

# Factors Associated With Work-Life Balance and Productivity Before and During Work From Home

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**Objectives:** Considering the prevailing work from home (WFH) arrangement globally due to COVID-19, this paper aims to compare job-related and psychosocial factors before and during WFH setup; and to determine the relationship of these factors to work-life balance (WLB) and productivity. **Methods:** A total 503 employees from 46 institutions answered the online questionnaire, 318 of whom met the inclusion criteria. Paired *t* test and structural equation modeling (SEM) with multigroup analysis were used for the statistical analyses. **Results:** Psychological detachment (PD), sleep, stress, social support (SS), WLB, and productivity declined during WFH. SEM showed that PD significantly influenced stress and sleep, subsequently affecting productivity. SS significantly helped the participants maintain WLB. **Conclusion:** The key to increasing productivity and WLB during WFH is to foster PD and SS among employees.

**Keywords:** COVID-19, productivity, social support, structural equation modeling, work from home, work load, work-life balance

One of the occurrences emanating from the COVID-19 pandemic is the work-from-home (WFH) arrangement on an unprecedented global scale. WFH scheme has revolutionized the way we do our work to achieve the same outcomes that are comparable if not better than previous arrangements. It provided workers with opportunities to manage their time and allocate their resources to achieve organizational objectives. Moreover, WFH reshapes the psycho-social and environmental aspects surrounding one's work, more specifically those in the home setting, which are intimately related to the person.

While WFH arrangement was gaining popularity in the Philippines even before the pandemic, there is limited local data on it as an alternative work arrangement and its impact on health and productivity. During the pandemic, community quarantine measures are enforced that have led to restrictions on business operations to prevent the further spread of COVID-19 in the country. Employers albeit not ready are forced to transition and adapt to the new normal way of operating their businesses. They have adopted WFH

arrangements to help minimize the impact of the pandemic on their businesses and employees.

Work-life balance (WLB) is a focal aspect of interest in several research studies about work even before the pandemic forced employees to WFH. Poor WLB is associated to self-reported poor health for both men and women.<sup>1,2</sup> With the advent of WFH schemes dominating the work arrangements worldwide, WLB takes on a different dimension with various factors affecting it, especially in the home setting where the delineation between work and home becomes blurred. Another area of concern in the WFH setting is the issue of productivity. The COVID-19 pandemic forced entire families to stay at home, so the situation and the workplace may not be very conducive to work. The lack of space at home and appropriate office furniture and equipment can also influence the efficiency and safety of employees doing computer-related tasks.

At the beginning of the pandemic, employees were not able to divide their time well because they were used to fixed working hours and specific routines.<sup>3</sup> Workers with families had to take care of children and household chores that may conflict with work-related tasks, thereby reducing the amount of time for productive work. This is especially true for women who have to juggle their time between the demands of their careers and parenting.<sup>4</sup>

## Literature Review

With most of their employees remotely working at home, companies are interested to know its impact on productivity.<sup>5</sup> Employers are blind to the activities of their employees and rely on information obtained from digital communication and online meetings. Productivity studies conducted during the COVID-19 pandemic had inconsistent results. Productivity of Chinese employees suffered during the COVID-19 pandemic due to self-regulation issues and problems with technology.<sup>6</sup> Evidently, not all people have the discipline to work without supervision. Interference from family and bouts of loneliness can affect the performance of tasks during WFH. Most researchers in Hungary working from home spent more time at work but were less efficient because of their inability to collaborate with their colleagues.<sup>7</sup> Although technology can support virtual meetings the need for immediate consultation and feedback is not possible in the WFH setting. However, knowledge workers in Europe found that WFH is more efficient because it minimizes unproductive time on meaningless tasks at work and allows them to focus on their job. These differences support further investigation of factors affecting productivity in the WFH environment.

Although productivity may suffer during WFH, it can potentially help promote work-life balance (WLB). Working at home allows parents to spend more time with their children and the high job autonomy (JA) and scheduling flexibility can help minimize work-family conflict.<sup>8</sup> Greater autonomy in determining working hours and managing tasks improved the productivity of employees that worked from home due to COVID-19.<sup>6</sup> JA is defined as "the extent to which work can provide great freedom, independence and discretion of the individual in work scheduling and determine the procedures to be used in implementing them."<sup>9</sup> Mache et al,<sup>10</sup> found that the freedom to choose working hours minimizes the perception that the job is mentally demanding. However, autonomy has negative effects on people that do not have a high level of discipline. It caused them to slow down and not achieve their goals.

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Clinical Significance: Working from home (WFH) is a prevailing condition globally due to the pandemic. Workers are exposed to job-related and psychosocial factors that can lead to adverse health effects. Such factors should be identified to facilitate targeted preventive actions for promoting work-life balance and productivity while working from home.

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Not all employees that WFH achieve WLB because it depends on the atmosphere at home and the support provided by family members.<sup>11</sup> During the COVID-19 pandemic, workload affected work-home balance among Chinese employees that worked from home during its early stages.<sup>12</sup> Professional women with children may find working at home more challenging because of the greater demand for caring. Women are expected to take care of children with little help from the husband.<sup>13</sup> Young internet online workers, on the other hand, reported a significantly lower satisfaction with WLB and a higher negative work-home interaction because they spent more time at work.<sup>14</sup> The competing demands of work and family life can create stress and anxiety for some workers. Working from home blurs the boundaries between work and personal time. Employees that are not able to establish boundaries from work to non-work have poor psychological detachment (PD).<sup>15</sup>

PD implies not thinking about work or doing work-related duties at home.<sup>16</sup> It is one of the significant predictors of well-being because some work situations can be unsettling and worrisome. It was found to have a significant negative effect on stress among employees working from home due to COVID19.<sup>17</sup> PD is related to employee engagement at work. Highly engaged employees find it difficult to distance themselves from their work. Sonnentag et al,<sup>18</sup> discovered that striking a balance between work and leisure is crucial in promoting employees' well-being. The use of information and communication technology (ICT) while working from home can affect PD because it was found to be disruptive to sleep. Boundary crossing between work and family does not necessarily affect sleep quality or consistency unless there is a problem with PD.<sup>19</sup>

Work-related difficulty in sleeping has been related to inability to detach from work. For WFH employees, the use of electronic devices is a job requirement to facilitate communication. Employees with high work-related smartphone use experience ego depletion when dealing with self-control demands at work. Sleep quality, however, attenuates this interaction. In cases of high sleep quality, next-day self-control processes at work are no longer affected by work-related smartphone use.<sup>20</sup> Sleep pattern is also related to productivity at work. Productivity of Korean nurses was adversely affected by poor sleep quality due to shiftwork.<sup>21</sup> Although shiftwork may not apply to people working from home, the disruption of schedule and working hours extending until late at night can also lead to poor sleep quality.

Sleep disorder and stress are very common work-related health problems.<sup>22</sup> Job stress is defined as something in the work environment that is perceived as threatening or something in the workplace which gives an individual an experience of discomfort.<sup>23</sup> It is the psychological and physical state that results when the resources of the individual are not sufficient to cope with the demands and pressures of work situations or family affairs or both. Studies showed that it is a significant determinant of employee productivity and performance.<sup>24-26</sup> It is a major problem for such employees that fail to balance the competing demands of work and family. It significantly influenced the productivity of employees without spouses and young employees that WFH.<sup>17</sup> Social support provided by family members and superiors, however, dampens the effect of stress and promotes quality of work life.<sup>26,27</sup> Employees that receive adequate support also showed high levels of productivity.<sup>28</sup> Social support (SS) of supervisors and colleagues minimizes the strain among employees because it cushions the effect of work-family conflict.<sup>29</sup> Work from home employees during the COVID-19 pandemic cited SS as a means to overcome loneliness and feelings of isolation.<sup>12</sup> It is associated with job satisfaction, work-family enrichment and mediates the relationship between stress and job satisfaction.<sup>30</sup> Low supervisor and coworker support had been associated with tiredness and sleeping difficulties.<sup>31</sup>

Keeping employees productive and healthy are important concerns of companies that allowed their employees to work from home due to the COVID19 pandemic. There is a dearth of literature on the level of employee productivity before and during the pandemic. Since all family members were forced to work at home to prevent the spread of the virus, the current situation cannot be compared with earlier studies of productivity on employees working from home. All family members had to share the space at home so work distraction is inevitable. Productivity and WLB is affected by factors related to the conflicting demand between work and family and the support system available to the employee. Thus, this paper aims to compare job-related and psychosocial factors before and during WFH setup and determine the relationship of job-related and psychosocial factors to WLB and productivity. The hypothesized relationships among the variables are shown in Fig. 1. This research query helps delineate the drivers to productivity and WLB while WFH. In doing so, employees as well as employers are guided which aspects to focus on towards the attainment of higher productivity while maintaining a healthy WLB, thereby harnessing employees' full potential. Comparing the WFH set up with the prior arrangement, that is, working in the office, establishes a baseline comparator to evaluate the WFH productivity and WLB. Thus, this gives more credence in determining the desirability of WFH scheme and how to make the most out of it especially during the pandemic.

## MATERIAL AND METHODS

### Participants and Data Collection Tool

The study utilized convenience sampling of employees from various institutions belonging to different industries in the Philippines. Study participants were selected based on the following inclusion criteria: (1) used computer while working from home (2) worked from home for at least 2 months.

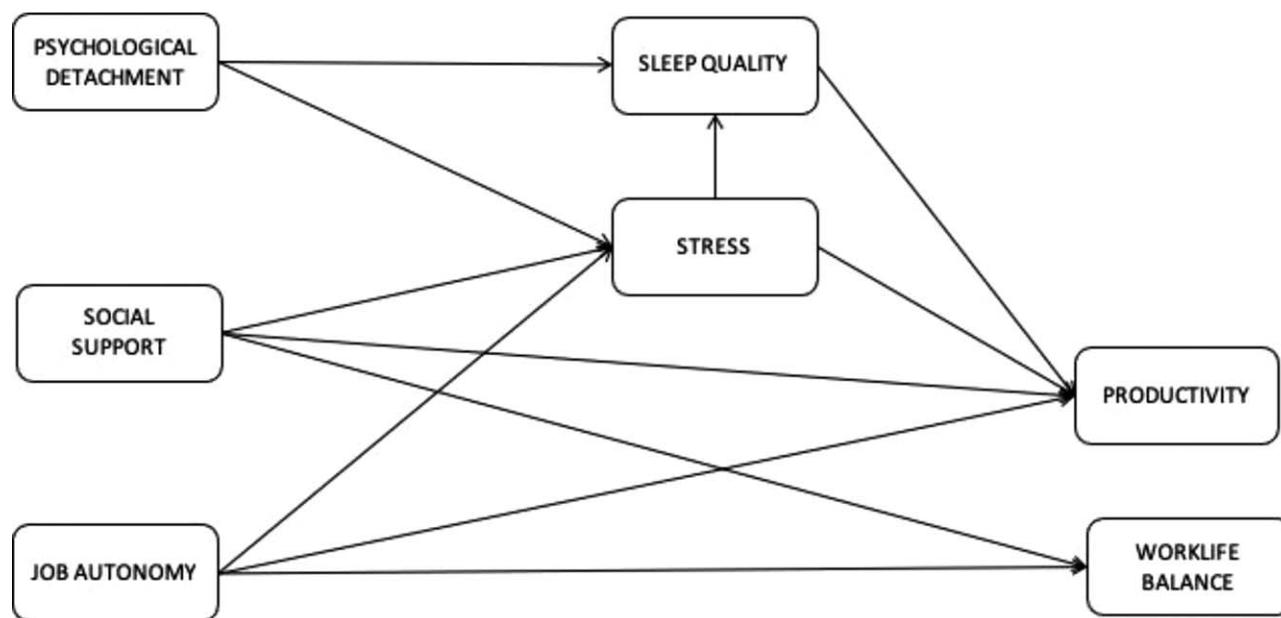
The authors identified institutions that are part of their network representing various industries. They wrote to the administrators of these institutions to invite their employees to participate in the online survey, not only for research purposes but also to promote health, safety, and productivity while on WFH through a webinar conducted for them at the end of the data gathering. The self-administered online questionnaire utilized in the study was pretested among 10 employees from various business establishments. The questionnaire was revised according to the assessment findings of the pre-test. The first part of the questionnaire is on sociodemographic data while the succeeding parts are questions pertaining to the measures of interest in this study before and during WFH. The authors sent the online questionnaire with a corresponding cover letter to the administrators and employees of participating institutions.

Anonymity and confidentiality were ensured in the administration and handling of the data. The study was given ethics approval in 2020 by the De La Salle University Research Ethics Review Committee (REO protocol code: FAF.007.2019-2020.T2.GCOE).

### Measures

The three items on PD were taken from the Recovery Experience Questionnaire.<sup>16</sup> The scale used showed good psychometric properties.<sup>32</sup> The items included were "I forget about work after working hours," "I don't think about work at all outside working hours," and "I distance myself from work." Scale ranges from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating higher PD.

The question to evaluate sleep quality (SQ) was "How do you evaluate this night's sleep?" It was taken from Pittsburg Sleep Quality Index<sup>33</sup> and was rated on a 5-point rating scale ranging from 1 (very bad) to 5 (very good).<sup>34</sup>



**FIGURE 1.** Hypothesized relationship between variables. JA, job autonomy; PD, psychological detachment; PRO, productivity; SQ, sleep quality; SS, social support; STR, stress; WLB, work-life balance.

Social support (SS) was assessed with three questions taken from the Copenhagen Psychosocial Questionnaire (COPSOQII) using a scale from 1 (never) to 5 (always): “How often do you get help and support from your colleagues?”; “How often are your colleagues willing to listen to your work-related problems at work?”; and “How often do your colleagues talk with you about how well you carry out your work?”

JA was measured in terms of decision-making autonomy using a 5-point likert scale 1 (strongly disagree) to 5 (strongly agree). The three questions were based on the Work Design Questionnaire<sup>35</sup>: “The job gives me a chance to use my personal initiative or judgment in carrying out the work?”; “The job allows me to make a lot of decisions on my own?”; and “The job provides me with significant autonomy in making decisions.”

Workload perception (WLD) was measured with three items from the Kurz-fragebogen zur Arbeitsanalyse (KFZA) instrument<sup>36</sup> using a 5-point Likert scale ranging from 1 (seldom or 1% to 25% of the time) to 5 (always or 76% to 100% of the time). The questions included were “Do you have to do overtime?”; “Is your workload unevenly distributed so it piles up?”; and “How often do you exceed required work hours?”

The three questions for stress (STR) were taken from the subscale in the second version of the Copenhagen Psychosocial Questionnaire-COPSOQ II.<sup>37</sup> Problems in relaxing, irritability, and tension are the aspects of STR that were asked. Items were scored on a 5-point Likert scale from 1 (seldom or 1% to 25% of the time) to 5 (always or 76% to 100% of the time). Research supports the psychometric qualities of the scale.<sup>32</sup>

The scale to evaluate work-life balance (WLB) was based on three items from the work-life conflict scale.<sup>38</sup> The first one considers the effect of work on personal life. The second item pertains to personal matters which make work challenging. Lastly, the third question is how personal life can drain a person’s energy. The respondents scored questions on WLB from 1 (seldom or 1% to 25% of the time) to 5 (always or 76% to 100% of the time).

An item on self-reported productivity (PROD) was scored from 1 (strongly Disagree) to 5 (strongly agree). The item was adapted from a web-based survey determining the characteristics and outcomes of telework.<sup>39</sup>

## Statistics

STATA 15.0 (StataCorp SE, College Station, TX) was used for descriptive data analysis. Categorical variables were summarized using frequency and proportion. The normality distribution of continuous variables was determined using Shapiro-Wilk test. Mean and standard deviation (SD) were used to summarize continuous quantitative data that met the normality assumption while median and range were used for continuous data that were not normally distributed.

Paired *t* tests to compare means before and during WFH were done using Statistical Package for Social Sciences (SPSS). Structural equation modeling (SEM) was used to determine the relationships among the factors affecting work-life balance and productivity. Results with *P*-value of <0.05 are considered statistically significant. Multigroup analysis was done to assess relationships among variables before and during WFH. Since PD, SS, JA, WLB, WLD, and STR were not directly measurable, these were estimated using various indicators classifying these as latent variables. Relationships between the latent variables and the relationships of other observed variables were assessed using SEM.

The SEM model was assessed using several goodness-of-fit statistics such as root mean square error of approximation (RMSEA), Tucker-Lewis Index (TLI), and comparative fit index (CFI). Model fit was considered to be good if: RMSEA less than 0.05, TLI and CFI more than or equal to 0.90. Data preparation and all statistical analyses for the SEM were done with SPSS 21.0 (IBM Corp.: Armonk, NY) and AMOS 21.0 (IBM Corp.: Armonk, NY).

## RESULTS

The management of a total of 46 business establishments, academic institutions, and government agencies agreed to have their employees participate in this study. Based on the inclusion criteria, 318 responses were included in the analysis from a total of 503 study participants that answered the online survey. Of the 503 participants, 26 did not WFH, 18 were not computer-users, 59 started WFH even before the pandemic, 48 only answered the section on sociodemographic profile, and 34 did not accomplish the section pertaining to their working conditions prior to the pandemic.

Table 1 shows the sociodemographic profile of the study participants including their occupational level and the type of

**TABLE 1.** Sociodemographic Profile of the Respondents (*n* = 318)

Demographic Characteristic		%
Age, yrs	Median: 33.5; range: 21–64	
21–30	123	38.68%
31–40	84	26.42%
>40	111	34.91%
Sex		
Male	122	38.36%
Female	196	61.64%
Marital status		
Single	186	58.49%
Married	123	38.68%
Separated/Divorced	6	1.89%
Widowed	3	0.94%
Length of working from home, months	Median: 7; range: 2–10	
Less than 6 months	62	19.50%
At least 6 months	256	80.50%
Number of people in the household	Median: 5; range: 1–18	
1–5	213	66.98%
6–10	97	30.50%
>10	8	2.52%
Number of children less than 18 in the household	Median: 1; range: 0–7	
0	147	46.52%
1–3	161	50.95%
4–7	8	2.53%
Living with a partner/spouse	148	46.54%
Smoker	23	7.23%
Has any diagnosed illness	69	21.70%
Works for the government	78	24.53%
Industry		
Education	122	38.36%
Government Administration/Relations	35	11.00%
Information Technology	28	8.81%
Human Resource	23	7.23%
Banking and Finance	13	4.09%
Manufacturing	12	3.77%
Health and Fitness	10	3.14%
Marketing and Sales	7	2.20%
Intellectual Property	7	2.20%
Business Process Outsourcing	6	1.89%
Research	6	1.89%
Others	49	15.41%
Occupational level		
Top management	7	2.20%
Upper middle management	33	10.38%
Lower middle management	68	21.38%
Semi-managerial	41	12.89%
Non-managerial	169	53.14%

industry where they belong. The median age of the study participants is 33.5 years, ranging from 21 to 64 years. Majority of the participants are women (61.64%) and single (58.49%).

Results also show that 7 months is the median duration of working from home among the study participants. Five is the median number of people in the household, up to a maximum of 18. While one child is the median number of children less than 18 years old with a maximum of seven children. Almost half (46.54%) of the participants are living with a partner or spouse. There are 21.70% who have comorbidities while 7.23% of the participants are smokers.

In terms of occupational level, most of the participants belong to the non-managerial level (53.14%) while the least belong to the top management (2.20%) level. The top three industries where the study participants are employed are education (38.36%), government administration (11.00%), and information technology (8.81%).

Table 2 presents the mean differences of the variables while on WFH set-up during the pandemic compared with before WFH, that is, while working in the office or institution. All the three measures for PD show that participants are less able to detach themselves from work while WFH. Results also show that the participants' quality of sleep is worse during WFH. Findings for stress indicate that participants have more problems in terms of relaxation, irritability, and tension while WFH. The same trend is observed with WLB and PRO wherein the measures for these two factors indicate worse conditions where the study participants have poor WLB and low productivity during WFH. For the job-related factors, social support from coworkers is significantly less on all measures during WFH set-up. Conversely, there is no significant difference for job autonomy on all measures before and during WFH. As for workload perception, only measures on overtime and exceeding required work hours are significantly increased on WFH.

**TABLE 2.** Means and Mean Differences Before and During WFH

Variables	Before		During		Paired Differences			P Value
	Mean	SD	Mean	SD	Mean	SD	t	
Psychological detachment								
I forget about work after working hours.	3.15	1.12	2.49	1.15	-0.65	1.38	-8.44	<0.001
I don't think about work at all outside working hours.	3.08	1.10	2.33	1.10	-0.75	1.22	-10.86	<0.001
I distance myself from work.	3.21	1.11	2.52	1.04	-0.70	1.18	-10.48	<0.001
Sleep								
How do you evaluate the quality of your sleep when you are working from home?	3.49	0.91	3.33	1.09	-0.16	1.40	-2.01	0.05
Social support								
How often do you get help and support from your colleagues?	3.84	0.92	3.42	1.01	-0.42	0.92	-8.09	<0.001
How often are your colleagues willing to listen to your work-related problems at work?	3.88	0.87	3.70	0.97	-0.18	0.77	-4.21	<0.001
How often do your colleagues talk with you about how well you carry out your work?	3.70	0.97	3.37	1.00	-0.33	0.88	-6.65	<0.001
Job autonomy								
The job gives me a chance to use my personal initiative or judgment in carrying out the work.	3.90	0.66	3.92	0.76	0.03	0.71	0.64	0.53
The job allows me to make a lot of decisions on my own.	3.76	0.71	3.75	0.84	-0.02	0.73	-0.39	0.7
The job provides me with significant autonomy in making decisions.	3.69	0.73	3.62	0.85	-0.07	0.68	-1.91	0.06
Workload perception								
Is your workload unevenly distributed so it piles up?	3.01	1.00	2.97	1.02	-0.04	0.87	-0.84	0.40
Do you have to do overtime?	2.90	1.11	3.06	1.21	0.16	1.15	2.45	0.02
How often do you exceed required work hours?	2.99	1.07	3.24	1.16	0.26	1.09	4.16	<0.001
Stress								
How often have you had problems relaxing?	2.91	0.87	3.23	0.90	0.32	1.05	5.45	<0.001
How often have you been irritable?	2.76	0.79	3.02	0.89	0.26	0.93	4.94	<0.001
How often have you been tense?	2.88	0.89	3.12	0.96	0.24	1.02	4.24	<0.001
Work-life balance								
I miss personal activities because of work.	2.54	1.08	2.82	1.20	0.29	1.14	4.54	<0.001
I find it hard to work because of personal matters.	2.15	0.90	2.47	1.00	0.31	0.95	5.88	<0.001
My personal life drains me of energy for work.	2.15	0.87	2.33	1.02	0.18	0.86	3.79	<0.001
Productivity								
I feel productive in doing my work	4.15	0.81	3.86	0.80	-0.30	1.07	-4.98	<0.001

WFH, work from home.

### Structural Equation Modeling

The relationships of the factors in the model were analyzed using SEM. The composite reliabilities of the constructs are PD = 0.65, SS = 0.73, JA = 0.75, WLB = 0.60, and STR = 0.60. The multivariate normality of data was also established.

Data obtained from the survey included ratings before and during the WFH set-ups, thus, 2 groups of data were included in the analysis of the structural model using multigroup analysis. The overall model fit statistics indicate a good fit to the data (chi-square/d.f. = 3.41; RMSEA = 0.06, CFI = 0.90; TLI = 0.88).

Table 3 summarizes the maximum likelihood estimates of path coefficients, standard error, and P values calculated before and during WFH. Relationships between variables in the model were shown by the path coefficients. The results indicated that PD significantly influences STR and SQ. Employees who are not able to forget and distance themselves from work experience higher STR and poor SQ both before and during WFH. SS significantly helps the participants maintain WLB, especially colleagues' willingness to listen to work-related problems. However, SS only affects stress during WFH. Employees who have low social support are more stressed in a WFH set-up. JA does not affect STR or WLB but significantly affects PRO while working from home. Those who experience high job autonomy are more productive during WFH. SQ also has a significant effect on PRO for both situations while SS only affects PRO before WFH where employees who have social support felt productive before WFH. STR has no significant effect on PRO both before and while WFH.

### DISCUSSION

Several factors affect productivity while working from home during the COVID-19 pandemic. Perceived workstation suitability helps improve productivity whereas stress adversely affects it among younger people and those without spouses. On the other hand, workstation ergonomic suitability and musculoskeletal symptoms have no significant effect on productivity.<sup>17</sup>

Comparing WFH versus pre-pandemic office work set-up, WFH is shown to pose more challenges as indicated by the respondents. PD is more difficult to attain while on WFH since there is no physical distinction between work and home obligations. Traveling to and from the office acts as a natural boundary between work and home which disappeared in WFH. Boundary setting is a helpful mechanism in attaining PD<sup>40</sup> but is challenging to establish in WFH where family obligations may get intertwined with one's work. When one is unable to psychologically detach oneself from work, one experiences a higher stress level.<sup>41</sup> This is supported by the results of this study where there is increased stress level with decreased PD.

PD has the largest effect on STR in the structural model before and during WFH. With work being done at home without the clearly defined work hours, job-related concerns constantly recur in the mind from rising to bedtime, thus increasing the stress level. As for the respondents' workload, they work beyond their working hours and often go on overtime while on WFH. Workload contributes to stress and affects job performance.<sup>42</sup> Furthermore, PD was shown to moderate the effects of job demands on burnout and

**TABLE 3.** Path Estimates ( $\beta$ ) With Standard Error and  $P$  Values Before and During WFH

Path	Before WFH			During WFH		
	$\beta$	S.E.	$P$	$\beta$	S.E.	$P$
STR <— PD	-0.20	0.04	***	-0.20	0.04	***
STR <— SS	-0.02	0.05	0.60	-0.12	0.05	0.01
STR <— JA	-0.07	0.06	0.24	-0.02	0.05	0.63
SQ <— PD	0.23	0.07	***	0.39	0.07	***
WLB <— SS	-0.12	0.06	0.03	-0.22	0.07	***
WLB <— JA	-0.04	0.07	0.56	-0.12	0.07	0.07
SQ <— STR	-0.52	0.11	***	-0.82	0.13	***
PRO <— SQ	0.28	0.06	***	0.13	0.05	0.02
PRO <— SS	0.18	0.07	0.02	0.03	0.08	0.71
PRO <— JA	0.19	0.09	0.05	0.27	0.08	***
PRO <— STR	-0.01	0.11	0.92	-0.13	0.13	0.31

SE, standard error; WFH, work from home.  
 \*\*\* $P < 0.01$ .

depression.<sup>43</sup> Without the defined boundaries between work and home, one easily drifts to one’s job while at home. Company superiors, expecting employees to be at home, schedule meetings even late at night. Work can also pile up for employees that are not disciplined enough to work during normal working hours and work until late hours at night. Chinese employees working at home from various industries during the COVID-19 outbreak experienced many work interruptions at home that negatively affect their work effectiveness.<sup>6</sup>

Another difference between WFH and working in the office is the SS which is markedly reduced on WFH as shown in this study. In the structural equation model, SS affected STR but only during WFH. Being physically present in the office facilitates communication among colleagues ranging from official meetings to casual dealings with officemates during work hours and breaktimes. Often, the latter dealings are avenues to listen and show support, give feedback, and align expectations. Perceived social support was shown to affect WLB while working in the office.<sup>44</sup> On WFH, such dealings are difficult to attain, save a call or message. Online meetings focus on business related discussions. Psychological needs are not met due to the isolation brought about by working from home.<sup>6</sup> This is felt more acutely in cultures where people are used to social gatherings and interactions that characterize most of the respondents in this study. This reduced SS further contributes to increasing STR. With increased STR, SQ suffers<sup>45</sup> as shown in this study. A person gets preoccupied with anxious thoughts while under STR, thereby overwhelming the mind with concerns, depriving it of the needed sleep. This study showed that PD and STR have significant influence on SQ before and during WFH. The path coefficients show that the effect on SQ is more pronounced during WFH which may be attributed to prolonged preoccupation about job concerns until the night especially for those who are unable to establish boundaries between work and personal life during WFH.

There are many factors affecting PRO, but we only considered the effects of SQ, SS, JA and STR in the structural equation model. Of all these factors, SQ is the only one that has a significant effect to PRO before and during WFH. A person who does not get enough sleep experiences fatigue and impairments in performance manifested by decreased attention and memory function.<sup>46</sup> It is interesting to note that the impact of SQ to PRO is greater prior to WFH as shown in the SEM results. Moreover, in the comparison of means, participants reported better sleep before WFH. Since our participants are not shiftworkers, work time did not affect their SQ prior to WFH. They follow the usual routine of working in the morning and sleeping at night. However, during the pandemic, this routine was disrupted as employees were given the flexibility to

work at their own time. This has led to extending working hours at night<sup>6</sup> which is congruent with their reported increase in work hours and overtime during WFH. Catching sleep in the morning may be difficult especially for married employees and those with children that are also confined at home.

JA only affected PRO significantly during WFH. The flexibility given to employees in carrying out their tasks at home influences their feeling of being productive. The WFH situation forced many process changes to continue business operations. The autonomy given to employees to customize their methods to suit the situation positively contributes to their PRO. Although ratings of PRO are lower during WFH than prior, JA proved to be a crucial means of allowing the respondents to cope with the new setup. This is consistent with other research findings where job autonomy and self-leadership are correlated with productivity during WFH.<sup>47</sup> Considering the various factors present in the home environment affecting productivity that are totally different from those in the office, job autonomy fosters initiative in exploring ways to enhance productivity in a different or even unfavorable setting. Unlike JA, SS only affected PRO significantly before WFH. Face to face interactions prior to WFH allows employees to quickly resolve work-related issues because they are all in one place and it is easy to seek help from colleagues. This may not be the case during WFH where it is difficult to ask help due to scheduling of meetings and technology problems. SS also significantly influenced WLB before and during WFH. Although there is limited SS in the WFH setting, it still influenced WLB. This is consistent with a study of academics in Malaysia that showed that support from coworkers and supervisors predict work-life balance.<sup>48</sup> The assistance provided by colleagues at work, with all the constraints imposed by WFH, seemed to help maintain WLB of employees.

WLB suffers during WFH. With difficulties distancing oneself from work, increased stress, reduced social support, more overtime, etc, there is hardly quality time for personal life. Moreover, productivity is likewise reduced in WFH, despite more hours put into one’s work. The cyclical effect of stress<sup>49</sup> is supported in this study.

Several limitations of the study are identified. External validity should be treated with caution since we have a small sample of heterogeneous group of participants with varying demographic characteristics. Moreover, productivity was measured using only one question and as reported by the respondents which are subjective to the respondents’ contexts. Also, WLB and STR have low composite reliabilities which may be due to the variation in the context on how the questions on the said variables are interpreted by the respondents.

## CONCLUSIONS

This study has shown that job-related and psychosocial factors declined significantly during WFH compared with working in the office previously. WLB and PRO suffered during WFH. Among the factors affecting PRO, SQ registered the highest impact which in turn was greatly affected by STR. Among the factors affecting STR, PD had the highest effect. Moreover, the path PD-SQ-PRO is significant, making SQ the mediating variable between PD and PRO. Hence, the key to increasing PRO during WFH is to foster PD among employees. Setting boundaries facilitate PD which is established by the employees themselves and from employers or supervisors by ensuring protected time for work as well as for personal life. Moreover, SS significantly affected WLB both before and during WFH. Hence, fostering SS among employees is highly beneficial. Data on job-related and psychosocial factors will aid policy-makers and employers to plan and implement targeted interventions that will promote work-life balance and productivity among employees while working from home.

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## REFERENCES

- Lunau T, Bambra C, Eikemo TA, van der Wel KA, Dragano N. A balancing act? Work-life balance, health and well-being in European welfare states. *Eur J Public Health*. 2014;24:422–427.
- Mensah A, Adjei NK. Work-life balance and self-reported health among working adults in Europe: a gender and welfare state regime comparative analysis. *BMC Public Health*. 2020;20:1052.
- Irawanto DW, Novianti KR, Roz K. Work from Home: measuring satisfaction between work-life balance and work stress during the COVID-19 pandemic in Indonesia. *Economies*. 2021;9:1–13.
- Dapiton EP, Quiambao DT, Canlas RB. Parenting as a moderating factor for research productivity and work-life balance: evidence from philippine women academics. *Eur J Educ Res*. 2020;9:1425–1434.
- Garton E, Mankins M. The pandemic is widening a corporate productivity gap. *Harvard Business Review*. 2020. Available at: <https://hbr.org/2020/12/the-pandemic-is-widening-a-corporate-productivity-gap>. Accessed August 2, 2021.
- Wang B, Liu Y, Qian J, Parker SK. Achieving effective remote working during the COVID-19 pandemic: a work design perspective. *Appl Psychol*. 2021;70:16–59.
- Aczel B, Kovacs M, van der Lippe T, Szasz B. Researchers working from home: benefits and challenges. *PLoS One*. 2021;16:e0249127.
- Golden TD, Veiga JF, Simsek Z. Telecommuting's differential impact on work-family conflict: is there no place like home? *J Appl Psychol*. 2006;91:1340–1350.
- Johari J, Yean Tan F, Tjik Zulkarnain Zati I. Autonomy, workload, work-life balance and job performance among teachers. *Int J Educ Manag*. 2018;32:107–120.
- Mache S, Servaty R, Harth V. Flexible work arrangements in open work-spaces and relations in occupational stress, need for recovery and psychological detachment from work. *J Occup Med Toxicol*. 2020;15:5.
- Crosbie T, Moore J. Work-life balance and working from home. *Soc Pol Soc*. 2004;3:223–233.
- Wang Z, Jex SM, Peng Y, Liu L, Wang S. Emotion regulation in supervisory interactions and marital well-being: a spillover-crossover perspective. *J Occup Health Psychol*. 2019;24:467–481.
- Krantz G, Berntsson L, Lundberg U. Total workload, work stress and perceived symptoms in Swedish male and female white-collar employees. *Eur J Public Health*. 2005;15:209–214.
- Jacukowicz A, Merecz-Kot D. Work-related Internet use as a threat to work-life balance – a comparison between the emerging on-line professions and traditional office work. *Int J Occup Med Environ Health*. 2020;33:21–33.
- Kinnunen U, Feldt T, de Bloom J, Sianoja M, Korpela K, Geurts S. Linking boundary crossing from work to nonwork to work-related rumination across time: a variable- and person-oriented approach. *J Occup Health Psychol*. 2017;22:467–480.
- Sonnentag S, Fritz C. The Recovery Experience Questionnaire: development and validation of a measure for assessing recuperation and unwinding from work. *J Occup Health Psychol*. 2007;12:204–221.
- Seva RR, Tejero LMS, Fadrilan-Camacho VFF. Barriers and facilitators of productivity while working from home during pandemic. *J Occup Health*. 2021;63:e12242.
- Sonnentag S, Mojza EJ, Binnewies C, Scholl A. Being engaged at work and detached at home: a week-level study on work engagement, psychological detachment, and affect. *Work Stress*. 2008;22:257–276.
- Barber LK, Jenkins JS. Creating technological boundaries to protect bedtime: examining work-home boundary management, psychological detachment and sleep. *Stress Health*. 2014;30:259–264.
- Gombert L, Konze AK, Rivkin W, Schmidt KH. Protect your sleep when work is calling: how work-related smartphone use during non-work time and sleep quality impact next-day self-control processes at work. *Int J Environ Res Public Health*. 2018;15.
- Park E, Lee HY, Park CS-Y. Association between sleep quality and nurse productivity among Korean clinical nurses. *J Nurs Manag*. 2018;26:1051–1058.
- Godin I, Desmarez P, Mahieu C. Company size, work-home interference, and well-being of self-employed entrepreneurs. *Arch Public Health*. 2017;75:69.
- Bell A, Rajendran D, Theiler S. Job stress, wellbeing, work-life balance and work-life conflict among Australian academics. *Electron J Appl Psychol*. 2012;8:25–37.
- Azmi F, Shahid SAM, Alwi A. The relationship between job stress and Front-liner job performance in a shared service center in Malaysia. *Int J Soc Sci Human*. 2016;6:510–513.
- Paje RC, Escobar PBA, Ruaya AMR, Sulit PAF, Paje RC, editors. The impact of compressed workweek arrangements on job stress, work-life balance, and work productivity of rank-and-file employees from different industries in Metro Manila. *J Phys: Conf Ser*. 2020;1529:032055.
- Sackey J, Sanda MA. Sustenance of human capital: social support as a managerial stress reliever for women in developing economies. *Res Pract Hum Resourc Manag*. 2011;19:1–23.
- Eisapareh K, Nazari M, Kaveh MH, Ghahremani L. The relationship between job stress and health literacy with the quality of work life among Iranian industrial workers: the moderating role of social support. *Curr Psychol*. 2020.
- Park KO, Wilson MG, Myung SL. Effects of social support at work on depression and organizational productivity. *Am J Health Behav*. 2004;28:444–455.
- O'Driscoll MP, Poelmans S, Spector PE, et al. Family-responsive interventions, perceived organizational and supervisor support, work-family conflict, and psychological strain. In: Cooper CL, editor. *From Stress to Wellbeing Volume 2: Stress Management and Enhancing Wellbeing*. London, UK: Palgrave Macmillan; 2013. p. 229–245.
- Kula S. Occupational stress, supervisor support, job satisfaction, and work-related burnout: perceptions of Turkish National Police (TNP) members. *Pol Pract Res*. 2017;18:146–159.
- Sinokki M, Ahola K, Hinkka K, et al. The association of social support at work and in private life with sleeping problems in the Finnish health 2000 study. *J Occup Environ Med*. 2010;52:54–61.
- Mette J, Velasco Garrido M, Preisser AM, Harth V, Mache S. Linking quantitative demands to offshore wind workers' stress: do personal and job resources matter? A structural equation modelling approach. *BMC Public Health*. 2018;18:934.
- Buysse DJ, Reynolds 3rd CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989;28:193–213.
- Hülshager UR, Lang JW, Depenbrock F, Fehrmann C, Zijlstra FR, Alberts HJ. The power of presence: the role of mindfulness at work for daily levels and change trajectories of psychological detachment and sleep quality. *J Appl Psychol*. 2014;99:1113–1128.
- Morgeson FP, Humphrey SE. The Work Design Questionnaire (WDQ): developing and validating a comprehensive measure for assessing job design and the nature of work. *J Appl Psychol*. 2006;91:1321–1339.
- Appel P, Schuler M, Vogel H, Oezelsel A, Faller H. Short Questionnaire for Workplace Analysis (KFZA): factorial validation in physicians and nurses working in hospital settings. *J Occup Med Toxicol*. 2017;12:11.
- Pejtersen JH, Kristensen TS, Borg V, Bjorner JB. The second version of the Copenhagen Psychosocial Questionnaire. *Scand J Public Health*. 2010;38(3 suppl):8–24.
- Hayman J. Psychometric assessment of an instrument designed to measure work life balance. *Res Pract Hum Resourc Manag*. 2005;13.
- Nakrošienė A, Bučiūnienė I, Goštautaitė B. Working from home: characteristics and outcomes of telework. *Int J Manpower*. 2019;40:87–101.

40. Derks D, van Mierlo H, Schmitz EB. A diary study on work-related smartphone use, psychological detachment and exhaustion: examining the role of the perceived segmentation norm. *J Occup Health Psychol.* 2014;19:74–84.
41. Smit BW, Barber LK. Psychologically detaching despite high workloads: the role of attentional processes. *J Occup Health Psychol.* 2016;21:432–442.
42. Parent-Lamarche A, Boulet M. Workers' stress during the first lockdown: consequences on job performance analyzed with a mediation model. *J Occup Environ Med.* 2021;63:469–475.
43. Muhamad Nasharudin NA, Idris MA, Loh MY, Tuckey M. The role of psychological detachment in burnout and depression: a longitudinal study of Malaysian workers. *Scand J Psychol.* 2020;61:423–435.
44. Uddin M, Ali KB, Khan MA. Perceived social support (pss) and work-life balance (wlb) in a developing country: the moderating impact of work-life policy. *Iranian J Manag Stud.* 2020;13:733–761.
45. Kalmbach DA, Anderson JR, Drake CL. The impact of stress on sleep: pathogenic sleep reactivity as a vulnerability to insomnia and circadian disorders. *J Sleep Res.* 2018;27:e12710.
46. Rosekind MR, Gregory KB, Mallis MM, Brandt SL, Seal B, Lerner D. The cost of poor sleep: workplace productivity loss and associated costs. *J Occup Environ Med.* 2010;52:91–98.
47. Galanti T, Guidetti G, Mazzei E, Zappalà S, Toscano F. Work from home during the COVID-19 outbreak: the impact on employees' remote work productivity, engagement and stress. *J Occup Environ Med.* 2021;63:e426–e432.
48. Shahid SAM, Amdan S, Alwi A, Syazreen F, Hassan CN. Social support, negative affectivity, and work personal life balance of academics. *Int J Soc Sci Human.* 2016;6:500–504.
49. Kijima S, Tomihara K, Tagawa M. Effect of stress coping ability and working hours on burnout among residents. *BMC Med Educ.* 2020;20:219.