

Original Research

Mental Health Impacts of Working from Home after COVID-19: Does Gender Matter?

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Abstract

Background: The COVID-19 pandemic has led to various social distancing practices such as mandatory working from home, which aim to reduce the spread of SARS-CoV-2. The purpose of this study was to compare the mental health impacts between men and women being forced to work from home following a COVID-19 outbreak. **Methods:** This study analyzed data collected from two rounds of surveys conducted in four cities in China: Beijing, Chengdu, Changsha, and Wuhan. A total of 940 individual responses were analyzed in this study. Multiple linear regression and ordinal logistic models were used to analyze the relationship between being forced to work from home, demographic variables, work-related variables, COVID-19 variables, family ties variables, and mental health variables. **Results:** The analysis showed that being forced to work from home was associated with worse mental health in men, but not among women. Married men reported better mental health compared with unmarried men, while the association between marital status and mental health was the opposite in women. Mental health was worse among those in higher job positions for both men and women. In addition, being forced to work from home was also associated with worse mental health among young, high-income men, and highly educated women. **Conclusions:** The impacts of the COVID-19 pandemic are far-reaching and may persist for years. Furthermore, the number of workers who choose to work from home is expected to increase. The findings of this study can inform policy-making that will improve the mental health of employees working from home, with particular attention to men forced to work from home.

Keywords: COVID-19 pandemic; SARS-CoV-2; mental health; work from home; gender; survey

1. Introduction

Since the start of the COVID-19 pandemic, countries have promulgated social distancing policies to contain the spread of SARS-CoV-2, which include restricting the mobility of the population and controlling the frequency of travel [1–4]. In response to social distance policies of the Chinese government, companies have chosen to adopt work-from-home practices. This response has led to a dramatic increase in the number of people working from home, increasing from 28% before the pandemic to 71% after the first COVID-19 outbreak in China [5]. In the United States, 62% of employees worked from home during the pandemic, which has doubled since mid-March 2020 [6]. Previous research has shown that voluntary telecommuting is associated with reduced feelings of stress and better work performance, perhaps because telecommuting gives workers greater time flexibility and independence [7,8]. However, working from home during the pandemic was often mandatory to accommodate lockdown measures [9]. Different from voluntarily working from home, the mandatory remote working option may not align with employee preferences. Some studies have shown that being forced to work from home during the pandemic may have led to negative outcomes among employees, including elevated

anxiety levels, cognitive deterioration, and a weak sense of subjective well-being [2,3,10].

There are distinct differences in mental health etiology between men and women. In general, women are more likely than men to suffer from depression, anxiety, and stress [11–13]. Men and women also express different preferences regarding working from home; studies have shown that women are more likely to work from home than men during the pandemic [14]. One reason explaining this finding may be that the COVID-19 pandemic had disproportionately negative impacts on employment opportunities for women through need to provide childcare [15]. Factors that influence men's and women's perceptions of telecommuting may also be different. For example, men's perceptions of telecommuting are more work-related, such as difficulty in accessing data, and difficulty in concentrating on work. [16]. On the other hand, women's perceptions of telecommuting are related to having to spend more time on housework and childcare [16–18]. Middle-aged women had more positive feeling toward working from home than young people, but women living with at least two children do not have the same positive attitude [16]. It has been found that women have more positive attitudes toward working from home and better perceptions of telecommuting than men



during and after the pandemic [16,19].

Since women generally have more responsibilities related to family and childcare, gender differences in mental health may be more salient for women than men under a lockdown, especially as previous research shows that women are more susceptible to negative attitudes and emotions. In addition, government lockdown measures can worsen the mental health of workers forced to work from home, which can exacerbate gender differences in mental health [20]. The mental health of employees who work from home is critical to the growth of any company. Some studies have shown that the mental health of employees working from home is positively associated with job satisfaction [21]. Also, good mental health can enhance the efficiency and productivity of workers who work from home [22,23]. This paper explores the factors affecting the mental health of teleworkers during the pandemic between men and women. The findings of this paper can help companies and governments develop policies corresponding to gender-specific influences to enhance employees' mental health and thus productivity, job satisfaction, and social well-being.

In addition, marital status may also be associated with mental health. Some studies have shown that married or cohabiting individuals are less likely to have poor mental health [24]. In contrast, other research has shown that single people have better mental health than married people during the COVID-19 pandemic [2]; while divorced and widowed people have significantly higher levels of anxiety and depression compared with single or married individuals [25].

Living alone is associated with higher levels of loneliness and daily life fatigue [26]. However, one study found that living with minors had a negative impact on the mental health of women, but a positive impact on men [2].

Close relationships with family members promote good mental health during the COVID-19 pandemic, and family support can have a positive impact on mental health [1]. Furthermore, perceiving adequate social and emotional support is less likely to lead to depression [27].

One study found higher anxiety after interacting with a person suspected of COVID-19 infection [28]. Similarly, interacting with an infected acquaintance was associated with high levels of depression, anxiety, and stress [29]. For women, living with someone at higher risk of infection and severe disease can have a negative impact on mental health [2]. Conversely, people living with someone diagnosed with COVID-19 reported lower anxiety in one study, possibly due to seeing the effects of COVID-19 firsthand, which may reduce anxiety by clarifying unknown COVID-19 symptoms and severity [27].

Throughout the COVID-19 pandemic, countries implemented various lockdown measures on neighborhoods, making it hard for residents to go shopping. Going shopping is likely to increase infection risk in neighborhoods

with confirmed cases [30]. However, the lockdown instilled widespread uncertainty that caused immense psychological distress in people; for many, this distress may have contributed to panic and hoarding of food and other supplies [31].

Mental health may vary by industry. Men in catering and sales and low-skilled workers are at lower risk of deteriorating well-being [2]. Health care workers have higher levels of stress, anxiety, and depression [1], possibly because of long hours in challenging and uncertain circumstances [32]. Furthermore, students and researchers reported moderate levels of anxiety, and teachers and employees reported mild levels of anxiety [32]. Mental health may also vary by position, with managers, directors, and senior officials reporting a high risk for lower self-perceived well-being [2].

Our paper has several contributions to the body of literature on the mental health impacts of people working from home. Firstly, the existing literature focuses on efficiency, perceptions, preferences, strengths, and weaknesses. However, few studies directly examine the link between working from home and mental health. Second, studies have been published on the psychological profile of working from home by gender, but there has been little research on the factors that affect the mental health of working from home by gender. Multiple linear regressions and ordered logistic models were used in this study to explore the association between gender and mental health, and heterogeneity analysis was used to explore the influencing factors. Finally, this paper offers some recommendations for companies and governments that have adopted telecommuting, and we hope that policymakers and companies use the findings in this study to implement more effective telework policies.

2. Data and Method

2.1 Study Design

Participants were randomly selected to participate in an online survey with provisions to ensure that information from respondents were protected. All respondents have fully informed volunteers. Respondents were recruited by Dynata (www.dynata.com), which is the world's largest first-party data platform. Respondents were able to terminate their participation and withdraw their response at any time. Data on mental health and other demographic variables were collected from two survey rounds between March 18th–March 30th and May 29th–June 13th of 2020. The surveys were conducted in four major cities in China, including Beijing, Changsha, Chengdu, and Wuhan (Wuhan was only included in the second round). The study was reviewed and approved by the Ethics Review Board of the University of Nottingham Ningbo China, on March 13, 2020.

2.2 Survey Participants

Chinese citizens aged 18 years and above, and who had been working for more than nine months in 2019 were eligible for inclusion. A total of 940 individual responses were collected for analysis.

2.3 Methods

The main dependent variables were *Unpleasant*, *Spiritless*, *Busy*, and *Index_all*, the definitions of which are in Table 1. Two mental health measures were used that are appropriate for measuring mental health status of Chinese people based on internationally accepted scales and the contextual factors of China. The Patient Health Questionnaire-9 (PHQ-9) [33] and Depression Anxiety Stress Scale-21 (DASS-21) [34] are the short professional versions of self-reported measures of mental health. *Unpleasant* represents the responses for the third question in DASS-21, which translates to “I could not feel positive emotions at all”. *Spiritless* was extracted from the fourth question of PHQ-9, which refers to “feeling tired or having little energy”. In recent years, China has encouraged working overtime, which could become even more prevalent during the pandemic with an increased number of people working from home. For this reason, we introduced the measure of *Busy* to show respondents’ mental health related to working overtime. *Index_all* combines *Unpleasant*, *Busy*, and *Spiritless*, an approximate interval scale variable.

Multiple linear regression was conducted to analyze the relationship between being forced to work from home and dependent variables. The regression analyses were run by gender to provide estimates of work-at-home impacts for men and women. In addition, the ordinal logistic models were used on the ordinal measurement of *Unpleasant*, *Busy*, and *Spiritless*, and these regressions were also stratified by gender. Finally, heterogeneity analysis was conducted by compiling demographic variables like *Age*, *Married*, *Education*, and *Income*, with *Forced to WFH* in the main regression equation to explore which subgroups were affected to a larger extent in mental health when they were forced to work from home. The data was analyzed in Stata (version 16, StataCorp LLC, College Station, Texas, US).

2.4 Description

The outcome variables, *Unpleasant*, *Spiritless*, *Busy*, and the combined variable, *Index_all* collectively represent mental health. These variables were measured by a five-point Likert scale, with a higher score indicating lower mental health status.

A number of explanatory variables were controlled to identify the influence of being forced to work from home on mental health, and these analyses were separated by gender. About 48.19% of the respondents were men, indicating similar proportions of men and women in the data. *Forced to WFH* referred to participants who did not work from home and worked in an office or other location in 2019 before the

pandemic, but had to work from home in 2020 during the pandemic. About 40.85% of men and 42.34% of women were forced to work from home in the collected data. Furthermore, 40.43% of men and 40.53% of women reported being married. While the average age of men was 36.4141 years, the average age of women was 35 years, suggesting that most of the respondents were middle-aged with families. *Did not graduate college* was used as a reference to see whether being forced to work from home had a greater impact on people with higher education. Statistics showed that the highest percentage of educational attainment is bachelor’s degree, accounting for 34.79% in men and 41.70% in women, respectively. This indicates that a large portion of the sample had higher education. Regarding annual household income, each increase in a family annual income level represented increase 50,000 CNY on the survey, with a total of six levels [35]. To make the results of the regression equation simpler and intuitive, each 100,000 increase was used as one level in the regression equation. Therefore, household income was represented as three instead of the original six levels. Households with an annual household disposable income of less than 100,000 CNY were labeled as the reference group. Approximately a quarter of men and women were identified as having a medium-income (24.26% and 25.96%, respectively), while 15.43% of men and 17.23% were labeled as high income. Cities included Beijing, Chengdu, Wuhan, and Changsha. Except for *Wuhan*, where 35.3% of the respondent identified as men and 64.7% as women, the ratio of men to women in other cities was comparable. *Chengdu* was used as the reference. These four cities reported a high number of cases because of their large populations and high mobility, so enforced lockdown measures were implemented earlier than in other cities [25,36,37].

Low position, *Medium position*, and *High position* were dummy variables, which referred to primary-, middle- and top-level management positions in a company, respectively. The primary position was used as the reference. The work position of 25.21% of men and 23.94% of women were in the *Medium position*. While men outnumbered women in the *High position*, 11.38% for women and 19.68% for men, women outnumber men in the *Low position*, 11.60% for women and 8.19% for men. Responses from participants were from nine industries: agriculture, computer, manufacturing, research and education, circulation, investment, medical industry, cultural and sport, and government. *Agriculture* was used as the reference group.

Exposure_f was a dummy variable that indicated whether a close friend or relative had been diagnosed or suspected to have COVID-19 infection. Panic and stress followed when a close relative or friend was infected by COVID-19 [28,29]. Our sample shows that about 1.38% of men and 1.17% of women had close relatives or friends who were infected with the SARS-CoV-2 virus. *Shopping* was a dummy variable that indicated whether it was convenient

Table 1. Summary statistics (n = 940).

Variable	Description	Male		Female	
		N (Mean)	% (Std)	N (Mean)	% (Std)
Dependent variables					
Unpleasant	To what degree one agrees with “I struggle to have any pleasant, comfortable feelings anymore” from 1 to 5, with 5 being “strongly agree”.	2.54	1.27	2.43	1.19
Spiritless	To what degree one agrees with “I feel like I’m consuming a lot of energy” from 1 to 5, with 5 being “strongly agree”.	3.00	1.16	2.95	1.13
Busy	To what degree one agrees with “I find it hard to stop and rest” from 1 to 5, with 5 being “strongly agree”.	2.94	1.18	2.89	1.13
Index_all	<i>Unpleasant</i> , <i>Spiritless</i> and <i>Busy</i> were combined into one variable which has a value from 3 to 15. A higher value indicates worse overall mental health.	8.48	3.01	8.26	2.81
Demographic variables					
Gender	Male	453	48.19%	—	—
	Female	—	—	487	51.81%
Age	Years	36.41	7.42	35	7.15
	Beijing	125	13.30%	121	12.87%
City	Wuhan	53	5.64%	97	10.32%
	Changsha	135	14.36%	141	15.00%
	Chengdu	140	14.89%	128	13.62%
Degree	Did not graduate college	75	7.98%	62	6.60%
	Completed or started Bachelor’s	327	34.79%	392	41.70%
	Completed or started graduate education	51	5.43%	33	3.51%
Family annual income	Low income (<100,000 CNY)	80	8.51%	81	8.62%
	Medium income (100,000–200,000 CNY)	228	24.26%	244	25.96%
	High income (>200,000 CNY)	145	15.43%	162	17.23%
Marriage	Married	380	40.43%	381	40.53%
	Other marital status	73	7.77%	106	11.28%
Working variables					
Work status	Being forced to work from home	384	40.85%	398	42.34%
	Other work status	69	7.34%	89	9.47%
	Agriculture	25	2.66%	43	4.57%
	Computer science	80	8.51%	54	5.74%
	Manufacture	132	14.04%	107	11.38%
	Research & edu	27	2.87%	48	5.11%
Industry	Circulation	56	5.96%	75	7.98%
	Investment	83	8.83%	86	9.15%
	Medical	12	1.28%	23	2.45%
	Cultural & sport	22	2.34%	29	3.09%
	Government	16	1.70%	22	2.34%
Work position	Low position, such as junior staff	107	11.38%	185	19.68%
	Medium position, such as manager	237	25.21%	225	23.94%
	High position, such as CEO	109	11.60%	77	8.19%

Table 1. Continued.

Variable	Description	Male		Female	
		N (Mean)	% (Std)	N (Mean)	% (Std)
COVID-19 variables					
Exposure _f	Close friends or relatives been diagnosed with COVID-19 or quarantined.	13	1.38%	11	1.17%
	No close friends or relatives been diagnosed with COVID-19 or quarantined.	440	46.81%	476	50.64%
Shopping	Convenient to go out and buy daily necessities.	41	4.36%	14	1.49%
	Inconvenient to go out and buy daily necessities.	412	43.83%	473	50.32%
Family ties variables					
Cohabit	The number of people living together	2.3	1.07	2.59	1.2
	Low closeness	12	1.28%	26	2.77%
Closeness	Medium closeness	121	12.87%	140	14.89%
	High closeness	320	34.04%	321	34.15%
Others					
Wave	Wave1, means data collected in the first round	235	25.00%	215	22.87%
	Wave2, means data collected in the second round	218	23.19%	272	28.94%

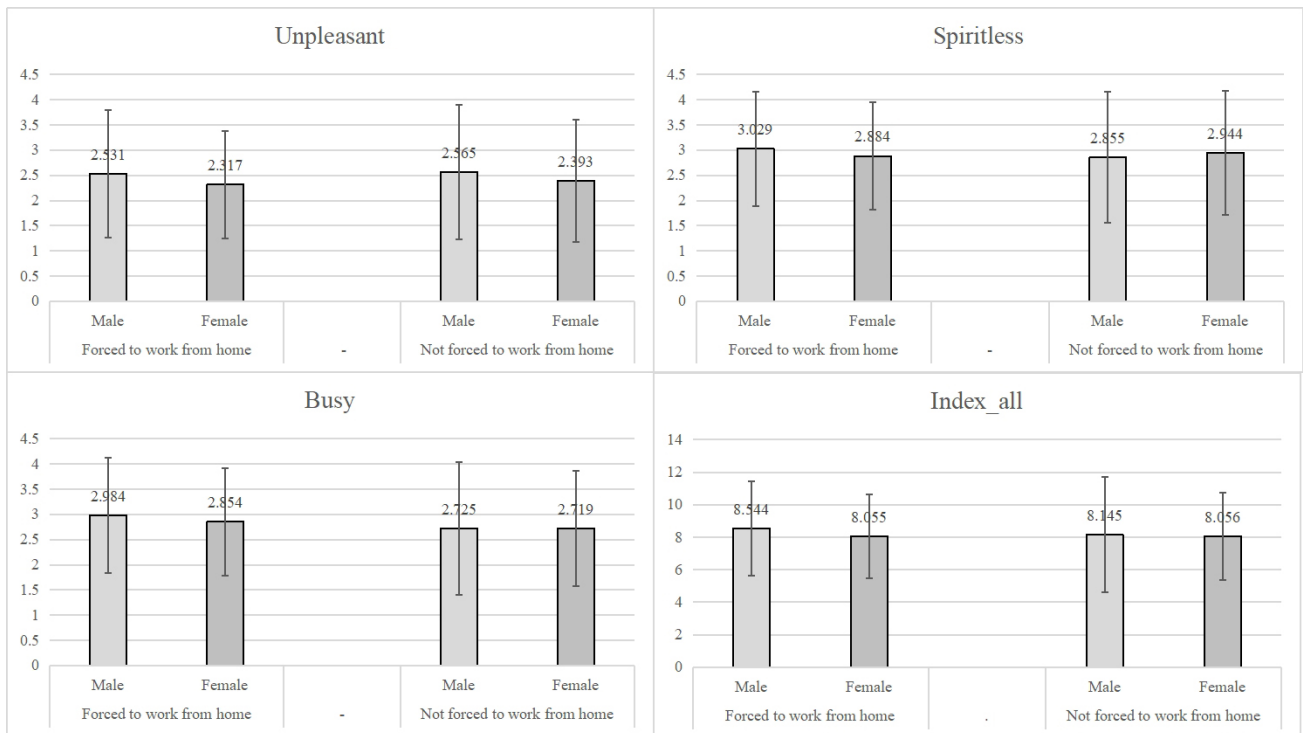


Fig. 1. The average score of unpleasant, spiritless, busy, index all whether to work from home by gender.

to buy food. However, lockdown measures hinder people's daily shopping activities. Surprisingly, 4.36% of men and 1.49% of women found it difficult to buy food during the pandemic, while 93% of respondents did not have any difficulties. This could be due to the rise in popularity of e-commerce and the convenience of no contact deliveries, which made it easy for people to shop without leaving home.

Family ties variables were represented by *Cohabit*, *Low closeness*, *Medium closeness*, and *High closeness*. *Cohabit* represented the number of people living together in a household. Analyses showed that the average number of people living together was 2.3 for men and 2.59 for women, indicating that most households had about 2–3 people living in their homes during the pandemic. *Low closeness*, *Medium closeness*, and *High closeness* referred to the relationship with close friends and relatives on a five-point Likert scale, with scores 1–2 being low closeness, 3 being medium closeness, and 4–5 being high closeness. Low closeness was used as the reference to explore the association between having a better relationship with family members and mental health. 1.28% of men and 2.77% of women reported having no close relationships, 12.87% of men and 14.89% of women reported a moderately close relationship with their friends, and 34.04% of men and 34.15% of women reported having a very close relationship with family and/or friends.

Wave denoted the two survey rounds: wave 1 and wave 2 referred to the data collected in March and May. People's mental health during lockdown can change over

time, which may, in part, reflect changes to lockdown policies [38] or adaptation to the closure status [39]. Therefore, *Wave* was used to control for temporal variability between surveys administered in waves 1 and 2.

Fig. 1 shows the mental health status of men and women forced to work from home compared to those not forced to work from home. Men who were forced to work at home had higher average negative mood scores than women, while men and women who were not forced to work at home did not have higher average negative mood scores. This finding shows that the mental health of men deteriorates more from being forced to work from home compared to women.

Table 2 shows the *t*-test on the dependent variables between male and female workers. *Unpleasant* and *Index_all* were significantly different between men and women, while no differences were found for *Spiritless* and *Busy*. Employment-related variables included occupational status and industry.

Table 2. T-test of Unpleasant, Spiritless, Busy, Index_all between men and women.

Variables	G1 (Female)	Mean1	G2 (Male)	Mean2	Mean Diff
Unpleasant	487	2.331	453	2.536	-0.206***
Spiritless	487	2.895	453	3.002	-0.107
Busy	487	2.830	453	2.945	-0.115
Index_all	487	8.055	453	8.483	-0.428**

2.5 Empirical Model

The main regression analysis adopted a multiple linear regression equation and ordered logistic regression. The specific model is as follows:

$$Y = \beta_0 + \beta_1 \text{ Forced to WFH} + \beta_2 X' + \varepsilon \quad (1)$$

Y is the dependent variable, which measures mental health. Y represents *Index_all* in the multiple linear regression analysis, which is a combination variable that includes *Unpleasant*, *Spiritless*, and *Busy* in ordered logistic regression. *Forced to WFH* is the primary variable that indicates whether or not people are forced to work from home. A value of 1 means refers to being forced to work from home, and 0 refers to not working from home. X' represents other control variables and demographic variables (*Age*, *Family annual income*, *City*, *Marriage*), work variables (*Industry*, *Work position*), COVID-19 variables (*Exposure_f*, *Shopping*), and family ties variables (*Cohabit*, *Closeness*), and *Wave*.

The heterogeneity analysis formula also adopted the multiple linear regression equation and ordered logistic regression, and the specific model is as follows:

$$Y = \beta_0 + \beta_1 \text{ Forced to WFH} + \beta_2 W + \beta_3 \text{ Forced to WFH} * W + \beta_4 X' + \varepsilon \quad (2)$$

The heterogeneity analysis formula added interaction terms based on the main regression equation. W represents *Age*, *Married*, *Edu*, and *Income*, and *Forced to WFH*W* measures the interaction between *Forced to WFH* and *W*.

3. Results

3.1 Regression Analysis

Table 3 shows the factors associated with mental health for men and women. The Odds Ratio (OR) is an estimate of the ratio of relative risk for binary outcome. There is a positive association between a factor and the disease when $OR > 1$, and a negative association when $OR < 1$. Compared with other work statuses, being forced to work from home was positively associated with *Unpleasant* (OR = 1.987), *Spiritless* (OR = 1.979), *Busy* (OR = 3.235) in men, whereas there was no significant association between these variables for women. Married men were less *Unpleasant* (OR = 0.355) and less *Busy* (OR = 0.545) than unmarried men. On the contrary, married women were more *Unpleasant* (OR = 1.839) and more *Busy* (OR = 2.408) than unmarried women. Men with high work positions compared to low positions were positively associated with *Unpleasant* (OR = 2.019) and *Busy* (OR = 3.082). Women with medium (OR = 1.732) and high work positions (OR = 2.072) were positively associated with *Busy* compared with men with a low position. For women, there was a positive association between *Unpleasant* (OR = 3.902), *Spiritless*

(OR = 4.354), and *Busy* (OR = 3.588) when a friend or family member was diagnosed with COVID-19, but there was no significant association for men. Interestingly, all negative psychological outcomes (OR = 3.01 for *Unpleasant*, OR = 2.635 for *Spiritless*, and OR = 2.326 for *Busy*) were associated with mental health in men when shopping was inconvenient, but not for women. The number of people living together during the pandemic was positively associated with all negative psychological aspects, and this result was consistent for men and women. Higher closeness to family and friends was negatively associated with *Unpleasant* (OR = 0.077) and *Busy* (OR = 0.159) in men, while there was no significant association in women. Men with an annual household disposable income between CNY100,000 and CNY200,000 were positively associated with negative mental health indicators (OR = 2.852 for *Unpleasant*, OR = 2.607 for *Spiritless*, and OR = 2.353 for *Busy*). There was no significant correlation between women and annual household income.

3.2 Heterogeneity Analysis

Table 4 and 5 present heterogeneity analyses that show which groups experienced greater impacts on mental health when they were forced to work from home. Younger men were more likely to feel busy (OR = 0.932) and experience poorer mental health when forced to work from home. Married men (OR = 3.674) were more likely to feel unhappy about being forced to work from home than unmarried men. Women with a graduate degree or higher (OR = 7.029) and higher-income men (OR = 4.379) were more likely to feel unhappy when forced to work from home than the reference category.

4. Discussions

As seen in Table 3, working from home during the COVID-19 pandemic was associated with worse mental health for men, which might be explained by challenges in accessing data and concentration [16]. This finding is consistent with the hypothesis of this study as well as extant literature that telecommuters were more likely to be anxious, experience cognitive deterioration, and have worse subjective well-being [2,3,10]. Some research indicates that financial strain, unemployment fears, work habit changes, and reduced work-related social interactions characterized the experiences of men working from home [3,10]. On the other hand, the association between working from home and mental health was not significant for women in this study.

This study found that married men had better mental health compared with single men, while married women had worse psychological health than single women [24]. These differences may be explained by the traditional Chinese family culture in which men spend their time working outside while women manage household responsibilities. In contemporary China, most women must work and

Table 3. The association between different factors and mental health by gender (n = 940).

	Ordinal Logistic Regression						Ordinary Least Square	
	Unpleasant		Spiritless		Busy		Index_all	
	OR (95% CI)		OR (95% CI)		OR (95% CI)		Co (Std)	
	Male	Female	Male	Female	Male	Female	Male	Female
Work status								
Other work status	1.000(ref)							
Forced to WFH	1.987** (1.091, 3.617)	0.75 (0.435, 1.291)	1.979** (1.084, 3.612)	0.821 (0.474, 1.422)	3.235*** (1.753, 5.970)	1.034 (0.600, 1.783)	1.384*** (0.431)	-0.239 (0.362)
Marriage status								
Other marriage status	1.000(ref)							
Married	0.355*** (0.171, 0.734)	1.839** (1.007, 3.359)	0.571 (0.277, 1.176)	0.68 (0.375, 1.231)	0.545* (0.269, 1.102)	2.408*** (0.600, 1.783)	-1.267** (0.538)	0.587 (0.409)
Work position								
Low position	1.000(ref)							
Medium position	1.146 (0.700, 1.877)	1.314 (0.862, 2.001)	1.117 (0.675, 1.847)	0.875 (0.580, 1.318)	1.459 (0.880, 2.420)	1.732** (1.135, 2.644)	0.349 (0.377)	0.380 (0.290)
High position	2.019** (1.069, 3.815)	1.251 (0.683, 2.294)	1.289 (0.684, 2.430)	1.022 (0.556, 1.879)	3.082*** (1.616, 5.875)	2.072** (1.128, 3.804)	1.286*** (0.474)	0.595 (0.410)
Exposure_f								
Do not exposure	1.000 (ref)							
Exposure	2.032 (0.579, 7.136)	3.902** (1.010, 15.076)	1.243 (0.359, 4.310)	4.354** (1.131, 16.767)	0.837 (0.232, 3.015)	3.588* (0.884, 14.568)	0.600 (1.013)	2.131** (0.966)
Shopping								
Shop inconvenience	1.000(ref)							
Shop convenience	3.010*** (1.616, 5.606)	1.484 (0.545, 4.040)	2.635*** (1.416, 4.903)	1.872 (0.752, 4.658)	2.326*** (1.237, 4.374)	1.040 (0.384, 2.820)	1.691*** (0.485)	0.694 (0.692)
Cohabit	1.354*** (1.090, 1.684)	1.273*** (1.076, 1.506)	1.420*** (1.142, 1.765)	1.211** (1.020, 1.439)	1.365*** (1.101, 1.692)	1.245** (1.045, 1.484)	0.545*** (0.161)	0.376*** (0.117)
Closeness								
Low closeness	1.000(ref)							
Medium closeness	0.140** (0.030, 0.646)	0.827 (0.326, 2.099)	0.375 (0.0845, 1.664)	0.597 (0.237, 1.502)	0.151** (0.025, 0.904)	0.893 (0.354, 0.253)	-2.585** (1.047)	-0.598 (0.618)
High closeness	0.077*** (0.017, 0.352)	0.504 (0.206, 1.236)	0.304 (0.070, 1.325)	0.556 (0.230, 1.345)	0.159** (0.027, 0.940)	0.943 (0.389, 2.284)	-2.968*** (1.034)	-0.807 (0.586)
wave	0.748 (0.480, 0.166)	0.726 (0.463, 1.139)	0.720 (0.463, 1.119)	1.218 (0.774, 1.918)	0.821 (0.531, 1.268)	0.772 (0.490, 1.216)	-0.377 (0.331)	-0.138 (0.305)

Table 3. Continued.

	Ordinal Logistic Regression						Ordinary Least Square	
	Unpleasant		Spiritless		Busy		Index_all	
	OR (95% CI)		OR (95% CI)		OR (95% CI)		Co (Std)	
	Male	Female	Male	Female	Male	Female	Male	Female
Industry								
Agriculture	1.000(ref)							
Computer	0.417*	0.509*	0.582	0.803	0.271***	1.815	-1.512**	-0.299
	(0.160, 1.083)	(0.232, 1.117)	(0.235, 1.444)	(0.355, 1.813)	(0.102, 0.725)	(0.808, 4.080)	(0.713)	(0.561)
Manufacture	0.395**	0.583	0.470*	0.509*	0.361**	1.421	-1.47**	-0.471
	(0.161, 0.972)	(0.285, 1.192)	(0.202, 1.094)	(0.244, 1.062)	(0.144, 0.911)	(0.692, 2.921)	(0.668)	(0.500)
Research & edu	0.121***	0.592	0.754	0.614	0.666	1.304	-1.628	-0.412
	(0.029, 0.502)	(0.255, 1.377)	(0.212, 2.684)	(0.258, 1.460)	(0.174, 2.547)	(0.570, 2.983)	(1.014)	(0.581)
Circulation	0.606	0.924	0.340**	0.837	0.491	2.178**	-1.309*	0.210
	(0.228, 1.613)	(0.431, 1.984)	(0.135, 0.856)	(0.387, 1.811)	(0.179, 1.351)	(1.008, 4.704)	(0.732)	(0.526)
Investment	0.782	1.003	0.667	0.565	0.904	1.407	-0.398	-0.110
	(0.300, 2.035)	(0.483, 2.082)	(0.267, 1.670)	(0.267, 1.195)	(0.340, 2.405)	(0.678, 2.921)	(0.714)	(0.509)
Medical	0.243	1.874	0.800	2.133	0.123**	2.466	-2.184	1.279
	(0.039, 1.495)	(0.634, 5.540)	(0.156, 4.116)	(0.661, 6.884)	(0.018, 0.864)	(0.771, 7.893)	(1.405)	(0.806)
Cultural & sport	0.789	0.887	0.522	0.430*	0.596	2.370*	-0.726	-0.032
	(0.237, 2.622)	(0.318, 2.477)	(0.165, 1.653)	(0.161, 1.149)	(0.166, 2.140)	(0.895, 6.276)	(0.919)	(0.685)
Government	0.377	0.670	0.305*	0.783	0.990	1.183	-1.461	-0.204
	(0.102, 1.399)	(0.238, 1.890)	(0.086, 1.083)	(0.275, 2.232)	(0.252, 3.887)	(0.433, 3.236)	(0.982)	(0.720)
Age	0.986	0.997	1.009	1.006	0.986	0.977	-0.011	-0.010
	(0.957, 1.016)	(0.968, 1.026)	(0.980, 1.039)	(0.975, 1.037)	(0.957, 1.016)	(0.948, 1.008)	(0.022)	(0.021)
Degree								
Did not graduate college	1.000(ref)							
Bachelor	0.972	0.941	0.631	0.992	0.993	0.653	-0.160	-0.207
	(0.540, 1.749)	(0.504, 1.755)	(0.352, 1.130)	(0.515, 1.912)	(0.542, 1.820)	(0.347, 1.228)	(0.437)	(0.426)
Graduate	0.704	0.924	0.72	0.843	1.139	0.582	-0.275	-0.434
	(0.301, 1.646)	(0.356, 2.397)	(0.313, 1.656)	(0.324, 2.192)	(0.486, 2.669)	(0.227, 1.488)	(0.638)	(0.648)
City								
Chengdu	1.000(ref)							
Beijing	1.743**	0.772	2.068**	0.606*	2.298***	0.663	1.176***	-0.559
	(1.007, 3.017)	(0.449, 1.326)	(1.186, 3.604)	(0.353, 1.041)	(1.313, 4.024)	(0.386, 1.138)	(0.417)	(0.366)
Wuhan	1.094	0.680	1.760	0.460**	1.196	1.087	0.460	-0.584
	(0.538, 2.226)	(0.375, 1.232)	(0.872, 3.554)	(0.255, 0.832)	(0.602, 2.376)	(0.585, 2.017)	(0.537)	(0.414)
Changsha	0.626*	0.439***	0.703	0.523**	1.327	0.608*	-0.387	-1.004***
	(0.365, 1.074)	(0.259, 0.745)	(0.416, 1.188)	(0.307, 0.890)	(0.785, 2.243)	(0.356, 1.039)	(0.394)	(0.36)

Table 3. Continued.

	Ordinal Logistic Regression						Ordinary Least Square	
	Unpleasant		Spiritless		Busy		Index_all	
	OR (95% CI)		OR (95% CI)		OR (95% CI)		Co (Std)	
	Male	Female	Male	Female	Male	Female	Male	Female
Family annual income								
Low income	1.000(ref)							
Medium income	2.852***	1.521	2.607***	1.592	2.353**	1.267	1.429***	0.632
	(1.458, 5.582)	(0.813, 2.843)	(1.344, 5.057)	(0.844, 3.001)	(1.187, 4.664)	(0.672, 2.388)	(0.483)	(0.429)
High income	2.152**	1.411	1.742	1.445	1.903	0.863	0.933*	0.347
	(1.007, 4.603)	(0.715, 2.783)	(0.829, 3.664)	(0.721, 2.895)	(0.876, 4.131)	(0.434, 1.717)	(0.552)	(0.467)
cons							9.604***	8.081***
							(1.401)	(0.973)

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4. The heterogeneous estimates on mental health by gender (n = 940).

	Ordinal Logistic Regression												Ordinary Least Square			
	Unpleasant				Spiritless				Busy				Index_all			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married
Work status																
Other work status	1.000(ref)															
Forced to WFH	8.443*	0.737	1.081	1.151	15.228**	1.109	1.801	0.675	41.062***	5.452***	7.677*	0.968	4.689**	0.659	1.431	-0.345
	(10.73)	(0.443)	(1.267)	(0.585)	(19.617)	(0.665)	(2.116)	(0.337)	(56.043)	(3.315)	(8.879)	(0.467)	(1.865)	(0.873)	(1.559)	(0.657)
Age	1.017	0.988	1.006	0.996	1.057*	1.010	1.023	1.006	1.045	0.986	1.024	0.978	0.061	-0.010	0.029	-0.010
	(0.031)	(0.015)	(0.032)	(0.015)	(0.033)	(0.015)	(0.030)	(0.016)	(0.035)	(0.015)	(0.031)	(0.015)	(0.045)	(0.022)	(0.041)	(0.021)
FoWFH_Age	0.962	NA	0.989	NA	0.945	NA	0.977	NA	0.932*	NA	0.943*	NA	-0.090*	NA	-0.050	NA
	(0.032)	NA	(0.034)	NA	(0.033)	NA	(0.033)	NA	(0.034)	NA	(0.031)	NA	(0.049)	NA	(0.045)	NA
Degree																
Did not graduate college	1.000(ref)															
Bachelor	0.966	0.957	0.934	0.939	0.633	0.618	0.982	0.999	1.004	1.012	0.628	0.653	-0.161	-0.181	-0.232	-0.207
	(0.291)	(0.286)	(0.298)	(0.298)	(0.189)	(0.184)	(0.329)	(0.335)	(0.311)	(0.314)	(0.201)	(0.211)	(0.435)	(0.437)	(0.427)	(0.427)
Graduate	0.693	0.692	0.927	0.930	0.716	0.701	0.856	0.844	1.114	1.166	0.594	0.583	-0.291	-0.306	-0.411	-0.433
	(0.301)	(0.300)	(0.451)	(0.453)	(0.305)	(0.298)	(0.418)	(0.412)	(0.486)	(0.508)	(0.283)	(0.280)	(0.636)	(0.639)	(0.648)	(0.649)
Marriage status																
Other marriage status	1.000(ref)															
Married	0.350***	0.124***	1.812*	2.855**	0.564	0.308*	0.663	0.554	0.533*	0.939	2.241**	2.250	-1.287**	-2.011**	0.537	0.485
	(0.130)	(0.083)	(0.563)	(1.524)	(0.209)	(0.204)	(0.202)	(0.292)	(0.192)	(0.611)	(0.704)	(1.146)	(0.536)	(0.948)	(0.411)	(0.67)
FoWFH_Married	NA	3.674*	NA	0.557	NA	2.157	NA	1.313	NA	0.499	NA	1.099	NA	0.946	NA	0.145
	NA	(2.520)	NA	(0.322)	NA	(1.486)	NA	(0.752)	NA	(0.345)	NA	(0.615)	NA	(0.992)	NA	(0.750)
Family annual income																
Low income	1.000(ref)															
Medium income	2.833***	2.972***	1.515	1.444	2.519***	2.695***	1.590	1.621	2.272**	2.299**	1.216	1.277	1.390***	1.463***	0.602	0.643
	(0.974)	(1.020)	(0.484)	(0.466)	(0.855)	(0.914)	(0.515)	(0.528)	(0.798)	(0.804)	(0.394)	(0.418)	(0.482)	(0.484)	(0.429)	(0.433)
High income	2.110*	2.208**	1.407	1.340	1.670	1.800	1.445	1.474	1.824	1.852	0.840	0.870	0.881	0.966*	0.329	0.356
	(0.822)	(0.857)	(0.488)	(0.469)	(0.637)	(0.684)	(0.513)	(0.526)	(0.726)	(0.734)	(0.295)	(0.308)	(0.55)	(0.553)	(0.467)	(0.470)
cons													7.105***	10.066***	6.807***	8.127***
													(1.957)	(1.482)	(1.511)	(1.003)

Note. Standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Industry, Work position, Exposure_f, Shopping, Cohabit, Closeness, Wave, City, and other variables have been omitted, see Appendix Table 6 for complete table details.

Table 5. The heterogeneous estimates on mental health by gender (n = 940).

	Ordinal Logistic Regression											Ordinary Least Square				
	Unpleasant				Spiritless				Busy			Index_all				
	Male		Female		Male		Female		Male		Female	Male		Female		
	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income
Work status																
Other work status	1.000(ref)															
ForcedtoWFH	1.247 (0.964)	0.98 (0.681)	0.496 (0.356)	1.238 (0.728)	1.605 (1.236)	1.711 (1.136)	0.825 (0.636)	1.891 (1.091)	1.902 (1.606)	5.929** (4.298)	3.102 (2.348)	1.135 (0.644)	0.795 (1.081)	1.143 (0.956)	0.227 (0.933)	0.343 (0.744)
Age	0.987 (0.015)	0.988 (0.015)	0.995 (0.015)	0.997 (0.015)	1.009 (0.015)	1.010 (0.015)	1.005 (0.016)	1.006 (0.016)	0.986 (0.015)	0.984 (0.015)	0.976 (0.015)	0.977 (0.015)	-0.01 (0.022)	-0.009 (0.022)	-0.012 (0.021)	-0.011 (0.021)
Degree																
Did not graduate college	1.000(ref)															
Bachelor	0.675 (0.531)	0.934 (0.282)	0.739 (0.501)	0.945 (0.300)	0.526 (0.418)	0.622 (0.186)	1.013 (0.735)	0.998 (0.333)	0.58 (0.497)	0.965 (0.300)	1.736 (1.242)	0.652 (0.21)	-0.665 (1.098)	-0.205 (0.436)	0.274 (0.882)	-0.2 (0.427)
Graduate	0.227 (0.246)	0.629 (0.276)	0.198 (0.204)	0.944 (0.459)	0.458 (0.513)	0.695 (0.297)	0.680 (0.783)	0.860 (0.420)	0.679 (0.814)	1.07 (0.471)	1.615 (1.673)	0.579 (0.278)	-1.568 (1.606)	-0.404 (0.641)	-0.772 (1.386)	-0.414 (0.649)
FoWFH_Bachelor	1.508 (1.255)	NA NA	1.373 (1.048)	NA NA	1.226 (1.029)	NA NA	0.976 (0.798)	NA NA	1.837 (1.658)	NA NA	0.294 (0.235)	NA NA	0.585 (1.177)	NA NA	-0.618 (0.996)	NA NA
FoWFH_Gradu	3.629 (4.093)	NA NA	7.029* (8.077)	NA NA	1.658 (1.919)	NA NA	1.286 (1.633)	NA NA	1.789 (2.226)	NA NA	0.272 (0.314)	NA NA	1.469 (1.673)	NA NA	0.394 (1.541)	NA NA
Marriage status																
Other marriage status	1.000(ref)															
Married	0.364*** (0.135)	0.361*** (0.134)	1.804* (0.555)	1.791* (0.557)	0.573 (0.211)	0.587 (0.217)	0.675 (0.206)	0.649 (0.198)	0.549* (0.197)	0.565 (0.204)	2.394*** (0.745)	2.393*** (0.750)	-1.248** (0.540)	-1.232** (0.537)	0.572 (0.410)	0.555 (0.411)
Family annual income																
Low income	1.000(ref)															
Medium income	2.882*** (0.988)	2.106 (1.593)	1.534 (0.492)	2.765* (1.626)	2.616*** (0.885)	2.967 (2.191)	1.593 (0.515)	3.932** (2.265)	2.367** (0.827)	6.599** (5.122)	1.241 (0.399)	1.354 (0.751)	1.437*** (0.484)	1.857* (1.064)	0.629 (0.429)	1.283* (0.736)
High income	2.123* (0.823)	0.594 (0.499)	1.460 (0.509)	1.616 (1.120)	1.735 (0.658)	1.011 (0.827)	1.446 (0.513)	2.267 (1.538)	1.889 (0.748)	1.946 (1.643)	0.843 (0.295)	0.956 (0.629)	0.918* (0.553)	-0.176 (1.159)	0.351 (0.468)	0.583 (0.840)
FoWFH_Mincome	NA NA	1.432 (1.157)	NA NA	0.449 (0.301)	NA NA	0.859 (0.682)	NA NA	0.288* (0.190)	NA NA	0.292 (0.244)	NA NA	0.904 (0.586)	NA NA	-0.518 (1.141)	NA NA	-0.924 (0.863)
FoWFH_Hincome	NA NA	4.379* (3.778)	NA NA	0.769 (0.588)	NA NA	1.824 (1.529)	NA NA	0.488 (0.368)	NA NA	0.932 (0.825)	NA NA	0.869 (0.639)	NA NA	1.272 (1.191)	NA NA	-0.429 (0.950)
cons													9.998*** (1.561)	9.613*** (1.502)	7.827*** (1.122)	7.817*** (1.019)

Note. Standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Industry, Work position, Exposure_f, Shopping, Cohabit, Closeness, Wave, City, and other variables have been omitted, see Appendix Table 7 for complete table details.

attend to household responsibilities, which often puts them under additional stress. This was especially true during the pandemic when children stayed at home because of school closures and women had to supervise children during working hours [17,40,41].

This study's analysis showed that mental health status varied by gender across eight industries. Men in the computer, manufacture, research and education, circulation, medical, and government industries reported better mental health. Furthermore, women in the computer and manufacturing industries reported better mental health. However, women in the circulation and cultural and sport industries reported worse mental health. Employees in the computer industry may have reported better mental health because of their technical computer expertise that provides the tools and supports to better adapt to working from home. Extant literature has found that computer and technological literacy is associated with lower stress [32]. On the other hand, this study also found that men and women in manufacturing industry reported good moods, which may be because these workers were unaffected by work-from-home policies. Manufacturing plays an essential role in maintaining society's function and economy. Manufacturing workers can return to work without being restricted by lockdown policies, and the risk of unemployment is relatively low [42]. With rising levels of job insecurity in all industries, high job satisfaction among manufacturing workers may be explained by the appreciation for having a job during the pandemic [43]. Men in research and education industries reported better mental health during the pandemic, possibly because these employees were unlikely to be unemployed. However, some studies have found that researchers had mild levels of stress and depression, as well as moderate levels of anxiety during the pandemic [32]. Additionally, teachers reported mild stress and anxiety possibly from adjusting to unfamiliar virtual teaching tools [32]. Men working in healthcare services reported better mental health, probably because healthcare workers may have better health awareness and positive attitudes during the pandemic, which may explain reduced anxiety levels [44]. On the other hand, an increased risk of contracting the virus from patients can attenuate psychological stress in healthcare workers [45–47].

The presence of a close friend or relative infected with or suspected of having COVID-19 was positively associated with negative mental health outcomes in women, which is consistent with previous research [2,28,29,48]. However, some studies showed that people living with those infected with COVID-19 reported lower levels of anxiety, possibly because increased knowledge about the virus gained from seeing the symptoms first-hand lowered their stress about disease uncertainty [27].

Interestingly, having an inconvenient shopping experience was positively associated with negative mental health outcomes in men. Lockdown policies allowed a sin-

gle person per household to go out to buy groceries every two days [49]. This shopping inconvenience exacerbated negative mental health outcomes in men because they often bought without knowledge or awareness of what to buy [50].

The present study found that a higher number of people living in the same household was negatively associated with mental health in men and women. Inconsistent lifestyles may have caused friction when more people live in the same household. Those who were working from home would need to take care of more people, causing additional pressure and workload. Another possible reason explaining negative mental health outcomes in people living with more families in the household was an increased risk of getting infected.

This study found a negative association between men's mental health and close relationship with friends, suggesting that men had a healthier psychological state when they had good relationships with friends. Close friendships would provide more social support from friends by providing them a way to share their feelings. Therefore, this would reduce the stress caused by the pandemic [1,44]. However, having a close relationship with friends had no significant impact on women's mental health.

An annual household disposable income of 100,000 CNY to 200,000 CNY was negatively associated with mental health in men because this income range can barely support families in the first- and second-tier cities like Beijing, Wuhan, and Changsha. Meanwhile, with an increased risk of unemployment and salary reduction during the pandemic, men were under more work pressure, thus leading to poorer mental health. Some research found that low-income individuals have poorer mental health [10,25], while other research has found better mental health among high-income men. The regression results of the current study showed no significant correlation between annual household income and mental health in women. For men, *FoWFH_Age* was negatively associated with *Busy* and *Index_all*, indicating that younger men were more likely to feel busy and have poorer mental health when forced to work from home. This finding is consistent with existing literature, where younger individuals reported poor mental health and conditions such as depression, anxiety, perceived stress, and post-traumatic stress symptoms [2,3,48]. Negative mental health outcomes among young people may be explained by having more access to discouraging information about the pandemic online [29]. Furthermore, younger people faced serious financial issues associated with more uncertain working conditions, and because of limited recreational activities and entertainment due to lockdown policies [51]. In addition, *FoWFH_Married* was positively associated with *Unpleasant*, suggesting that married men were more likely to feel unhappy towards being forced to work from home compared to unmarried men, possibly because working from home may increase the

amount of childcare they provided [17].

Both highly educated men and women reported poorer mental health from working at home. For women, *FoWFH_Gradu* was positively associated with *Unpleasant*, suggesting that women with a master's degree or higher were more likely to report negative mental health outcomes when forced to work from home. This may be because highly educated women typically earn more, and higher-income women are more connected to the labor market than low-income women. This link may explain why women with a higher income reported being more worried about COVID-19 than women with lower incomes [2]. *FoWFH_Hincome* was positively associated with *Unpleasant* for men as well, suggesting that high-income men were more likely to report negative health outcomes when forced to work from home. High-income men often have high-ranked positions in companies. For businesses that experienced a service disruption during the pandemic, job performance and income in men because of challenges in obtaining data, inconvenient communication, difficult management, and other problems [16].

5. Conclusions

This paper examined how being forced to work from home affected the mental health of men and women. Being forced to work from home was negatively associated with mental health in men, but the association with women's mental health was not statistically significant. However, expanding this study's sample size may yield noteworthy and significant results. Married men reported better mental health than unmarried men, while women showed the opposite relationship. The mental health status varied by gender in different industries. Men in the computer, manufacture, research and education, circulation, medical, and government industries reported better mental health. Likewise, women in the computer and manufacturing industries reported better mental health. Women reported worse mental health when they had a friend or relative who was newly infected with COVID-19 or suspected of being infected, while men reported experiencing negative mental health when they found it inconvenient to go shopping for groceries. Increased numbers of inhabitants per household were negatively associated with the mental health of both men and women. Men were less affected when they had good relationships with their relatives and friends. And men with an annual household disposable income between 100,000 CNY and 200,000 CNY reported worse mental health.

Based on the results of this study, we have some suggestions for companies and governments that use telecommuting. Companies can provide resources and support, such as a professional mental health physician, to provide online counseling services for employees who work from home. Team building activities can also be organized remotely so that the team can be given time to relax during stressful work periods. Women who worked from home faced negative mental health outcomes from taking on more

family responsibilities. The government might consider introducing policies that address the impact of working from home on women, such as taking maternity leave for men and women and providing childcare subsidies.

6. Limitations

This study has at least three important limitations. First, while this study used the Patient Health Questionnaire 9 (PHQ-9) and Depression Anxiety Stress Scales-21 (Dass-21), the measures we used do not provide a comprehensive view of mental health, and future studies may consider using other scales that measure different aspects of mental health not explored in this study. Likewise, the mental health status in this study was self-reported rather than clinically diagnosed, so the results may be affected by the subjective feelings of respondents.

Second, due to the limitations of cross-sectional design, the findings from the current study illustrate only associations; and we cannot causal inferences. Third, we only have data for March and May 2020, limiting the extent to which we were able to assess the impact of working from home on mental health over time. Future research could use longitudinal studies to better explore the causal relationships between working from home and mental health, as well as the changes over time.

Author Contributions

NH and ZC conceptualized and designed the questionnaire for the survey. ZC administered the ethics review process. NH and TL conceived the research idea. NH and TL developed the theory and XN performed the statistical analysis. NH, XN and TL verified the analytical methods. NH encouraged XN to investigate the topic and supervised the findings of this work. All authors discussed the results and contributed to writing of the final manuscript.

Ethics Approval and Consent to Participate

The present study protocol was reviewed and approved by the institutional ethical committee of the University of Nottingham Ningbo China. Informed consent was obtained from all individual participants included in the study.

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Conflict of Interest

The authors declare no conflict of interest.

Appendix

See Tables 6,7.

Table 6. The heterogeneous estimates on mental health by gender (n = 940).

	Ordinal Logistic Regression											Ordinary Least Square				
	Unpleasant				Spiritless				Busy			Index_all				
	Male		Female		Male		Female		Male		Female	Male		Female		
	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married
Work status																
Other work status	1.000(ref)															
Forced to WFH	8.443*	0.737	1.081	1.151	15.228**	1.109	1.801	0.675	41.062***	5.452***	7.677*	0.968	4.689**	0.659	1.431	-0.345
	(10.730)	(0.443)	(1.267)	(0.585)	(19.617)	(0.665)	(2.116)	(0.337)	(56.043)	(3.315)	(8.879)	(0.467)	(1.865)	(0.873)	(1.559)	(0.657)
Age	1.017	0.988	1.006	0.996	1.057*	1.010	1.023	1.006	1.045	0.986	1.024	0.978	0.061	-0.010	0.029	-0.010
	(0.031)	(0.015)	(0.032)	(0.015)	(0.033)	(0.015)	(0.030)	(0.016)	(0.035)	(0.015)	(0.031)	(0.015)	(0.045)	(0.022)	(0.041)	(0.021)
FoWFH_Age	0.962		0.989		0.945		0.977		0.932*		0.943*		-0.090*		-0.050	
	(0.032)		(0.034)		(0.033)		(0.033)		(0.034)		(0.031)		(0.049)		(0.045)	
Degree																
Did not graduate college	1.000(ref)															
Bachelor	0.966	0.957	0.934	0.939	0.633	0.618	0.982	0.999	1.004	1.012	0.628	0.653	-0.291	-0.306	-0.411	-0.433
	(0.291)	(0.286)	(0.298)	(0.298)	(0.189)	(0.184)	(0.329)	(0.335)	(0.311)	(0.314)	(0.201)	(0.211)	(0.636)	(0.639)	(0.648)	(0.649)
Graduate	0.693	0.692	0.927	0.930	0.716	0.701	0.856	0.844	1.114	1.166	0.594	0.583	-1.287**	-2.011**	0.537	0.485
	(0.301)	(0.300)	(0.451)	(0.453)	(0.305)	(0.298)	(0.418)	(0.412)	(0.486)	(0.508)	(0.283)	(0.280)	(0.536)	(0.948)	(0.411)	(0.670)
Marriage status																
Other marriage status	1.000(ref)															
Married	0.350***	0.124***	1.812*	2.855**	0.564	0.308*	0.663	0.554	0.533*	0.939	2.241**	2.250	-0.161	-0.181	-0.232	-0.207
	(0.130)	(0.083)	(0.563)	(1.524)	(0.209)	(0.204)	(0.202)	(0.292)	(0.192)	(0.611)	(0.704)	(1.146)	(0.435)	(0.437)	(0.427)	(0.427)
FoWFH_Married		3.674*		0.557		2.157		1.313		0.499		1.099		0.946		0.145
		(2.520)		(0.322)		(1.486)		(0.752)		(0.345)		(0.615)		(0.992)		(0.750)
Family annual income																
Low income	1.000(ref)															
Medium income	2.833***	2.972***	1.515	1.444	2.519***	2.695***	1.590	1.621	2.272**	2.299**	1.216	1.277	1.390***	1.463***	0.602	0.643
	(0.974)	(1.020)	(0.484)	(0.466)	(0.855)	(0.914)	(0.515)	(0.528)	(0.798)	(0.804)	(0.394)	(0.418)	(0.482)	(0.484)	(0.429)	(0.433)
High income	2.110*	2.208**	1.407	1.340	1.670	1.800	1.445	1.474	1.824	1.852	0.840	0.870	0.881	0.966*	0.329	0.356
	(0.822)	(0.857)	(0.488)	(0.469)	(0.637)	(0.684)	(0.513)	(0.526)	(0.726)	(0.734)	(0.295)	(0.308)	(0.550)	(0.553)	(0.467)	(0.470)
Industry																
Agriculture	1.000(ref)															
Computer	0.420*	0.454	0.514*	0.511*	0.591	0.615	0.819	0.800	0.295**	0.260***	1.909	1.818	-1.516**	-1.432**	-0.255	-0.299
	(0.205)	(0.223)	(0.207)	(0.205)	(0.274)	(0.287)	(0.341)	(0.333)	(0.148)	(0.131)	(0.789)	(0.751)	(0.710)	(0.718)	(0.562)	(0.562)
Manufacture	0.407*	0.422*	0.595	0.584	0.498	0.493	0.532*	0.509*	0.414*	0.350**	1.565	1.424	-1.399**	-1.404**	-0.388	-0.470
	(0.187)	(0.196)	(0.220)	(0.213)	(0.216)	(0.214)	(0.202)	(0.191)	(0.198)	(0.165)	(0.579)	(0.523)	(0.667)	(0.672)	(0.506)	(0.501)
Research & edu	0.125***	0.133***	0.594	0.596	0.797	0.823	0.620	0.612	0.771	0.620	1.300	1.305	-1.532	-1.538	-0.410	-0.413
	(0.092)	(0.097)	(0.255)	(0.257)	(0.518)	(0.535)	(0.274)	(0.271)	(0.535)	(0.426)	(0.548)	(0.551)	(1.012)	(1.019)	(0.580)	(0.581)
Circulation	0.621	0.612	0.939	0.915	0.354**	0.345**	0.862	0.842	0.556	0.489	2.346**	2.180**	-1.273*	-1.282*	0.270	0.216
	(0.310)	(0.307)	(0.369)	(0.357)	(0.167)	(0.163)	(0.341)	(0.333)	(0.289)	(0.252)	(0.921)	(0.857)	(0.730)	(0.733)	(0.529)	(0.528)

Table 6. Continued.

	Ordinal Logistic Regression												Ordinary Least Square			
	Unpleasant				Spiritless				Busy				Index_all			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married
Investment	0.825 (0.404)	0.825 (0.406)	1.015 (0.380)	0.999 (0.372)	0.722 (0.338)	0.692 (0.325)	0.581 (0.223)	0.565 (0.216)	1.061 (0.537)	0.89 (0.443)	1.486 (0.551)	1.410 (0.526)	-0.288 (0.714)	-0.344 (0.716)	-0.064 (0.51)	-0.105 (0.510)
Medical	0.255 (0.237)	0.251 (0.232)	1.897 (1.052)	1.890 (1.045)	0.841 (0.703)	0.848 (0.713)	2.209 (1.324)	2.108 (1.262)	0.142** (0.141)	0.118** (0.116)	2.626 (1.563)	2.460 (1.461)	-2.105 (1.401)	-2.125 (1.407)	1.317 (0.806)	1.279 (0.807)
Cultural & sport	0.893 (0.557)	0.827 (0.509)	0.889 (0.466)	0.864 (0.455)	0.603 (0.360)	0.549 (0.324)	0.438* (0.219)	0.434* (0.218)	0.793 (0.535)	0.576 (0.375)	2.428* (1.201)	2.367* (1.176)	-0.456 (0.928)	-0.675 (0.921)	-0.016 (0.685)	-0.029 (0.686)
Government	0.398 (0.266)	0.403 (0.272)	0.684 (0.364)	0.646 (0.342)	0.325* (0.210)	0.325* (0.211)	0.813 (0.437)	0.797 (0.428)	1.146 (0.805)	0.943 (0.659)	1.305 (0.672)	1.189 (0.611)	-1.361 (0.980)	-1.395 (0.984)	-0.127 (0.723)	-0.193 (0.723)
Work position																
Low position	1.000(ref)															
Mediun position	1.142 (0.288)	1.150 (0.290)	1.313 (0.282)	1.319 (0.284)	1.097 (0.282)	1.116 (0.286)	0.870 (0.182)	0.875 (0.183)	1.444 (0.373)	1.470 (0.380)	1.726** (0.372)	1.731** (0.373)	0.319 (0.376)	0.356 (0.377)	0.373 (0.290)	0.378 (0.290)
High position	2.066** (0.673)	2.002** (0.652)	1.257 (0.389)	1.269 (0.392)	1.311 (0.424)	1.287 (0.416)	1.023 (0.318)	1.020 (0.317)	3.213*** (1.060)	3.130*** (1.030)	2.135** (0.665)	2.067** (0.641)	1.307*** (0.472)	1.289*** (0.474)	0.611 (0.410)	0.592 (0.411)
Exposure_f																
Do not exposure	1.000(ref)															
Exposure	1.937 (1.240)	2.116 (1.362)	3.882** (2.681)	3.903** (2.684)	1.182 (0.750)	1.264 (0.804)	4.262** (2.929)	4.333** (2.977)	0.767 (0.510)	0.825 (0.540)	3.417* (2.444)	3.577* (2.558)	0.497 (1.011)	0.617 (1.013)	2.109** (0.965)	2.131** (0.967)
Shopping																
Shop incovenience	1.000(ref)															
Shop convenience	3.111*** (0.994)	3.263*** (1.047)	1.478 (0.754)	1.446 (0.731)	2.713*** (0.863)	2.734*** (0.873)	1.855 (0.862)	1.894 (0.881)	2.381*** (0.769)	2.258** (0.729)	1.022 (0.520)	1.044 (0.532)	1.757*** (0.485)	1.732*** (0.487)	0.667 (0.692)	0.700 (0.694)
Cohabit	1.357*** (0.151)	1.376*** (0.154)	1.275*** (0.110)	1.278*** (0.110)	1.418*** (0.157)	1.435*** (0.160)	1.217** (0.107)	1.209** (0.106)	1.368*** (0.150)	1.356*** (0.149)	1.261*** (0.113)	1.245** (0.111)	0.540*** (0.160)	0.556*** (0.161)	0.380*** (0.117)	0.375*** (0.117)
Closeness																
Low closeness	1.000(ref)															
Medium closeness	0.133** (0.105)	0.133*** (0.101)	0.828 (0.393)	0.780 (0.373)	0.323 (0.249)	0.378 (0.285)	0.603 (0.284)	0.612 (0.290)	0.145** (0.134)	0.167* (0.156)	0.852 (0.399)	0.904 (0.432)	-2.715*** (1.046)	-2.641** (1.049)	-0.603 (0.618)	-0.058 (0.626)
High closeness	0.074*** (0.058)	0.073*** (0.055)	0.507 (0.232)	0.483 (0.221)	0.272* (0.206)	0.305 (0.226)	0.565 (0.256)	0.566 (0.256)	0.157** (0.144)	0.174* (0.162)	0.912 (0.408)	0.950 (0.431)	-3.055*** (1.032)	-3.029*** (1.036)	-0.795 (0.586)	-0.795 (0.590)
Wave	0.754 (0.171)	0.752 (0.170)	0.725 (0.167)	0.714 (0.164)	0.726 (0.164)	0.717 (0.161)	1.210 (0.28)	1.227 (0.284)	0.825 (0.184)	0.823 (0.183)	0.767 (0.178)	0.772 (0.179)	-0.354 (0.330)	-0.390 (0.331)	-0.151 (0.305)	-0.136 (0.306)

Table 6. Continued.

	Ordinal Logistic Regression												Ordinary Least Square			
	Unpleasant				Spiritless				Busy				Index_all			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married	Age	Married
City																
Chengdu	1.000(ref)															
Beijing	1.702*	1.778**	0.771	0.784	1.994**	2.099***	0.610*	0.599*	2.227***	2.284***	0.659	0.660	1.118***	1.184***	-0.565	-0.564
	(0.478)	(0.500)	(0.213)	(0.217)	(0.566)	(0.597)	(0.168)	(0.166)	(0.639)	(0.652)	(0.182)	(0.183)	(0.417)	(0.418)	(0.366)	(0.367)
Wuhan	1.072	1.107	0.685	0.703	1.682	1.777	0.466**	0.453***	1.130	1.190	1.111	1.081	0.413	0.465	-0.563	-0.592
	(0.388)	(0.401)	(0.208)	(0.215)	(0.604)	(0.637)	(0.141)	(0.138)	(0.397)	(0.417)	(0.352)	(0.343)	(0.536)	(0.537)	(0.414)	(0.416)
Changsha	0.620*	0.631*	0.44***	0.45***	0.688	0.706	0.525**	0.517**	1.297	1.324	0.619*	0.606*	-0.409	-0.387	-0.994***	-1.010***
	(0.171)	(0.174)	(0.119)	(0.122)	(0.185)	(0.189)	(0.143)	(0.141)	(0.348)	(0.355)	(0.169)	(.0166)	(0.393)	(0.395)	(0.360)	(0.362)
cons													7.105***	10.066***	6.807***	8.127***
													(1.957)	(1.482)	(1.511)	(1.003)

Table 7. The heterogeneous estimates on mental health by gender (n = 940).

	Ordinal Logistic Regression												Ordinary Least Square			
	Unpleasant				Spiritless				Busy				Index_all			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income
Work status																
Other work status	1.000(ref)															
Forced to WFH	1.247 (0.964)	0.98 (0.681)	0.496 (0.356)	1.238 (0.728)	1.605 (1.236)	1.711 (1.136)	0.825 (0.636)	1.891 (1.091)	1.902 (1.606)	5.929** (4.298)	3.102 (2.348)	1.135 (0.644)	0.795 (1.081)	1.143 (0.956)	0.227 (0.933)	0.343 (0.744)
Age	0.987 (0.015)	0.988 (0.015)	0.995 (0.015)	0.997 (0.015)	1.009 (0.015)	1.010 (0.015)	1.005 (0.016)	1.006 (0.016)	0.986 (0.015)	0.984 (0.015)	0.976 (0.015)	0.977 (0.015)	-0.010 (0.022)	-0.009 (0.022)	-0.012 (0.021)	-0.011 (0.021)
Deree																
Did not graduate college	1.000(ref)															
Bachelor	0.675 (0.531)	0.934 (0.282)	0.739 (0.501)	0.945 (0.300)	0.526 (0.418)	0.622 (0.186)	1.013 (0.735)	0.998 (0.333)	0.580 (0.497)	0.965 (0.300)	1.736 (1.242)	0.652 (0.210)	-0.665 (1.098)	-0.205 (0.436)	0.274 (0.882)	-0.200 (0.427)
Graduate	0.227 (0.246)	0.629 (0.276)	0.198 (0.204)	0.944 (0.459)	0.458 (0.513)	0.695 (0.297)	0.680 (0.783)	0.860 (0.420)	0.679 (0.814)	1.070 (0.471)	1.615 (1.673)	0.579 (0.278)	-1.568 (1.606)	-0.404 (0.641)	-0.772 (1.386)	-0.414 (0.649)
FoWFH_Bachelor	1.508 (1.255)		1.373 (1.048)		1.226 (1.029)		0.976 (0.798)		1.837 (1.658)		0.294 (0.235)		0.585 (1.177)		-0.618 (0.996)	
FoWFH_Graduate	3.629 (4.093)		7.029* (8.077)		1.658 (1.919)		1.286 (1.633)		1.789 (2.226)		0.272 (0.314)		1.469 (1.673)		0.394 (1.541)	
Marriage status																
Other marriage status	1.000(ref)															
Married	0.364*** (0.135)	0.361*** (0.134)	1.804* (0.555)	1.791* (0.557)	0.573 (0.211)	0.587 (0.217)	0.675 (0.206)	0.649 (0.198)	0.549* (0.197)	0.565 (0.204)	2.394*** (0.745)	2.393*** (0.750)	-1.248** (0.540)	-1.232** (0.537)	0.572 (0.410)	0.555 (0.411)
Family annual income																
Low income	1.000(ref)															
Medium income	2.882*** (0.988)	2.106 (1.593)	1.534 (0.492)	2.765* (1.626)	2.616*** (0.885)	2.967 (2.191)	1.593 (0.515)	3.932** (2.265)	2.367** (0.827)	6.599** (5.122)	1.241 (0.399)	1.354 (0.751)	1.437*** (0.484)	1.857* (1.064)	0.629 (0.429)	1.283* (0.736)
High income	2.123* (0.823)	0.594 (0.499)	1.460 (0.509)	1.616 (1.120)	1.735 (0.658)	1.011 (0.827)	1.446 (0.513)	2.267 (1.538)	1.889 (0.748)	1.946 (1.643)	0.843 (0.295)	0.956 (0.629)	0.918* (0.553)	-0.176 (1.159)	0.351 (0.468)	0.583 (0.840)
FoWFH_Mincome		1.432 (1.157)		0.449 (0.301)		0.859 (0.682)		0.288* (0.190)		0.292 (0.244)		0.904 (0.586)		-0.518 (1.141)		-0.924 (0.863)
FoWFH_Hincome		4.379* (3.778)		0.769 (0.588)		1.824 (1.529)		0.488 (0.368)		0.932 (0.825)		0.869 (0.639)		1.272 (1.191)		-0.429 (0.950)
Industry																
Agriculture	1.000(ref)															
Computer	0.430* (0.209)	0.442* (0.216)	0.535 (0.215)	0.513* (0.208)	0.596 (0.279)	0.605 (0.281)	0.810 (0.338)	0.795 (0.333)	0.280** (0.141)	0.280** (0.141)	1.808 (0.758)	1.805 (0.75)	-1.454** (0.718)	-1.449** (0.713)	-0.258 (0.565)	-0.293 (0.564)
Manufacture	0.403** (0.185)	0.405** (0.186)	0.621 (0.228)	0.592 (0.219)	0.481* (0.210)	0.480* (0.207)	0.515* (0.195)	0.500* (0.190)	0.374** (0.177)	0.369** (0.175)	1.427 (0.533)	1.411 (0.524)	-1.422** (0.674)	-1.443** (0.667)	-0.423 (0.504)	-0.463 (0.506)

Table 7. Continued.

	Ordinal Logistic Regression										Ordinary Least Square					
	Unpleasant				Spiritless				Busy		Index_all					
	Male		Female		Male		Female		Male		Female		Male		Female	
	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income
Research & edu	0.120*** (0.087)	0.114*** (0.083)	0.620 (0.268)	0.596 (0.258)	0.768 (0.503)	0.738 (0.479)	0.621 (0.275)	0.600 (0.266)	0.690 (0.473)	0.667 (0.461)	1.336 (0.569)	1.295 (0.549)	-1.597 (1.020)	-1.679* (1.012)	-0.376 (0.584)	-0.428 (0.583)
Circulation	0.615 (0.306)	0.596 (0.297)	0.984 (0.385)	0.900 (0.355)	0.347** (0.165)	0.345** (0.163)	0.847 (0.337)	0.788 (0.316)	0.510 (0.264)	0.520 (0.270)	2.162* (0.860)	2.157* (0.856)	-1.263* (0.739)	-1.274* (0.731)	0.240 (0.529)	0.178 (0.533)
Investment	0.780 (0.380)	0.771 (0.376)	1.002 (0.373)	0.995 (0.373)	0.678 (0.318)	0.665 (0.311)	0.567 (0.217)	0.542 (0.209)	0.925 (0.462)	0.897 (0.447)	1.443 (0.543)	1.397 (0.524)	-0.365 (0.718)	-0.420 (0.713)	-0.090 (0.510)	-0.129 (0.513)
Medical	0.239 (0.221)	0.240 (0.222)	1.903 (1.060)	1.843 (1.025)	0.811 (0.681)	0.826 (0.691)	2.155 (1.298)	2.056 (1.235)	0.126** (0.126)	0.133** (0.132)	2.746* (1.655)	2.457 (1.460)	-2.172 (1.411)	-2.151 (1.402)	1.343* (0.810)	1.229 (0.810)
Cultural & sport	0.807 (0.494)	0.772 (0.474)	0.916 (0.481)	0.877 (0.465)	0.523 (0.307)	0.504 (0.299)	0.431* (0.217)	0.403* (0.202)	0.598 (0.388)	0.571 (0.372)	2.234 (1.116)	2.359* (1.175)	-0.703 (0.922)	-0.798 (0.920)	-0.067 (0.689)	-0.050 (0.687)
Government	0.375 (0.250)	0.393 (0.264)	0.680 (0.361)	0.641 (0.341)	0.309* (0.200)	0.311* (0.201)	0.789 (0.423)	0.724 (0.389)	1.011 (0.705)	1.028 (0.715)	1.186 (0.610)	1.169 (0.605)	-1.434 (0.985)	-1.420 (0.980)	-0.159 (0.722)	-0.274 (0.728)
Work position																
Low position	1.000(ref)															
Medium position	1.148 (0.290)	1.148 (0.292)	1.287 (0.277)	1.294 (0.28)	1.111 (0.287)	1.092 (0.283)	0.873 (0.183)	0.863 (0.182)	1.441 (0.374)	1.379 (0.359)	1.773*** (0.384)	1.736** (0.376)	0.342 (0.379)	0.326 (0.379)	0.376 (0.291)	0.368 (0.291)
High position	2.029** (0.659)	2.054** (0.670)	1.269 (0.394)	1.273 (0.393)	1.291 (0.418)	1.285 (0.418)	1.024 (0.320)	1.040 (0.324)	3.105*** (1.024)	2.948*** (0.974)	2.184** (0.685)	2.076** (0.645)	1.301*** (0.475)	1.267*** (0.476)	0.625 (0.412)	0.610 (0.411)
Exposure_f																
Do not exposure	1.000(ref)															
Exposure	2.093 (1.345)	2.127 (1.382)	3.761* (2.618)	3.767* (2.597)	1.256 (0.798)	1.284 (0.817)	4.340** (2.991)	4.441** (3.079)	0.843 (0.552)	0.877 (0.577)	3.741* (2.678)	3.614* (2.587)	0.630 (1.015)	0.685 (1.011)	2.112** (0.968)	2.109** (0.969)
Shopping																
Shop inconvenience	1.000(ref)															
Shop convenience	2.959*** (0.940)	3.037*** (0.971)	1.398 (0.718)	1.525 (0.797)	2.610*** (0.829)	2.634*** (0.838)	1.854 (0.866)	1.837 (0.871)	2.334*** (0.755)	2.267** (0.733)	1.018 (0.521)	1.029 (0.527)	1.675*** (0.487)	1.666*** (0.486)	0.644 (0.696)	0.697 (0.699)
Cohabit	1.353*** (0.150)	1.391*** (0.155)	1.291*** (0.111)	1.276*** (0.109)	1.421*** (0.158)	1.428*** (0.159)	1.214** (0.107)	1.22** (0.108)	1.367*** (0.150)	1.364*** (0.150)	1.241** (0.112)	1.245** (0.111)	0.542*** (0.161)	0.562*** (0.162)	0.383*** (0.118)	0.382*** (0.117)

Table 7. Continued.

	Ordinal Logistic Regression												Ordinary Least Square			
	Unpleasant				Spiritless				Busy				Index_all			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income	Edu	Income
Closeness																
Low closeness	1.000(ref)															
Medium closeness	0.141**	0.139**	0.786	0.781	0.386	0.381	0.588	0.578	0.152**	0.172*	0.795	0.886	-2.556**	-2.585**	-0.678	-0.657
	(0.110)	(0.109)	(0.379)	(0.373)	(0.297)	(0.292)	(0.281)	(0.273)	(0.138)	(0.163)	(0.388)	(0.420)	(1.052)	(1.045)	(0.626)	(0.621)
High closeness	0.078***	0.080***	0.476	0.467*	0.315	0.320	0.547	0.529	0.161**	0.193*	0.829	0.937	-2.927***	-2.872***	-0.898	-0.881
	(0.060)	(0.062)	(0.222)	(0.215)	(0.240)	(0.242)	(0.252)	(0.239)	(0.145)	(0.181)	(0.39)	(0.425)	(1.042)	(1.035)	(0.596)	(0.590)
Wave	0.750	0.783	0.747	0.717	0.719	0.744	1.222	1.192	0.823	0.858	0.769	0.768	-0.376	-0.310	-0.122	-0.147
	(0.170)	(0.179)	(0.172)	(0.166)	(0.162)	(0.169)	(0.284)	(0.277)	(0.183)	(0.192)	(0.180)	(0.179)	(0.332)	(0.332)	(0.306)	(0.307)
City																
Chengdu	1.000(ref)															
Beijing	1.781**	1.863**	0.758	0.783	2.095***	2.123***	0.605*	0.618*	2.286***	2.327***	0.660	0.663	1.195***	1.253***	-0.584	-0.559
	(0.500)	(0.526)	(0.209)	(0.217)	(0.598)	(0.605)	(0.167)	(0.170)	(0.655)	(0.671)	(0.183)	(0.183)	(0.420)	(0.419)	(0.367)	(0.366)
Wuhan	1.098	1.077	0.649	0.683	1.752	1.716	0.459**	0.468**	1.170	1.134	1.122	1.093	0.450	0.403	-0.594	-0.585
	(0.398)	(0.392)	(0.198)	(0.208)	(0.629)	(0.617)	(0.139)	(0.142)	(0.412)	(0.399)	(0.357)	(0.347)	(0.540)	(0.537)	(0.415)	(0.415)
Changsha	0.634*	0.652	0.426***	0.444***	0.703	0.717	0.521**	0.534**	1.323	1.371	0.622*	0.610*	-0.381	-0.335	-1.013***	-0.986***
	(0.175)	(0.181)	(0.115)	(0.120)	(0.189)	(0.193)	(0.142)	(0.145)	(0.355)	(0.369)	(0.171)	(0.167)	(0.396)	(0.395)	(0.360)	(0.361)
cons													9.998***	9.613***	7.827***	7.817***
													(1.561)	(1.502)	(1.122)	(1.019)

References

- [1] Cheikh Ismail L, Mohamad MN, Bataineh MF, Ajab A, Al-Marzouqi AM, Jarrar AH, *et al.* Impact of the Coronavirus Pandemic (COVID-19) Lockdown on Mental Health and Well-Being in the United Arab Emirates. *Frontiers in Psychiatry*. 2021; 12: 633230.
- [2] Escudero-Castillo I, Mato-Diaz FJ, Rodriguez-Alvarez A. Furloughs, Teleworking and Other Work Situations during the COVID-19 Lockdown: Impact on Mental Well-Being. *International Journal of Environmental Research and Public Health*. 2021; 18.
- [3] Fiorenzato E, Zabberoni S, Costa A, Cona G. Cognitive and mental health changes and their vulnerability factors related to COVID-19 lockdown in Italy. *PLoS ONE*. 2021; 16: e0246204.
- [4] [2020] No.9. Notice on the issuance of the recent work plan for the prevention and control of pneumonia from novel coronavirus infections. *Pneumonia Mechanisms: National Health Commission Website*. 2020.
- [5] Skyconnect N. The proportion of home office has increased from 28% before the outbreak to 71%. 2020. Available at: https://m.sohu.com/a/412542294_100161396 (Accessed: 11 August 2020).
- [6] Megan B. U.S. Workers Discovering Affinity for Remote Work. 2020. Available at: <https://news.gallup.com/poll/306695/workers-discovering-affinity-remote-work.aspx> (Accessed: 3 April 2020).
- [7] Allen TD, Golden TD, Shockley KM. How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest*. 2015; 16: 40–68.
- [8] Gajendran RS, Harrison DA. The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*. 2007; 92: 1524–1541.
- [9] Chong S, Huang Y, Chang CD. Supporting interdependent telework employees: A moderated-mediation model linking daily COVID-19 task setbacks to next-day work withdrawal. *Journal of Applied Psychology*. 2020; 105: 1408–1422.
- [10] Savolainen I, Oksa R, Savela N, Celuch M, Oksanen A. COVID-19 Anxiety-A Longitudinal Survey Study of Psychological and Situational Risks among Finnish Workers. *International Journal of Environmental Research and Public Health*. 2021; 18: 794.
- [11] Álamo C, Antúnez Z, Baader T, Kendall J, Barrientos M, de la Barra D. The sustained increase of mental health symptoms in Chilean university students over three years. *Revista Latinoamericana De Psicología*. 2020; 52: 71–80.
- [12] Gitay MN, Fatima S, Arshad S, Arshad B, Ehtesham A, Baig MA, *et al.* Gender Differences and Prevalence of Mental Health Problems in Students of Healthcare Units. *Community Mental Health Journal*. 2019; 55: 849–853.
- [13] Kumar P, Rathee S. Mental Health Issue and Dissociative Symptoms among Undergraduate Medical Students: Across the Gender. *Journal of Psychosocial Research*. 2021; 16: 67–74.
- [14] Astroza S, Tirachini A, Hurtubia R, Carrasco JA, Guevara A, Munizaga M, *et al.* Mobility Changes, Teleworking, and Remote Communication during the COVID-19 Pandemic in Chile. *Findings*. 2020.
- [15] Alon T, Doepke M, Olmstead-Rumsey J, Tertilt M. The impact of COVID-19 on gender equality (No. w26947). *National Bureau of Economic Research*. 2020.
- [16] Nguyen MH, Armoogum J. Perception and Preference for Home-Based Telework in the COVID-19 Era: A Gender-Based Analysis in Hanoi, Vietnam. *Sustainability*. 2021; 13: 3179.
- [17] Carli LL. Women, Gender equality and COVID-19. *Gender in Management: An International Journal*. 2020; 35: 647–655.
- [18] Shockley KM, Clark MA, Dodd H, King EB. Work-family strategies during COVID-19: Examining gender dynamics among dual-earner couples with young children. *Journal of Applied Psychology*. 2021; 106: 15–28.
- [19] Nguyen MH. Factors influencing home-based telework in Hanoi (Vietnam) during and after the COVID-19 era. *Transportation*. 2021; 48: 3207–3238.
- [20] Zamarro G, Prados MJ. Gender differences in couples' division of childcare, work and mental health during COVID-19. *Review of Economics of the Household*. 2021; 19: 11–40.
- [21] Faragher EB, Cass M, Cooper CL. The Relationship between Job Satisfaction and Health: a Meta-Analysis. *Occupational & Environmental Medicine*. 2013; 62: 105–112.
- [22] Dongarwar D, Yusuf KK, Maiyegun SO, Ibrahim S, Ikedionwu C, Salihu HM. Covid-19 and Neuro-Behavioral Economics: A Conceptual Framework to Improve Physical and Mental Health among Remote Workers. *International Journal of Maternal and Child Health (MCH) and AIDS (IJMA)*. 2020; 9: 360–363.
- [23] Okubo T, Inoue A, Sekijima K. Teleworker Performance in the COVID-19 Era in Japan. *Asian Economic Papers*. 2021; 20: 175–192.
- [24] Gualano MR, Lo Moro G, Voglino G, Bert F, Siliquini R. Effects of Covid-19 Lockdown on Mental Health and Sleep Disturbances in Italy. *International Journal of Environmental Research and Public Health*. 2020; 17: 4779.
- [25] Lei L, Huang X, Zhang S, Yang J, Yang L, Xu M. Comparison of Prevalence and Associated Factors of Anxiety and Depression Among People Affected by versus People Unaffected by Quarantine During the COVID-19 Epidemic in Southwestern China. *Medical Science Monitor*. 2020; 26: e924609.
- [26] Bartoszek A, Walkowiak D, Bartoszek A, Kardas G. Mental Well-Being (Depression, Loneliness, Insomnia, Daily Life Fatigue) during COVID-19 Related Home-Confinement-A Study from Poland. *International Journal of Environmental Research and Public Health*. 2020; 17: 7417.
- [27] Killgore WDS, Cloonan SA, Taylor EC, Dailey NS. Mental Health During the First Weeks of the COVID-19 Pandemic in the United States. *Frontiers in Psychiatry*. 2021; 12: 561898.
- [28] Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, *et al.* Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *International Journal of Environmental Research and Public Health*. 2020; 17: 1729.
- [29] Mazza C, Ricci E, Biondi S, Colasanti M, Ferracuti S, Napoli C, *et al.* A Nationwide Survey of Psychological Distress among Italian People during the COVID-19 Pandemic: Immediate Psychological Responses and Associated Factors. *International Journal of Environmental Research and Public Health*. 2020; 17: 3165.
- [30] Hao N, Wang HH, Zhou Q. The impact of online grocery shopping on stockpile behavior in Covid-19. *China Agricultural Economic Review*. 2020; 12: 459–470.
- [31] Wang HH, Hao N. Panic buying? Food hoarding during the pandemic period with city lockdown. *Journal of Integrative Agriculture*. 2020; 19: 2916–2925.
- [32] Rehman U, Shahnawaz MG, Khan NH, Kharshiing KD, Khurshed M, Gupta K, *et al.* Depression, Anxiety and Stress among Indians in Times of Covid-19 Lockdown. *Community Mental Health Journal*. 2021; 57: 42–48.
- [33] Spitzer RL, Williams JB. Validation and Utility of a Self-Report Version of PRIME-MD: The PHQ Primary Care Study. *Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire*. *Journal of the American Medical Association*. 1999; 282: 1737–1744.
- [34] Bottesi G, Ghisi M, Altoè G, Conforti E, Melli G, Sica C. The Italian version of the Depression Anxiety Stress Scales-21: Factor structure and psychometric properties on community and clinical samples. *Comprehensive Psychiatry*. 2015; 60: 170–

181.

- [35] Wang J, Jing R, Lai X, Zhang H, Lyu Y, Knoll MD, *et al.* Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. *Vaccines*. 2020; 8: 482.
- [36] Government BMPs. Notice of the People's Government of Beijing Municipality on Flexible Arrangements for Work of Enterprises in Beijing during the Prevention and control of the Novel Coronavirus Pneumonia Outbreak. 2020. Available at: http://www.beijing.gov.cn/zhengce/zhengcefagui/202001/t20200131_1622070.html (Accessed: 31 January 2020).
- [37] Command WNCPPaC. Circular of Wuhan Novel Coronavirus Pneumonia Prevention and Control Headquarters (No. 1). 2020. Available at: http://www.gov.cn/xinwen/2020-01/23/content_5471751.htm (Accessed: 23 January 2020).
- [38] Stroud I, Gutman LM. Longitudinal changes in the mental health of UK young male and female adults during the COVID-19 pandemic. *Psychiatry Research*. 2021; 303: 114074.
- [39] Russo D, Hanel PHP, Altmickel S, van Berkel N. Predictors of well-being and productivity among software professionals during the COVID-19 pandemic – a longitudinal study. *Empirical Software Engineering*. 2021; 26: 62.
- [40] Collins C, Landivar LC, Ruppanner L, Scarborough WJ. COVID-19 and the gender gap in work hours. *Gender, Work & Organization*. 2020; 28: 101–112.
- [41] Waddell N, Overall NC, Chang VT, Hammond MD. Gendered division of labor during a nationwide COVID-19 lockdown: Implications for relationship problems and satisfaction. *Journal of Social and Personal Relationships*. 2021; 38: 1759–1781.
- [42] Sinclair RR, Allen T, Barber L, Bergman M, Britt T, Butler A, *et al.* Occupational Health Science in the Time of COVID-19: now more than ever. *Occupational Health Science*. 2020; 4: 1–22.
- [43] Syrek C, Kuhnel J, Vahle-Hinz T, de Bloom J. Being an accountant, cook, entertainer and teacher-all at the same time: Changes in employees' work and work-related well-being during the coronavirus (COVID-19) pandemic. *International Journal of Psychology*. 2022; 57: 20–32.
- [44] El-Zoghby SM, Soltan EM, Salama HM. Impact of the COVID-19 Pandemic on Mental Health and Social Support among Adult Egyptians. *Journal of Community Health*. 2020; 45: 689–695.
- [45] Chen B, Li QX, Zhang H, Zhu JY, Yang X, Wu YH, *et al.* The psychological impact of COVID-19 outbreak on medical staff and the general public. *Current Psychology*. 2020. (in press)
- [46] Du J, Mayer G, Hummel S, Oetjen N, Gronewold N, Zafar A, *et al.* Mental Health Burden in Different Professions During the Final Stage of the COVID-19 Lockdown in China: Cross-sectional Survey Study. *Journal of Medical Internet Research*. 2020; 22: e24240.
- [47] Zhang W, Wang K, Yin L, Zhao W, Xue Q, Peng M, *et al.* Mental Health and Psychosocial Problems of Medical Health Workers during the COVID-19 Epidemic in China. *Psychotherapy and Psychosomatics*. 2020; 89: 242–250.
- [48] Rossi R, Socci V, Talevi D, Mensi S, Niolu C, Pacitti F, *et al.* COVID-19 Pandemic and Lockdown Measures Impact on Mental Health Among the General Population in Italy. *Frontiers in Psychiatry*. 2020; 11: 790.
- [49] Pan SL, Cui M, Qian J. Information resource orchestration during the COVID-19 pandemic: a study of community lockdowns in China. *International Journal of Information Management*. 2020; 54: 102143.
- [50] Miscellany AC. During the epidemic, men buy food and cook to confuse behavior. 2020. Available at: https://www.sohu.com/a/378283118_100094213 (Accessed: 7 March 2020).
- [51] Pieh C, Budimir S, Probst T. The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria. *Journal of Psychosomatic Research*. 2020; 136: 110186.