Perceived Stress, Work-Related Burnout, and Working From Home Before and During COVID-19: An Examination of Workers in the United States

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Abstract
The purpose of the study was to understand the impact of involuntary remote working during the early phases of the COVID-19 pandemic on perceived stress and work-related burnout for workers with and without previous experience of remote work. The authors developed a questionnaire, open from March 23rd to May 19th, 2020, incorporating the Perceived Stress Scale, Copenhagen Burnout Inventory, demographic, and work-related questions. This sample consisted of 256 professionals who self-identified as working at home during the pandemic. Pandemic restrictions increased perceived stress for all participants, but age and gender had significant effects on stress and burnout. Burnout was most significant for respondents already working remotely before COVID-19. The most significant challenges reported were—communication, collaboration, and time management with colleagues via technology. Working from home may contribute to higher levels of perceived stress and work-related burnout, which questions moves by some employers to make working from home a permanent arrangement.

Keywords
sociology of work, sociology, social sciences, organizations, occupation, and work, sociology of work, applied psychology, psychology, social psychology, psychology, social change and modernization, measurement and scaling methods, research methods

While social and traditional media discussed work-related stress and burnout during the COVID-19 pandemic, there was little empirical research to examine the phenomena except for a few high-level surveys (Brynjolfsson et al., 2020; Center for National Health Statistics, 2020; CVS Health, 2020; Petterson et al., 2020). Although the quickly forced shift to working from home was brought on by social distancing efforts and stay at home orders put in place during the COVID-19 pandemic, business leaders began discussing making working from home a permanent arrangement for some employees (Lavelle, 2020). The swiftness with which organizations from large global companies to smaller non-profits considered changing the physical relationship between workers, workplaces, personal, and family lives was significant. The authors of the present study wanted to better understand the impact of involuntary remote working during the early phases of the COVID-19 pandemic on perceived stress and work-related burnout for workers with and without previous experience of working from home.

Coming from a primarily role strain, role overload, and spillover orientation, the researchers hypothesized that the COVID-19 restrictions would increase perceived stress and work-related burnout for workers since a wider range of professionals not regularly working from home were transitioned into involuntarily remote working. Thus, the pandemic provided a natural social experiment to better understand issues related to perceived stress, work-related burnout, and technology-facilitated working from home. The authors developed a questionnaire incorporating valid and reliable self-report stress and burnout measures (Perceived Stress Scale, Copenhagen Burnout Inventory), demographics, and questions related to previous work experience. The authors believed that having research based on valid and reliable instruments would help employers and schools make better decisions about how to support those who could remain at home.

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home to avoid the potential for a secondary outbreak and provide insights on the future of how workers might cope with unanticipated remote work.

**Literature Review**

SARS-CoV-2, the virus that causes the COVID-19 disease, is characterized by a range of symptoms from mild fever, dry cough, and sore throat to Severe Acute Respiratory Syndrome (SARS), and an increasing list of related conditions like inflammatory illnesses in children (Centers for Disease Control & Prevention, 2020a; Centers for Disease Control & Prevention, 2020c). The virus is easily transmitted from person to person and many carriers are asymptomatic. In early March 2020, the WHO declared COVID-19 a pandemic, and in response many countries began recommending social distancing measures, imposing “lockdowns” (i.e., including restrictions on non-essential travel, closing schools, and non-essential businesses), and issuing “stay-at-home” orders forced on all people (infected or not) into a sort of quarantine essential businesses), and issuing “stay-at-home” orders forced on all people (infected or not) into a sort of quarantine (Centers for Disease Control & Prevention, 2020b). The pandemic resulted in the highest number of simultaneous global shutdowns/lockdowns in history. By early April 2020, the restrictions impacted 3.9 billion people, including 90% of the population of the United States (Brynjolfsson et al., 2020; Sandford, 2020).

Because of the lockdowns, behavioral health professionals expressed concerns for American’s collective mental health as lockdowns reduced access to social support systems while contributing to a “perfect storm” of pandemic anxiety, job loss or fear of job loss, and role stress. Empirically-based assessments have examined aspects of mental health (Center for National Health Statistics, 2020; CVS Health, 2020; Pettersson et al., 2020), but no formal research has examined the impacts of burnout and perceived stress when workers are forced into quarantine, particularly amongst those with no previous experience working at home or in a remote environment.

As COVID-19 began to spread, transitioning employees to remote working appealed to many organizations. The pandemic restrictions forced many organizations and companies that had little experience with a significant number of employees working from home, into moving quickly to develop or expand remote working arrangements for employees who otherwise would not have had this flexibility. Not only was this a rapid shift, but it was also involuntary for both organizations and employees. The abruptness of the change left many people with little information or guidance on how their jobs would change, how long the situation would last, and almost no sense of expectations regarding this type of work.

Despite a general lack of information or strategy, leaders across business, education, and government sectors rapidly moved forward with requesting their employees work remotely. In the early stages of COVID-19, many workers transitioned some or all of their job to their home, except for those who came to be known as “essential workers” (e.g., healthcare, grocery, postal/delivery, and sanitation) since their jobs required being physically present (Rigotti et al., 2020). The uncertainty and precariousness for “non-essential workers” created issues around presenteeism for jobs that still required a high degree of face to face interaction or were service based (Kinman & Grant, 2021). In education, for example, this meant that teachers had to quickly transition classrooms online, which meant new modalities and additional stresses for teachers and families (Akour et al., 2020). In other areas, little was known about the amount of support workers were, or were not, getting while simultaneously making the transition to involuntarily remote work and becoming responsible for other personal situations. Common situations manifested as a result of the lockdowns like child care, virtual schooling, caring for sick, or older relatives/neighbors. One survey conducted during the early stages of the pandemic found women were disproportionately impacted by work-family stress and burnout (LeanIn.org & Survey Monkey, 2020). Specifically, women working full time with a partner and children reported doing 20 more hours a week of housework and caregiving on average than men, with women of color and single mothers reporting even higher levels. Despite the uncertainty or an understanding of the longer-term impacts of this situation, some companies began discussing the possibility of making remote work a permanent fixture for some employees (Lavelle, 2020). When examining the history of research into remote working and working from home, it becomes clearer why companies might have been considering the move.

**Remote Working**

Remote working, working from home, and flexible working arrangements have become increasingly more common and sought after over the past 40 years (Chiru, 2017; McAlpine, 2018). The concept of “telecommuting” took hold in the 1970s and 1980s with increased access to personal computers and home networking (Olson, 1983a; Olson, 1983b) and expanded over the next 40 years as home computers, internet connectivity, smartphones, and a multitude of internet-based platforms allowing for team collaboration through document sharing and video conferencing became ubiquitous (Chiru, 2017; Gray & Suri, 2019). Individuals and organizations continued to look for ways to improve the quality of life for their employees, increase work productivity, and lower overhead costs, and telecommuting seemed to provide a solution to satisfy these areas (Chiru, 2017; Olson, 1983a).

Remote work is often provided to an employee already seeking some form of alternative working arrangement and is presented as a form of benefit. Research has supported some of those benefits including reduced commute; increased productivity and motivation; reduced stress from co-workers; allowing for more flexibility to manage family care.
Work-Related Stress and Burnout

The sudden onset of the COVID-19 restrictions enacted across the world meant significant shifts occurred to ordinary working and home life and coping with work-family stress became topics for news media and academics (Rigotti et al., 2020). The negative impact on both employees and their organizations of chronic workplace stress and work-related burnout resulting from chronic stress are well-documented (Gray-Stanley & Muramatsu, 2011; Kristensen et al., 2005; Maslach & Jackson, 1984; Maslach & Leiter, 2016; Shirom et al., 2009; Wood et al., 2020).

Previous research into remote work and work-life stress provided some insights into potential issues for those who moved quickly to remote work including, role stress and role overload from balancing work and family issues, lack of perceived organizational support, the impact of the physical environment on job performance, and the impact of subjective experiences of time on work stress (Bolger et al., 1989; Duxbury et al., 2018; Eldor et al., 2017; Stamper & Johlke, 2003; Vischer, 2007). Each of these areas of research builds on and supports theories that suggest stress is likely the result of “role strain,” “role overload,” and “spillover” from home to work and work to home (Bolger et al., 1989; Duxbury et al., 2018; Goode, 1960). Although some research suggests that work events can have a positive impact on family, typically spillover creates or exacerbates work-family conflicts (Fan et al., 2019; Ilies et al., 2015; Lim & Kim, 2014). Stress proliferation across work and home life often emanates from entrenched gendered expectations around work and family leaving women and men from lower socio-economic classes to be most vulnerable (Fan et al., 2019). Unsurprisingly, the quantitative, emotional, and mental demands that contribute to work stress are consistent with sources of work-related burnout (Peeters et al., 2005).

“Burnout” is a psychological syndrome that is the result of long-term, job-specific, physical and emotional exhaustion from interpersonal stress that results in detachment, cynicism, reduced feelings of efficacy and accomplishment and may have significant impacts on job performance and satisfaction (Kristensen et al., 2005; Maslach & Leiter, 2016; Queen & Harding, 2020). In short, burnout is stress compounded over a prolonged period. Burnout has been studied extensively in health care and human service occupations, but burnout is not well understood in many other professions that may also require both significant professional skill and high degrees of interaction with people (Gray-Stanley & Muramatsu, 2011; Ilić et al., 2017; Kristensen et al., 2005; Maslach & Jackson, 1984; Maslach & Leiter, 2016; Shirom et al., 2009; Wood et al., 2020).

An important element in contributing to stress, burnout, and negative outcomes in remote work environments is gender (Bolger et al., 1989; Duxbury et al., 2018; Fan et al., 2019; Karkolian et al., 2016). Pre-pandemic studies consistently showed higher stress and burnout levels for women due to role overload (Bolger et al., 1989; Duxbury et al., 2018), lack of support from work and spouses/partners, and more work-family conflicts especially for women in precarious (part-time) jobs and from lower socio-economic classes (Fan et al., 2019; Flesia et al., 2020; Karkolian et al., 2016; Peeters et al., 2005). As noted above, some research undertaken during the early stages of the pandemic found that women working full time with a partner and children were still doing 20 more hours of housework and childcare than men, although everyone was at home. The figure was even higher for women of color and single mothers (LeanIn.org & Survey Monkey, 2020).

Research Questions and Hypotheses

What emerged from an examination of extant literature was a complex and incomplete picture of how involuntary remote work in the context of the COVID-19 restrictions might impact perceived stress and work-related burnout. In general, remote working has historically been a voluntary arrangement, typically viewed as an employee benefit, which offers more flexibility and opportunities for work-life responsibilities; and other potential improvements in work-life satisfaction (Bell, 2012; Chiru, 2017; Degbey & Einola, 2020; McAlpine, 2018). Organizations also benefit from workers who choose remote work through reduced overhead costs; retaining talented workers; and accessing workers who may live too far to commute (Bell, 2012; Chiru, 2017; Degbey & Einola, 2020; McAlpine, 2018). Despite the benefits to individuals and organizations, challenges with remote work are also documented and research has noted: a reduction in the quality of communication among employees and management; difficulties in managing remote workers; reduction in creative idea generation among team members; and negative impacts on the long-term relationship of the employee to the organization (Bell, 2012; Chiru, 2017; Degbey & Einola, 2020; McAlpine, 2018).

Reading the literature one might conclude that many employees and organizations have benefited from technology-facilitated remote work. It is worth considering that much of the research and theorizing about remote work has been underpinned by an assumption that remote working is voluntary. Prior to the pandemic, opportunities to work remotely were limited to individuals who had jobs that could be done remotely. In the case of the COVID-19 pandemic, working from home was involuntary and impacted a much broader spectrum of workers than previously would have worked from home. Thus, although workers potentially reaped some of the benefits of remote work, they also were impacted by the known challenges. Indeed, Hoffman et al. (2020) examined 557 medical providers and reported that working from home was associated with reduced burnout, but that family care requirements and technology issues negatively influenced the experience.
balance. Conversely, some studies suggest that working from home tended to increase sources of perceived stress (i.e., work-family conflict). These negative impacts seem to disproportionately impact women and those in part-time work, due principally to their decreased ability to compartmentalize the roles salient to work and home domains. Drawing conclusions about work-related burnout was also difficult in the context of COVID-19’s involuntary remote work arrangements since most of the extant literature in this area is focused on jobs now classified as “essential workers,” such as health care and human service occupations that typically have high degrees of direct human interaction. Scant research on burnout in other types of occupations exists.

Primarily derived from a role strain, role overload, and spillover orientation, the researchers hypothesized that the COVID-19 restrictions would create additional sources of perceived stress and work-related burnout since a wider range of professionals not regularly working from home were transitioned in involuntarily remote working. Thus, the pandemic provided a natural social experiment to better understand issues related to perceived stress, work-related burnout, and technology-facilitated working from home.

The emergent research question was: “How have the COVID-19 restrictions impacted perceived stress and work-related burnout for people who are now working from home?” Specifically, the following hypotheses were considered:

H1: Participants in the sample will report higher overall Perceived Stress Scale (PSS) scores since COVID-19 restrictions began (i.e., Post PSS scores will be higher than Pre PSS scores).

H2: The change in overall Perceived Stress Scale (PSS) from before the COVID-19 restrictions to during COVID-19 restrictions will be a function of age, gender, experience working remotely Pre-COVID, the number of hours worked per week, and time in current job.

H3: The Total Work-Related Burnout scores will be a function of age, gender, experience working remotely Pre-COVID, number of hours worked per week, and time in current job.

**Methodology**

The study design was a transversal, self-report on-line questionnaire utilizing two validated instruments—the Perceived Stress Scale-10 and Copenhagen Burnout Inventory (CBI)—as well as, questions related to participant demographics and prior experiences with remote work. The survey was launched on March 23rd, 2020, and was finally closed on May 19, 2020. Participants were recruited using a snowball sampling method through social media platforms (LinkedIn, Twitter) and were invited to respond if they were over 18 years of age and working from home due to COVID-19 restrictions. This initial method resulted in neither a high response nor completion rate. In May, the researchers employed Qualtrics Research Services to assist in the recruitment of a minimum of 250 additional participants. Recruitment criteria for the sample included: 50% male, 50% female; 75% Full-Time (defined as >30 hours a week) and 25% Part-Time (<30 hours a week); and no >50% of the sample had a job that previously required them to work remotely. Ensuring that the sample included a minimum amount of participants who met these criteria was important in answering the hypotheses. All analyses were conducted using SAS Studio (v. 3.8), R (v. 3.6.1), and SPSS (v. 26), and respondents were only excluded if they did not meet all the inclusion criteria. A total of 370 respondents began this survey with 69% meeting all inclusion criteria (n=256). Except for where corrections were required, the significance level for all analyses was set at p < .05. This research was reviewed and approved for expedited review under FDA and DHHS (OHRP) designation by the Institutional Review Board at Kennesaw State University as study #20-464.

The Perceived Stress Scale-10 (PSS-10) is a validated, brief measure that examines how different situations affect perceived stress to both internal and external events (Cohen & Williamson, 1988; Cohen et al., 1983; Taylor, 2015). The questions in the scale focus on feelings and thoughts during the last month and ask respondents to indicate how often they felt or thought a certain way. Each question in the PSS is scored 0 to 4 and all items are summed to provide total PSS scores ranging from 0 to 40. The PSS-10 has shown strong concurrent validity with the full scale (Lee, 2012; Roberti et al., 2006; Taylor, 2015).

To capture changes in perceived stress in response to the COVID-19 restrictions, the 10-item PSS was slightly modified and presented as a repeated measure in the questionnaire. The participants were asked to complete the PSS for the time period “during the last month before the COVID-19 restrictions” (pre-COVID) and then the 10 questions were repeated, asking participants to complete the PSS “since the COVID-19 restrictions began” (during-COVID). This retrospective pre-test was the only way to capture a proxy for change over time since it was not possible to predict the pandemic or the arrival of the mass work from home restrictions that arrived in March and April 2020 around the world. Although this was a modification of how the instrument had been used before, consistent with the instrument’s published results, the Cronbach’s alpha values in the current study demonstrated accepted reliability values (α=.74 and .76, for the pre and during COVID-19 periods, respectively).

The full Copenhagen Burnout Inventory (CBI; Kristensen et al., 2005) conceptualizes burnout as three separate components: personal burnout (six questions); work-related burnout (seven questions); and client-related burnout (six questions). All questions in the CBI are scored on a five-point Likert scale that was converted from 0 to 100 and then divided by the number of questions in the subscale, to provide a mean score on a 100-point scale. Since the focus of the study was working from home under pandemic conditions,
the authors used only the work-related burnout subscale. The researchers chose not to use a repeated measure on the Work-Related subscale of the CBI because burnout is the result of longer-term exposure to stress and other factors. Given the relatively short amount of time participants had been in lockdown, measured changes in burnout would unlikely be the result of COVID-19 restrictions alone. Thus, burnout scores were only sought as a comparative and related measure. Previous research has shown the CBI to have excellent convergent and predictive validity with a myriad of constructs (Kristensen et al., 2005; Sestili et al., 2018). The current study utilized the English version of the CBI developed for the PUMA study (Kristensen et al., 2005) and generated an acceptable reliability value ($\alpha = .85$) consistent with other studies that have used this instrument.

Work challenges item. To better understand the issues contributing to the stress and burnout levels of workers, the survey also offered participants an opportunity to provide more detail about the parts of working remotely that were most challenging during COVID-19; participants were provided a list of six of the most challenging aspects of working from home and asked to “check all that apply.”

### Results

The final sample ($n=256$) was relatively balanced among three age groups (18–34, 35–54, and 55-older respectively) and reflective of the general population in terms of gender identity (49% female). The group was well-educated with over 40% of the sample having a graduate degree or higher. Professionally most of the sample self-identified as either a Manager/Supervisor (29%), Educator (12%), Professional (12%), Executive (6.5%), Student (3%), or Other (20%). In the “Other” category, “Administrator,” “Director,” and “Researcher” were the most frequent responses. More detailed study participant demographics are listed in Table 1.

Participants had varying amounts of experience with and ability to work from home before the COVID-19 restrictions. For example, 47% of the participants ($n=121$) worked remotely before the pandemic. Of those who did not work remotely before the pandemic ($n=135$), the majority (61%) did not have the flexibility to work from home before the pandemic. Of those that did have the flexibility to work remotely before COVID-19, 52% worked $<5$ hours a week (1 day) and 71% worked $<15$ hours a week (2 days) at home. See Table 2 for complete information on remote working experiences for participants.

Both the pre-COVID-19 PSS-10 and the during-COVID PSS-10 values were correlated with the CBI total work-related burnout (TWRB) values, the correlations were moderate ($r=.59$ and $.55$, respectively; see Table 3 below). These moderate correlation values reinforced the researcher’s decisions to consider the stress and burnout hypotheses separately rather than develop stress and burnout as a single construct. Further results on the TWRB score, presented in Table 4, demonstrate that the average TWRB is highest for people who worked at home prior to the pandemic ($M=16.38$), men aged 35 to 44 ($M=15.38$), and 45 to 55 ($M=16.15$), participants with 3 to 5 years of experience in their current job ($M=15.08$), and participants who work 51+ hours per week ($M=19.31$). The complete overall change in PSS-10 and the TWRB score values across the considered factors are provided in Table 4.

### Table 1. Study Participant Demographics ($n=256$).

| Demographics             | Choices                           | N (%)       |
|--------------------------|-----------------------------------|-------------|
| Age                      | 18–34                             | 76 (29.69)  |
|                          | 35–54                             | 89 (34.77)  |
|                          | 55+                               | 91 (35.55)  |
| Gender                   | Male                              | 130 (50.78) |
|                          | Female                            | 125 (48.83) |
|                          | Prefer not to say/non-binary      | 1 (0.39)    |
| Education                | $<4$ year degree                  | 79 (30.85)  |
|                          | 4 year degree                     | 88 (34.38)  |
|                          | Professional degree/doctorate     | 89 (34.77)  |
| Current job title        | Administrator                     | 18 (7.03)   |
|                          | Director                          | 9 (3.52)    |
|                          | Educator                          | 34 (13.28)  |
|                          | Executive                         | 23 (8.98)   |
|                          | Manager/supervisor                | 96 (37.50)  |
|                          | Professional (e.g., Lawyer, Accountant) | 24 (9.38) |
|                          | Researcher                        | 2 (0.78)    |
|                          | Student                           | 8 (3.12)    |
|                          | Other                             | 42 (16.41)  |
### Table 2. Remote Working Arrangements of Study Participants (n = 256).

| Working arrangements                                      | Choices | N (%)     |
|-----------------------------------------------------------|---------|-----------|
| Before COVID-19, did you only work remotely?             | Yes     | 121 (47.27) |
|                                                           | No      | 135 (52.73)  |
| Before COVID-19, did your job allow you flexibility to work remotely? | Yes     | 52 (38.52)   |
|                                                           | No      | 83 (61.48)   |
| Before the COVID-19 restrictions, how many hours per week did you work remotely? | 0–5     | 70 (51.85)    |
|                                                           | 6–15    | 26 (19.26)    |
|                                                           | 16–30   | 14 (10.37)    |
|                                                           | 31+     | 25 (18.52)    |

### Table 3. Pearson Correlation Coefficient Values for Stress and Burnout (n = 256).

|                      | Overall pre PSS | Overall during PSS | Overall burnout |
|----------------------|-----------------|--------------------|-----------------|
| Overall pre PSS      | 1.00000         |                    |                 |
| Overall during PSS   | 0.6084          | 1.00000            |                 |
|                      | <.0001          |                    |                 |
| Overall burnout      | 0.5950          | 0.5498             | 1.0000          |
|                      | <.0001          | <.0001             |                 |

### Table 4. Change in PSS-10 Values and Burnout Values by Factor (n = 256).

| Choices (n)          | Change in PSS-10 value (during—pre) | Burnout value |
|----------------------|-------------------------------------|---------------|
|                      | Mean (std) | Min | Max | Mean (std) | Min | Max |
| Overall              | 2.62 (5.49) | −10.00 | 22.00 | 13.52 (6.47) | 0.00 | 28.00 |
| Work from home before Covid? |          |      |     |            |      |     |
| Yes (121)            | 1.90 (4.93) | −6.00 | 22.00 | 16.38 (5.95) | 0.00 | 28.00 |
| No (135)             | 3.29 (5.89) | −10.00 | 20.00 | 10.96 (5.82) | 0.00 | 25.00 |
| Gender               |          |      |     |            |      |     |
| Female (125)         | 3.55 (5.76) | −9.00 | 22.00 | 12.06 (5.75) | 0.00 | 24.00 |
| Male (130)           | 1.73 (5.07) | −10.00 | 21.00 | 14.94 (6.84) | 0.00 | 28.00 |
| Age                  |          |      |     |            |      |     |
| 18–24 (28)           | 1.44 (5.72) | −8.00 | 18.00 | 13.57 (4.46) | 5.00 | 20.00 |
| 25–34 (48)           | 2.33 (5.68) | −9.00 | 19.00 | 14.90 (5.52) | 3.00 | 25.00 |
| 35–44 (63)           | 1.05 (4.06) | −10.00 | 11.00 | 15.38 (7.05) | 0.00 | 24.00 |
| 45–55 (26)           | 2.04 (4.28) | −4.00 | 13.00 | 16.15 (6.90) | 0.00 | 24.00 |
| 55–64 (74)           | 4.13 (5.86) | −6.00 | 22.00 | 11.24 (5.50) | 0.00 | 24.00 |
| 65+ (5.56 (7.11)     | −8.00 | 21.00 | 8.53 (7.58) | 0.00 | 28.00 |
| Time in job before COVID-19 (years) |          |      |     |            |      |     |
| >1 year (22)         | 4.70 (6.89) | −6.00 | 20.00 | 10.50 (4.98) | 0.00 | 20.00 |
| 1–2 (31)             | 2.23 (6.13) | −9.00 | 19.00 | 14.32 (4.56) | 5.00 | 22.00 |
| 3–5 (63)             | 2.13 (4.66) | −5.00 | 22.00 | 15.08 (6.17) | 0.00 | 25.00 |
| 6–10 (65)            | 2.25 (4.22) | −4.00 | 20.00 | 14.62 (6.84) | 0.00 | 24.00 |
| 10+ (75)             | 2.94 (6.36) | −10.00 | 21.00 | 11.81 (6.87) | 0.00 | 28.00 |
| Hours a week worked for pay (hours) |          |      |     |            |      |     |
| >20 (16)             | 3.81 (7.25) | −8.00 | 19.00 | 10.88 (5.85) | 0.00 | 22.00 |
| 21–30 (49)           | 2.28 (5.56) | −8.00 | 21.00 | 13.08 (6.95) | 0.00 | 28.00 |
| 31–40 (129)          | 2.41 (5.25) | −10.00 | 20.00 | 13.29 (6.22) | 0.00 | 25.00 |
| 41–50 (46)           | 3.93 (5.76) | −5.00 | 22.00 | 13.52 (6.20) | 0.00 | 24.00 |
| 51+ (16)             | 0.47 (3.46) | −5.00 | 8.00 | 19.31 (5.68) | 7.00 | 24.00 |
Hypothesis 1 stated, “The overall Perceived Stress Scores (PSS-10) will be higher for all participants \( (n=256) \) in the sample since COVID-19 restrictions began.” The total “pre-COVID” PSS-10 \( (M=16.82, SD=6.29) \) and “during-COVID” PSS-10 \( (M=19.52, SD=6.08) \) scores were calculated. A paired \( t \)-test confirmed that there was a statistically significant difference in overall PSS for the pre-COVID and during-COVID scales \( (t(241) = 7.43, M=2.62, SD=5.49, p < .001) \). While this finding was expected, from Table 4 we can see that the change (during-pre) in PSS-10 scores varied by factors. On average scores changed most dramatically for participants who did not work from home before COVID \( (M=3.29) \), females \( (M=3.55) \), those aged 55 to 64 \( (M=4.13) \), and 65+ \( (M=5.56) \), participants with <1 year in their current job before COVID \( (M=4.70) \), and those who worked <20 hours per week \( (M=3.81) \) and worked 41 to 50 hours per week \( (M=3.93) \). These differences contributed to the support of Hypothesis 2—“The change in overall Perceived Stress Scale (PSS) will be a function of age, gender, experience working remotely Pre-COVID, the number of hours worked per week, and time in current job. Although the results for the overall model were weak \( (F=1.84, p=.05, R^2=.074) \), the individual effects of gender and age were significant \( (F=7.01, p=.008 \text{ and } F=2.49, p=.03, \text{ respectively}) \). In addition, a posthoc analysis determined that the interaction effect of gender and age was also significant, with men reporting higher PSS-10 differences (increased stress from pre to during COVID-19) than women in the 18 to 24 age group, but women reporting higher PSS-10 differences (increased stress) than men in the 45 to 54 and 55 to 64 age groups \( (F=2.23, p = .01) \). Table 5 and Figure 1 provide additional details on changes, differences, and interactions. These results suggested that age and gender had more salient impacts on change in stress than prior experience working from home before COVID, how long they had worked in their jobs, or how many hours a week they worked.

Finally, Hypothesis 3 stated, “The Total Work-Related Burnout scores will be a function of age, gender, working remotely pre-COVID, number of hours worked per week, and time in current job.” The hypothesis used the same factors in a Generalized Linear Model with a linear link function. In contrast to the PSS-10 change, the results for the overall model were moderate \( (F=7.85, p < .001, R^2=.33) \), with all

| Table 5. Generalized Linear Model Results Testing Hypothesis 2—Individual Effects on Changes in PSS-10 Scores \( (n=256) \). |
|-----------------|-----|-------|------|
| Gender          | 1   | 7.01  | 0.0087 |
| Age             | 5   | 2.49  | 0.0319 |
| Interaction of gender and age | 11  | 2.23  | 0.0140 |
| Work from home before Covid? | 1   | 0.23  | 0.6307 |
| Time in job before COVID-19 (years) | 4   | 0.84  | 0.4991 |
| Hours a week worked for pay (hours) | 4   | 1.41  | 0.2304 |

Figure 1. Differences in PSS-10 scores by age and gender (during—pre, \( n=256 \)).
hypothesized effects found to be significant. In addition, a post-hoc analysis demonstrated that the interaction effect of gender and age was significant, with women reporting higher TWRB scores than men in the 45 to 54 age groups ($F=5.05$, $p<.001$). Table 6 and Figure 2 provide more details on these results. These results, along with the correlations in Table 3 and results from Hypothesis 2, suggest that stress and burnout are related constructs, but COVID-19 restrictions had different impacts on them.

To understand more about the potential sources contributing to stress and work-related burnout, the researchers provided participants a question with a list of issues that emerged from the literature on work-related stress and burnout and asked them to “select all that apply” (see Table 7). Responses to the question suggest that work-related issues were slightly more challenging than family-related issues for these participants. From this list, “Maintaining appropriate levels of communication with my team/colleagues,” “Managing technology/communication tools,” and “Managing my time/Avoiding distractions” were the answers most frequently selected by participants and selected by approximately half of all respondents. Nearly 40% of participants chose “Balancing personal/family responsibilities with workload,” but it made up only 15% of the overall number of items selected.

### Discussion

These results provide important insights related to perceived stress, work-related burnout, and the challenges of working from home during the first few months of the COVID-19 pandemic in 2020. Although over the past 40 years most jobs have benefited from the increased flexibility that technology has brought to work, the global COVID-19 pandemic forced many organizations and companies that had little experience with significant numbers of employees working from home to move quickly to develop or expand remote working arrangements for those who otherwise would not have had this flexibility. This situation created both opportunities and additional sources of potential stress and conflict for employees already in the midst of concerns about a public health crisis.
In this sample of 256 primarily well-educated professionals who self-identified as working at home during the early stages of the COVID-19 pandemic, it appeared that certain types of jobs—managers, professionals, educators, administrators—were able to transition quickly to remote working. This transition was likely due to the nature of these jobs being integrated into and facilitated by existing technology. Approximately 60% of the workers in this sample either worked remotely or had the flexibility to work remotely >2 days per week pre-COVID, which meant that 40% of the sample had little or no previous experience working remotely. Despite pre-COVID working arrangements, pandemic restrictions increased perceived stress—as measured by the change in PSS-10—for all participants. Especially impacted were participants who did not work from home before COVID, women, those over 55, participants with <1 year in their current job, part-time workers, and people working >40 hours per week.

Extant literature suggested that stress and burnout were related, primarily by stress being a precursor and contributor to burnout, but moderate correlations between the PSS-10 and CBI work-related burnout results in this study reinforced the researchers’ decision to develop separate hypotheses for perceived stress and TWRB. Results of subsequent analyses suggested that age and gender were more important to understanding both increased stress and burnout during COVID-19 than prior experience working from home before COVID, how long participants had worked in their jobs, or how many hours a week they worked. Even so, age and gender functioned differently on perceived stress and burnout for different groups. Perceived stress increased most for younger men (25–34), middle-aged and older women (45+), and older men (55+). Burnout scores were highest in middle-aged men (35–54), which might help explain the lower change in stress scores since their levels of burnout are already the highest of any group. These groups were likely to be vulnerable to increases in stress for different, but equally valid reasons such as lack of prior experience/training in remote work; increased family care and/or work responsibilities; work responsibilities due to stage of career/role in the organization; being in an age-related high risk group for contracting COVID-19; and vulnerability to layoffs/firing due to time in their role or being unfamiliar with technology.

The most significant COVID-19 challenges faced by these respondents were primarily work-related issues like communication, collaboration, and time management with work colleagues via technology. These results were noteworthy since balancing work/family responsibilities was clearly an issue for some workers, but not one that was chosen as frequently relative to work-related items. Since respondents were not asked to rank the items, it is only possible to report they felt it was an issue, not how important it was relative to other items for that individual.

**Limitations**

The present study has some methodological limitations that warrant additional discussion. The sample appears to be heavily biased toward professionals with a college education and over half the sample were people who either had remote jobs or jobs that already allowed them some flexibility to work remotely. What is unclear is how reflective the final sample is of the population of individuals who would have had jobs that would allow them to work from home during the early stages of the pandemic. Educated “essential” workers (i.e., doctors, nurses) and less educated non-essential workers (i.e., working in restaurants and other services) would have been excluded since they were not working remotely, albeit for different reasons. Further research exploring the demographics of those who work from home or have remote work flexibility is needed to establish the nature of this population. Beyond this, it is plausible that the present findings may not be generalizable to the general population as responder bias may have influenced the results. Specifically, the pandemic lockdown increased instances of working from home (Brynjolfsson et al., 2020; Hoffman et al., 2020), and thereby social loneliness. Thus, it could be that the respondents felt a strong need to discuss their situation or engage with others even if that engagement was via a survey.

**Table 7. “The Most Challenging Aspects of Working Remotely Are... (Check All That Apply).”**

| Responses                                                                 | N   | Percentage of items selected | Percentage of participants |
|--------------------------------------------------------------------------|-----|------------------------------|---------------------------|
| Maintaining appropriate levels of communication with my team/colleagues   | 114 | 22.05                        | 44.5                      |
| Managing technology/communication tools                                  | 111 | 21.5                         | 43.4                      |
| Managing my time/avoiding distractions                                   | 88  | 17.0                         | 34.4                      |
| Balancing personal/family responsibilities with workload                 | 76  | 14.7                         | 29.7                      |
| Maintaining productivity                                                 | 71  | 13.7                         | 27.7                      |
| Receiving clear communication from supervisors/managers                  | 44  | 8.5                          | 17.2                      |
| Other                                                                    | 13  | 2.5                          | 5.1                       |
| Total number of items selected                                           | 517 |                              |                           |
| Total number of participants                                             | 256 |                              |                           |

*Note. Participants (n=256) could select as few or as many options as they felt appropriate but could only select an item once.*
The questionnaire also did not include direct questions on marital status, number of children, or other family factors. This was an oversight that limited the research in making direct analyses related to family and child care, thus the researchers had to rely on age and questions on work/family balancing as a proxy for these analyses. In the overall analyses, only 30% of respondents reported work/family balance issues but having the ability to conduct more nuanced analyses to gain a better understanding of those issues would have been beneficial. In retrospect, the researchers should have asked respondents to rank the items contributing to stress and burnout rather than just selecting them. Having a ranking would have allowed further analysis to assess how important it was relative to other items.

Data on convergent and divergent constructs on perceived stress and burnout were limited. Future studies would do well to elaborate on this and collect additional data utilizing a broader battery of biopsychosocial-related constructs. These data could continue advancing knowledge of the impacts of perceived stress and work-related burnout, as well as, identifying potential protective factors. Knowing more would have been especially important in understanding the aging workers (55+) who may have experienced stress more acutely for multiple work and health related factors. In addition, although the PSS-10 had not been previously modified as a repeated measures instrument, the retrospective pre-test method in the traversal design was the only available method since no panel study on these issues was already in place. Other research using retrospective pre-test or post-then-pre has illustrated that this is an appropriate method, although it does have limitations compared to longitudinal designs (Hill & Betz, 2005; Pratt et al., 2000; Rockwell & Kohn, 1989). As is the case with any self-report measure, it is possible that participants over or underestimated their stress levels beforehand thereby conflating some scores. Finally, there may have been time series bias. Specifically, the respondents in the sample we used all responded in May 2020 when the restrictions had been in place for nearly 2 months in many places.

**Conclusions**

The results of this research contribute to a growing body of literature on experiences and lessons learned during the COVID-19 pandemic. In the future, this literature will grow in importance since this time period provided a global context in which to consider and reconsider assumptions about some fundamental social issues, such as the intersection of work and family life. All the methods and results in this study should be framed in the context in which the research took place since both the study participants and the researchers were under the same involuntary working from home restrictions during the period of the study.

This research extended current knowledge on factors contributing to perceived stress and work-related burnout among professionals in the context of remote work. Although resulting from a specific context, the results are noteworthy for both researchers and business professionals to consider when planning teleworking, remote work, or work from home arrangements. While the survey did not ask detailed questions about work-family conflicts, the results do support previous and current research that suggests that these may be increasing during the COVID-19 involuntary work from home period especially for women who have family responsibilities (Fan et al., 2019; Flesia et al., 2020; LeanIn.org & Survey Monkey, 2020; Lim & Kim, 2014). The results build on and support theories that suggest increases in perceived stress during the initial period of remote work are likely due to “spillover” and “role overload.” In this context of this research, work and home were the same physical place for a group of people unfamiliar with this way of organizing their lives (Bolger et al., 1989; Duxbury et al., 2018), which would likely be the case for anyone making a transition to remote working. This is an important avenue for future research that warrants additional examination.

Another interesting context-specific finding was related to the ages of participants. Although burnout was lower among older male and female workers, the levels of change in perceived stress were highest for these groups. It seemed that what came to be known as “pandemic stress” impacted these individuals strongly and was likely the combination of being a group vulnerable to the worst effects of COVID-19, as well as, being a group vulnerable because of age and a workforce now completely reliant on technology to be laid off or fired.

Although the primary framework for this study was “role overload” and “spillover” there are other literature and perspectives from which these issues could be examined in future research. The finding that working from home, pre-pandemic, or as the result of the pandemic, resulted in higher perceived stress and high work-related burnout scores was inconsistent with some received wisdom that has touted the benefits of remote and flexible work. It is consistent with the critique that most previous studies into remote work were done with a self-selected group of voluntary remote workers. While some of the results in this study may be accounted for by the pandemic restrictions and personal/familial context, other results were also consistent with the emerging studies of the impact of technology-facilitated work on individuals. These studies suggest that remote work has a unique (and potentially more potent) set of associated stress and burnout factors and echo theoretical work around “precarity” (Standing, 2012, 2014), “ghost work” (Gray-Stanley & Muramatsu, 2011), “Uberization” (Rosenblat, 2018), and ultimately back to Ritzer’s McDonaldization (Ritzer, 2018).

The current research suggested there were personal mental health, time, and communication management issues for teams who are primarily interacting through technology. These same issues show up in Gray and Suri’s (2019) research with “ghost workers” and Rosenblat’s (2018) workers suffering from “Uberization,” effectively “gig economy” employees who only have an indirect and transactional relationship to their employers. In most cases, companies do not
consider these workers “employees”—rather contractors—and thus the economic and psychological investment in them is low. Remote work brings with it a sense of precarity that is becoming more common among educated and skilled workers (Standing, 2012, 2014). Left unchecked, individual feelings of job insecurity brought on by “ghost work” and precarity, can become contagious within an organization (Sora et al., 2013). This is especially true in workplaces with a strong organizational culture, which impedes employee interactions and may lead to employee withdrawal. Left unconsidered, these are potential recipes for disaster for creating burnout in employees. For these reasons, the authors suggest that more research is needed to establish if there are baseline differences in the stress and burnout levels among at-home, flexible, and office-based workers.

These considerations are especially important for organizations that are considering moving significant numbers of employees to work remotely on a more permanent basis (LeanIn.org & Survey Monkey, 2020). Before making significant changes, organizations will want to consider the impact of permanent or non-voluntary changes on women, employees with family responsibilities, salaried employees working long hours, and other situational factors that may make work-life balance precarious for their employees and increase perceived stress and work-related burnout.

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