.099)	(0.270)
Women × COVID-19 stringency index					
Women (ref. = men)	–0.058	0.031	0.123	0.541	0.442
	(0.210)	(0.180)	(0.258)	(0.520)	(0.577)
COVID-19 stringency index	0.000	–0.002	–0.001	–0.006	–0.007
	(0.003)	(0.005)	(0.006)	(0.013)	(0.017)
Women × COVID-19 stringency index	0.000	0.001	–0.011	0.000	0.011
	(0.005)	(0.005)	(0.007)	(0.013)	(0.015)
Women × country-level intensity of internet use					
Women (ref. = men)	0.536	–0.478	0.001	–0.080+	–0.042
	(0.879)	(1.052)	(0.103)	(0.042)	(0.038)
Country-level intensity of internet use	0.113	–0.569**	0.093***	–0.019	–0.015**
	(0.126)	(0.190)	(0.026)	(0.012)	(0.006)
Women × country-level intensity of internet use	–0.134	0.121	–0.007	0.023*	0.013
	(0.203)	(0.242)	(0.024)	(0.010)	(0.009)

Note: ref. = reference group. SE = standard error clustered at country level. The models estimating the interaction between gender and country-level intensity of internet use also included country-level random slopes for the gender dummy variable (not shown). All models included control variables, individual intercept, country random intercepts, and industry dummies. Industry was measured using the 21-category top-level NACE (Nomenclature of Economic Activities) classification. We did not include industry in our main analysis because of cell size issues and because its inclusion would lead to underpowered model estimates. Indeed, for the models regressing the profiles of "high work-only," "dual-high," and "high family-only" on the interaction between gender and country-level intensity of internet use, multilevel logit models had difficulty converging due to cell size issues resulting from the inclusion of industry dummies; for these models, therefore, we have reported results from the linear probability multilevel models in this table. Notably, the inclusion of industry dummies does not alter our substantive findings.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.