Journal of **Tourism** & Development | n.º **35** | 2021 | [**23** - 52]
e-ISSN 2182-1453

The **psychological impacts** of **COVID-19 outbreak** on **research productivity**: a comparative study of tourism and non-tourism scholars

MOHAMMAD SOLIMAN * [msoliman.sal@cas.edu.om]

STANISLAV IVANOV ** [stanislav.ivanov@vumk.eu]

CRAIG WEBSTER *** [cwebster3@bsu.edu]

Abstract |The COVID-19 pandemic has a massive influence upon the working environments of scholars globally. In this paper, we investigate how the changing conditions under which individuals work because of various restrictions have influenced the productivity of scholars based on a global sample of 1073 scholars from 83 countries. The findings show that tourism and non-tourism scholars react in similar ways to the changes in the social and physical environment of the pandemic with one exception: teleworking stressors positively affected all scholars' perceived safety and did not impact tourism scholarly productivity. Tourism and non-tourism researchers' productivity had also a positive relationship with social isolation and perceived safety. Additionally, perceived safety mediated the relationship between the psychological factors and scientific production. Moreover, perceived risk moderated the link between perceived safety and scholarly productivity. This paper contributes to tourism studies by looking at the psychological factors that influence tourism researchers' productivity during COVID-19 and comparing their responses to non-tourism scholars.

Keywords | Research productivity, COVID-19, Stress, Safety, Perceived risk

* **Assistant Professor** at the University of Technology and Applied Sciences-Salalah, Oman. Faculty of Tourism & Hotels, Fayoum University, Egypt. ORCID ID: https://orcid.org/0000-0002-9359-763X
** **Professor** at the Varna University of Management, Bulgaria. **Director** of the Zangador Research Institute. ORCID ID: https://orcid.org/0000-0002-6851-5823
*** **Associate Professor** at the Department of Management, Miller College of Business, Ball State University, Muncie, Indiana, USA. ORCID ID: https://orcid.org/0000-0003-0665-0867

1. Introduction

There is a long history between the development of civilization and sicknesses (McNeill, 1976) and the outbreak of COVID-19 is just the latest and most severe outbreak in our historical minds. Some of the sicknesses that have hurt humanity have left a lasting, and sometimes physical impact on society. For example, there are plague columns throughout much of German-speaking Europe that were erected following the end of particularly unpleasant epidemics (Black, 2011). Many political events were influenced by epidemics, such as the peasant revolt of 1381 in Britain that followed a plague outbreak (Dobson, 1983; Munro, 2004). The plague reduced the population so much in what is now the United Kingdom that the value of labour increased, since the quantity of labour was significantly reduced. This economic change in the value of labour upset the political balance and led to a major revolt. Similar developments were observed in other countries as well (Economist, 2013; Scheidel, 2017).

However, sickness and disease have also been a massive incentive for human ingenuity and science. While smallpox had ravaged human populations for centuries, Edward Jenner in 1796 developed the first vaccine to combat illnesses thanks to which smallpox has been eradicated (CDC, 2016). The most recent historical pandemic before 2019 was during 1918 when the Spanish Flu ravaged the globe. At that time, the movement of soldiers and logistical systems for carrying out a massive world war spread a disease that otherwise may have remained isolated. The pandemic killed about 50 million people and about a third of humanity had been exposed to it. No subsequent pandemic reached anywhere near the severity of the outbreak of 1918 (Belser & Tumpey, 2018).

It was in December 2019 that the SARS-CoV-2 that causes the COVID-19 disease was identified in China (Buckley, 2020). Since then it has spread to all countries in the world. Because of the global outbreak of the virus, many governments throughout the world have instituted restrictions to contain its dissemination in their populations (Pew Research Center, 2020). Schools and universities have been closed in many countries and teaching moved to an online environment. Scholars retreated to their homes to do their research and were physically cut off from others. As such, the pandemic of 2020 has caused a massive change in the social environment in which scholars do their research and produce scholarship. At the same time, the pandemic provided opportunities to tourism and hospitality scholars to research the impact of COVID-19 on tourism (Gössling, Scott & Hall, 2020; Hassan & Soliman, 2021; Ivanova, Ivanov, & Ivanov, 2020; Jamal & Budke, 2020; Zheng, Goh, & Wen, 2020). Although there is some literature that looks into the correlates of the productivity of scholars (Blackburn & Bentley, 1993; Hamermesh & Oster, 2002; Lee & Bozeman, 2005; Maske, Durden, & Gaynor, 2003; McNally, 2010; Wilke, Gmelch, & Lovrich, 1985), there is no scholarship that has yet looked into how the extreme circumstances of the COVID-19 environment have impacted upon scholarship and the productivity of scholars, especially in the context of tourism and hospitality.

Scholarly production is considered one of the most significant criteria to evaluate academic performance and the number of publication outlets is increasing among the majority of research areas including tourism (Cheng, Li, Petrick, & O'Leary, 2011). Tourism and hospitality scholars face the pressure to 'publish or perish' (McKercher, 2008) which might have been increased by the COVID-19 pandemic. Consequently, it is important to understand the psychological influence of COVID-19 conditions on the productivity of tourism scholars and to compare it to non-tourism researchers. While many researchers were expected to continue research (albeit under radically different operating conditions), tourism researchers were expected to do the same while studying the tourism-related in-

dustries that were swiftly and severely damaged by the changes in their operating environments.

This paper empirically investigates the influence of various psychological factors and the social conditions in which tourism and non-tourism scholars are forced to work under restrictions imposed by governments in response to the COVID-19 pandemic. Specifically it aims to: a) evaluate the impact of mental stress, teleworking stressors, social isolation, and job insecurity on both perceived safety of scholars and their scientific production; b) assess the mediating role of perceived safety on the relationship between the studied psychological factors and scientific production; c) examine the moderating role of perceived risk on the relationship between perceived safety and scientific production of researchers around the world; and d) determine if the research domain of scholars (tourism or non-tourism related) influences their productivity. The logic for separating tourism-related researchers from others is that the tourism industries were one of the first and hardest hit economically by the pandemic. What made the changed environment especially stressful for tourism researchers is that the industry in which they have expertise and in which they should speak in an authoritative way to students and the public was changed in a very extreme way, almost overnight. Furthermore, the pandemic showed the vulnerability of tourism industry which may dissuade some potential students from studying tourism programmes, hence, creating job insecurity for tourism researchers. Thus, the separation of researchers who deal mostly with tourism phenomena and other researchers who may not expect such a massive hit and restructuring of the industries/topic they typically study. It allows the researchers to see whether the COVID-19 pandemic had different psychological effects on tourism and non-tourism researchers.

The rest of the paper is organised as follows. The next section provides a focused review of related literature and develops the research hypotheses. Section 3 elaborates on the methodology. Section 4 presents the findings, while Section 5 discusses the results in the context of prior studies. Section 6 elaborates on the implications, while Section 7 addresses the limitations and future research directions, and concludes the paper.

2. Conceptual framework and hypotheses development

The COVID-19 pandemic has led to a global obstacle and opportunity for many researchers. There are a number of different factors that have been introduced by the virus and the subsequent lockdowns of universities that may have a psychological impact upon the productivity of researchers.

There is already a sizable contribution with regards to how COVID-19 impacted upon the general population. Unsurprisingly, the majority of the research illustrates the impact of the virus upon the psychology of the Chinese population (see, for example, Wang et al., 2020; Qiu et al., 2020; Cao et al., 2020), since the Chinese population was the first one to be exposed to the virus and to the social ramifications of a virus-linked lockdown, although there are studies that have also investigated the impact of COVID-19 outside of China (Ho, Chee, & Ho, 2020; Hamouche, 2020). Wang et al. (2020) find evidence that the COVID-19 virus and the various work and social restrictions following it have had an impact upon the population in China with a majority of respondents indicating that it had caused them to have moderate to severe psychological impact from the situation. These results are echoed by those of Qiu et al. (2020). Furthermore, Wang et al. (2020) find that there are different segments of the population that are impacted more by the virus and the resulting social situation, noting that females, students, and those with other physical conditions were more likely to experience higher levels of stress from the situation than others. Cao et al. (2020) also find

evidence that some segments of the student population in China exhibited various levels of stress caused by the virus and the resulting social changes. In a similar manner, González-Sanguino et al. (2020) find that about a fifth of their Spanish respondents developed depressive, anxiety and post-traumatic stress disorder as a result of the pandemic. These results are further supported by Dubey et al. (2020) in their review of publications in the psychosocial impacts of COVID-19. Ho et al. (2020) delves into the specific ways that the population of Singapore has been impacted and gives some insight into how the population can use strategies to fight the deleterious impact of the virus.

There is limited literature on how scholarly research is produced. Probably one of the most useful articles on the topic is Blackburn and Bentley (1993) who looked into the correlates of faculty research productivity. Their conclusions suggest that stress can be mitigated against by personal variables. The conclusion by Blackburn and Bentley (1993) are largely consistent with the findings of Wilke et al. (1985). There have been other studies that have looked into what impacts upon scholarly productivity for university researchers (see, for example; Lee and Bozeman, 2005; Hamermesh and Oster, 2002; Maske et al., 2003; McNally, 2010). Lee and Bozeman (2005) investigate the impact of research collaboration upon productivity and identify a sophisticated relationship which does not entirely support the notion that collaboration is good for research productivity. In addition, Hamermesh and Oster (2002) find that technological tools may increase the number of long-distance collaborations in academia but they do not seem to lead to an increase in the productivity of the authors.

In this paper we will investigate how the specific stressors brought to the fore by the COVID-19 pandemic have impacted upon how scholars' work. In the next paragraphs we look into the specific relationships between stressors and job performance and develop the respective research hypotheses.

2.1. The psychological factors of COVID-19

2.1.1. Mental stress and perceived safety

There is a clear and understandable link between a feeling of safety and the ability to perform a job. Although there is little or no research into the topic with regards to scholarly productivity, there is research that deals with the linkage between productivity and the perception of risk with regards to production. Fullerton et al. (2006) found that disaster workers following 9/11 cleanup suffered a great deal following cleanup efforts and that the perception of safety played a major role in terms of influencing their ability to work and to function in social settings. This finding illustrates that the perception of safety added mental stress to disaster and cleanup workers and the same sort of psychological impact could be found to be at play with scholars. That is why the following hypothesis was formulated:

> H1: Mental stress is negatively linked to perceived safety of scholars.

2.1.2. Teleworking stressors and perceived safety

While there is no research that links the perception of safety of scholars to teleworking, there is some research that has looked at the way that people work from home and form teams. Baruch (2000) investigated the benefits and pitfalls of workers using teleworking technologies, something that Weinert et al (2014) did for IT professionals. Aroles, Granter, and Vaujany (2020) investigated the mainstreaming of teleworking, while Lippe and Lippényi (2019) investigated how teleworking would impact upon individual and team performance. While none of the research would clearly be linked with the perception of safety of scholars within the COVID-19 context, we can hypothesize there is such a relationship. On the one

hand, teleworking eliminates the physical contact between people and decreases the chance of viral infections; thus teleworking would increase the perceived physical safety of researchers. On the other hand, teleworking creates stress for researchers, because it changes their daily routine, opposes professional and personal responsibilities of researchers, requires that they allocate more time for preparation of classes, alienates research team members, etc. Since teleworking increases both perceived safety and teleworking-related stress, we hypothesize that teleworking stressors and perceived safety are positively related. Hence:

> H2: Teleworking stressors are positively linked to perceived safety of scholars.

2.1.3. Social isolation and perceived safety

Few would argue that social isolation plays a role in making a person feel safer from a virus, although there is a question as to how it influences a perception of safety. Although there is little or no research on the topic linked to scholarly production, there is a great deal of research that investigates loneliness and how it impacts upon a person's psychology (see, for example, Adair et al., 2017; Green, Richardson, Lago, & Schatten-Jones, 2001; Hawthorne, 2006; Vincenzi & Grabosky, 1987; Wright, Burt, & Strongman, 2006). While enforced social isolation may be a new thing for many people, there is a question as to how much the enforced isolation impacts upon perceptions of safety. Considering the insufficient scientific knowledge about the virus at the early stages of its spread, staying at home and keeping physical distance was widely considered as an effective way to curb its spread and provide safety of people (World Health Organisation, 2020). Therefore, the formulated hypothesis is:

> H3: Social isolation is positively linked to perceived safety of scholars.

2.1.4. Job insecurity and perceived safety

In addition, there is a question of the linkage between the perception of safety of scholars and job insecurity. Academics have researched the impact of job insecurity and its influence upon behavior of workers in the workplace (see, for example; Ali, Ali, Albort-Morant, & Leal-Rodríguez, 2020; De Cuyper & De Witte, 2006). No previous scholarship links job insecurity and the perception of safety of scholars. However, it could be supposed that while the insecurity of a job seems to be understood as impacting the behavior or employees, there is also a link with safety, under COVID-19 conditions. More specifically, as previously mentioned, staying at home and teleworking both decrease the contacts between people, the probability of infection, and the physical safety of researchers. However, the barriers to travel might hinder international student enrollment and some domestic students to postpone their studies due to income losses or safety concerns. Both factors might contribute to a drop in total student enrollment, lost revenues for universities, potential job cuts, and increased sense of job insecurity among researchers. Hence:

> H4: Job insecurity is positively linked to perceived safety of scholars

2.2. The psychological factors of COVID-19 and scientific production

2.2.1. Mental stress and scientific production

While there is substantial literature that links the relationship between mental stress and productivity (see for example, Donald et al., 2005; Colligan & Higgins, 2006; Naqvi, Khan, Kant, & Khan, 2013), there is much less scholarship that looks at how stress can influence scientific production of scholars. The major findings of previous studies

show that moderate levels of stress may actually influence the production of scholarly works in a positive way (Blackburn & Bentley, 1993; Wilke et al., 1985), but that higher and lower levels of stress may not be conducive to scientific production. The uncertainties of COVID-19 phenomenon and governments' actions to mitigate its negative impacts, the drastic change in the daily routine of researchers, the workload related to online teaching, email correspondence, online student supervision, and insufficient physical exercises due to the lockdown and homestay, might have increased the mental stress of scholars beyond moderate levels, hence decreasing their research productivity. Although COVID-19 provided new research opportunities to scholars, this might have added additional mental stress. Hence:

> H5: Mental stress is negatively linked to scientific production of scholars.

2.2.2. Teleworking stressors and scientific production

In recent years, there has been a significant amount of research on telework and there is some speculation as to whether it is something that is conducive to productivity (Ruth & Chaudhry, 2008). However, there is a dearth of research looking into how teleworking impacts upon scientific production. What little research that exists on the topic, suggests that the relationship between teleworking and scholarly production is complicated (Hamermesh & Oster, 2002). According to Hamermesh and Oster (2002), it seems that teleworking may encourage cooperation between people who live and work far apart but what is produced by such research teams seems to be less likely to be prominently cited. Additionally, the workload of teleworking scholars has increased the need to prepare for online classes, answer individual student emails (instead of in face-to-face classes), provide more written guidance to students and colleagues, which takes time to do and decreases the time available for research. Hence:

> H6: Teleworking stressors are negatively linked to scientific production of scholars.

2.2.3. Social isolation and scientific production

Some research has looked into how social isolation impacts upon productivity among office workers (see, for example, Johanson, 2007; American Psychiatric Association, 2020), but there is no known direct research on the impact of social isolation and scientific production. Although social interactions and communication work in ways to enhance the productivity of researchers, the social isolation during the pandemic freed some time for them by decreasing face-to-face social interactions which researchers could use for research purposes. Hence:

> H7: Social isolation is positively linked to scientific production of scholars.

2.2.4. Job insecurity and scientific production

There is a well-researched link between job security, attitudes, and behavior in the workplace (Ali et al., 2020; De Cuyper & De Witte, 2006). Although others have looked into the productivity of economists (Maske et al., 2003) noting the correlates of productivity of economists, there is no study identifying a positive or negative relationship between research productivity and job security. However, the sense of job insecurity might distract a researcher from research and encourage using energies to find other employment and income sources. Hence:

> H8: Job insecurity is negatively linked to scientific production of scholars

2.2.5. Perceived safety and scientific production

There is no research on the relationship between perceived safety and productivity in an academic setting, probably because an academic setting is a very safe working environment, apart from the occasional papercut or active shooting on a university campus. However, with the introduction of contagion as a major concern with regards to safety on university campuses and other research environments, there is an elevated level of risk associated with scientific research. Since others illustrate that safety can and does promote productivity (see, for example, Salminen & Saari, 1995), it seems appropriate to incorporate the factor of the perception of safety into the equation, to determine if it plays a role in conditioning scholarly productivity. Hence, the formulated hypothesis is:

> H9: Perceived safety is positively linked to scientific production of scholars.

2.3. The mediating role of perceived safety

Previous studies have noted the mediating role of perceived safety (Davidson et al., 2016; Etopio, Devereux & Crowder, 2019; Griffin & Andrew, 2000). Most of the hypothesized relationships below are deducted from the logic that flows from the relationships between the variables, as there is scant research that delves into the relationships.

The entire production of scholarly work is considered as being influenced by mental stress and the perception of safety would have a mediating impact upon the relationship between stress and production. The expectation is that safety will mediate the relationship between stress and production, enabling researchers to be more productive, under stressful situations.

> H10: The relationship between mental stress and scientific production of scholars is mediated by perceived safety.

Obviously, safety and the perception of safety is a critical issue linked with a person's psychology and productivity of academic work, and it is posited that perceptions of safety mitigate the relationship between the stresses of teleworking and scientific production. Thus, if a person has a stressful teleworking experience, the feeling of safety may mitigate the stress to assist in the productivity of the individual.

> H11: The relationship between teleworking stressors and scientific production of scholars is mediated by perceived safety.

In a similar way, we assume that the perception of safety mitigates the sense of social isolation of individual scholars. Thus, we assume that while social isolation may not necessarily assist in productivity of an individual, the perception of safety that a person experiences from the isolation may play a role in mitigating the social isolation and enhance the productivity of the individual.

> H12: The relationship between social isolation and scientific production of scholars is mediated by perceived safety.

Also, following from the other leads, it seems that the perceived safety would also mitigate job security and enhance productivity. The idea is that while a person may experience a sense of security or insecurity with her/his workplace, the perception of safety of the lockdown would play a role in mitigating the impact that job security/insecurity would have on scientific productivity.

> H13: The relationship between job insecurity and scientific production of scholars is mediated by perceived safety.

2.4. The moderating role of perceived risk

There is a notion that the perception of risk

would moderate the relationship between the perception of safety and scholarly productivity. For example, scholars with higher level of perceived risk of COVID-19 might not be very productive even if they report a high level of perceived safety. So, while the perception of safety of the scholar may have a direct influence upon scientific production, such an influence could be moderated by the perception of risk in the environment. The moderating role of perceived risk has been acknowledged in other studies as well (Gürhan-Canli & Batra, 2004; Lai-Ming Tam, 2012).

H14: Perceived risk moderates the relationship between perceived safety and scientific production of scholars.

Figure 1 presents the research model. The 14 hypotheses were tested separately for three samples – overall sample (hypotheses are denoted with an index a), tourism scholars (index b), and non-tourism scholars (index c).

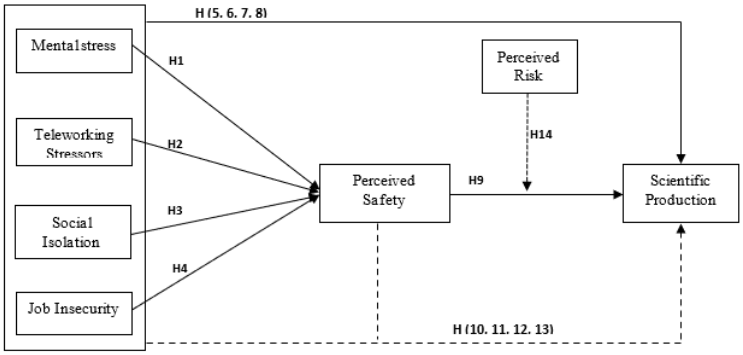

Figure 1 | Research model

3. Methods

3.1 Measures

Based on the conceptual framework, the current paper includes seven latent reflective variables, namely mental stress (MS), teleworking stressors (TS), social isolation (SI), job insecurity (JI), perceived risk (PR), perceived safety (PS) and scientific production (SP). Each construct was measured by a number of items adapted from the literature sources, except the last latent variable (SP) that has new scales (see Appendix 1).

3.2. Data collection procedure

This study targeted all scholars in all domains around the world. Participants were asked to complete an online questionnaire concerning their opinions on the impact of COVID-19 on their scientific production. We conducted a combination of sampling methods as follows: (1) convenience sampling by sending the survey link directly to potential respondents via their emails and social media accounts such as Facebook Messenger and WhatsApp; (2) self-selection sampling by posting the link on social networking sites (e.g., Facebook) and email distribution lists such as TRINet; and (3) snowball sampling by asking colleagues from various countries to forward the email further to their contacts and to share the questionnaire link with their colleagues and scholars. These sampling techniques helped to attain a larger number of responses from researchers from various countries and to diminish the nonresponse bias. Considering the time differences of participants' countries, the link to the questionnaire was also distributed at different times of the day. This helped in avoiding res-

ponse bias. During the period from 19 March to 5 April 2020, 1100 scholars participated in the study, 1073 of them completed the questionnaire with valid responses that were used for further analysis.

3.3. Data collection instrument

The online questionnaire had two sections. The first section included questions about respondents' characteristics (i.e. gender, age, position, work status, work institution, country, research publications since 2015, teaching load during spring 2020, teaching level, number of students, research domain and publications in Tourism, Hospitality and Events). The second section contained all statements of the latent variables that were measured on a 5-point Likert-type scale, ranging from 1 "strongly disagree" to 5 "strongly agree." Reverse coding was used for the statements of the following constructs: mental stress (MS), teleworking stressors (TS), social isolation (SI), job insecurity (JI), and perceived risk (PR). The questionnaire took 10-15 minutes to be completed.

3.4. Data analysis process

First, the Statistical Package for Social Sciences (SPSS 25) was applied to assess the descriptive analysis for the sample profile, and the means and standard deviations of constructs and items. In order to estimate the path model with the constructs, a partial least squares path modeling (PLS-SEM) was performed using the WarpPLS 7.0 program (Kock, 2020). PLS-SEM was conducted to establish the reliability and validity of constructs and measures (measurement model) and to assess the hypothesized relationships between the latent variables (structural model) (Hair, Hult, Ringle, & Sarstedt, 2017). It should be stressed that PLS-SEM was employed in this study as it is considered a rigorous statistical approach that allows for causal analysis in high-complexity situations. In addition, PLS-SEM methods demand at least one item of a latent construct (Henseler, Hubona, & Ray, 2016). Moreover, PLS-SEM is a proper SEM technique to perform mediation and moderation analyses (Kock, 2020).

4. Results

4.1 Descriptive analysis

Table 1 presents the sample's characteristics. Among 1073 participants, 524 respondents were female, 36.4% aged between 31 and 40, 38.5% were Assistant Professor/Lecturer. There were 847 respondents with a full-time job and 622 worked at a public university. Since 2015, 38.8% of them had less than 10 publications and 36.6% had published between 11 and 20 publications. During Spring 2020, 26.7% of them taught two courses, 39.9% taught both undergraduate and postgraduate students and 29.3% taught less than 100 students. The highest share (61.5%) of respondents were 'Social Sciences' domain and 35.9% of them published regularly in the field of 'Tourism, Hospitality, and Events.'

This research was carried out globally and 1073 respondents from 83 nations participated in it (Table 2): 294 come from hardest hit countries (as of 6th April 2020) and 779 come from other countries. The classification was based on the number of COVID-19 related deaths per million citizens. Regarding the responses, the peak value is recorded amongst Egypt (186 responses), followed by Indonesia, Italy and India (78, 58 and 57 responses respectively). It should be stressed that some of the hardest hit countries are not presented on Table 2, as the total number of responses from them is less than 10, however substantial number of responses were received from some of the hardest hit nations including Portugal (51), Spain (45), the UK (38), the USA (37), France (17), Germany (12) and Austria (10).

Table 1 | Sample's characteristics

Demographics	Categories	Frequency	Percentage (%)
Gender	Female	524	48.8
	Male	521	48.6
	Other	3	0.3
	Prefer not to say	25	2.3
Age	20-30	147	13.7
	31-40	391	36.4
	41-50	353	32.9
	51-60	157	14.6
	61+	25	2.3
Position	Doctoral student / Post Doc	238	22.2
	Assistant Professor / Lecturer	413	38.5
	Associate Professor / Senior Lecturer	270	25.2
	Full Professor	152	14.2
Work status	Part-time	226	21.1
	Full-time	847	78.9
Work institution	Public university	622	58.0
	Private university	255	23.8
	Public college	110	10.3
	Private college	66	6.2
	Other	20	1.9
Research publications since 2015	less than 10	416	38.8
	11-20	393	36.6
	21-30	166	15.5
	31-40	56	5.2
	41-50	15	1.4
	51 or more	23	2.1
	None	4	0.4
Teaching load (Spring 2020)	None	112	10.4
	1 course	177	16.5
	2 courses	286	26.7
	3 courses	276	25.7
	4 or more courses	222	20.7
Teaching level	Undergraduate	412	38.4
	Postgraduate	121	11.3
	Both	428	39.9
	None	112	10.4
No. of students (Spring 2020)	Less than 100 students	314	29.3
	101-200	282	26.3
	201-300	183	17.1
	301-400	95	8.9
	More than 400 students	87	8.1
	None	112	10.4
Research domain	Arts \& Humanities	147	13.7
	Science \& Technology: Life Sciences \& Biomedicine	120	11.2
	Science \& Technology: Physical Sciences	45	4.2
	Science \& Technology: Technology	101	9.4
	Social Sciences	660	61.5
Research focus in Tourism, Hospitality and Events	Yes	385	35.9
	No	688	64.1
Total		**1073**	**100.0**

Table 2 | Countries' profile

Country-hit by Covid-19			
Dimension		**Frequencies**	**Percentage**
Hardest hit country		294	27.4
Other country		779	72.6
Total		1073	100.0
Most participating countries			
Country	**Frequencies**	**Percentage**	**Number of deaths per one million citizens** *(the world average = 9.1)**
Egypt	186	17.3	0.8
Indonesia	78	7.3	0.8
Italy	58	5.4	**263**
India	57	5.3	0.09
Portugal	51	4.8	**31**
Spain	45	4.2	**282**
Turkey	42	3.9	7
UK	38	3.5	**79**
USA	37	3.4	**29**
China	35	3.3	2
Oman	34	3.2	0.4
Brazil	32	3.0	2
Ukraine	25	2.3	0.9
Bulgaria	23	2.1	3
Algeria	22	2.1	3
France	17	1.6	**124**
Russia	15	1.4	0.3
Australia	15	1.4	2
Malaysia	15	1.4	2
Poland	15	1.4	3
Pakistan	15	1.4	0.2
Germany	12	1.1	**19**
Taiwan	11	1.0	0.2
Greece	10	.9	8
Mexico	10	.9	0.7
Austria	10	.9	**24**
Others	165	15.4	--
Total	**1073**	**100.0**	

Note: *= These figures were recorded on Monday, April 6, 2020 (14.30 GTM) (Source: https://www.worldometers.info/coronavirus/)

Table 3 presents the descriptive statistics (mean and standard deviation) of the constructs and the individual items, item loadings, composite reliability and AVE of the constructs. Results show that researchers are generally neutral toward most of the constructs and associated items.

Table 3 | Descriptive statistics and assessment results of the measurement models

Constructs/items		Total sample (n= 1073)					Tourism scholars (n= 385)					Non-tourism scholars (n= 688)					MIA
		M	SD	IL	CR	AVE	M	SD	IL	CR	AVE	M	SD	IL	CR	AVE	*p-values*
Mental Stress (MS)		**2.74**	**0.88**		**0.89**	**0.64**	**2.71**	**0.90**		**0.90**	**0.65**	**2.76**	**0.86**		**0.89**	**0.62**	
MS1	The outbreak of COVID-19 makes me feel sad and depressed (r)	2.71	1.14	0.80			2.70	1.16	0.81			2.72	1.13	0.80			0.98
MS2	The outbreak of COVID-19 makes me get upset easily (r)	2.79	1.10	0.81			2.74	1.12	0.83			2.82	1.09	0.79			0.65
MS3	The outbreak of COVID-19 makes me remain in a state of nervous tension (r)	2.71	1.09	0.80			2.69	1.10	0.80			2.72	1.09	0.79			0.81
MS4	The outbreak of COVID-19 makes me get agitated easily (r)	2.77	1.06	0.77			2.74	1.06	0.79			2.79	1.07	0.76			0.85
MS5	The outbreak of COVID-19 makes me feel scared easily (r)	2.75	1.09	0.80			2.71	1.12	0.79			2.77	1.08	0.80			0.98
Teleworking Stressors (TS)		**2.71**	**0.83**		**0.90**	**0.56**	**2.69**	**0.88**		**0.91**	**0.60**	**2.72**	**0.80**		**0.89**	**0.54**	
TS1	Teleworking (online teaching) creates a variety of problems and complications in my job (r)	2.68	1.09	0.74			2.67	1.10	0.77			2.69	1.09	0.72			0.80
TS2	Teleworking makes me feel rushed (r)	2.82	1.09	0.76			2.77	1.11	0.77			2.85	1.07	0.75			0.87
TS3	Teleworking makes me feel pressured (r)	2.75	1.13	0.80			2.77	1.18	0.82			2.74	1.10	0.79			0.76
TS4	Teleworking increases conflicts with my personal responsibilities (r)	2.88	1.14	0.75			2.83	1.12	0.78			2.90	1.15	0.73			0.54
TS5	Teleworking is not easy to do compared to in-class teaching (r)	2.53	1.11	0.72			2.55	1.11	0.73			2.52	1.11	0.71			0.59
TS6	Teleworking requires much time and effort to do (r)	2.49	1.10	0.73			2.49	1.13	0.76			2.49	1.08	0.71			0.71
TS7	I feel confused about prioritizing tasks of teleworking to do (r)	2.86	1.10	0.73			2.78	1.17	0.76			2.90	1.06	0.72			0.39
Social Isolation (SI)		**2.93**	**0.90**		**0.87**	**0.63**	**2.94**	**0.94**		**0.88**	**0.65**	**2.92**	**0.87**		**0.86**	**0.61**	
SI1	With the COVID-19 lockdown, I feel less integrated with my research team (r)	2.83	1.11	0.81			2.85	1.18	0.81			2.81	1.06	0.81			0.56
SI2	With the COVID-19 lockdown, I feel poorly informed about the updated issues of research from my team (r)	2.94	1.07	0.76			2.94	1.09	0.73			2.94	1.06	0.78			0.25
SI3	With the COVID-19 lockdown, I feel isolated from my research team members (r)	2.85	1.13	0.82			2.90	1.20	0.86			2.82	1.10	0.79			0.24

Constructs/items		Total sample (n= 1073)					Tourism scholars (n= 385)					Non-tourism scholars (n= 688)					MIA
		M	**SD**	**IL**	**CR**	**AVE**	**M**	**SD**	**IL**	**CR**	**AVE**	**M**	**SD**	**IL**	**CR**	**AVE**	***p-values***
SI4	With the COVID-19 lockdown, I feel alone and friendless (r)	3.11	1.22	0.77			3.10	1.20	0.81			3.12	1.23	0.75			0.47
Job Insecurity (JI)		**3.18**	**1.08**		**0.91**	**0.78**	**3.11**	**1.10**		**0.91**	**0.79**	**3.22**	**1.07**		**0.91**	**0.78**	
JI1	With the COVID-19 lockdown, I think I might lose my job in the near future (r)	3.23	1.25	0.90			3.16	1.29	0.90			3.28	1.22	0.90			0.72
JI2	With the COVID-19 lockdown, I feel insecure about the future of my job (r)	3.02	1.20	0.85			2.95	1.20	0.85			3.07	1.20	0.85			0.61
JI3	With the COVID-19 lockdown, chances are I will soon lose my job (r)	3.29	1.22	0.90			3.24	1.24	0.91			3.32	1.21	0.89			0.91
Perceived Risk (PR)		**2.86**	**0.84**		**0.89**	**0.58**	**2.83**	**0.91**		**0.90**	**0.62**	**2.88**	**0.80**		**0.88**	**0.55**	
PR1	I worry about getting infected with COVID-19 (r)	2.61	1.12	0.74			2.58	1.17	0.77			2.62	1.09	0.71			0.78
PR2	I am concerned about getting COVID-19 (r)	2.61	1.07	0.71			2.58	1.12	0.73			2.63	1.05	0.69			0.91
PR3	I am sure I will get infected with COVID-19 (r)	3.15	1.14	0.75			3.16	1.21	0.77			3.15	1.10	0.75			0.97
PR4	I feel I am likely to get infected with COVID-19 (r)	3.04	1.11	0.79			3.03	1.16	0.83			3.05	1.08	0.77			0.74
PR5	I feel vulnerable to COVID-19 infection (r)	2.78	1.08	0.76			2.72	1.10	0.79			2.81	1.07	0.74			0.61
PR6	I think my chances of getting infected with COVID-19 are high (r)	2.99	1.12	0.79			2.92	1.16	0.82			3.03	1.09	0.77			0.97
Perceived Safety (PS)		**3.74**	**0.86**		**0.88**	**0.65**	**3.85**	**0.84**		**0.88**	**0.64**	**3.69**	**0.86**		**0.88**	**0.66**	
PS1	With the outbreak of COVID-19, I always follow all safety procedures	3.85	1.03	0.85			3.95	1.03	0.64			3.79	1.03	0.85			0.85
PS2	With the outbreak of COVID-19, I always wear safety equipment when required	3.53	1.09	0.74			3.63	1.09	0.72			3.47	1.09	0.75			0.85
PS3	With the outbreak of COVID-19, I always keep my area clean	3.77	1.03	0.81			3.86	1.01	0.81			3.71	1.04	0.81			0.92
PS4	With the outbreak of COVID-19, safety always is my first priority	3.85	1.08	0.82			3.96	1.07	0.83			3.80	1.09	0.82			0.95
Scientific Production (SP)		**3.11**	**0.87**		**0.87**	**0.57**	**3.20**	**0.91**		**0.89**	**0.62**	**3.06**	**0.84**		**0.87**	**0.59**	
SP1	With the COVID-19 lockdown, I am psychologically ready to conduct research.	3.25	1.08	0.77			3.37	1.08	0.72			3.18	1.07	0.73			0.53

Constructs/items		Total sample (n= 1073)					Tourism scholars (n= 385)					Non-tourism scholars (n= 688)					MIA
		M	SD	IL	CR	AVE	M	SD	IL	CR	AVE	M	SD	IL	CR	AVE	*p-values*
SP2	With the COVID-19 lockdown, my focus to be just on conducting research	3.08	1.13	0.77			3.13	1.21	0.83			3.06	1.09	0.77			0.15
SP3	With the COVID-19 lockdown, I now have sufficient time to do my research	3.19	1.14	0.71			3.30	1.10	0.81			3.13	1.15	0.79			0.06
SP4	With the COVID-19 lockdown, doing research is simple and logical	3.02	1.14	0.77			3.12	1.15	0.77			2.96	1.12	0.77			0.70
SP5	With the COVID-19 lockdown, I now have fewer distractions from my research	3.03	1.11	0.75			3.09	1.20	0.79			3.00	1.06	0.76			0.19

Notes: M= Mean; SD= Standard deviation; IL= Indicator loading; CR= Composite reliability; AVE= Average variance extracted; Coding: (1= strongly disagree, 5= strongly agree); (r) = denotes reverse coding; MIA= Measurement Invariance Analysis

4.2 Measurement models

The measurement model of this research encompasses seven reflective latent variables. According to Hair, Ringle, and Sarstedt (2011) and Henseler, Ringle, and Sinkovics (2009), the reflective measurement model has to be assessed with regard to its reliability and validity. In doing so, indicator reliability, internal consistency reliability, convergent validity and discriminant validity were conducted. First, we eliminated all indicators that have standardized loadings below the recommended value of 0.70 (Hair et al., 2011) (see Appendix 1). Consequently, we conducted the analysis again. Table 3 demonstrates that items loadings are higher than 0.70, proving indicator reliability. To ensure the internal consistency reliability, the composite reliability (CR) is used and should exceed 0.70 (Hair et al., 2017). A shown in Table 3, the CR of all constructs are greater than 0.70. These results confirmed the reliability of the measurement model.

To confirm convergent validity, the average variance extracted (AVE) of the constructs should be higher than 0.5 (Hair et al., 2017). Based on the results presented in Table 3, the AVE of the latent variables exceeded 0.50, establishing the convergent validity. To test the discriminant validity of the studied constructs, two approaches of Fornell-Larcker and heterotrait-monotrait (HTMT) were applied. With regard to the first approach, the AVE of each construct should exceed the latent variable's highest squared correlation with any other latent variable (Fornell & Larcker, 1981). As indicated in Table 4, the square root of each construct's AVE is larger than its correlations with any other construct. Concerning the second approach, the HTMT ratio is considered a superior assessment method for discriminant validity compared to the Fornell-Larcker criterion (Henseler, Ringle, & Sarstedt, 2015). To assess HTMT ratios, two different values were considered: HTMT ratio is good if <0.90 and best if <0.85 (Henseler et al., 2015). As shown in Table 4, all HTMT ratio is ≤ 0.85. These results illustrated that discriminant validity is confirmed.

Table 4 | Discriminant validity

Construct	Fornell–Larcker																			
	Total sample							Tourism scholars							Non-tourism scholars					
	MS	TS	SI	JI	PR	PS	SP	MS	TS	SI	JI	PR	PS	SP	MS	TS	SI	JI	PR	PS	SP
MS	**0.80**							**0.81**							**0.79**						
TS	0.68	**0.75**						0.72	**0.77**						0.66	**0.73**					
SI	0.67	0.67	**0.79**					0.71	0.71	**0.81**					0.65	0.64	**0.78**				
JI	0.57	0.55	0.59	**0.88**				0.65	0.60	0.67	**0.88**				0.53	0.52	0.54	**0.88**			
PR	0.68	0.57	0.60	0.62	**0.76**			0.74	0.61	0.65	0.69	**0.79**			0.65	0.542	0.56	0.58	**0.74**		
PS	-0.38	-0.36	-0.23	-0.16	-0.34	**0.81**		-0.48	-0.43	-0.28	-0.21	-0.38	**0.80**		-0.33	-0.32	-0.20	-0.12	-0.31	**0.81**	
SP	-0.30	-0.28	-0.29	-0.39	-0.39	0.37	**0.76**	-0.42	-0.38	-0.41	-0.46	-0.48	0.41	**0.79**	-0.22	-0.19	-0.20	-0.34	-0.31	0.31	**0.76**

Note: The bold elements represent the SQRT of AVEs, and other numbers are correlations between variables.

Construct	Heterotrait–monotrait (HTMT)																			
	Total sample							Tourism scholars							Non-tourism scholars					
	MS	TS	SI	JI	PR	PS	SP	MS	TS	SI	JI	PR	PS	SP	MS	TS	SI	JI	PR	PS	SP
MS																					
TS	0.79							0.81							0.77						
SI	0.81	0.80						0.84	0.83						0.79	0.77					
JI	0.67	0.64	0.71					0.75	0.68	0.80					0.62	0.61	0.66				
PR	0.80	0.66	0.72	0.72				0.85	0.69	0.77	0.79				0.77	0.63	0.69	0.68			
PS	0.46	0.43	0.28	0.19	0.41			0.57	0.51	0.34	0.26	0.46			0.39	0.38	0.25	0.15	0.38		
SP	0.36	0.34	0.36	0.46	0.47	0.45		0.48	0.44	0.50	0.53	0.56	0.49		0.26	0.23	0.26	0.40	0.38	0.38	

Note: The numbers depict the HTMT ration for each variable is ≤ 0.85

4.3 Structural models

First, based on the recommendations by Kock (2020), the fit indices ensured that the three models were relatively consistent with the data (see Table 5).

Further, as the measurement model assessment illustrated the reliability and validity of the latent variables and associated items, the following step was to perform the structural model to test the hypothesized relations between the independent, mediator, moderator and dependent constructs pro-

vided in the study conceptual model (Hair et al., 2017). It is evident that there are a number of measures that can be used to evaluate the structural model. However, we used the standardized path coefficients (β), significance levels (p-value), R^2, f^2 and Q^2. These measures could present evidence of the quality of the structural model (Hair, Sarstedt, Ringle, & Mena, 2012) and help scholars to examine the suggested hypotheses.

Table 5 | Models fit indices

	Overall sample	Tourism scholars	Non-tourism scholars
Average path coefficient (APC)	0.175, P<0.001	0.209, P<0.001	0.160, P<0.001
Average R-squared (ARS)	0.228, P<0.001	0.308, P<0.001	0.182, P<0.001
Average adjusted R-squared (AARS)	0.225, P<0.001	0.299, P<0.001	0.176, P<0.001
Average block VIF (AVIF)	2.065	2.421	1.912
Average full collinearity VIF (AFVIF)	2.079	2.477	1.905
Tenenhaus GoF (GoF)	0.394	0.465	0.350
Sympson's paradox ratio (SPR)	0.600	0.600	0.600
R-squared contribution ratio (RSCR)	0.884	0.865	0.890
Statistical suppression ratio (SSR)	1.000	1.000	1.000
Nonlinear bivariate causality direction ratio (NLBCDR)	0.800	0.900	0.800

To begin, it should be stressed that all items of a psychological factors (i.e. MS, TS, SI, JI and PR) were measured in reverse coding (see Table 3), whereas, PS and SP were measured in normal coding. This means that a negative path coefficient between any of these psychological factors and PS or SP will actually show a positive relationship and vice versa.

Figure 2 depicts the findings of the hypothesized relationships of the structural model regarding the overall sample. The first two hypotheses suggested that perceived safety (PS) is negatively associated with mental stress (MS) and positively associated with teleworking stressors (TS). Results did not support H1a (β = -0.35, $p < 0.001$), whereas H2a (β = -0.27, p <0.001) was supported. Hypotheses 3a and 4a suggested that social isolation (SI) and job insecurity (JI) are positively associated with PS. The findings articulated that H3a (β = 0.12, p <0.001) and H4a (β = 0.12, p <0.001) were not accepted. Hypotheses 5a, 6a and 8a suggested that MS, TS and JI are negatively associated with scientific production (SP). The findings did not support both H5a (β = 0.02, p = 0.22) and H8a (β = -0.36, $p < 0.001$), while H6a (β = 0.05, p = 0.04) was accepted. Hypotheses 7a and H9a suggested that SI and PS is positively associated with SP. The results confirmed H7a (β = -0.06, $p < 0.05$) and H9a (β = 0.27, p <0.001). In addition, MS, TS, SI and JI explained 19% of the variance in PS (R^2 = 0.19), while MS, TS, SI, JI and PS explained 27% of the variance in SP (R^2 = 0.27). To assess the effect size (f^2), the guidelines of Cohen (1988) were followed. The values are 0.02, 0.15, and 0.35; for small, medium, and large effects accordingly. Table 7 demonstrates that all paths have small effect sizes. Moreover, the results indicated that Q^2 values of PS and SP are 0.190 and 0.270 respectively. This means that the conceptual model has predictive relevance since the Q^2 is greater than 0 (Chin, Peterson, & Brown, 2008).

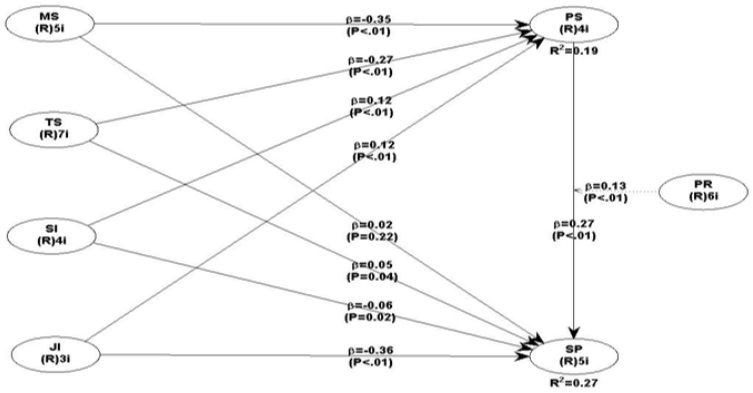

Figure 2 | Structural model results of the overall sample

Figure 3 demonstrates the structural model results related to scholars who have publications in Tourism, Hospitality and Events. It is revealed that PS was positively affected by MS (β = -0.51, $p <$ 0.001) and TS (β = -0.29, $p <$0.001). Therefore, H1b was rejected and H2b was accepted. PS also negatively influenced by SI (β = 0.17, $p <$0.001) and JI (β = 0.17,$p <$0.001), rejecting H3b and H4b. In addition, it is indicated that there is no link between SP and both MS (β = 0.02, p = 0.34) and TS (β = 0.05, p = 0.16), H5b and H6b were therefore rejected. While SI (β = -0.16, $p <$ 0.05) and JI (β = -0.34, $p <$ 0.001) had a significant and positive impact on SP. Thus, H7b was supported and H8b was not accepted. The results supported H9b since SP positively impacted by PS (β = 0.27, $p <$0.001). Moreover, MS, TS, SI and JI explained 29% of the variance in PS (R^2 = 0.29), whereas MS, TS, SI, JI and PS explained 33% of the variance in SP (R^2 = 0.33). As shown in Table 7, all relations have a small and medium effect sizes (Cohen, 1988). Regarding Q^2 values, it is revealed that the research model has a good predictive relevance since the Q^2= 0.286 for PS and Q^2= 0.334 for SP (Chin, et al., 2008).

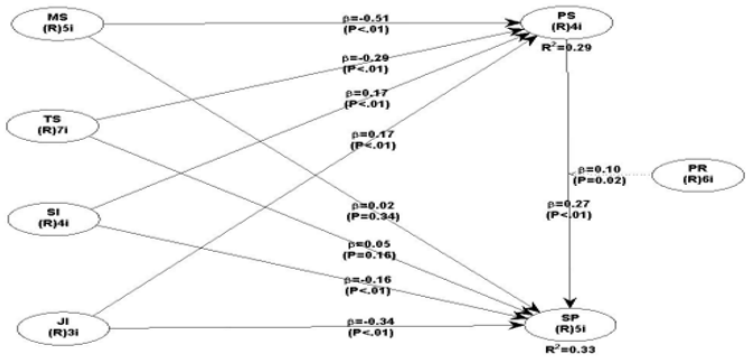

Figure 3 | Structural model results of tourism scholars

Regarding non-tourism scholars, the findings of structural model (Figure 4) indicated that both MS (β = -0.28, $p <$ 0.001) and TS (β = -0.25, $p <$0.001) had a positive and significant link with PS, thus H1c was rejected and H2c was confirmed. On the other hand, SI (β = 0.08, $p <$0.05) and JI (β = 0.11, $p <$0.001) had a negative and significant relationship with PS. As a result, H3c

and H4c were not accepted. Moreover, the findings did not support H5c and H8c since MS (β = 0.01, p = 0.44) and JI (β = -0.36, p < 0.001). However, SP was negatively affected by TS (β = 0.11, p <0.001) and positively influenced by both SI (β = -0.02, p = 0.30) and PS (β = 0.23, p <0.001). These results supported H6c, H7c and H9c. Furthermore, MS, TS, SI and JI explained 14% of the variance in PS (R2 = 0.14), whereas MS, TS, SI, JI and PS explained 22% of the variance in SP (R2 = 0.33). Regarding the f2 (Table 7), all relationships had small effects (Cohen, 1988). Additionally, Q^2= 0.146 for PS and Q^2= 0.222 for SP indicating that the model has suitable predictive relevance (Chin, et al., 2008).

Moreover, measurement invariance analysis (MIA) was performed; all p-values are non-significant (Table 3) indicating that loadings do not change significantly between the two samples of tourism scholars and non-tourism scholars (Kock, 2020).

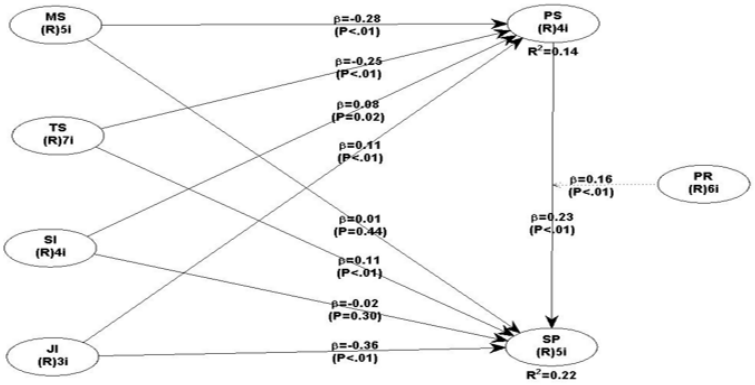

Figure 4 | Structural model results of non-tourism scholars

4.4 Mediation Analysis

Four hypotheses were formulated to examine the possibility of the mediating impact of perceived safety on the relationship between the psychological factors of COVID-19 and scientific production of researchers following the approach explained by Kock (2014). In doing so, hypotheses 10, 11, 12 and 13 suggested that the impact of the four independent constructs (MS, TS, SI and JI) on scientific production (SP) is mediated by perceived safety (PS) (hypothesis 10: MS→PS→SP; hypothesis 11: TS→PS→SP; hypothesis 12: SI→PS→SP; and hypothesis 13: JI→PS→SP). The findings in Table 6 indicated that PS partially mediated the relationship between MS, TS and SI (predictors variables) and SP (outcome variable) in the three group models. Therefore, hypotheses 10a,b,c to 12a,b,c were supported. PS also partially mediated the relationship between JI and SP in the models related to the overall sample and the sample of tourism scholars, confirming H13a and H13b. Additionally, there is a full mediation impact of PS on the link between JI and SP concerning non-tourism scholars' model. As a result, H13c was accepted.

Table 6 | The mediation effect of perceived safety on scientific production among psychological factors

Overall sample						
Hypotheses		**Direct effect**		**Indirect effect**		**Supported**
		Path coefficient	**P value**	**Path coefficient**	**P value**	
H:10a	**MS→PS→SP**	-0.30	<0.001	-0.11	<0.001	Partial Mediation
H:11a	**TS→PS→SP**	-0.28	<0.001	-0.11	<0.001	Partial Mediation
H:12a	**SI→PS→SP**	-0.29	<0.001	-0.07	<0.001	Partial Mediation
H:13a	**JI→PS→SP**	-0.39	<0.001	-0.05	<0.001	Partial Mediation
Tourism scholars						
H:10b	**MS→PS→SP**	-0.42	<0.001	-0.13	<0.001	Partial Mediation
H:11b	**TS→PS→SP**	-0.38	<0.001	-0.13	<0.001	Partial Mediation
H:12b	**SI→PS→SP**	-0.41	<0.001	-0.09	<0.01	Partial Mediation
H:13b	**JI→PS→SP**	-0.46	<0.001	-0.09	<0.05	Partial Mediation
Non-tourism scholars						
H:10c	**MS→PS→SP**	-0.22	<0.001	-0.09	<0.001	Partial Mediation
H:11c	**TS→PS→SP**	-0.19	<0.001	-0.09	<0.001	Partial Mediation
H:12c	**SI→PS→SP**	-0.21	<0.001	-0.05	<0.05	Partial Mediation
H:13c	**JI→PS→SP**	-0.34	<0.001	-0.03	0.10	Full Mediation

4.5 Moderation Analysis

The current study also aimed to examine the potential moderating role of perceived risk (PR) on the relationship between perceived safety (PS) and scientific production (SP) of researchers. Moderation impact analysis was evaluated using PLS-SEM that can provide solid measures of the impacts of moderator that influences the direct relationships between pairs of construct (Chin, Marcolin, & Newsted, 2003). To assess the moderating effect, PS (predictor) and PR (moderator) was multiplied to create an interaction latent variable (PS_PR) to predict SP. As shown in Figures 2, 3 and 4, the paths coefficient for the impact of the moderator on SP for the overall sample ($\beta = 0.13$; $p < 0.01$), for the tourism scholars' sample ($\beta = 0.10$; $p < 0.05$) and for the non-tourism scholars' sample ($\beta = 0.16$; $p < 0.01$) were significant. This result revealed that PR moderates the relationships between PS and SP and provided support for hypotheses 14a, 14b and 14c. In addition, according to Kock (2020), PLS-SEM can be employed to show the distribution of plots of moderating relationship including three latent variables. In other words, it provides the high and low values of moderating construct with data points (Figures 5 to 7).

Table 7 demonstrates a summary of the hypotheses results.

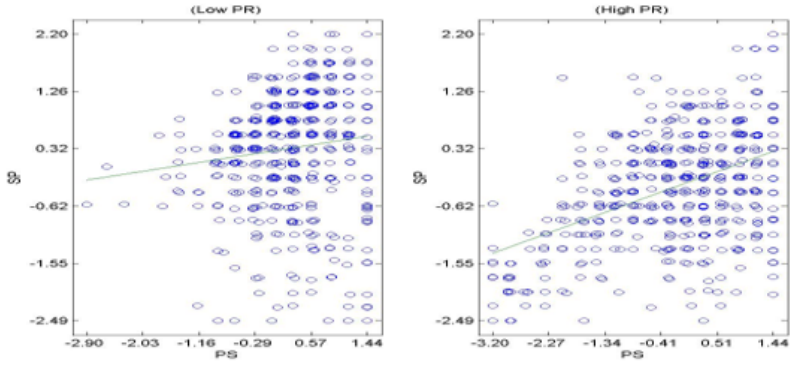

Figure 5 | High and low values of moderating construct with data points (Total sample)

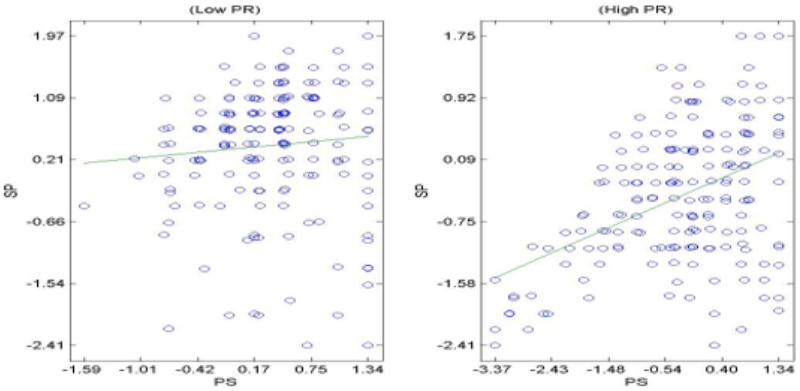

Figure 6 | High and low values of moderating construct with data points (tourism scholars)

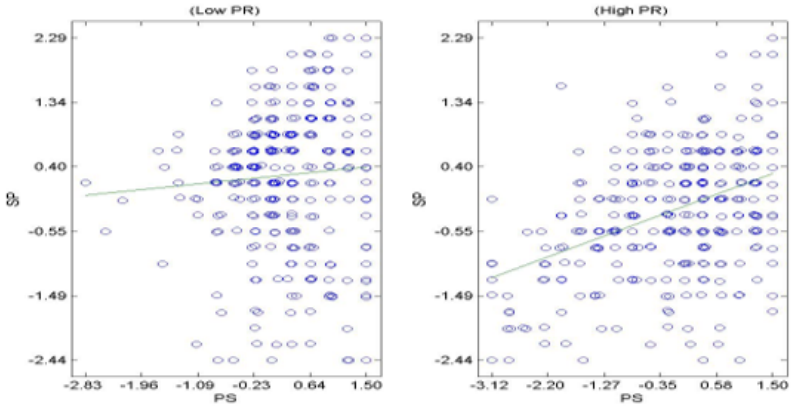

Figure 7| High and low values of moderating construct with data points (non-tourism scholars)

Table 7 | Summary of the hypotheses results and effect size (f^2 values)

Hypothesis		Result			Effect size (f^2)		
		Overall sample	*Tourism scholars*	*Non-tourism scholars*	*Overall sample*	*Tourism scholars*	*Non-tourism scholars*
H1:	Mental stress is negatively linked to perceived safety of scholars	Not supported	Not supported	Not supported	0.138	0.244	0.093
H2:	Teleworking stressors are positively linked to perceived safety of scholars	Supported	Supported	Supported	0.097	0.127	0.081
H3:	Social isolation is positively linked to perceived safety of scholars	Not supported	Not supported	Not supported	0.027	0.049	0.016
H4:	Job insecurity is positively linked to perceived safety of scholars	Not supported	Not supported	Not supported	0.020	0.037	0.014
H5:	Mental stress is negatively linked to scientific production of scholars	Not supported	Not supported	Not supported	0.007	0.009	0.001
H6:	Teleworking stressors is negatively linked to scientific production of scholars	Supported	Not supported	Supported	0.016	0.020	0.021
H7:	Social isolation is positively linked to scientific production of scholars	Supported	Supported	Supported	0.018	0.065	0.004
H8:	Job insecurity is negatively linked to scientific production of scholars	Not supported	Not supported	Not supported	0.141	0.157	0.123
H9:	Perceived safety is positively linked to scientific production of scholars	Supported	Supported	Supported	0.101	0.112	0.072
H10:	The relationship between mental stress and scientific production of scholars is mediated by perceived safety	Supported	Supported	Supported	0.029	0.058	0.014
H11:	The relationship between teleworking stressors and scientific production of scholars is mediated by perceived safety	Supported	Supported	Supported	0.021	0.031	0.011
H12:	The relationship between social isolation and scientific production of scholars is mediated by perceived safety	Supported	Supported	Supported	0.009	0.020	0.004
H13:	The relationship between job insecurity and scientific production of scholars is mediated by perceived safety	Supported	Supported	Supported	0.013	0.022	0.009
H14:	Perceived risk moderates the relationship between perceived safety and scientific production of scholars	Supported	Supported	Supported	0.032	0.026	0.042

5. Discussion

This paper investigated the psychological impacts of COVID-19 outbreak on research productivity of tourism and non-tourism scholars. The hypothesized conceptual model received mixed confirmation. Furthermore, the empirical results of tourism scholars are mostly similar to those of non-tourism scholars, meaning that the pandemic had similar psychological effects on both respondent groups.

It is evident that mental pressure results in the scholars' feeling a state of sadness, depression and nervous tension. All of this could negatively affect the perception of safety. Therefore, we hypothesized that mental stress (MS) resulting from the COVID-19 negatively affected the perceived safety (PS) of tourism and non-tourism researchers. Although, the empirical results exactly indicated the opposite, this result supported previous studies (Blackburn & Bentley, 1993; Wilke et al., 1985) illustrating the generally role of stress in academic productivity. The finding also suggested that safety is linked with productivity increases in workplaces, consistent with Salminen and Saari (1995).

While the COVID-19 continues to spread around the world, most countries have taken a number of proactive measures to limit the spread of the virus, the most important of which are quarantine and isolation. Accordingly, most researchers started to work from their homes including teleworking (online teaching) and other academic activities. Therefore, we hypothesized that teleworking will have a positive impact on their perception of safety. The findings of this study confirmed this hypothesis. This means that the perceived safety of scholars in tourism and non-tourism related-field has a positive and significant link with teleworking activities. Although there is no previous study that investigated the relationship between teleworking and perception of the safety of scholars, especially in the tourism context, this research is in line with some previous studies (e.g. Aroles et al., 2020; Baruch, 2000; Lippe & Lippényi, 2019; Weinert et al., 2014) that examined the linkage between teleworking and perceived safety in various contexts.

According to reports issued by the WHO, one

of the main reasons for the spread of coronavirus is the personal contact and meeting between individuals. Therefore, the current study assumed that the isolation procedures increase researchers' feeling that they are living in a safe environment. The findings did not confirm this hypothesis. In other words, there is no positive correlation between the social isolation of both tourism and non-tourism researchers and their perception of safety. The greater feeling of isolation and loneliness, the lower perception of safety. Despite the fact that there are limited studies on how social isolation influences the scholars' perception of safety, the present study supports the findings of prior research investigated the effect of loneliness on person's psychology (e.g., Adair et al., 2017; Green et al., 2001; Hawthorne, 2006; Vincenzi & Grabosky, 1987; Wright et al., 2006).

With the continued outbreak of the COVID-19 pandemic, many higher education institutions have been forced to close to prevent the spread of the disease among academics and students. As a result, we assumed that some researchers could fear losing their jobs in the future. While the feeling of job insecurity increases, researchers will be extremely keen to be in a safe environment, hoping that maintaining a safe environment would limit the virus spread. This may then help decision-makers to open the educational institutions again. This hypothesis was not supported in this research. Interestingly, the more tourism and non-tourism scholars feel job insecurity, the less safe they feel. In this regard, previous studies linked job insecurity to employees' behavior in different areas (e.g. Ali et al., 2020; De Cuyper & De Witte, 2006) are supported. However, there is no study dealing with the relationship between job insecurity and perceived safety concerning researchers, a gap that this study partially filled in.

The current study hypothesized that there was a negative and significant correlation between mental stress and the scientific production of researchers. This hypothesis was developed upon the existence of literature that studied the relationship between mental stress and worker productivity (e.g. Donald et al., 2005; Colligan & Higgins, 2006; Naqvi et al., 2013). The results of this study demonstrated that mental stress has not negatively affected both tourism and non-tourism researchers' productivity. This finding is compatible with the results of past studies illustrated that reasonable levels of mental stress may have a positive impact on employees' performance (Blackburn & Bentley, 1993; Wilke et al., 1985).

Furthermore, we supposed that teleworking will have a negative and significant impact on academic productivity, especially with those who have a notable teaching load or who do not have much experience in distance teaching. As this will result in many pressures in terms of time, effort, work priorities, and conflict with family life. The results proved that teleworking stressors had a negative effect on the scientific production of non-tourism researchers, but not of tourism researchers. This result was unexpected, because tourism, hospitality and events programmes have practical modules related to culinary arts, restaurant and bar services, or housekeeping, that require face-to-face classes for the development of practical skills. Teleworking required the transformation of the practical classes into online classes during the pandemic, but it seems this teleworking stress did not influence negatively the productivity of tourism scholars. There are not sufficient prior studies that have researched the effect of teleworking stressors on the productivity of workers in the academic setting. However, this finding supported past research (e.g. Hamermesh & Oster, 2002) examined the link between teleworking and teamwork cooperation.

Moreover, the results articulated that social isolation positively affected the scientific production of both researchers in tourism and non-tourism related-fields, confirming the suggested hypothesis. Although the researchers may feel isolated and lonely within the imposition of isolation procedures, they could get much time to focus on

their research and become more productive. In this vein, the relationship between social isolation and scholarly production had not been tested previously. However, this finding is in line with some prior studies that linked between the two variables in different contexts (e.g. Johanson, 2007; American Psychiatric Association, 2020). Moreover, these findings are compatible with the fact that there is a substantial number of published articles and research notes in all areas including tourism, hospitality and events since the implementation of protective measures related to the COVID-19 pandemic including social isolation.

With continued lockdowns, researchers become more concerned about the future of their jobs. This job insecurity may create a negative attitude of scholars toward conducting scientific research, especially with the burgeoning uncertainty about their job in the future. Thus, we assumed that job insecurity has a negative influence on their scientific production. However, the results indicated that job insecurity positively impacted scholarly production. Based on this result, we argue that job insecurity stimulates some tourism and non-tourism scholars to do more research to keep their jobs, while others are distracted because they lose ground under their feet. This result contradicts the study of Maske et al. (2003) who stated that there is no indication that there is either a positive or negative relation in academic circles between productivity and job security.

Further, the results revealed that the tourism and non-tourism researchers' perception of being in a safe and healthy environment will increase their scientific production. Being in a safe environment will make scholars psychologically ready and more focused to conduct more research smoothly. This result supports prior research on the relationship between safety and productivity in another context (e.g. Salminen & Saari, 1995).

It is evident that the outbreak of the COVID-19 has had a great psychological impact on people all over the world. Accordingly, this research sought to study the effect of perceived safety as a mediator variable between the psychological factors arising from this virus and the researchers' productivity. The results confirmed the partial mediating role of perceived safety on the link between the psychological factors and the production of scholars in tourism and non-tourism linked-field. Although mental stress directly affects scientific production, the safe environment will partially affect the relationship between stress and production for both tourism and non-tourism researchers. This result is in agreement with prior research of Davidson et al. (2016) who studied the mediating impact of perceived safety in a different domain. In a similar way, scientific production is highly related to the stressors of teleworking, however, this research revealed that the perception of safety partially mediates the link between the teleworking stresses and productivity of academic work of all area of research. As a result, if a scholar has a stressful teleworking experience, the perceived safety will decrease his stress to produce research effectively. Similarly, the results indicated that perceived safety has a partial mediating effect on the relationship between social isolation of both tourism and non-tourism researchers and their scholarly production. Having a safe environment arising from social isolation has a substantial role in enhancing researchers' productivity. In addition, since scholars have a sense of job insecurity their perception of safety would mitigate their feelings of insecurity associated with the job and improve their scientific production. Therefore, there is a meditating impact of perceived safety on the association between job insecurity and scholars' productivity within the tourism and non-tourism related-field. In this vein, it should be mentioned that, to the best of the authors' knowledge, there is no prior study that examined the mediating role of perceived safety on the link between job insecurity and productivity of scholars. However, this result is in line with the findings of Ali et al. (2020) who indicated that workers improve their engagement at

workplace and tend to share more knowledge when they feel to lose their jobs.

Finally, the findings showed that perceived risk holds a significant moderating impact on the relationship between perceived safety and scientific production of tourism scholars and non-tourism scholars. Here, researchers' perception of safety has a direct effect on their scientific production, such an impact could be mitigated by the perception of risk in the environment. In other words, the more the researcher realizes the risks in the environment, the more eager to follow safety and security procedures, and to be in a safe environment, which in turn will lead to increase his ability to conduct his research more effectively.

6. Implications

The current study has various theoretical and practical contributions. The main theoretical contribution of this work lies within the literature regarding scientific production in general, and in tourism, hospitality and events context in particular. This research is the first work that investigated the psychological factors of COVID-19 influencing scientific production of both tourism and non-tourism scholars. Moreover, it is the first attempt to measure scholarly production as a latent reflective construct, within an integrated structural model, in all areas and specializations including tourism, hospitality and events. In addition, the combination of the studied constructs in a conceptual framework is new and not explored in any similar pandemic and global crises, particularly within the tourism setting. It also contributes to the tourism literature on performance during a time of crisis. To the best of our knowledge, there is no known work comparing the psychological antecedents of scientific production of tourism researchers and non-tourism scholars. Furthermore, it is the first attempt to evaluate the interaction role of the perceived risk of COVID-19 on the direct link between scholarly production and their perception of safety among scholars working on tourism area and those who are involved in other areas of research. More importantly, although there are substantial number of publications concerning the impact of COVID-19 on different contexts among tourism area such as tourists' attitudes and behavioral intentions, etc., as far as we know, this paper is one of the first to explore the influence of this virus conditions on the academic work of tourism scholars compared to non-tourism scholars taking into consideration some critical factors that are very interrelated to the COVID-19 pandemic including mental stress, online teaching, social isolation, job insecurity, perceived safety and perceived risk arising from this virus outbreak.

With regard to the practical implications, this research provides clear outlines on the influence of a number of psychological factors associated with the outbreak of COVID-19 on the scientific production of tourism and non-tourism researchers. More specifically, the empirical findings revealed that the scientific production of both scholars in tourism and non-tourism related-domain is positively affected by social isolation and perceived safety. These results reflect the significance of setting and deploying a research plan by scholars to produce more research during the implementation of such protective measures (e.g., being in a safe and healthy environment and social isolation) in times of crises. The findings also revealed that the scientific production of non-tourism scholars is negatively influenced by the stress of online teaching but such relationship was not found for tourism scholars. That is, higher education institutions should provide efficient training courses and workshops for academic staff to increase their experience in distance teaching. This could help in decreasing their pressure regarding teleworking, which in turn will help scholars to be more productive in terms of publications. Although teleworking stressors were not influencing negatively the rese-

arch productivity of tourism scholars, they would benefit of such training as well, especially in terms of how to teach practical courses completely online or in a hybrid mode (a combination between online and offline classes). In addition, higher education institutions have to pay closer attention to the technological and technical structure of online teaching and ensure that all staff members have the ability and skills to provide e-learning in an efficient manner without any stressor. Moreover, the results showed that perceived safety mediates the association between the psychological factors (i.e., mental stress, teleworking, social isolation, and job insecurity) and scientific production of both tourism and non-tourism researchers. Furthermore, the findings illustrated that perceived risk has a moderating impact on the link between perceived safety and scientific production of researchers all over the world. These results indicated the importance of having alternative strategies and tactics for higher education institutions in times of crisis (e.g., the COVID-19 pandemic) through which they ensure the smooth and easy work flow and achieving the desired goals, taking into account the deployment of health and safety procedures such as teleworking and social isolation to all stakeholders including faculty members. These procedures will positively affect the perceived safety of scholars and decrease their perception of risk which in turn has a positive and significant impact on their scientific production.

7. Limitations and future research directions

This research is not without limitations. First and foremost, the data were collected between 19 March to 5 April 2020 – i.e. at the beginning of the lockdown period (except for China); hence, the initial stress of respondents and the uncertainties about the medical issues related to the virus and of the consequences of governments' actions to curb its spread, might have influenced respondents' answers. Furthermore, the questionnaire was available in English language only, hence, only researchers who can speak English could participate. However, considering that international journals are largely published in English language and English is the de facto lingua franca of science, this was a minor limitation which was offset by the speed of data collection, which was vital for a fast developing phenomenon such as COVID-19 outbreak. A qualitative approach can be followed in future work to evaluate the effect of COVID-19 on the scientific production of tourism scholars. This can be achieved by conducting some techniques (e.g., focus group or interviews) with a sample of tourism researchers around the world. In addition, future research may investigate the role of other factors on the productivity of tourism researchers in crisis situations. For example, research may shed light on the role of demographic characteristics (e.g. gender, age), the tourism research productivity before the crisis, job level, and other factors on research productivity of tourism scholars. Furthermore, it would be interesting to perform a post hoc study on the actual productivity of tourism researchers after the pandemic in order to see real outcome of the pandemic on research output within the tourism field.

References

Adair, K. C., Fredrickson, B. L., Castro-Schilo, L., Kim, S., & Sidberry, S. (2017). Present with you: Does cultivated mindfulness predict greater social connection through gains in decentering and reductions in negative emotions? *Mindfulness, 9*(3), 737–749.

Ali, M., Ali, I., Albort-Morant, G., & Leal-Rodríguez, A. L. (2020). How do job insecurity and perceived well-being affect expatriate employees' willingness to share or hide knowledge? *International Entrepreneurship Management Journal*, 1-26.

American Psychiatric Association (2020). Workplace Mental Health - Loneliness in the Workplace Can Be

a High Cost For Employers. Retrieved from http://workplacementalhealth.org/News-Events/Blog/January-2018/Loneliness-in-the-Workplace-Can-\Be-a-High-Cost

Aroles, J. Granter, E. & Vaujany, F. (2020). Becoming mainstream: the professionalisation and corporatisation of digital nomadism. *New Technology, Work and Employment, 35* (1), 114-129.

Baruch, Y. (2000). Teleworking: benefits and pitfalls as perceived by professionals and managers. *New technology, Work and Employment, 15*(1), 34-49.

Belser, J.A., Tumpey, T.M. (2018). The 1918 flu, 100 years later. *Science, 359*(6373), 255. 10.1126/science.aas9565.

Black, A. (2011). Morbid Monday: Triumph of Life - Plague Columns. Atlas Obscura. https://www.atlasobscura.com/articles/morbid-monday-plague-columns

Blackburn, R. T., & Bentley, R. J. (1993). Faculty research productivity: Some moderators of associated stressors. *Research in Higher Education, 34*(6), 725-745. https://doi.org/10.1007/BF00992157

Buckley, C. (2020). Chinese doctor, silenced after warning of outbreak, dies from coronavirus. New York Times, available at: https://www.nytimes.com/2020/02/06/world/asia/chinese-doctor-Li-Wenliang-coronavirus.html. (accessed 30 April 2020).

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research, 287*,112934, 1-5. https://doi.org/10.1016/j.psychres.2020.112934.

CDC (2016). History of Smallpox. https://www.cdc.gov/smallpox/history/history.html

Cheng, C.-K., Li, X. R., Petrick, J. F., & O'Leary, J. T. (2011). An examination of tourism journal development. *Tourism management, 32*(1), 53-61.

Chin, W. W., Peterson, R. A., & Brown, P. S. (2008). Structural equation modelling in marketing: Some practical reminders. *Journal of Marketing Theory and Practice, 16*(4), 287-298.

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information systems research, 14*(2), 189-217.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.

Colligan, T. W., & Higgins, E. M. (2006). Workplace stress: Etiology and consequences. *Journal of workplace behavioral health, 21*(2), 89-97.

Davidson, M. M., Butchko, M. S., Robbins, K., Sherd, L. W., & Gervais, S. J. (2016). The mediating role of perceived safety on street harassment and anxiety. *Psychology of Violence, 6*(4), 553.

De Cuyper, N., & De Witte, H. (2006). The impact of job insecurity and contract type on attitudes, well-being and behavioural reports: a psychological contract perspective. *Journal of occupational organizational psychology, 79*(3), 395-409.

Dobson R.B. (1983). The Peasants' Revolt of 1381. History in Depth. Palgrave Macmillan, London

Donald, I., Taylor, P., Johnson, S., Cooper, C., Cartwright, S., & Robertson, S. (2005). Work environments, stress, and productivity: An examination using ASSET. *International Journal of Stress Management, 12*(4), 409.

Dubey, S., Biswas, P., Ghosh, R., Chatterjee, S., Dubey, M.J., Chatterjee, S., Lahiri, D. & Lavie, C.J., (2020). Psychosocial impact of COVID-19. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14*, 779-788.

Economist (2013). Plagued by dear labour: The Black Death was horrible but had benign economic effects. https://www.economist.com/free-exchange/2013/10/21/plagued-by-dear-labour

Etopio, A. L., Devereux, P. & Crowder, M. (2019) Perceived campus safety as a mediator of the link between gender and mental health in a national U.S. college sample, *Women & Health, 59*(7), 703-717.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research, 18*(1), 39-50.

Fullerton, C. S., Ursano, R. J., Reeves, J., Shigemura, J., & Grieger, T. (2006). Perceived safety in disaster workers following 9/11. *The Journal of nervous and mental disease, 194*(1), 61-63.

González-Sanguino, C., Ausín, B., ÁngelCastellanos, M., Saiz, J., López-Gómez, A., Ugidos, C., & Muñoz, M. (2020). Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain, Behavior, and Immunity, 87*, 172-176.

Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism*, (in press) 1-20. doi: https://doi.org/10.1080/09669582.2020.1758708

Green, L. R., Richardson, D. S., Lago, T., & Schatten-Jones, E. C. (2001). Network correlates of social and emotional loneliness in young and older adults. *Personality and Social Psychology Bulletin, 27*(3), 281–288.

Griffin, M. & Andrew, N. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology, 5*(3), 347-58.

Gürhan-Canli, Z., & Batra, R. (2004). When corporate image affects product evaluations: The moderating role of perceived risk. *Journal of marketing research, 41*(2), 197-205.

Hair, J., Hult, G. T., Ringle, C., & Sarstedt, M. (2017). A primer on partial least squares structural equation modeling (PLS-SEM) (2 ed.). Los Angeles, CA: Sage publications.

Hair, J., Ringle, C., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice, 19*(2), 139-152.

Hair, J., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science, 40*(3), 414-433.

Hamermesh, D. S., & Oster, S. M. (2002). Tools or toys? The impact of high technology on scholarly productivity. *Economic Inquiry, 40*(4), 539-555.

Hamouche, S. (2020). COVID-19 and employees' mental health: stressors, moderators and agenda for organizational actions. *Emerald Open Research, 2*(15), 15.

Hassan, S. & Soliman, M. (2021). COVID-19 and repeat visitation: Assessing the role of destination social responsibility, destination reputation, holidaymakers' trust and fear arousal. *Journal of Destination Marketing & Management, 19*, 100495. https://doi.org/10.1016/j.jdmm.2020.100495.

Hawthorne, G. (2006). Measuring social isolation in older adults: development and initial validation of the friendship scale. *Social indicators research, 77*(3), 521-548.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial management & data systems, 116*(1), 2-20.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science, 43*(1), 115-135.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *New challenges to international marketing (Advances in International Marketing), 20*, 277-319.

Ho, C. S., Chee, C. Y., & Ho, R. C. (2020). Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. *Ann Acad Med Singapore, 49*(1), 1-3.

Idrees, M. D., Hafeez, M., & Kim, J.-Y. (2017). Workers' age and the impact of psychological factors on the perception of safety at construction sites. *Sustainability, 9*(5), 745.

Ivanova, M., Ivanov, I. K., & Ivanov, S. (2020). Travel behaviour after the pandemic: the case of Bulgaria. *Anatolia*(in press). doi: https://doi.org/10.1080/13032917.2020.1818267

Jamal, T., Budke C. (2020) Tourism in a world with pandemics: local-global responsibility and action. *Journal of Tourism Futures, 6*(2), 181-188. https://doi.org/10.1108/JTF-02-2020-0014

Johanson, K. G. (2007). Effects of a sense of isolation on productivity among office workers, managers, and telecommuters (Doctoral dissertation, Walden University).

Kock, N. (2014). Advanced mediating effects tests, multi-group analyses, and measurement model assessments in PLS-based SEM. *International Journal of e-Collaboration, 10*(3), 1-13.

Kock, N. (2020). WarpPLS User Manual: Version 7.0 Laredo, Texas USA: ScriptWarp Systems. In.

Lai-Ming Tam, J. (2012). The moderating role of perceived risk in loyalty intentions: an investigation in a service context. *Marketing Intelligence & Planning, 30*(1), 33-52.

Lee, S., & Bozeman, B. (2005). The impact of research collaboration on scientific productivity. *Social studies of science, 35*(5), 673-702.

Lippe, T. and Lippényi, Z. (2019), Co-workers working from home and individual and team performance, *New Technology, Work and Employment, 35*, 1, (60-79).

Maske, K. L., Durden, G. C., & Gaynor, P. E. (2003). Determinants of scholarly productivity among male and female economists. *Economic Inquiry, 41*(4), 555-564.

McKercher, B. (2008). A citation analysis of tourism scholars. *Tourism Management, 29*(6), 1226-1232.

McNally, G. P. (2010). Scholarly productivity, impact, and quality among academic psychologists at group of eight universities. *Australian Journal of Psychology, 62*(4), 204-215.

McNeill W.H. (1976). *Plagues and Peoples.* Anchor Books, New York, USA.

Munro, J. (2004). Before and After the Black Death: Money, Prices, and Wages in Fourteenth-Century England. Working Paper Number 24. https://www.economics.utoronto.ca/public/workingPapers/UT-ECIPA-MUNRO-04-04.pdf

Napper, L. E., Fisher, D. G., & Reynolds, G. L. (2012). Development of the perceived risk of HIV scale. *AIDS and Behavior, 16*(4), 1075-1083.

Naqvi, S. M. H., Khan, M. A., Kant, A. Q., & Khan, S. N. (2013). Job stress and employees' productivity: case of Azad Kashmir public health sector. *Interdisciplinary Journal of Contemporary Research in Business, 5*(3), 525-542.

Pew Research Center (2020). More than nine-in-ten people worldwide live in countries with travel restrictions amid COVID-19. https://www.pewresearch.org/fact-tank/2020/04/01/more-than-nine-in-ten-people-worldwide-live\-in-countries-with-travel-restrictions-amid-covid-19/

Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *General psychiatry, 33*(2). http://dx.doi.org/10.1136/gpsych-2020-100213.

Ruth, S., & Chaudhry, I. (2008). Telework: A productivity paradox?. *IEEE Internet Computing, 12*(6), 87-90.

Salminen, S., & Saari, J. (1995). Measures to improve safety and productivity simultaneously. *International Journal of Industrial Ergonomics, 15*(4), 261-269.

Scheidel, W. (2017). *The Great Leveler: Violence and the History of Inequality from the Stone Age to the Twenty-First Century*. Princeton University Press.

Vincenzi, H., & Grabosky, F. (1987). Measuring the emotional/social aspects of loneliness and isolation. *Journal of Social Behavior and Personality, 2*(2), 257.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). 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, 17*(5), 1729.

Weinert, C., Maier, C., Laumer, S., & Weitzel, T. (2014). Does teleworking negatively influence IT professionals? An empirical analysis of IT personnel's telework-enabled stress. Paper presented at the Proceedings of the 52nd ACM conference on Computers and people research.

Wilke, P. K., Gmelch, W. H., & Lovrich Jr, N. P. (1985). Stress and productivity: Evidence of the inverted U function. *Public Productivity Review*, 342-356.

World Health Organisation (2020). *Coronavirus disease (COVID-19) advice for the public.* Retrieved 25th March 2020 from urlhttps://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

Wright, S.L., Burt, C.D.B., Strongman, K.T. (2006) Loneliness in the Workplace: Construct definition and scale development. *New Zealand Journal of Psychology, 35*(2), 59-68.

Zheng, Y., Goh, E., & Wen, J. (2020). The effects of misleading media reports about COVID-19 on Chinese tourists' mental health: a perspective article. *Anatolia*, (in press), 1-4. doi: https://doi.org/10.1080/13032917.2020.1747208

Appendix

Appendix 1 | Constructs, indicators and sources

Constructs/items		Sources
Mental Stress (MS)		
MS1	The outbreak of COVID-19 makes me feel sad and depressed	(Idrees, Hafeez, \& Kim, 2017)
MS2*	The outbreak of COVID-19 makes me feel that life isn't worthwhile	
MS3	The outbreak of COVID-19 makes me get upset easily	
MS4	The outbreak of COVID-19 makes me remain in a state of nervous tension	
MS5	The outbreak of COVID-19 makes me get agitated easily	
MS6	The outbreak of COVID-19 makes me feel scared easily	
Teleworking Stressors (TS)		
TS1	Teleworking (online teaching) creates a variety of problems and complications in my job	(Weinert et al., 2014)
TS2	Teleworking makes me feel rushed	
TS3	Teleworking makes me feel pressured	
TS4*	Teleworking blurs the boundaries between work and personal life	
TS5	Teleworking increases conflicts with my personal responsibilities	
TS6	Teleworking is not easy to do compared to in-class teaching	
TS7*	With teleworking, I cannot get much information from my colleagues about our job	
TS8	Teleworking requires much time and effort to do	
TS9	I feel confused about prioritizing tasks of teleworking to do	
TS10*	Generally, the outbreak of COVID-19 increases my teaching workload	
Social Isolation (SI)		
SI1	With the COVID-19 lockdown, I feel less integrated with my research team	(Hawthorne, 2006; Weinert et al., 2014)
SI2	With the COVID-19 lockdown, I feel poorly informed about the updated issues of research from my team	
SI3*	With the COVID-19 lockdown, it is difficult for me to use research facilities at home	
SI4*	With the COVID-19 lockdown, I more frequently contact my research team members	
SI5	With the COVID-19 lockdown, I feel isolated from my research team members	
SI6	With the COVID-19 lockdown, I feel alone and friendless	
Job Insecurity (JI)		
JI1	With the COVID-19 lockdown, I think I might lose my job in the near future.	(Ali et al., 2020)
JI2	With the COVID-19 lockdown, I feel insecure about the future of my job.	
JI3*	With the COVID-19 lockdown, I am sure I can keep my job.	
JI4	With the COVID-19 lockdown, chances are I will soon lose my job.	
Perceived Risk (PR)		
PR1	I worry about getting infected with COVID-19	(Napper, Fisher, \& Reynolds, 2012)
PR2*	I find it very hard picturing myself getting COVID-19	
PR3	I am concerned about getting COVID-19	
PR4	I am sure I will get infected with COVID-19	
PR5	I feel I am likely to get infected with COVID-19	
PR6	I feel vulnerable to COVID-19 infection	
PR7*	There is a chance, no matter how small, I could get COVID-19	
PR8	I think my chances of getting infected with COVID-19 are high	
PR9*	I have always thought about getting COVID-19	
PR10*	I am washing my hands more frequently to mitigate risk	
Perceived Safety (PS)		
PS1	With the outbreak of COVID-19, I always follow all safety procedures	(Idrees et al., 2017)
PS2	With the outbreak of COVID-19, I always wear safety equipment when required	
PS3	With the outbreak of COVID-19, I always keep my area clean	
PS4*	With the outbreak of COVID-19, I report safety situations to my supervisor when I feel any safety problems	
PS5	With the outbreak of COVID-19, safety always is my first priority	
PS6*	With the outbreak of COVID-19, safety secures me from any kind of infection	
Scientific Production (SP)		
SP1	With the COVID-19 lockdown, I am psychologically ready to conduct research.	New scales
SP2*	With the COVID-19 lockdown, I am interested in conducting more research	
SP3*	With the COVID-19 lockdown, I will stick to my research plan	
SP4	With the COVID-19 lockdown, my focus to be just on conducting research	
SP5*	With the COVID-19 lockdown, I will intentionally contact others to do new research	

Constructs/items		Sources
SP6*	With the COVID-19 lockdown, my research ideas are appropriate	
SP7*	With the COVID-19 lockdown, it is easy to use any tool of data collection (i.e. questionnaire, interview, etc.)	
SP8*	With the COVID-19 lockdown, I will not postpone my research plan	
SP9	With the COVID-19 lockdown, I now have sufficient time to do my research	
SP10	With the COVID-19 lockdown, doing research is simple and logical	
SP11*	With the COVID-19 lockdown, I try to keep up with the necessary changes in my research activities.	
SP12*	With the COVID-19 lockdown, I am relaxing and enjoying time with my family instead of doing research	
SP13*	With the COVID-19 lockdown, I prefer to sleep more instead of doing research	
SP14	With the COVID-19 lockdown, I now have fewer distractions from my research	

*This indicator was removed after confirmatory factor analysis