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Work from Home: Lessons Learned and Implications for Post-pandemic Workspaces

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Abstract

*The experience of working from home (WFH) has evolved due to the COVID-19 response. A concurrent mixed-methods approach was used to assess the experiences and needs of WFH during COVID-19 pandemic across eight countries. Input concerning office workspace modifications was also explored. Participants (*n *= 82) were from Asia, Europe, and North America. Participants were working from home more and indicated they were somewhat satisfied with WFH and saw no change in productivity. The most common experience was feeling distracted while others experienced focus or calmness. Most participants were challenged by the lack of appropriate furniture and equipment, as well as being distracted by technology and communication. Participants most frequently used dedicated workspaces and outdoor views. They preferred workspaces with natural light, neutral colours, and natural ventilation. Participants reported better thermal comfort and air quality when compared to their pre-pandemic office but less access to necessary equipment, collaboration, and communication. WFH during the pandemic challenged how people worked and shifted their experience of home interiority. The key outcomes show support for hybrid work options as well as design strategies offered for accommodating home offices in the future.*

Keywords: COVID-19, biophilic design, work from home, office design, post-pandemic design

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Introduction

The recent COVID-19 pandemic caused a massive shift in how people conduct their work (Verma et al., 2021). Due to social distancing and quarantine guidelines, many workers were moved to remote work environments, primarily working at home. Since then, remote working from home (WFH) has become the norm for more workers. The shift to increased WFH was a period of change and adaptation for many.

The work environment evolved over the last century to offer more flexible remote work options but was generally an exception from typical work expectations (Hill et al., 2003). Developments in technology and culture have made it possible to fulfil many required job tasks outside of the office building. The International Labour Organization (ILO, 2020) estimated that 7.9% of the international workforce permanently worked from home before the pandemic. In April 2020, 59 countries had already established teleworking for non-essential staff, with many governments encouraging employers to accommodate remote working situations (ILO, 2020). Though flexible work arrangements were becoming more popular prior to the year 2020, many workers around the world rapidly transitioned to working remotely from home (WFH) due to the COVID-19 pandemic. As conditions of the public response to the pandemic shifted, many workers continued to work either part or full-time from home (Kniffin et al., 2021).

Research before COVID-19 showed benefits and challenges to traditional and remote offices (Hill et al., 2003) and how the pandemic has influenced work experiences is still being determined. To better understand the recent WFH experiences during the beginning of the COVID-19 pandemic, this study responds to the following research questions: 1) What was the experience of working from home during the onset of the pandemic? 2) What type of workspace was used during the beginning of the pandemic? 3) Due to WFH experiences, what were the desired modifications for office workspaces?

Workplace at Home: Benefits and Challenges

WFH is a type of remote work where an individual works away from traditional on-site company facilities in their home (Como et al., 2021). A study conducted in the United States pre-pandemic found that remote working from home had risen with organisations offering telecommuting (60%), flextime (54%), and shift flexibility options (21%) (Society for Human Resource Management, 2016). Additionally, remote work generally increased in America from 39% of employees to 43% from 2012 to 2016 (Gallup, 2017). Employees spending most

of their time remotely (80% or more) increased from 24% to 31%. However, the ability and feasibility to work remotely are not equally distributed among countries and professions (Garrote Sanchez et al., 2021). Higher-income countries can have more flexibility in home-based work options. Conversely, lower-income countries may only have 1 out of 26 jobs that could be performed remotely due to internet access problems or the prevalence of jobs that are not feasible to be performed remotely.

Remote work benefits

Remote work has documented benefits with a common justification for its use being increased job satisfaction (Fonner & Roloff, 2010). Additionally, better emotional and motivational outcomes, the ability to focus, and increased control have been found for remote workers (Biron & Van Veldhoven, 2016). Remote work situations have been analysed as optimal for employees in a hybrid work model with approximately 60–80% off-site, as this balanced remote work benefits with the addition of direct contact with co-workers (Gallup, 2017). Additionally, remote work settings function best when they are designed to align with the types and variety of employee work activities, so they may not be effective in all circumstances (Leesman, 2019).

During COVID-19, one study found that employees mainly experienced remote WFH favourably, in line with prior research (Ipsen et al., 2021). However, research on employee productivity may be mixed. For instance, WFH arrangements for software engineers (Russo et al., 2021) and New Zealanders (O'Kane et al., 2020) appeared to not affect productivity negatively for the majority of workers in the studies. However, WFH productivity is not uniform as certain factors, such as the ability to self-manage and having adequate working conditions at home, influence employee productivity (Mihalca et al., 2021).

WFH during the pandemic has offered some better work-life integration, efficiency, and control (Ipsen et al., 2021). Additionally, it was valued as a way of lowering the risk of contracting and spreading disease. A study in Europe identified that "over three-quarters of employees … indicated a preference to work from home at least occasionally if there were no COVID-19 restrictions" (Eurofound, 2020, p. 3). The advantages of work efficiency allowed for spending less time in meetings and on meaningless tasks at work and also being able to focus on tasks without interruptions. The advantages of having more work control emphasised the perception of having less supervision oversight, the ability to have autonomy regarding breaks, and feelings of self-control (Ipsen et al., 2021). Overall, WFH has increased

in popularity and several identified benefits have emerged that can make WFH a viable modality for many to fulfil work duties away from the office, but it does present challenges.

Remote work challenges

Remote work challenges existed prior to COVID-19 (Kurland & Bailey, 1999). In order to accommodate remote work, organisations were challenged with the need for appropriate technology and security, maintaining the overall organisational culture, work coordination, interpersonal mentoring and communication, as well as managerial monitoring and performance measuring (Kurland & Bailey, 1999). Individual challenges included isolation, needing conducive work-home environments, having too much focus on work, longer hours, reduced access to resources, and needing to be more technologically savvy.

Remote workers in the United Kingdom also identified increased work intensification and an inability to transition away from work (Felstead & Henseke, 2017). Interpersonal issues have been expressed in reduced communication with others, feelings of isolation, miscommunication, and increased conflicts (Hertel et al., 2005). Individual work control can also vary among organisations, with higher autonomy in work being perceived as a demand instead of a benefit (Biron & Van Veldhoven, 2016). Remote work does decrease distractions from traditional office communications. However, for WFH, it has been recommended that "organisations should also consider implementing temporal, physical, and technological boundaries that facilitate uninterrupted work, aid work-life balance, and allow employees to avoid office politics" (Fonner & Roloff, 2010, p. 356). Thus, there were numerous challenges with remote work established pre-COVID-19.

The literature has also identified several challenges related to WFH during COVID-19 (Ipsen et al., 2021; Joshi et al., 2020; Samuel & Kahn, 2020). Ipsen et al., (2021) categorised three main challenges related to WFH during the pandemic: home office constraints, work uncertainties, and inadequate tools. Home office constraints resulted in people missing communication with their colleagues, missing getting out of the home, and having poor physical work conditions in the home office (Ipsen et al., 2021). The constraints include fewer outings outside the home, being in front of a computer for an extended time, and being distracted by others in the home.

Similar challenges were noted in another study where participants endorsed problems with internet connectivity, distractions, physical

workspace issues, and difficult communication with colleagues (Samuel & Kahn, 2020). Another disadvantage included work uncertainty. This area spanned problems, such as finding meaning in work, concerns about insufficient work to complete, finding WFH tasks uninteresting, and financial problems interfering with focusing on work (Ipsen et al., 2021). Other studies have also cited concerns related to financial insecurity and job instability (Joshi et al., 2020; Najeeb & George, 2022). A disadvantage of having inadequate tools included the lack of access to materials/tools necessary to perform work. This included physical equipment, data, and documents necessary to perform work, as well as experiencing the inability to do certain work-related tasks at home due to this lack of resources (Ipsen et al., 2021). Equipment and resource issues, such as limited access to software or adequate devices, have also been identified in another research (Saragih et al., 2021).

Nature and Workplaces

Workplace design research has connected benefits of exposure to nature for health, productivity, and wellbeing (Gray & Birrell, 2014; Heerwagen & Orians, 1986; Leather et al., 1998). This has led to growing interest in nature-based design, called biophilic design (Hartig et al., 2014). The current two dominating theory paradigms are Kaplans' Attention Restoration Theory (ART) (Kaplan, 1995) and Ulrich's Psychophysiological Stress Reduction Theory (PSR) (Ulrich, 1983; Ulrich et al., 1991). These have fostered research linking access to nature and improved physiological and mental health in the workplace. Common ART and PSR research pathways include nature's benefits for stress reduction, physical activity, social cohesion, and air quality, with additional research still needed (Hartig et al., 2014).

Applying biophilic design to interiors has begun to be fostered through the creation of a user-friendly language in the Biophilic Interior Design Matrix, a collection of 54 design attributes that are nature-based (McGee et al., 2019). The attributes range from actual nature, abstract and scaled representations to contextual and experiential features. Thoughtful and varied incorporation is theorised to benefit interiority experiences being aimed at in biophilic interior design. Benefits for nature incorporation vary, with examples including daylight in workspaces being found to increase job satisfaction, reduce intentions to quit, and moderately support general well-being (Leather et al., 1998).

Remote work was increasing worldwide and accelerated during the onset of the pandemic. The benefits of remote work (e.g., productivity) have been documented; however, the work setting

needs to be designed to maximise efficiency and support well-being. Some employers have provided a range of hybrid work options since COVID-19 to incorporate the employees' desires for additional flexibility in the workplace (Steelcase, 2022). Understanding what the experiences of WFH were during the pandemic, the workspaces that were used at home, and reflecting on office workspaces may help with understanding the recent global shift in interiority and the interface of nature and work environments.

Method

This study investigated the perceptions of adults working during the COVID-19 pandemic. A mixed-methods process was used because of the ability to use both data types to better understand the experiences of participants working from home after COVID-19 became a global concern. For the purpose of this study, the term "home" indicates a WFH office space, and the term "office" indicates a dedicated office space at a site away from home.

Participant characteristics

Participants were 82 adults representing varying age groups, countries, industries, and WFH situations (Table 1). Participants' ages ranged from 18 to 70+, with 30–39 years old being the most frequent category with 37.8%. The household size ranged from 1 to 10 people (M = 2.46, SD = 1.48). Participants were from 8 different countries. : Austria = 1, China = 2, Denmark = 23, Estonia = 9, Germany = 2, India = 5, Italy = 1, United Kingdom = 7, and United States = 32. Three continents were represented: Asia = 7, Europe = 43, and North America = 32. The inclusion criteria required participants to complete at least 50% of questions, have a 240 seconds minimum duration, and be at least 18 years or older. Overall, 157 participants participated and 75 were eliminated to establish the final pool.

The type of industry that participants worked in was among 13 types, with 11 selecting "other." The most frequent was architecture or interior design (n = 18, 22.0%), which was followed by education (n = 12, 14.6%). The most hours worked from home was over 40 hours per week (n = 24, 29.3%). An almost equal proportion of participants endorsed being in partial (n = 36, 43.9%) or no quarantine (n = 37, 45.1%). The frequency of WFH was most commonly occurring now than before the quarantine (n = 55, 67.1%).

Sampling procedures

Initially, participants were recruited for the study by use of convenience sampling. A flyer was included as the main content in email and social media postings that gave the study context

(i.e., the current work environment people had in their homes post-COVID-19 quarantine). The posting included a QR code and a direct link to the survey. Snowball sampling was used afterwards by asking participants to forward the survey in the recruitment email or social media post. No incentives were provided and the study was IRB approved as exempt. Participation was voluntary and the responses were anonymous. Data collection occurred from April 2020 to April 2021.

Measures

The online survey included 10 questions with both fixed and open-response questions related to the participants' personal experience working from home. The questionnaire started with general information about the study and the informed consent; next, a demographics block was used to identify age, industry, caretaker role, number in household, hours of work from home, quarantine condition, and primary workspace. One question asked if they worked from home more, the same, or less.

The first research question included five sub-questions. Participants were asked about the emotional experience of working from home among six options and an "other" with a text option. The level of satisfaction in the home workplace environment had a five-point scale, from extremely satisfied to extremely dissatisfied. Two open-response questions asked about what challenges in terms of equipment, stationery, furniture, etc., they faced while working from home, the sources of distraction while working from home, and how their productivity had been affected because of working from home.

The second research question included three sub-questions. The first question was about which room they spent the most time in during working hours, with four given options and an "other" with a text option. Participants were also asked about the view from their home workspace when seated. Additionally, participants were asked about the presence of ten criteria in both home and office workspaces. The third research question used two open-response questions to find out what participants would change in their office workspace now based on their experiences from home and what was missed from their office workspaces.

This non-experimental design included quantitative data analysed using McNemar tests and descriptive statistics. A conventional approach was used for the content analysis (Hsieh & Shannon, 2005) without using predefined codes or themes. Initially, all the responses are coded separately. The codes are then refined into emergent

themes, which are agreed upon by all research members. Intercoder reliability showed some agreement issues and the coders then finalised differences together. This inductive approach created the thematic categories.

Table 1
Demographic characteristics per continent

		Europe		N. America		Asia		Total	
		n	%	*n*	%	*n*	%	*n*	%
Age									
	18-29	13	30.2	6	18.8	2	28.6	21	25.6
	30-39	20	46.5	7	21.9	4	57.1	31	37.8
	40-49	2	4.7	8	25.0	0	0	10	12.8
	50-59	3	7.0	5	15.6	0	0	8	10.3
	60-69	1	2.3	5	15.6	1	14.3	7	9.0
	70+	0	0	1	3.1	0	0	1	1.3
Industry									
	Accounting/legal	0	0	1	3.1	0	0	1	1.2
	Architecture/interior design	6	14.0	11	34.4	1	14.3	18	22.0
	Business	2	4.7	1	3.1	0	0	3	3.7
	Education	5	11.6	6	18.8	1	14.3	8	9.8
	Finance	5	11.6	2	6.3	1	14.3	8	9.8
	Government or non-profit	0	0	1	3.1	0	0	1	1.2
	Healthcare	0	0	1	3.1	1	14.3	3	2.4
	IT	1	2.3	1	3.1	1	14.3	3	3.7
	Manufacturing	2	4.7	0	0	0	0	2	2.4
	Media	2	4.7	1	3.1	0	0	3	3.7
	Other	8	18.6	3	9.4	0	0	11	13.4
	Restaurants & entertainment	1	2.3	0	0	0	0	1	1.2
	Retail	1	2.3	0	0	0	0	1	1.2
	Service	1	2.3	0	0	0	0	1	1.2
Hours WFH per week									
	0-10	16	37.2	3	9.4	2	28.6	21	25.6
	11-20	4	9.3	0	0	1	14.3	5	6.1
	21-30	6	14.0	3	9.4	0	0	9	11.0
	32-40	11	25.6	9	28.1	3	42.9	23	28.0
	41+	6	14.0	17	53.1	1	14.3	24	29.3
Quarantine status									
	Full	2	4.7	3	9.4	0	0	5	6.1
	Partial	12	27.9	20	62.5	4	57.1	36	43.9
	No	25	58.1	9	28.1	3	42.9	37	45.1
WFH status									
	More	24	55.8	26	81.3	5	71.4	55	67.1
	Same	12	27.9	5	15.6	1	14.3	18	22.0
	Less	3	7.0	1	3.1	1	14.3	5	6.1

Note: WFH = Work from home. The other industry choices participants listed were academia.

WFH Experiences During Pandemic

Pandemic experiences working from home

Participants' responses varied (n = 81) regarding their emotional experiences working from home. The most frequently endorsed emotion was distracting (n = 22, 26.8%), followed by focused (n =

19, 23.2%), and calming (*n* = 17, 20.7%). A qualitative analysis of the other emotional experiences (*n* = 11, 13.4%) revealed that several participants endorsed various combinations or variations in their emotional experiences while working from home (e.g., Participant 22 said, "Always changing, not really consistent"), while others endorsed experiencing emotions not listed (e.g., "frustrating"). Hectic (*n* = 6, 7.3%), restorative (*n* = 4, 4.9%), and stressful (*n* = 1, 2.4%) were the least frequently experienced.

People were at least somewhat satisfied with their WFH environment for the majority of participants (*n* = 77, missing responses = 5, 6.1%). Specifically, the most frequently endorsed response regarding rating satisfaction with their home workplace environment was somewhat satisfied (*n* = 32, 39.0%). Twenty-two (26.8%) reported being extremely satisfied with their WFH environment. The least frequent responses were neither satisfied nor dissatisfied (*n* = 12, 14.6%), somewhat dissatisfied (*n* = 10, 1.2%), and extremely dissatisfied (*n* = 1, 1.2%).

Table 2
Emotional experiences during working from home

Emotion	*n*	%
Distracting	22	26.8
Focused	19	23.2
Calming	17	20.7
Other	11	13.4
Hectic	6	7.3
Restorative	4	4.9
Stressful	2	2.4

Note: *n* = 81, one person did not answer this question.

The main challenges in working from home were a lack of appropriate furniture, equipment, and resources; however, experiencing no challenges was the third most common answer. Some examples of participant responses included one participant noting, "I do not have a printer which means I have to read from the screen all day which is not enjoyable or healthy for me" (Participant 43). Another participant stated that they did not "have plotters, didn't have a work computer until three months into quarantine, not able to access resource/sample libraries all the time" (Participant 69). Furniture issues were cited, such as having to "purchase proper office desk and chair to ensure better sitting positions" (Participant 7). Also, another participant reported that "working from the dining table is not the same, even with a bigger monitor" (Participant 38). An additional issue highlighted was ergonomic problems, with examples such as having "uncomfortable chair, table and chair heights mismatched" (Participant 80). Participants also stated that they experienced no challenges with their WFH environment. An example of a no-

challenge response included one participant stating they were "all good" (Participant 42) and another reporting, "none— I'm used to my space being the size it is" (Participant 40).

Table 3
Challenges to working from home

Themes	Description	Total
Lack of adequate equipment/ resources	Missing needed office equipment, software training, and supply access	30
Improper furniture	Lack of ergonomics and appropriate furniture	23
None	No challenges	16
Lack of designated workspace	Using a space not dedicated as an office or having to move work materials to and from areas	8
Space constraints	Needing more space, workspace needing organising, or having to move home office locations	5
Interpersonal communication	Lack of communication with others, within groups, and direct support	4
Environmental	Poor lighting and weather conditions	3

Table 4
Sources of distraction while working from home

Themes	Description	Total
Technology, media, & communication	Digital communication, television, telephone, books, music, and online activities	26
People & family	Family, roommates, and other people	25
Chores & to-do	Household chores (e.g., cleaning and laundry)	22
Outside distractions	Disturbances originating from outside (e.g., animals, cars, construction, deliveries, neighbours)	15
Pets	Domesticated animals (e.g., dogs, cats)	12
Eating & cooking	Food preparation or eating	11
Self-sabotage	Lack of self-discipline and procrastination, lacking oversight/supervision	8
Hobbies	Personal activities (e.g., gardening, music, reading)	5
Interior sensory stimuli	Auditory, thermal comfort, and visual distractions	5
None	No distractions	4
Loneliness	Feelings of loneliness and lack of interaction with others	3
Everything	Everything is distracting	1
Medical	Medical treatment for self or others	1

Sources of distractions were most frequently focused on technology and the availability of media and communication, including phones, social media, the news, and messaging. An example was a participant who struggled with "having access to non-work-related stuff on my personal computer" (Participant 36). The second most frequently cited distraction was having issues with other people around, such as family and roommates. One example provided by a participant was their "roommate wandering about on our creaky floorboards" (Participant 14). Another participant said they were distracted by their "husband (talking to me or others) when also working from home" (Participant 41). Chores and things on the to-do list were also a source of distraction, like "cleaning my apartment" (Participant 39). Another participant noted,

> when procrastinating it just suddenly seems more fun doing the laundry, dishes and vacuuming and I can justify me not working if it's stuff I would normally find boring or annoying … because then that's at least done and over with 'more cleanliness for a calmer mind when working' I say to myself. (Participant 40)

Another example quote is, "Perhaps I'll decide the flat isn't clean or tidy and start cleaning instead. I'll find any excuse to leave the flat too, food shopping or otherwise" (Participant 43).

Regarding productivity, the majority of respondents (*n* = 69, missing responses = 15.9%) reported that their productivity was more or less the same (*n* = 34, 41.5%). The second most popular response was decreased productivity (*n* = 19, 23.2%), followed by increased productivity (*n* = 16, 19.5%).

Pandemic workspaces

The type of workspace most frequently used by participants (*n* = 82) was a dedicated home office (*n* = 26, 31.7%). The living room (*n* = 23, 28.0%) was the next most popular choice. Bedrooms were used third most frequently (*n* = 16, 19.5%), followed by kitchens (n = 10, 12.2%). Other responses (*n* = 7, 8.5%) included: "work," "bedroom/living room/home office," "office also serves as a guest bedroom and art space," "porch," "sometimes on the balcony," "studio apartment—so kitchen/living room area," and "terrace."

Table 5
What the participants see when seated at home workspace

Themes	Description	Total
Exterior view	Views of gardens, nature, backyard, plants, pool, and urbanscapes	51
Furniture & home electronics	Room furniture	30
Natural materials	Natural substances, such as trees, grass, etc.	26
Office supplies	Computer equipment, whiteboards, office paper, and other supplies	23
Art & decor	Personal items, accessories, and artwork	22
View of wall	View of a wall	19
Plants	Houseplants or outside plants	14
Interior areas	Other interior rooms and spaces	11
Animals (pets)	Pets	8
Artificial light	Lamps and ambient lighting	4
People	Other roommates and neighbours	4
Chores	Unfolded laundry	2
Food & beverage	Breakfast, coffee and water bottle	2
Tobacco	Tobacco and unspecified together	1

Most participants reported having a view to the outside when seated at their home workspace. A view of furniture and home electronics

was the second most frequent response. Viewing natural materials was the third most frequent response. Additionally, views of office supplies, art and decor, and a wall were noted. Other views included plants, other interior areas, animals, artificial light, people, chores, food and beverages, with one comment specifically mentioning tobacco products. Participants were asked about the presence or absence of 10 features in their pre-pandemic office and their current workspace at home (abbreviated as "office" and "home" consecutively in Table 6).

Table 6
The presence of built environment features across the pre-pandemic office and during-pandemic home workspace

Feature			Home +	Home -	*n*	X^2	*p*
Comfortable noise levels	Office	+ -	38 23	11 4	76	3.56	.059
Thermal comfort	Office	+ -	39 28	4 2	73	16.53	.000*
Individual focus work area	Office	+ -	35 23	13 3	74	2.25	.134
Space for collaborative work	Office	+ -	18 4	47 4	73	34.59	.000*
Comfortable lighting levels	Office	+ -	43 19	9 1	72	2.89	.089
Adequate working equipment	Office	+ -	49 3	20 2	74	–	.000*
Effective communications/ meetings	Office	+ -	52 3	16 3	74	–	.004*
Better air quality	Office	+ -	37 28	5 3	73	14.67	.000*
Space for creative thinking	Office	+ -	29 21	14 9	73	1.03	.310
Options where to take a break	Office	+ -	53 14	3 3	73	–	.013

Note: $p = \leq .005$ was used after Bonferroni correction; no X^2 is reported when 25 or fewer cases swap categories. The sign "+" signifies the presence of a feature specific to the working environment, while "-" indicates the absence of that feature.

There were five significantly different features found when comparing home working environments and offices: thermal comfort, X^2 (1, n = 73) = 16.53, p < .001; space for collaborative work, X^2 (1, n = 73) = 34.59, p <.001; adequate working equipment p = .000), effective communications/meetings (p = .004); and better air quality, X^2 (1, n = 73) = 14.67, p = .000. Of these, thermal comfort and better air quality were more present in the home than in the office. For thermal comfort, approximately half (n = 32, 43.8%) reported a change, with 28 participants identifying this as being present at home but not at their office. Only four reported the opposite. Approximately half of the participants (n = 33, 44.6%) reported changes in air quality when comparing the home and office. From these participants, 28 indicated that they experienced better air quality at home but not in their office, while five reported the opposite.

Three features—space for collaborative work, adequate working equipment, and effective communications/meetings—were present in the office more than in the home. While over half (51 of 73) of participants reported a change in space for collaborative work, 47 participants reported having collaborative space in their office but not in their home-work environment. Approximately a third of participants (n = 23, 31.1%) reported a change in adequate working equipment, including the 20 participants indicating having access to adequate work equipment in the office but not having adequate equipment available at home. Only three reported the opposite. For effective communications/meetings, approximately a quarter of the participants (n = 19, 25.7%) reported having a change in effective communications or meetings across the office and home environments. From these participants, 16 reported having effective communication or meetings at the office but not having this same level of communication or meetings at home, while three reported the opposite.

Five features were non-significant when comparing office and home-work environments. These included comfortable noise level, X^2 (1, n = 76) = 3.56, p = .059;, individual focus work area, X^2 (1, n = 74) = 2.25, p = .134; comfortable lighting levels, X^2 (1, n = 72) = 2.89, p = .089; space for creative thinking, X^2 (1, n = 73) = 1.03, p = .310; and options for where to take a break (p = .013).

Table 7
Frequencies and mean ratings of the presence of natural features in participants' workspace

Feature	Absent		Small		Medium		Large		*M*	*SD*
	n	*(%)*	*n*	*(%)*	*n*	*(%)*	*n*	*(%)*		
Direct natural light	0	(0.0)	8	(10)	37	(45)	37	(45)	3.35	0.66
Natural ventilation	10	(12)	19	(23)	20	(24)	32	(39)	2.91	1.06
Neutral colours	3	(4)	28	(34)	26	(32)	23	(28)	2.86	0.88
Earth tones	7	(9)	28	(34)	32	(39)	15	(18)	2.67	0.88
Plants/landscape features	17	(21)	20	(24)	20	(24)	25	(31)	2.65	1.13
Natural materials	11	(13)	33	(40)	22	(27)	16	(20)	2.52	0.96
Nature views	19	(23)	24	(29)	17	(21)	22	(27)	2.51	1.13
Bright colours	22	(27)	31	(38)	18	(22)	9	(11)	2.17	0.97
Flora/fauna patterns	29	(35)	31	(38)	14	(17)	8	(10)	2.01	0.96
Animals/pets	47	57	7	(9)	12	(15)	16	(20)	1.96	1.23
Water features	64	(78)	9	(11)	7	(9)	1	(1)	1.32	0.69

Note: All n sizes were 82 with the exception of natural ventilation (n = 81), water features (n = 81), bright colours (n = 80), and neutral colours (n = 80). Percentages may not total 100% due to rounding. Values: 1 = absent; 2 = small amount present; 3 = medium amount present; 4 = large amount present.

The three most frequent natural features in home office workspaces were natural light (M = 3.35, SD = 0.66), natural ventilation (M = 2.91, SD = 1.06), and neutral colours (M = 2.86, SD = 0.88). The least

endorsed natural features included flora/fauna patterns (*M* = 2.01, *SD* = 0.96), animals/pets (*M* = 1.96, *SD* = 1.23), and water features (*M* = 1.32, *SD* = 0.69).

Participant workspaces

Participants were given the opportunity to upload images of their workspaces. A few examples are illustrated in Figure 1, which highlights common access to natural lights, fresh air, and various nature-based features and locations. Some people had dedicated spaces and some were multi-purpose. Plants can also be seen in multiple images here as well as natural materials and neutral colours, as well as some bright colours. The views, furniture, and equipment also varied.

Reflections on workspaces

What participants missed most about the office workspace while working from home was the human connection. One participant noted, "I miss collaboration in person and human interaction" (Participant 73). Another example noted missing "face-to-face discussion with colleagues" (Participant 37). Access to facilities and WFH distinction were also common themes, with comments such as:

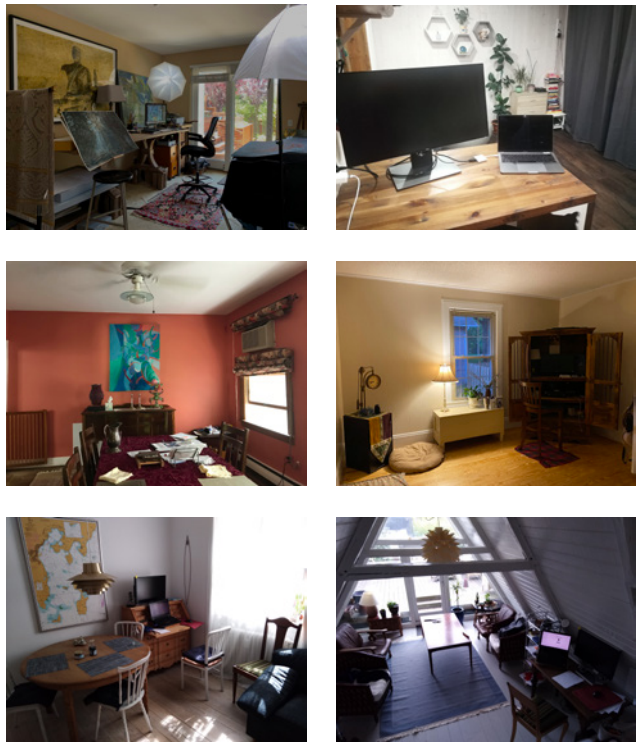

Figure 1
Selection of participants' WFH environments (Photographs by participants)

> I miss the space, both physical and mental space. When I enter my office workspace my mind enters work mode and I am able to focus, leave home behind and get things done.
>
> When I return home I feel I can relax and unwind but since I work from my bedroom my work day never feels to start and end. I miss my height-adjustable desk so I can stand and work. (Participant 43)

That WFH distinction was also represented in a quote from another participant who missed "the ability to 'leave' work" (Participant 74).

The responses regarding what participants would change in office workspaces based on WFH resulted in seven themes. The most frequent comment was the addition of biophilic features. An example response included "more operable windows, more views in general, thermal control, better quality lighting (w/dimmers), serious upgrade on the aesthetics" (Participant 77). A few other examples simply noted the need for "lots of plants" (Participant 26) and wanting a "garden view" (Participant 53). Having one's own space in the office was also highly desired with example quotes including wanting "sheltering that gives focus. (Office is an open office, no walls, which is great. But it could have dens for momentarily concentration/focus/creativity)" (Participant 46). Also desired was to "have a designated room to be able to close off work" (Participant 55) and have more "privacy and less micromanaging" (Participant 70). Despite the want for adjustments to many people's office workspaces, some participants suggested: "no changes" in statements, such as "office is better than home" (Participant 68).

Interior Features for WFH Experience

We investigated the experience of interiority in working from home during the onset of the pandemic, as well as the types of workspaces used and the desired modifications for office workspaces. Most participants were somewhat satisfied with their WFH experiences and experienced the same level of productivity. Participants' work hours per week and quarantine status varied. Most participants worked 31 or more hours per week under partial or no quarantine. Most reported that they were working from home more than before COVID-19. Overall, the participants were working from home in dedicated offices. There was a range of emotions experienced, from distracted to focused and calm. Some participants encountered no challenges, which potentially could be due to having already been established in WFH. The most frequent challenges identified with WFH included a lack of appropriate equipment and resources, improper furniture,

and lack of communication. Participants were also distracted by technology, media and communication, other people, and chores, and noted their own self-sabotaging behaviour. Desirable WFH office characteristics included natural features and views of nature and good indoor air quality with control over temperature, lighting, fresh air, and aesthetics. Additionally, several notable findings among the three research questions focused on the desire for appropriate facilities, biophilic features, and interpersonal/individual well-being.

Appropriate facilities

The need for appropriate facilities was an overarching focus across multiple questions representing concerns about space, furniture, and indoor environmental quality. Access to appropriate facilities and work differentiation were frequently missed during WFH. Though most frequently participants endorsed having a dedicated home office space, this represented only approximately a third of participants (31.7%). Other rooms not designated for office work were used which may have led to some challenges involving proper furniture and equipment. For example, some participants noted having to relocate to other parts of their house, move around files, or work from multiple locations. This was similar to the findings of Xiao et al. (2021), which found that 33% of workers had a dedicated room for work activities in their home during COVID-19, and 50.3% had a dedicated workspace in a room with other uses.

A dedicated unshared workspace has been found to include fewer interruptions (Leroy et al., 2021) which may be why both distracted and focused emotions emerged as the two most frequently endorsed. Participants also desired to have more focus and private spaces in their office, which was enclosed and quiet to work independently. Focus was a common emotion that was experienced by participants, but only about half of participants noted that they had space for individual focus work areas at home and in their office. "The reason people prefer to do individual work from home may be because they need more privacy than their current open plan office offers them" (Steelcase, 2022, p. 25). Other space-related challenges included needing more space and organising.

Another need related to appropriate facilities included a demand for adequate equipment and furniture at both office and work locations. Participants appreciated aspects of their home-work environment over features in their offices. This included having better ergonomic or home-like furniture. They also noted wanting updated computer equipment in their office.

Indoor environmental quality was seen in a few different areas. Thermal comfort appeared to be a benefit for many in their WFH experiences while infrequently being a source of distraction. Thermal comfort being present in both home and office types had a mix of responses, with around half not having thermal comfort at work while having thermal comfort at home. Lighting and noise levels were overall comfortable in both settings. Natural ventilation was second most frequently rated as being present in WFH, with natural light being the most frequently rated. A dedicated WFH area with appropriate size, thermal control, equipment, and ergonomic furniture, away from other household members may benefit those with flexible or dedicated WFH arrangements.

Biophilic features

Biophilic features were present for many in their WFH experience. Viewing the findings through the lens of the Biophilic Interior Design Matrix list of design attributes (McGee et al., 2019), the views of nature and natural materials were commonly present. The frequently desired requests for biophilic feature-related changes to office spaces included adding nature-based sounds, aroma and views of nature, adding plants, air quality control, water for white noise, having a place by a window, and natural textures. Nature-based design features were also listed as desired components specifically of WFH spaces, with natural light, natural ventilation, and neutral colours being the most preferred. Natural light as the most frequently present feature in workspaces has much research supporting its health implications for people's circadian rhythm and their ability to sleep and be productive (Alimoglu & Donmez, 2005; Beute & de Kort, 2014; Jamrozik et al., 2019). Natural ventilation was also appreciated for its importance to air quality and health during the COVID-19 pandemic, which increased public awareness (Aviv et al., 2021).

Interpersonal and individual well-being

Interpersonal and individual well-being was addressed in various ways throughout the study. Interpersonal themes discussed by participants included inadequate interpersonal communication as well as being distracted by feelings of loneliness and lack of interaction with others. When asked what they missed most about their office, the most frequently discussed area was interpersonal communication. However, some were distracted by their relationships and the people in their houses. The lack of a collaborative workspace was an issue with WFH. Participants did not frequently list collaborative workspaces as a need for their office, which may indicate adequate collaboration spaces away from home. Effective communications/meetings were also reduced in WFH. Prior to the recent pandemic, flexible office

environments benefited from increased communication with colleagues, support for planned meetings, and increased informal social interaction (Zahn, 1991). The need for communication and socialisation seems to still be a preference for workers in response to their recent WFH environment. It was noted that "collaboration may draw people to the office, but if people can't do individual focus work there as well, they will struggle to feel productive after they've made the commute" (Steelcase, 2022, p. 25). In addition, individual well-being was a specific focus and included challenges related to self-sabotaging behaviour (e.g., procrastination) during WFH and the desire for more inclusion of self-care in their office space. Workers may need additional assistance or resources related to environmental and behavioural strategies to manage these issues while WFH. Employers might also find ways to support self-care activities and provide space and remote self-care resources.

The trending increase in flexible work arrangements, when feasible, may provide the best future path for many (Castrillon, 2022). It allows employees to work where and when they are most productive. It also offers the differentiation of work life to home life, with some time in the office offering appropriate facilities, easier communication, and desired socialisation, as well as the time at home offering flexibility in scheduling and focused time working in a potentially comfortable environment.

Limitations and future directions

This study was conducted over the first year of the COVID-19 pandemic to get more realistic overall experiences before the release of the first widespread vaccine. One limitation of the current study is the generalisability of findings. This study could be expanded to include more representation from other countries and professions as well as longitudinal data. For example, increasing the number of participants representing specific professions would allow for a more robust analysis of WFH experiences using group comparisons. Differences in the WFH environments and connections to nature have been documented among different genders, with emerging research finding disparities in WFH experiences (Chung et al., 2021; Leroy et al., 2021). For future research, collecting information such as gender identity, socio-economic status, infrastructure access, work profile fit with WFH, and rurality status may provide additional information in illuminating differences in WFH experiences across different groups and cultures. Due to the limitations of relying on self-reported data, it would be beneficial for future research to include objective ways of assessing spaces, such as examining photographs in addition to participant self-reports. One future

direction would be to include more specific comparisons between office and WFH situations since this may impact how people view their experiences. Future research might explore how people altered their office work environments and work-life based on their experiences from the pandemic WFH.

Conclusion

This study was able to document the experiences and perceptions of people from multiple countries working from home during a unique time, as well as the interior features related to these experiences and perceptions. The amount of time spent at home and in the office will probably fluctuate in the future, yet the need for understanding worker preferences and perceptions was a gap. Steelcase (2002) predicts that "people are still going to spend time in the office, but they're going to be working differently than they did before the pandemic" (p. 29). This study reveals that WFH experiences during the pandemic appear to vary but also align with previous research about the benefits and challenges of WFH. The key outcomes show support for hybrid work options which offer access to desired equipment and collaboration features away from home, as well as the benefits of WFH. To optimise WFH, the interior of home workspaces should include private spaces, biophilic features, individual well-being features, views, and operable windows with indoor environmental controls. The emerging patterns identified here can further inform potential limitations and benefits of WFH, help workers and employers strategically navigate these changes in the coming years, and promote appropriate interior design strategies for post-pandemic workspaces.

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