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Safety behaviors and job satisfaction during the pandemic: The mediating roles of uncertainty and managerial commitment

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A B S T R A C T

Introduction: As the Covid-19 pandemic affects the world, disruptions to work routines impose a psychological burden on people, and thus can affect their job performance and well-being. We conducted an empirical study to explore the links between the experience of Covid-19 and workers’ safety behaviors and well-being outcome of job satisfaction. Method: Structural equation modelling (SEM) with a sample of 515 safety workers was conducted to simultaneously test the links among these constructs. Results: Experience of Covid-19 was associated with lower employee job satisfaction, explained by higher psychological uncertainty and decreased perception of managerial commitment to safety. Notably, contrasting pathways from experience of Covid-19 to safety behaviors were found. On the one hand, higher psychological uncertainty caused by the pandemic was associated with lower perceptions of managerial safety commitment; and lower perceived managerial safety commitment was linked to reduced safety compliance and safety participation. On the other hand, experience of Covid-19 in this study showed unexpected positive direct links with safety behaviors, which might be explained by workers’ enhanced safety knowledge, motivation, and status of mindfulness due to Covid-19 related safety instructions and communications. Conclusions: This exploratory study helps to deepen the understanding of workplace safety and well-being in the context of pandemic and in times of uncertainty. Practical Applications: The practical insights are useful for applying appropriate strategies for managing the Covid-19 crisis, coping with uncertainties, and building a healthier and safer workplace in the long run.

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1. Introduction

The spread of Covid-19 quickly overwhelmed the world and changed every aspect of life: social relations, work patterns, business practices, and even life-style. Psychological uncertainty, which was heightened by the pandemic, is an intrinsic feature of life and is associated with the infectiousness of the virus (Raoult, Zumla, Locatelli, Ippolito, & Kroemer, 2020; Yi, Lagniton, Ye, Li, & Xu, 2020), the changing workplace conditions (Bartik et al., 2020; Bartsch, Weber, Büttgen, & Huber, 2020), and global economic disruption (Alcover, Salgado, Nazar, Ramirez-Vielma, & Gonzalez-Suhr, 2020; Hamouche, 2020). To better respond to the Covid-19 crisis, cope with uncertainties, and identify new opportunities to improve health and safety, more understanding is needed on how Covid-19 and the ever-increasing psychological uncertainty might be associated with safety and well-being in the workplace.

The association between experience of Covid-19 and safety behaviors such as compliance with safety procedures is likely to be complex. On the one hand, increasing uncertainty is likely to damage an organization’s effort to build cohesive safety culture, which is known to enhance safety compliance (Griffin & Curcuruto, 2016; Neal & Griffin, 2002). On the other hand, efforts to prevent the virus spreading (e.g., hand hygiene, using personal protective equipment (PPE), and frequently assessing risks) are likely to enhance the awareness of following safety procedures (Darawad, Al-Hussami, Alhairat, & Al-Sutari, 2012; Munro & Munro, 2010). In this paper, we explore how the Covid-19 pandemic and the associated psychological uncertainty might link with safety behaviors and well-being outcome of job satisfaction. We first reviewed well-established links among the key concepts, including safety behaviors, psychological uncertainty, management safety commitment, and job satisfaction. We then proposed that Covid-19 highlighted gaps in our knowledge about these concepts. We presented this exploratory study as a starting point to deepen the understanding of workplace safety and well-being in the context of a pandemic and in times of disturbance.
2. Theoretical development

2.1. Managerial safety commitment and safety behaviors

In the safety literature, one of the most important predictors of safety behaviors is safety climate (perceptions of policies, procedures, and practices relating to safety in the workplace), reflecting employees’ shared perceptions of how safety is valued in an organization (Zohar, 1980; Griffin & Neal, 2000; Curcuruto & Griffin, 2016). Due to its multi-dimensional nature, this study focuses on one key dimension: employee perception of managerial safety commitment, which is considered the most fundamental component of safety climate (Bosak, Coetsee, & Cullinane, 2013; Clarke, 2010; Griffin & Curcuruto, 2016; Neal, Griffin, & Hart, 2000). Neal and Griffin (2004) referred to managerial commitment for safety as “the extent to which management is perceived to place a high priority on safety and act on safety issues effectively” (p. 27). Fruhen, Griffin, and Andrei (2019) further claimed that managerial safety commitment was a psychological state in managers, and this expression of safety commitment could be enhanced by the skills and capabilities of management. A high level of management safety commitment is an indicator that the organization has a positive safety culture, which in turn promotes safety outcomes in the organization (Cheyne, Cox, Oliver, & Tomáš, 1998; Flin, Mearns, O’Connor, & Bryden, 2000). Thus, managerial commitment to safety is an important component of organizational safety programs (Mearns, Whitaker, & Flin, 2003; Zohar, 1980).

Safety behaviors are typically described in relation to two types of work performance, as proposed by Neal and Griffin (2006). Safety compliance refers to the extent that workers follow safety procedures and carry out their work in a safe manner. Safety participation demonstrates how the workers promote safety programs and improve safety in the workplace (Neal & Griffin, 2006; Neal et al., 2000). The positive impact of managerial safety commitment on safety behaviors has been well recognized in safety research, and a high level of perceived management safety commitment was found encouraging compliance to operational rules and increasing proactive involvement in safety program (Fernández-Muñiz, Montes-Peón, & Vázquez-Ordás, 2012; Vinodkumar & Bhasi, 2010). Ye, Ren, Li, and Wang (2020) provided further support to the positive relationship between perceived management safety commitment and workers’ safety compliance and participation; moreover, they explained this positive link with four constituents of psychological capital—self-efficacy, hope, optimism, and resilience. Fernández-Muñiz et al. (2012) also argued for the role of perceived management commitment in alleviating workplace stress, and ultimately reducing the occurrence of errors and unsafe behaviors. Hence, a high level of managerial safety commitment has been recognized as an enabler of positive safety behaviors (Beus, Payne, Bergman, & Arthur, 2010; Christian, Bradley, Wallace, & Burke, 2009).

2.2. Managerial safety commitment and job satisfaction

Job satisfaction describes employees’ contentment, fulfillment, and positive emotional reactions toward their work (Ali, Kertahadi, & Nayatt, 2014; Iaffaldano & Muchinsky, 1985; Spector, 1997; Weiss, Nicholas, & Daus, 1999). It indicates how workers perceive their jobs, work tasks, and environment. Job satisfaction negatively links to job risks (Sjöberg & Drott-Sjöberg, 1992) and workplace stress (Kirk-Brown & Wallace, 2004; Sullivan & Bhagat, 1992), while positively linking to perceived organizational support (Rhoades & Eisenberger, 2002; Settoon, Bennett, & Liden, 1996; Simons & Roberson, 2003). Therefore, job satisfaction is a pleasurable emotional state, demonstrated by individuals positively appraising their experience at work, and it is an important indicator of worker well-being (Wang & Jing, 2018).

Michael, Evans, Jansen, and Haight (2005) found that increased management commitment to safety resulted in positive work-related attitudes, such as job satisfaction and organizational commitment. They explained the findings with social exchange theory and organizational support theory that employees formed beliefs and attitudes regarding how much the employer valued them and their personal well-being. Similarly, Ayim Gyekye (2005) claimed that workers with higher level job satisfaction were those who perceived management’s role and contributions in promoting workplace safety, rewarding safe work, providing safe equipment, and responding to safety concerns. With data collected from 171 firms that operate in Turkey, Bayram (2018) further highlighted that increased managerial commitment to occupational health and safety had a direct positive effect on the improved employee satisfaction at work. Thus, the positive link between managerial safety commitment and employee job satisfaction was well established with extensive evidence.

2.3. Psychological uncertainty and job satisfaction

There is no doubt that the Covid–19 pandemic has drastically changed life from every perspective, including changes in the workplace. Changes in working patterns, methods, and environment create psychological uncertainty for workers, and this change-induced uncertainty has a negative impact on workers’ experience, attitudes, and emotion at work (DiFonzo & Bordia, 1998; Rafferty & Griffin, 2006). Previous studies show that psychological uncertainty can lead to deleterious outcomes in the organization, such as poor job satisfaction and high job turnover intentions via increased job insecurity (Ashford, Lee, & Bobko, 1989), low commitment (Hui & Lee, 2000), mistrust (Schweiger & DeNisi, 1991), as well as systolic blood pressure (Pollard, 2001). Ferris (1977) found that in an accounting environment, uncertainty reduced satisfaction by lowering the employees’ expectations for the relation between effort and performance and by making it more difficult to understand the duties and requirements of their roles. Cullen, Edwards, Casper, and Gue (2014) demonstrated that organizational change-related uncertainty arose when employees were unsure about how changes occurring in the organization would affect their job, lowering perception of being supported by management, and ultimately reducing satisfaction. Recently, Zhang et al. (2020) found that during the epidemic peak of Covid–19, healthcare staff who were uncertain about whether they had Covid–19 were more distressed and anxious, leading to less satisfaction with their work.

2.4. The unknowns highlighted by Covid–19

With the global economic slowdown and extensive employee lay-offs, more people are experiencing economic pressure, resulting in emotional exhaustion and psychological strain (Charoensukmongkol & Phungsoonthorn, 2021; Godinic, Obrenovic, & Khudaykulov, 2020a, 2020b; Glowacz & Schmits, 2020). As the unfolding pandemic impairs employee mental health conditions and satisfaction with work, enhancing the understanding of Covid–19 impact is urgently needed and critical for providing the right support (2020b; Godinic et al., 2020a; Zhang et al., 2020). Pandemic-induced social isolation and remote working policies have intensified the situation by reducing social support and workplace resources that could help people thrive at work, all of the above collectively increased employee psychological uncertainty (Altig et al., 2020; Larsen, Donaldson, & Mohanty, 2020; Smith, Twohy, & Smith, 2020). Recently, researchers have proposed that uncertainty can prompt organizations to enhance safety by taking
appropriate risk management activities and balancing stability and flexibility (Griffin & Grote, 2020; Grote, 2007, 2015). There are, however, few studies examining how individuals’ perception of uncertainty might affect their perceptions of how safety is valued by management, and how their psychological uncertainty might impact their safety behaviors. Moreover, the impact of Covid-19 on safety behaviors such as compliance with safety procedures is likely to include further complexities. Thus, our study explores the potential links between experience of Covid-19 and safety behaviors and well-being outcome of job satisfaction.

Fig. 1 presents the conceptual model of this study. It depicts paths to represent the potential relationships among the constructs reviewed above. Solid arrows depict established paths based on previous discussions and research findings: Covid-19 positively predicts psychological uncertainty; uncertainty negatively predicts job satisfaction; perceived managerial safety commitment positively predicts safety behaviors and job satisfaction. Because uncertainty and managerial safety commitment have untested mediational roles in the conceptual model, Covid-19 might be associated with safety behaviors and job satisfaction in different ways depending on the strength and direction of these mediational paths. Therefore, this study aims to unpack these two research questions:

Q1: How might Covid-19 be associated with safety behaviors, considering the possible mediating roles of psychological uncertainty and managerial safety commitment?

Q2: How might Covid-19 be associated with job satisfaction, considering the possible mediating roles of psychological uncertainty and managerial safety commitment?

As Fig. 1 shows, we propose that Covid-19 might be associated with safety behaviors through three paths: (a) Covid-19 might directly link with safety behaviors (Q1a); (b) Covid-19 might link with safety behaviors via the mediating role of psychological uncertainty (Q1b); and (c) Covid-19 might link with safety behaviors via the mediating roles of psychological uncertainty and managerial safety commitment (Q1c). Similarly, we propose that Covid-19 might be associated with job satisfaction directly (Q2a), or indirectly through the mediating role of psychological uncertainty (Q2b), or via the mediators of both psychological uncertainty and managerial safety commitment (Q2c). Our study tests the significance of these pathways and can provide new insights into management implications for safety and well-being in the context of Covid-19.

3. Method

3.1. Sample and procedure

Respondents in this study were recruited through Prolific, a UK based research service provider for recruiting online surveys participants. Pre-screening restrictions were set with Prolific to recruit participants who work in safety-related industries. From the initial 530 respondents, we removed careless responses (N = 15) for the three reasons: (1) extreme short time used in responding; (2) identical answers to questions worded in the opposite direction; and (3) obvious patterns in the responses. The final data set consists of 515 valid responses and there were no missing data. Among the respondents, 57% were male and 43% were female. The profile of the respondents (including their education background, working experience, industry, and country) is shown in Table 1.

3.2. Measures

Managerial safety commitment was measured with three items, adopted from Neal and Griffin (2006), capturing the degree to which safety was valued by the management in the organization. An example item for managerial safety commitment is, “Management places a strong emphasis on workplace health and safety.”

Two components of safety behaviors were assessed: safety compliance and safety participation as proposed by Neal and Griffin (2006). Safety compliance assesses the extent that workers follow safety procedures and carry out their work in a safe manner (Neal et al., 2000). Three items, adopted from Neal and Griffin (2006), assessed safety compliance. One example item for safety compliance is “I use all the necessary safety equipment to do my job.” Safety participation involves promoting safety program and putting in extra effort to improve safety of the workplace (Neal et al., 2000). Three items from Neal and Griffin (2006) were used to measure safety participation as well. One example item is, “I voluntarily carry out tasks or activities that help to improve workplace safety.” All the above items were measured on a 5-point rating scale ranging from one (strongly disagree) to five (strongly agree).

Job satisfaction was assessed when asking the workers to think about their job over the past some period, this was measured by

![Conceptual model](image-url)

**Fig. 1.** Conceptual model.

### Table 1

Profile of the respondents.

| Education background | Percentage (%) | Working experience | Percentage (%) |
|----------------------|----------------|--------------------|----------------|
| High school graduate, diploma or the equivalent | 16.5 | Less than 5 years | 35.5 |
| Trade/technical training | 9.3 | 6–10 years | 26.0 |
| Bachelor’s degree | 45.4 | 11–15 years | 12.0 |
| Master’s degree | 16.3 | 16–20 years | 6.5 |
| Others | 12.5 | More than 20 years | 20.0 |
| **Total** | **100.0** | **Total** | **100.0** |

| Industry | Percentage (%) | Country | Percentage (%) |
|----------|----------------|---------|----------------|
| Mining | 1.0 | North America | 58.4 |
| Construction | 13.2 | South America | 2.7 |
| Transportation | 12.6 | Europe | 30.5 |
| Administrative and support service activities | 17.7 | Oceania | 6.2 |
| Human health and social work activities | 33.8 | Others | 2.2 |
| Others | 21.7 | **Total** | **100.0** |
three items from QPASS job satisfaction scale (Hart, Griffin, Wearing, & Cooper, 1996). One example item is, “Overall, I am satisfied with the kind of work I do.”

Psychological uncertainty was measured by the psychological uncertainty scale developed in Rafferty and Griffin (2006), assessing the uncertainty perceived by the workers during changes. One example item is, “I am often unsure about the effect on change on my work unit.” Psychological uncertainty and job satisfaction were rated against a 5-point rating scale ranging from one (Never) to five (Constantly).

Recent studies demonstrated the impact of Covid-19 on workplace health and performance, including the following perspectives: (1) anxiety and fear of the disease (Ahorsu et al., 2020); (2) concerns on job security in Covid-19 situations (Chen & Eyoun, 2021); and (3) impact on daily task completion (Chong, Huang, & Chang, 2020). Therefore, experience of Covid-19 in this study was developed as a higher-order construct measured by three latent variables (fear of Covid-19, job insecurity due to Covid-19, impact on work task). Fear of Covid-19 was measured by the item, “To what extent are you worried about contracting Covid-19.” Job insecurity due to Covid-19 was measured by the item, “To what extent are you worried about losing job due to Covid-19.” Impact on work task was measured by the item, “After Covid-19 emerged, has your work (task, pattern...) been affected.” The benefits of using single item indicators in developing parsimonious models were recommended by researchers (Hayduk & Littvay, 2012; Petrescu, 2013).

To justify the use of three single items to represent a higher-order Covid-19 construct, we conducted an additional validation study with the following Covid-19 scales in recent literature: (1) Fear of Covid-19 Scale (Ahorsu et al., 2020) (Fear Scale hereafter); (2) Perceived job insecurity during Covid-19 (Chen & Eyoun, 2021) (Job Scale hereafter); and (3) Daily Task Setbacks scale (Chong et al., 2020) (Task Scale hereafter). Respondents were asked to indicate their experience of Covid-19 against a 5-point rating scale ranging from one (not at all) to five (a very large extent). Concurrent and discriminant validity of the Covid-19 experience construct in the study was estimated by correlating the higher-order Covid-19 construct as well as the three latent variables with the above Covid-19 scales. Bivariate Pearson correlations were reported in Table 2. The experience of Covid-19 construct in this study correlated with the three Covid-19 impact scales in the recent publications, with the highest correlation being with the Fear Scale ($r = 0.665$, $p < 0.01$), followed by Task Scale ($r = 0.595$, $p < 0.01$), and the lowest for Job Scale ($r = 0.570$, $p < 0.01$). Latent variable 1 Fear of Covid-19 showed the highest correlation being with Fear Scale ($r = 0.756$, $p < 0.01$), followed by Task Scale ($r = 0.702$, $p < 0.01$), and Job Scale ($r = 0.609$, $p < 0.01$). Latent variable 2 Job insecurity due to Covid-19 showed the highest association with Task Scale ($r = 0.702$, $p < 0.01$), followed by Fear Scale ($r = 0.702$, $p < 0.01$) and Job Scale ($r = 0.488$, $p < 0.01$), and Task Scale ($r = 0.345$, $p < 0.01$). Latent variable 3 Impact on work task showed the highest association with the Task Scale ($r = 0.571$, $p < 0.01$), followed by Job Scale ($r = 0.488$, $p < 0.01$), and Fear Scale ($r = 0.360$, $p < 0.01$). The measurement statements in the above Covid-19 scales can be found in the Appendix.

Previous studies showed the association between age and safety compliance behaviors (Dahl, 2013), therefore we controlled for the demographic variable of age in this study. In addition, to control for the overall differences of Covid-19 impact on different industries and countries, we also included industry and country of the respondents in the analyses for control purposes. Since both industry and country are categorical variables, dummy variables were added into the SEM model as control variables.

### 4. Data analyses

#### 4.1. Testing the measurement model

We first tested the measurement model with confirmatory factor analysis (CFA) using Mplus (v7.4). As described above, the experience of Covid-19 was measured by three single items representing different dimensions of the experience. To incorporate these items in our analysis, we estimated a higher-level Covid-19 construct indicated by three latent variables comprising one single item. This estimation is reflected in the analyses, where each single indicator latent variable was specified by fixing the observed indicator’s factor loading to 1 and fixing its error term to a value 0, calculated by its variance and assumed reliability: $m = Var * (1 - r)$, where Var is the variance and r is its reliability (Anderson & Gerbing, 1988). In this study, the reliability values of the single indicators were represented by the reliability values of the three Covid-19 impact scales. For example, reliability of Item 1: Fear of Covid-19 was represented by the reliability of Fear Scale as they have the strongest correlation (0.756). Reliability of Item 2: Job insecurity due to Covid-19 was represented by the reliability of Job Scale as they have the strongest correlation (0.702). Reliability of Item 3: Impact on work task was represented by the reliability of Task Scale as they have the strongest correlation (0.571).

CFA results of the measurement model showed good model fit (Chi-square/df = 1.80, $p < 0.01$; CFI = 0.984; TLI = 0.977; RMSEA = 0.039; and SRMR = 0.028). We also tested alternative comparison models by combining the items measuring safety compliance and safety participation into an overall safety performance construct or combining the items measuring managerial safety commitment and job satisfaction into an overall construct. As shown in Table 3, the alternative models produced poorer fit and with significant changes in Chi-square ($p < 0.01$). Therefore, it is more desirable to treat the all the constructs separately in this study.

Cronbach’s alpha and composite reliability (CR) were used to evaluate the reliability of the constructs. It can be seen in Table 4 that all the constructs have Cronbach’s alpha values larger than 0.70 (Hair, Black, Babin, Anderson, & Tatham, 2006), except the Cronbach’s alpha of Covid-19 experience construct is 0.519. It is possible when the Covid-19 experience construct is a higher-order construct with three different latent variables measuring

### Table 2

Comparison of the Covid-19 construct with recently published Covid-19 impact scales using validity sample.

|   | 1  | 2  | 3  | 4  | 5  | 6  |
|---|----|----|----|----|----|----|
| 1 | COVID construct | | | | | |
| 2 | Latent variable 1: Fear of COVID | 0.718 | | | | |
| 3 | Latent variable 2: Job insecurity due to COVID | 0.688 | 0.360 | | | |
| 4 | Latent variable 3: Impact on work task | 0.609 | 0.208 | 0.155 | | |
| 5 | Task Scale | 0.595 | 0.303 | 0.345 | 0.571 | |
| 6 | Job Scale | 0.570 | 0.279 | 0.702 | 0.249 | 0.378 |
| 7 | Fear Scale | 0.665 | 0.756 | 0.488 | 0.207 | 0.382 | 0.409 |

Note: All correlations reported are significant at $p < 0.01$. 

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the experience of Covid-19. Moreover, Cronbach’s alpha should not be regarded as a sole index of reliability as the number of items in a measurement can affect it (Cortina, 1993). Thus, composite reliability (CR) was calculated as well, and all the constructs in Table 4 have satisfactory CR values larger than 0.70 (Hair et al., 2006). Factor loadings of all the items were presented in Table 5. Convergent validity of the proposed measurement model was supported with all the factor loadings being statistically significant at 0.001 level. Hence, the overall quality of the measurement model was supported. Descriptive statistics and correlations of factors are shown in Table 4.

4.2. Structural model assessment

Structural Equation Modelling (SEM) was used to test the relations among the latent variables (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014; Hoyle, 1995). The SEM analysis based on the model in Fig. 1 provided good model fit (Chi-square/df = 2.048, p < 0.01; CFI = 0.961; TFI = 0.952; RMSEA = 0.045; and SRMR = 0.042). Both direct and indirect relations among the latent variables generated from SEM are presented in Table 6. The paths of the structural model tested are shown in Fig. 2. Only significant direct relations are shown in Fig. 2 with estimated standardized effect coefficients (β). Table 4 indicated close relatedness among safety compliance, safety participation and job satisfaction. Correlations among the above variables were not shown in Fig. 2 for a more concise presentation.

It can be seen from Table 6 that positive direct links from experience of Covid-19 to safety compliance (β = 0.144, p < 0.05) and safety participation (β = 0.263, p < 0.01) were identified. Therefore, positive direction of Q1a pathway in Fig. 1 was supported. This positive direction of Q1a pathway through psychological uncertainty: COVID → PU (β = 0.263, p < 0.01) was identified. Therefore, positive direction of Q1a pathway in Fig. 1 was supported. This positive direction of Q1a pathway was different from our earlier expectation on the disruptive Covid-19 impact on job performance.

Consistent with previous expectations, experience of Covid-19 was found significantly adding to psychological uncertainty (β = 0.451, p < 0.01), which in turn impedes perceived managerial safety commitment (β = −0.163, p < 0.01). However, mediating pathway through psychology uncertainty: COVID → PU → MSC (β = −0.029, p < 0.01) and COVID → PU → SCo (β = −0.032, p < 0.05) were found insignificant, therefore, pathway Q1b was not supported. When testing the existence of pathway Q1c, COVID → PU → MSC → SCo (β = −0.023, p = 0.05) were found. Thus, path Q1c was supported with a negative direction.

As Table 6 shows, the direct effect from Covid-19 to job satisfaction was non-significant (β = 0.091, p > 0.05), therefore Q2a was
not supported. However, increased psychological uncertainty was found to decrease job satisfaction both directly ($\beta = -0.149$, $p < 0.05$) and via the mediating role of managerial safety commitment ($\beta = -0.079$, $p < 0.01$). Previous studies demonstrated positive links from managerial safety commitment to job satisfaction (Brondino, Silva, & Pasini, 2012; Clarke, 2013; Wu, Chang, Shu, Chen, & Wang, 2011). This study added more support to these with significant impact from managerial safety commitment to job satisfaction ($\beta = 0.413$, $p < 0.01$) presented in Fig. 2. In addition, both pathway COVID → PU → JS ($\beta = -0.067$, $p < 0.05$) and COVID → PU → MSC → JS ($\beta = -0.030$, $p < 0.01$) were found significant, thus mediating pathway Q2b and Q2c were both supported.

5. Discussion

Our study investigated the possible links between Covid-19 and safety behaviors and job satisfaction. Experience of Covid-19 was associated with lower employee job satisfaction, explained by higher psychological uncertainty and decreased perception of managerial commitment to safety (Q2b and Q2c). Notably, contrasting pathways from Covid-19 experience to safety behaviors were found with both direct positive path (Q1a) and indirect negative path (Q1c).

5.1. The mediating role of psychological uncertainty in the Covid-19—job satisfaction relationship

There was no significant direct link between experience of Covid-19 and job satisfaction, thus Q2a in Fig. 1 was not supported. Rather, indirect pathways via psychological uncertainty and managerial safety commitment were found: COVID → PU → JS ($\beta = -0.067$, $p < 0.05$) and COVID → PU → MSC → JS ($\beta = -0.030$, $p < 0.01$). Hence, the results indicated that psychological uncertainty fully mediated the link between experience of Covid-19 and job satisfaction, highlighting the critical role of uncertainty in reducing positive well-being outcomes during the pandemic.

As the Covid-19 pandemic is bringing unpredicted changes to work environment, work patterns, and work methods, employees are experiencing high levels of task uncertainty and low levels of personal control (Tang, Ma, Naumann, & Xing, 2020). Individuals’ perceptions and subjective understandings of changes in organizations can affect their responses and attitudes, and, ultimately, their turnover intentions and job satisfaction (Rafferty & Griffin, 2006). When employees are unsure about the impact of the changes on their work, the accuracy of their role perception can be impaired, leading to declined adaptability to environmental stimuli, thus declined task performance, and ultimately satisfaction at work (Ferris, 1977). In addition, unpredicted change-associated uncertainties can drain people emotionally and produce higher level of work stress and poor well-being outcomes (DeGhetto, Russell, & Ferris, 2017). As the global pandemic crisis affects the labor market, employees have to cope with uncertainties not only on personal safety but also on job stability. Intensified anxiety and insecurity added to a greater cognitive load for employees to manage, resulting in psychological exhaustion and reduced fulfilment (2020b; Godinic et al., 2020a). In addition, when employees are uncertain about their stability in their job, it could trigger a feeling of being deprived of a safe working environment, causing unfulfilled emotional needs and dissatisfaction (Bordia, Hunt, Paulsen, Tourish, & DiFonzo, 2004; Khan & Ghufar, 2018; Nelson, Cooper, & Jackson, 1995).

5.2. Dual pathways to safety behaviors: Negative indirect path and positive direct path

In both Fig. 2 and Table 6, dual pathways from Covid-19 to safety behaviors were observed by negative indirect paths and positive direct paths. Significant indirect paths from experience of Covid-19 to safety compliance and safety participation were presented: COVID → PU → MSC → SCo ($\beta = -0.029$, $p < 0.01$) and COVID → PU → MSC → SP ($\beta = -0.023$, $p < 0.05$). Similar to its associations with job satisfaction, the negative paths from Covid-19 to safety behaviors were mediated by psychological uncertainty and managerial safety commitment. In times of uncertainty, when employees were psychologically unstable, they perceived less support and commitment from the organization on their safety and well-being. Lower perceptions of safety commitment by management led to employees’ reluctance to input efforts required to comply with safety procedures (Bond, Tuckey, & Dollard, 2010; Dollard & McFerman, 2011; Neal et al., 2000). Moreover, the increased workplace pressure caused by uncertainty and lack of support might even trigger their inclination to violate safety procedures (Fogarty & Shaw, 2010). Negative paths from Covid-19 to safety behaviors are consistent with existing theories.

Notably, Table 6 and Fig. 2 also showed positive direct paths from experience of Covid-19 to safety compliance ($\beta = 0.144$, $p < 0.05$) and safety participation ($\beta = 0.263$, $p < 0.01$). The results

| Construct | Measurement statement | Factor loading | P-value |
|-----------|------------------------|----------------|---------|
| Fear of COVID | To what extent are you worried about contracting Covid-19? | 0.707 | *** |
| Job insecurity due to COVID | To what extent are you worried about losing your job due to Covid-19? | 0.707 | *** |
| COVID impact on daily task | After COVID emerged, has your work (task, pattern...) been affected? | 0.707 | *** |
| Psychological uncertainty | My work environment is changing in an unpredictable manner. | 0.70 | *** |
| PU1 | I am often unsure about the effect of change on my work unit. | 0.91 | *** |
| PU2 | I am often uncertain about how to respond to change. | 0.73 | *** |
| Managerial safety commitment | Management places a strong emphasis on workplace health and safety. | 0.85 | *** |
| MSC1 | Safety is given a high priority by management. | 0.92 | *** |
| MSC2 | Management considers safety to be important. | 0.87 | *** |
| Safety compliance | I use all the necessary safety equipment to do my job. | 0.90 | *** |
| SCo1 | I use the correct safety procedures for carrying out my job. | 0.86 | *** |
| SCo2 | I ensure the highest levels of safety when I carry out my job. | 0.90 | *** |
| Safety participation | I promote the safety program within the organization. | 0.86 | *** |
| SP1 | I put in extra effort to improve the safety of the workplace. | 0.79 | *** |
| SP2 | I voluntarily carry out tasks or activities that help to improve workplace safety. | 0.67 | *** |
| Job satisfaction | Overall, I am satisfied with the kind of work I do. | 0.78 | *** |
| JS1 | Overall, I am satisfied with the organization in which I work. | 0.95 | *** |
| JS2 | Overall, I am satisfied with my job. | 0.88 | *** |
| JS3 | Note: N = 515. ***p < 0.001. | 0.86 | *** |
supported the positive direction of pathway Q1a. These positive
direct links were different from our earlier expectations on the dis-
ruptive Covid-19 impact on job performance. We explored three
possible explanations in the next section.

6. Implications of multiple mediating pathways

6.1. Increased safety motivation through health and hazard awareness

As the Covid-19 pandemic spreads across workplaces, many
actions have been taken to ensure a healthy and safe work environ-
ment (Gallagher, Gao, Kring, Ocampo, & Volz, 2021). Health and
safety issues have been discussed and communicated more often
than ever. It was reported that due to the health threat of Covid-
19, there has been increased attention paid not only to one’s own
health conditions but also to the potential safety risks in their
workplace (Hu, Yan, Casey, & Wu, 2021). Thus, Covid-19 pandemic
highlights the importance of safety awareness. This increased
recognition of potential risks as well as a deeper understanding
of the possible harm, injuries or illness, have likely intensified
the intention to prevent harm in the first place. When employees
are aware of the possible outcomes of potential hazards, they are
more likely to recognize the utility value and necessity of following
safety procedures (Hu et al., 2018; Xia, Xie, Hu, Wang, & Meng,
2020). Based on self-determination theory, a conscious valuing of
a behavioral goal or actions could trigger autonomous integrated
regulation to assimilate the actions to the self, thus increasing
internalized motivation to practice these actions for desired out-
comes (Gagné & Deci, 2005; Ryan & Deci, 2000). Consistent with
Neal and Griffin (2004), individual’s attitudes toward safety could
increase safety motivation; in the case of Covid-19, enhanced
safety awareness might result in higher motivation to adhere to
Covid-19 workplace guidelines. Just as safety scholars have been
emphasizing the positive link between safety motivation and
safety behaviors (Guo, Yiu, & González, 2016; Neal & Griffin,
2004), this study further highlighted the importance of motivating
employees to become engaged in the safety efforts during a
pandemic.

Table 6

| Standardized pathway effects. | Effect | SE  | Lower 95% CI | Upper 95% CI |
|-------------------------------|--------|-----|--------------|--------------|
| **COVID → SCo**               |        |     |              |              |
| • Total effects:              | 0.083  | 0.059 | −0.014       | 0.207        |
| • Direct (Q1a)                | 0.144* | 0.074 | 0.023        | 0.299        |
| • Indirect                    |        |     |              |              |
| **COVID → PU → SCo (Q1b)**   | −0.031 | 0.033 | −0.108       | 0.015        |
| **COVID → PU → MSC → SCo (Q1c)** | −0.029** | 0.011 | −0.052       | −0.008       |
| **COVID → SP**                |        |     |              |              |
| • Total effects:              | 0.208**| 0.075 | 0.066        | 0.351        |
| • Direct (Q1a)                | 0.263**| 0.095 | 0.082        | 0.459        |
| • Indirect                    |        |     |              |              |
| **COVID → PU → SP (Q1b)**    | −0.032 | 0.036 | −0.116       | 0.023        |
| **COVID → PU → MSC → SP (Q1c)** | −0.023* | 0.009 | −0.042       | −0.006       |
| **COVID → JS**                |        |     |              |              |
| • Total effects:              | −0.006 | 0.063 | −0.127       | 0.117        |
| • Direct (Q2a)                | 0.091  | 0.074 | 0.043        | 0.240        |
| • Indirect                    |        |     |              |              |
| **COVID → PU → JS (Q2b)**    | −0.067*| 0.033 | −0.142       | −0.012       |
| **COVID → PU → MSC → JS (Q2c)** | −0.030** | 0.011 | −0.054       | −0.008       |

*p < 0.05; **p < 0.01;

Fig. 2. Structural model. *p < 0.05; **p < 0.01.
6.2. Improved mindfulness due to safety instructions

During the Covid-19 pandemic, a range of relevant health and safety regulations have been put in place at the site level to keep workplaces safe. Activities include: measuring temperature before going to site and while on site; detecting medical conditions, disease, and risk factors; using personal protective equipment; and keeping social distancing. These practices collectively created a safety-conscious work environment, which was likely to increase employee present-moment focused attention to safety instructions (Klockner & Thomas, 2013). This status of mindfulness was found linked to positive safety performance and reduced accidents and injuries (Valley & Stallones, 2017; Zhang, Ding, Li, & Wu, 2013). More recently, Chen and Eyoun (2021) identified the benefits of mindfulness in buffering the impact of Covid-19 fear on job insecurity. In this study, this improved mindfulness of onsite workers might help explain the observed positive Covid-19–safety behaviors link in this study. This also offered insight into the development of long-term organizational safety strategies beyond the pandemic with an emphasis on mindfulness training.

6.3. Promoting safety knowledge through virtual communication

A third explanation is that the spread of Covid-19 has increased safety knowledge sharing and workplace learning about safety. Rapid uptake of collaborative technology (e.g., online meetings) made digital communication a common feature of work during the pandemic (Yang et al., 2020). Collaboration technologies and platforms have been used more frequently for knowledge delivery, and people were reporting a higher level of learning motivation (Sheng, Li, Griffin, Van Vulpen, & Desai, 2021; Ting, Carin, Dzau, & Wong, 2020). Disseminating safety knowledge is therefore more efficient and feasible. More information about hazard identification, prevention, and mitigation as well as emergency operation procedures can be delivered via various virtual communication channels. When workers have more knowledge about the correct way to implement safety procedures, they would be more likely to enact safety behaviors (Guo et al., 2016; Neal et al., 2000). Burke, Sarpy, Tesluk, and Smith-crowe (2002) showed that safety knowledge improved safety performance on different performance dimensions: using personal protective equipment; engaging in risk mitigation work practices; communicating health and safety information as well as exercising employee rights and responsibilities. As Covid-19 promotes the benefits of digital communication and collaboration, it is important to rethink new ways and implications of communicating and sharing safety knowledge to support a healthier and safer working environment.

7. Conclusions

As the Covid-19 pandemic affects the world, uncertainty has increased as an intrinsic feature of life (Altig et al., 2020; Smith et al., 2020). To respond to the Covid-19 crisis, cope with uncertainties, and identify new opportunities to improve health and safety in the workplace, more understanding is needed on the associations between Covid-19 experience and safety performance and well-being outcomes. Our study investigated the possible links between Covid-19 and safety behaviors, and the well-being outcome of job satisfaction. Experience of Covid-19 was associated with lower employee job satisfaction, explained by higher psychological uncertainty and decreased perception of managerial commitment to safety. Notably, contrasting pathways from Covid-19 to safety behaviors were found. Consistent with our earlier expectation, increased psychological uncertainty due to the pandemic was associated with lower perceptions of managerial safety commitment, which in turn impaired proactive safety behaviors. Different from our earlier expectations, experience of Covid-19 showed positive direct links with safety behaviors. We explored three possible explanations: workers’ enhanced safety motivation; status of mindfulness; and improved safety knowledge due to Covid-19 related safety instructions and communications. We presented this exploratory study as a starting point to deepen the understanding of workplace safety and well-being in the context of a pandemic and in times of uncertainty. The findings provided practical insights into strategies for managing the current pandemic and building a healthier and safer workplace in the long run.

Despite endeavors to understand how Covid-19 experience might link with safety behaviors and workplace well-being outcomes, we acknowledge the limitations to the study, which also offered avenues for future research. One limitation of this study is its cross-sectional data collection. Employee psychological uncertainty, safety behaviors, and job satisfaction had not been compared across time, as no related data were collected before this unprecedented Covid-19 pandemic. Further research may consider using experimental designs to validate the links between Covid-19 experience and safety behaviors and workplace well-being outcomes. In addition, this study has a limitation in terms of data collection method. To obtain an international sample across different industries and locations, online recruitment platform was deployed. Thus, no follow up interviews could be conducted to seek more details and further validate the data analyses results from the questionnaire survey. The limitation of Prolific platform such as lack of control of the respondents and rushed answers might happen. However, measures were taken with multiple screening processes to ensure the data quality and remove rushed responses.

This study offered exploratory explanations on the unexpected links between Covid-19 and safety behaviors, pointing to future research directions on safety motivation, safety mindfulness, and sharing of safety knowledge. Qualitative studies in the safety workplace would also support a deeper understanding on the Covid-19 related safety regulations.

8. Declarations

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Keyao Li and Mark A. Griffin. The first draft of the manuscript was written by Keyao Li. Mark A. Griffin commented and further revised on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflicts of interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

Ethics approval

The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the Curtin University (Ethics approval number: HRE2020-0383).
Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jsr.2022.05.008.

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