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The influence of pandemic-related workplace safety practices on frontline service employee wellbeing outcomes

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ABSTRACT

The COVID-19 pandemic has exposed the vulnerability of frontline employee (FLEs) to infections and other hazards and highlighted the importance of workplace safety practices (WSP) for service organizations. In response to the critical issue of service safety, we developed and empirically tested a model proposing that WSPs negatively influence FLE perceptions of pandemic related threats and positively influence their perceptions of organizational supportiveness (POS). In turn, these perceptions have time-lagged effects on two aspects of FLE wellbeing—reduced emotional exhaustion and increased work engagement. Utilizing data from a two-wave (separated by a month) survey panel consisting of 310 FLEs across the United States, we found evidence for all hypothesized relationships. We discuss the practical and theoretical implications of our findings and provide suggestions for future research on service safety on the organizational frontlines.

Safety is a fundamental human need and an essential precondition for employee work engagement (Kahn, 1990; Kuppelwieser & Finsterwalder, 2011). The COVID-19 pandemic has highlighted the notion of workplace safety, with establishments struggling to find ways to stay viable while ensuring the health and safety of both, employees and customers. The implementation of workplace safety has been a key concern for regulators for decades (e.g., Occupational Safety and Health Act of 1970), and academic scholarship on the topic has a long history (e.g., McFarland & Moore, 1957; Zohar, 1980). However, with few exceptions, extant research has focused on accidents, injuries, and fatalities in the context of physically-demanding work such as manufacturing and construction, as opposed to infection-related threats pervasive in high human-contact interfaces such as service frontlines. As noted recently, while "service safety was not a managerial or academic research priority before the pandemic… COVID-19 has changed the landscape for service organizations" (Berry, Danaher, Aksoy, & Keiningham, 2020, p. 5).

Within the context of COVID-19, the issue of FLE safety is attaining criticality because of its significant potential human- and financial implications. For instance, Voorhees, Fombelle, and Bone (2020) highlighted the high levels of stress encountered by FLEs charged with providing service during the pandemic; and multiple panel-studies have revealed high prevalence of safety-related fear, worry, anxiety, and psychological exhaustion resulting from pandemic related stress among FLEs around the world (Nabe-Nielsen et al., 2021; Sasaki et al., 2021; Tan et al., 2020). In parallel, there is evidence that FLE perceptions of organizational responsiveness to the pandemic (evidenced in clear communication and other safety-related practices) mitigate some of these negative outcomes (Hu, Yan, Casey, & Wu, 2021; Nabe-Nielsen et al., 2021). Together, these early findings highlight the importance of a detailed exploration of workplace safety practices (WSPs) enacted by service organizations in response to pandemic events such as COVID-19.

The aim of this paper is to extend the literature on service safety by attending to a critical issue: the influence of organization initiated WSP on FLE wellbeing outcomes. Specifically, using a framework grounded in job demands-resource (JD-R) theory (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), we propose that FLEs who perceive their workplace as implementing both, essential and discretionary WSPs will experience lower levels of threat (i.e., risks and hazards) from COVID-19, which will

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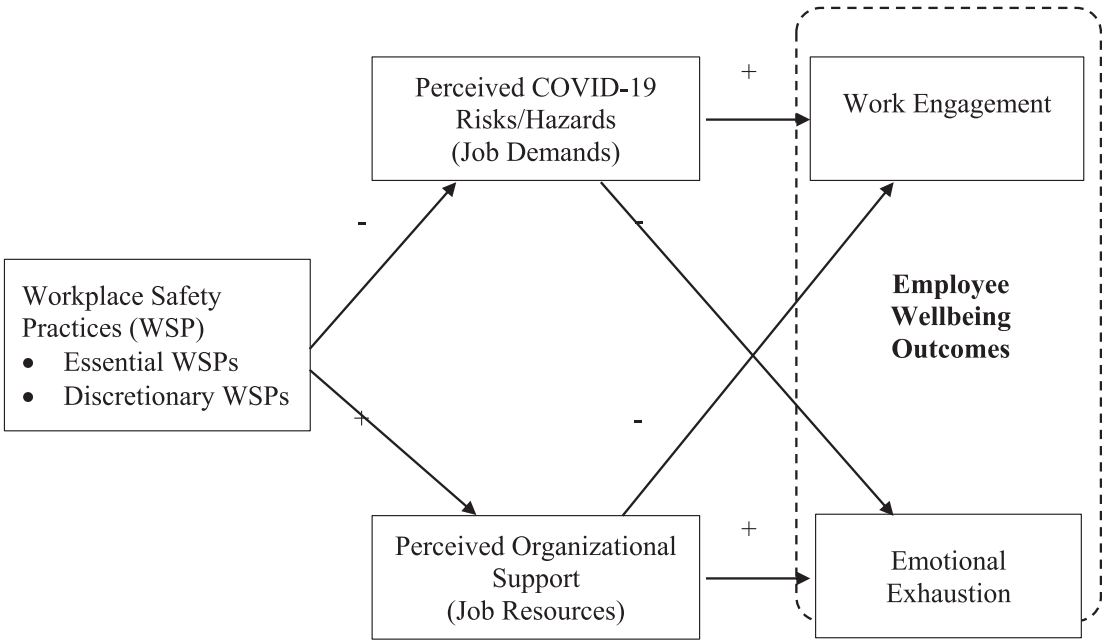


Fig. 1. Conceptual framework for the study.

lead to lower levels of emotional exhaustion and higher levels of work engagement – what we term, wellbeing outcomes. Simultaneously, high levels of WSPs will enhance FLE perception of organizational support (a key resource), and lead to reciprocation in the form of increased FLE work engagement and lower levels of emotional exhaustion. Thus, these two psychological – threat reduction and supportiveness enhancement – mechanisms will together enhance FLE wellbeing outcomes.

This study contributes to service research in three important ways. First, it responds to the recent calls to develop scholarship related to the safety and wellbeing of FLEs during disruptive times such as pandemics (Berry et al., 2020; Voorhees et al., 2020) by identifying and testing the psychological mechanisms through which WSPs influence FLE well-being. The COVID-19 pandemic caused significant disruption in the daily lives and routines of people (e.g., social distancing, wearing of masks, quarantines), and exerted a critical influence on public health (in the terms of sickness and mortality) and the global economy (Hu & Subramony, 2022). Emerging literature on WSPs during this pandemic has already provided important insights into the influence of various pandemic related stressors on safety compliance (Probst, Lee, & Bazzoli, 2020) and wellbeing of employees (Lin, Shao, Li, Guo, & Zhan, 2021); as well as the role of the organization (He, Mao, Morrison, & Coca-Stefaniak, 2021; Kim, Kim, & Lee, 2021) and leaders (Yuan, Ye, & Zhong, 2020; Zhang, Xie, Wang, Morrison, & Coca-Stefaniak, 2020) in promoting employee engagement and conformance to safety procedures. For instance, a recent study conducted in China revealed that FLE perceptions of risks from COVID-19 translated into anxiety, which further led to lower levels of safety related behaviors (Wang, He, Sheng, & Yao, 2022). Further, the literal life-and-death implications of what organizations can do to ensure the safety of FLEs (e.g., option to work at home, use of personal protective equipment) have been discussed in both the popular press and academic journals, all of which highlight the physical and psychological impact of WSPs on employee wellbeing (Carnevale & Hatak, 2020; Finsterwalder & Kuppelwieser, 2020; Voorhees et al., 2020). This paper takes the next formal step of empirically testing a conceptual model of workplace safety informed by JD-R theory.

Second, this study extends the literature on occupational safety that has primarily focused on individual- and unit-level determinants of employees' safety behaviors and physical outcomes such as injuries and accidents (Hofmann, Burke, & Zohar, 2017). While FLE wellbeing is often viewed as a predictor of safety-related work outcomes in the above research stream, our focus is on the workplace safety determinants of FLE exhaustion and engagement. In this respect we respond to recent calls to focus on the experience of FLEs in order to "benefit from a better understanding of the service workers' experience in its own right" (Subramony & Groth, 2021, p. 227).

Finally, this study was conducted at a critical period prior to the availability of the COVID-19 vaccine, i.e., at a time where employees, employers, and customers were experiencing heightened levels of concern regarding workplace safety. The unique timing and sample type (panel of FLEs across industries in the US) gives service scholars a snapshot of FLE experiences of their workplaces during crisis. Thus, the study also contributes to the small but robust literature related to disruptive events and work-related processes and outcomes (e.g., Brooks, Dunn, Amlôt, Rubin, & Greenberg, 2018; Hochwarter, Laird, & Brouer, 2008). In the subsequent sections of this paper, we provide a brief review of workplace safety literature followed by the development and analysis of our theoretically grounded hypotheses. We conclude with discussion of the theoretical and managerial implications and the limitations of our study.

1. Literature review and hypotheses

We propose and empirically test a model of FLE workplace safety exploring the relationship between FLE perceptions of WSPs on two specific wellbeing outcomes – emotional exhaustion and work engagement, with these relationships fully mediated by job demands and resources, respectively. Our conceptual framework represented in Fig. 1 proposes that WSPs (both, essential and discretionary) negatively influence FLE perceptions of risks/hazards related to COVID-19 and positively influence their perceptions of organizational support. In other words, in workplaces where there is a focus on implementing both, essential and discretionary safety practices, FLEs perceive fewer risks/hazards and higher levels of organizational supportiveness. Consistent with JD-R theory, risks/hazards are experienced by FLEs as job demands that drain their psychological resources, while organizational support is experienced as a job resource that helps replenish this resource loss (Bakker & Demerouti, 2017). Further, job demands result in emotional exhaustion, while job resources translate into FLE work engagement. Our framework and the resultant hypotheses are described in the following section.

1.1. Workplace safety practices

Research on workplace safety has a rich history in the management, psychology, occupational health, and health care literatures (e.g., Christian, Bradley, Wallace, & Burke, 2009; Hofmann et al., 2017; Pagell, Klassen, Johnston, Shevchenko, & Sharma, 2015; Vogus & Iacobucci, 2016; Zohar, 2010). This research is focused on various aspects of workplace safety, including the prevention of accidents and injuries (Christian et al., 2009; Pagell et al., 2015). For instance, high-reliability organizations (such as nuclear power plants) have long aimed to design and implement robust safety processes to operate at or near zero errors, and the lessons learned from these initiatives have subsequently been applied more widely to improve safety outcomes in other contexts such as health care (Stock, McFadden, & Gowen, 2007; Vogus & Iacobucci, 2016).

A central assumption underlying WSP research is that the influence of safety practices on employee behaviors is mediated by employees' perceptions of these practices. For instance, Zohar (1980) defined safety climate as "employees' perceptions about the relative importance of safe conduct in their occupational behaviour" (p. 96) and argued that employees form these perceptions by comparing espoused versus enacted policies, observing co-worker actions, and supervisory responses to determine whether, and if so, which safety behaviors are rewarded or punished (Zohar, 2010). Similarly, Griffin and Neal (2000) found that employees differ in their perceptions of safety practices (e.g., the adequacy of safety inspections, safety equipment) and that these perceptions influence safety performance through employees' knowledge, skills, and motivation regarding safety. This focus on employee perceptions of WSPs is paralleled in the process-based approach in the human resource management (HRM) literature which emphasizes employees' perceptions and interpretations of HR practices, as opposed to the practices that organizations intend to implement (Piening, Baluch, & Ridder, 2014; Sanders & Yang, 2016). Further, it has been noted that "employees respond attitudinally and behaviorally to HR practices based on the attributions they make about management's purpose in implementing the actual HR practices" (Nishii, Lepak, & Schneider, 2008, p. 505). We adopt a similar process-approach for WSPs by focusing on employee perceptions of safety practices enacted within the workplace.

In this paper, we highlight two related types of WSPs - "essential WSP" (i.e., practices that are covered by regulatory mandates) and "discretionary WSP" (practices that are perceived by employees as important but that are not mandated). Our conceptualization of WSP types is consistent with the United States Occupational Safety Health Administration (OSHA, 2020) guidelines on managing the effects of the COVID-19 virus on worker safety. Specifically, OSHA provides two sets of guidelines to manage workplace safety during the pandemic: (a) those involving the implementation of infection prevention measures, and the identification and isolation of sick employees; and (b) practices meant to develop, implement, and communicate workplace flexibilities and protections. The first set of practices (e.g., promoting hand sanitizing, encouraging workers to stay home if sick, promoting appropriate physical distance, providing suitable masks and gloves, conducting routine cleaning and disinfecting) can be viewed as essential to managing workplace safety, as without these the COVID-19 infection is likely to spread among workers. The second set of practices (e.g., flexible policies that permit employees to stay home to care for a sick family member, replacing face-to-face meetings with virtual communications and implementing telework, providing workers with up-to-date education and training) can be considered non-mandatory, but intend to provide employees broader protections consistent with safe and healthy workplaces. In addition to grounding the two types of WSPs in policy and best-practice, we provide a theoretical interpretation of these WSPs within a JD-R framework for workplace safety (Nahrgang, Morgeson, & Hofmann, 2011).

1.2. JD-R theory and workplace safety

JD-R theory is based on a meta-analysis that identified the possible causes of burnout including eight job demands and thirteen job resources (Lee & Ashforth, 1996). According to this theory, job demands refer to "physical, social, or organizational aspects of the job that require sustained physical or mental effort" (Demerouti et al., 2001, p. 501), while job resources are job aspects that are "functional in achieving work goals, reduce job demands and the associated physiological and psychological resources or stimulate personal growth, learning, and development" (Bakker & Demerouti, 2017, p. 274). Within the context of a pandemic, for FLEs, expectations related to keeping the workplace sanitized, communicating with customers through a mask and social distance, and engaging in handwashing, would all be considered job demands. Conversely, support from supervisors, training on safely delivering services, and access to safety equipment would be considered resources. Job demands (e.g., workload, pressure, demanding interpersonal interactions) lead to increased strain and negative employee outcomes including exhaustion, burnout, and employee withdrawal in the form of turnover and absenteeism (see Bowling, Alarcon, Bragg, & Hartman, 2015). Job resources, on the other hand, independently influence motivation and positive employee outcomes such as work engagement (Schaufeli & Bakker, 2004) which has been defined as a "positive, fulfilling, work related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli, Salanova, González-romá, & Bakker, 2002, p. 74). According to JD-R theory, job demands in the workplace act as hindrances or obstacles to the attainment of employees' goal directed behaviors and when resources are limited, these demands can be sources of strain and exhaustion (Bakker, 2015).

JD-R theory has emerged over time as the dominant model for explaining how work characteristics influence employee wellbeing outcomes, with considerable empirical evidence available in support of the dual processes of strain and motivation described above (Bakker & Demerouti, 2017; Crawford, LePine, & Rich, 2010; Lesener, Gusy, & Wolter, 2019; Nielsen et al., 2017; Schaufeli & Taris, 2014). According to this theory, "employee health and wellbeing result from a balance between positive (resources) and negative (demands) job characteristics … [it] assumes that *any* demand and *any* resource may affect employee health and wellbeing … [and] can be tailored to a much wider variety of work settings" (Schaufeli & Taris, 2014, p. 44). JD-R theory has been used to explain employee outcomes in both blue collar (Bakker et al., 2003) and white-collar settings (Bakker et al., 2004) across the world (Hakanen et al., 2006; Hansez & Chmiel, 2010; Lewig et al., 2007). Given it is widespread across contexts, we view JD-R theory as particularly relevant to an examination of employee safety perceptions and wellbeing during COVID-19.

Past safety related studies based on JD-R have demonstrated that the demands and resources are related to safety perceptions and behaviors of employees (Beus, McCord, & Zohar, 2016). For instance, there is evidence that employees perceiving a positive safety climate experience lower job demands (work pressure and emotional demands) leading to decreased psychological strain, and higher resources in the form of discretion in the use of skills that increase work engagement levels (Dollard & Bakker, 2010). Similarly, Hansez and Chmiel (2010) reported that employees perceiving job demands in the form of work overload and role ambiguity experienced higher job-strain and engaged in higher violation of routine safety procedures, while those perceiving their work environment as supportive (a job resource) experienced work engagement and were significantly less likely to engage in routine violations.

Utilizing JD-R theory, Nahrgang et al. (2011, p.3) examined a model where risks and hazards, i.e., "environmental and workplace conditions and exposures, which include possible loss of life, injury, or chance of danger" were viewed as job demands; and supportive environment (leadership, social support, and safety climate) was considered a job resource. Their model predicted that continuous exposure to job

demands in the form of risk and hazards would deplete employees' physical, cognitive and mental resources, leading to exhaustion. Job resources such as supportiveness, however, signal to employees that they are valued, leading to a replenishing of resources and motivating employees to be engaged in their work. Using meta-analytic data, Nahrgang et al. (2011) found that risks and hazards were indeed, the foremost (negative) predictors of work engagement, accounting for 61% of the variance in this outcome, while the supportive environment factors – leadership (25%), safety climate (23%), and social support (10%) – were significant (negative) predictors of exhaustion/burnout.

In this paper, we extend the work of Nahrgang et al. (2011) by proposing that WSPs are antecedents of safety-related job demands (risks/hazards) and job resources (organizational support) with both demands and resources mediate their influence on exhaustion and engagement. In the subsequent sections, we review the rationale for the mediating relationships depicted in Fig. 1.

1.3. Hypotheses development

We argue that essential safety practices such as social distancing, workplace sanitization, and use of personal protection equipment will lead to FLEs experiencing a heightened sense of safety at work and lower experienced risks/hazards associated with the virus. This claim is consistent with the work of Griffin and Curcuruto (2016) and Jiang, Lavaysse, and Probst (2019) who provide empirical support for the negative impact of safety climate (i.e., perceptions of events, practices and procedures) on beliefs about risk and hazards. Consistent with this assertion, a recent study reported that WSPs related to COVID-19 mitigation reduce employee perceptions of risk, and thereby positively influence citizenship behaviors (Vu, Vo-Thanh, Nguyen, Van Nguyen, & Chi, 2022). Further, Hu et al. (2021) report that deep compliance with WSPs is influenced by employee perceptions of the utility of essential safety practices. These authors also provide some support for the use of discretionary WSPs such as communication and flexible work arrangements, particularly where such practices demonstrate management's commitment to protecting employees. These two complementary types of WSPs thus assist organizations to preserve a healthy workforce by lowering risks/hazards related to health and work. Therefore, we hypothesize:

Hypothesis 1a. FLE perceptions of WSPs will negatively influence experienced risks/hazards.

Recent research highlights the influence of continued exposure to COVID-19 related risks and hazards on resource-depletion among employees. For instance, a recent three-wave panel study found that both, state-level average COVID-19 cases and growth in these cases over time influenced employee experiences of general state anxiety, which in turn, related positively to emotional exhaustion and negatively to engagement (Fu, Greco, Lennard, & Dimotakis, 2021). Given that job demands of perceived risks and hazards were negatively associated with engagement (Nahrgang et al., 2011), we anticipate a negative relationship between risks/hazards and work engagement. Further, there is evidence that employees who perceive high levels of risks of being infected by COVID-19 also experience emotional exhaustion (Falco, Girardi, Dal Corso, Yıldırım, & Converso, 2021). Results from a three-wave panel study revealed that involvement in critical incidents related to COVID-19 predicted emotional exhaustion among healthcare workers (Caldas et al., 2021). These results can be explained by the fact that "intense job demands deplete psychological resources… when individuals view their tasks negatively, they are more likely to focus on undesirable aspects of their job, which… makes it more exhausting for individuals to devote time and effort in their work… [additionally] affect regulation, in which individuals are required to suppress emotions, drains personal resources, fostering fatigue and focusing attention on feelings of fatigue" (Caldas et al., 2021, p. 30). The draining of personal emotional and cognitive resources, in addition, will interfere with resource mobilization required for FLEs to experience and display work engagement (Fu et al., 2021). Thus, we expect risks/hazards will be positively related to emotional exhaustion, and hypothesize the following:

Hypothesis 1b. FLE perceptions of risks/hazards will negatively influence work engagement.

Hypothesis 1c. FLE perceptions of risks/hazards will positively influence emotional exhaustion.

Together, we expect risks/hazards to mediate the relationship between WSPs and two FLE outcomes – emotional exhaustion and work engagement.

Hypothesis 1d. The relationship between WSPs and FLE wellbeing outcomes (work engagement and emotional exhaustion) will be mediated by FLE perceptions of risks/hazards.

In addition to reducing employee experienced risks/hazards, the use of WSPs can also lead to perceived organizational support (POS), which refers to employees' global beliefs regarding the extent to which the organization values and cares for their wellbeing (Eisenberger, Huntington, Hutchison, & Sowa, 1986; Stackhouse & Turner, 2019). According to organizational support theory, when employees view the organization's actions toward them as stemming from positive regard, they develop global beliefs regarding the extent to which the organization is supportive and reciprocate by holding positive attitudes and engaging in discretionary behaviors (Rhoades & Eisenberger, 2002). Indeed, there is meta-analytic evidence suggesting that perceived management practices and job conditions act as antecedents of POS which, in turn predicts employee wellbeing (Kurtessis et al., 2017). In the context of safety, management commitment to the implementation of essential WSPs (e.g., social distancing, hygiene procedures, and contract-tracing), and their support for the use of discretionary practices (e.g., non-punitive leave policies, permitting FLEs to stay home to care for sick family members, providing them with safety training) indicate the organization's willingness to expend energy and resources in order to foster wellbeing, not just induce productivity (Rhoades & Eisenberger, 2002). We should, therefore, expect POS to be evoked by WSPs. Therefore, we hypothesize:

Hypothesis 2a. FLE perceptions of WSPs will positively influence POS.

Within the safety context, there is evidence relating POS with employee willingness to trust the organization and engage in upward communication such as reporting safety risks and incidents, and demonstrating safety commitment (Credo, Armenakis, Field, & Young, 2010; Hofmann & Morgeson, 1999; Tucker, Chmiel, Turner, Hershcovis, & Stride, 2008). These findings bear out the argument that POS invokes social exchange processes – specifically, reciprocity – among employees. Indeed, meta-analytic evidence clearly demonstrate a positive relationship between this variable and employees' work attitudes (Kurtessis et al., 2017; Riggle, Edmondson, & Hansen, 2009) including work engagement (Caesens & Stinglhamber, 2014). Thus, we propose that FLEs who perceive their organization as providing care for them through the implementation of discretionary practices to enhance wellbeing, will reciprocate by demonstrating high levels of work engagement. It can also be argued that POS, acting as a resource, lowers the risk of emotional exhaustion. As Cropanzano, Rupp, and Byrne (2003, p. 161) state: "emotional exhaustion can be seen as a cost that qualifies the value of any benefits received through employment … [and] employees are apt to resent an organization that overworks them to the point of emotional exhaustion, causing them to perceive the organization's actions as unfair." Consistent with this argument, recent evidence demonstrates that the emotional exhaustion of frontline restaurant workers during COVID-19 was significantly reduced by perceptions that organizations were committed to the safety and wellbeing of staff (Chen &

Table 1
Respondent demographic information.

Demographic variables	N (%)
Employment status	
Employed full-time	219 (70.6)
Employed part-time	91 (29.4)
Client type	
Mostly internal clients	31 (20.1)
Mostly external clients	74 (48.1)
About the same	49 (31.8)
Gender	
Male	108 (34.8)
Female	202 (65.2)
Race	
American Indian or Alaska Native	4 (1.3)
Asian	21 (6.8)
Black or African American	51 (16.5)
Native Hawaiian or Pacific Islander	2 (0.6)
White	209 (67.4)
Other	23 (7.4)
Hispanic, Latino or Spanish	
Yes	54 (17.4)
No	256 (82.6)
Industry	
Transportation, communications, electric, gas, and sanitary services	20 (6.5)
Wholesale trade	3 (1)
Retail	67 (21.6)
Hospitality	26 (8.4)
Finance, insurance, and real estate	20 (6.5)
Public administration	4 (1.3)
Other Services	34 (11)
For Profit - Service	25 (8.1)
Federal or State Government	21 (6.8)
Not-for-Profit or Non-Profit	19 (6.1)
Others	71 (22.9)
Residence area	
Urban	88 (28.4)
Suburban	170 (54.8)
Rural	52 (16.8)

Eyoun, 2021). Also, there is evidence linking employees' perceptions of organizational supportiveness and employee engagement (Hansez & Chmiel, 2010). Thus, we hypothesize:

Hypothesis 2b. POS will positively influence FLEs work engagement.

Hypothesis 2c. POS will negatively influence FLEs emotional exhaustion.

Together, we expect POS to mediate the relationship between WSPs and two FLE outcomes – emotional exhaustion and work engagement.

Hypothesis 2d. The relationship between WSPs and FLE wellbeing outcomes (work engagement and emotional exhaustion) will be mediated by POS.

2. Method

2.1. Participants and procedure

Survey data were collected using a Qualtrics panel in the United States (Allen, Peltokorpi, & Rubenstein, 2016; Rudolph & Baltes, 2017). The use of panel data is supported by meta-analytic evidence suggesting that the validity and credibility of online panel data are comparable to conventionally sourced data (Walter, Seibert, Goering, & O'Boyle, 2019). Our inclusion criteria consisted of age requirements (18 years or older) and employment in a frontline customer contact role. All participants provided informed consent prior to completing the surveys. A unique ID for each participant was generated by Qualtrics for matching two surveys.

Data were collected across two time points, allowing for a time lag between predictors and outcome variables. The first survey (T1) was completed between late August and early September 2020, with a total of 490 responses received. The second survey (T2) was completed four weeks later, with a total of 310 completions. The analysis presented in this paper is based on the final matched sample (N = 310). A detailed demographic breakdown of this sample is provided in Table 1. From this data, we can see that 65.2% of respondents were female, 70.6% were employed full-time, with an average age of 37.8 years, average working hours of 37.4 h per week, and an average job tenure of 7.4 years.

2.2. Measures

Whenever possible, we used and/or adapted previously established scales to measure the constructs in our conceptual model. By employing scales with different anchors, and validity check items (e.g., "for this item, please select strongly agree"), we attempted to minimize response bias in our measures (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). Following is a description of the constructs and source items.

Workplace safety practices (WSPs). WSPs were measured using the US Occupational Safety Health Administration (OSHA, 2020) guidelines for workplaces during the COVID-19 pandemic. This resulted in a second-order reflective construct comprised of two dimensions. The first dimension captured "essential WSP" corresponding to considerations grouped by OSHA under the category of safety procedures (10 items, $\alpha = 0.90$). The second dimension related to "discretionary WSP" and corresponded to considerations grouped by OSHA under the category of work policies (8 items, $\alpha = 0.92$). Because this is a new scale, we provide a detailed description of scale-development and psychometric properties (see Appendix A). Following the example of Hur, Shin, and Moon (2020), and based on acceptable dimension-level reliabilities, we utilised item parcelling to measure the second-order WSP construct (2 items, $\alpha = 0.87$). Parcelling produces an aggregate-level indicator comprising the average of two or more items (Cattell, 1956). The psychometric advantage of parcelling is that parcels result in more reliable measurement models that are more parsimonious, reduces the likelihood of correlation among residuals, and reduces sampling error (Little, Cunningham, Shahar, & Widaman, 2002).

Perceived COVID risks/hazards. The perceived threat of COVID-19 pandemic was measured using four items developed by Pew Research Center (2020) (2020) and validated by Kachanoff, Bigman, Kapsaskis, and Gray (2020). The items were "how much of a threat, if any, is the coronavirus outbreak for (i) your personal health, (ii) your personal financial situation, and (iii) your day-to-day life;" and "to what extent has the coronavirus outbreak changed your personal life?" All items were rated on a 3-point Likert-type scale as recommended by Kachanoff et al. (2020). As the reliability of this measure was a little low (4 items, $\alpha = 0.68$), we undertook exploratory factor analysis. This analysis suggested removing two items due to low factor loadings (<0.5). The reliability of the resulting scale was acceptable (2 items, $\alpha = 0.70$), anchored in personal health and day to day life dimensions.

Perceived organizational support (POS). POS was measured in our study using Eisenberger et al. (1986) 8-item scale. Respondents were asked to indicate their level of agreement to items such as "my organization cares about my general satisfaction at work" on a five-point Likert scale ranging from strongly disagree to strongly agree. The reliability of this scale was very high (8 items, $\alpha = 0.93$).

Emotional exhaustion. This construct was measured using the Shirom-Melamed Burnout Measure (Shirom, 1989). This well-established scale has been shown to be a reliable and valid measure for assessing employee fatigue, emotional exhaustion, and cognitive weariness related to work. Respondents were asked to indicate the frequency of occurrence of 14-items (e.g., "I have no energy for going to work in the morning") using a 7-point Likert scale where the responses ranged from "never/almost never" to "almost always/always". Though one item was removed due to a low factor loading, the reliability of the measure was also found to be high (13 items, $\alpha = 0.94$).

Work engagement. Work engagement was measured using Schaufeli et al. (2002) 17-item Utrecht scale. This scale is usually depicted as a

Table 2
Descriptive statistics and inter-correlations between variables (N = 310).

		Mean	SD	α	CR	AVE	1	2	3	4	5	6	7	8	9
1	Work safety practices (WSP)	2.38	0.51	0.873	0.92	0.85	**0.923**								
2	COVID Risks/hazard	2.23	0.57	0.702	0.71	0.55	−0.147*	**0.744**							
3	Perceived org. support (POS)	3.41	1.07	0.934	0.94	0.64	0.664***	−0.157*	**0.802**						
4	Work engagement	4.72	1.09	0.895	0.97	0.91	0.475***	−0.225**	0.548***	**0.954**					
5	Emotional Exhaustion	2.52	1.10	0.944	0.94	0.57	−0.398***	0.278***	−0.508***	−0.584***	**0.755**				
6	Change in customer contact	1.72	0.73	..	..	..	−0.122*	−0.114*	−0.086	−0.059	−0.023	..			
7	Residence area	1.88	0.66	..	..	..	−0.134*	−0.115*	−0.066	−0.062	0.098	−0.075	..		
8	Containment index	56.45	8.16	..	..	..	0.032	0.013	−0.055	−0.092	0.111	−0.032	−0.074	..	
9	Gender			..	..	..	−0.02	−0.06	−0.05	−0.06	0.20**	−0.00	−0.01	0.03	..

Note: Square root of AVE on diagonal. *p < .05, **p < .01, ***p < .001.

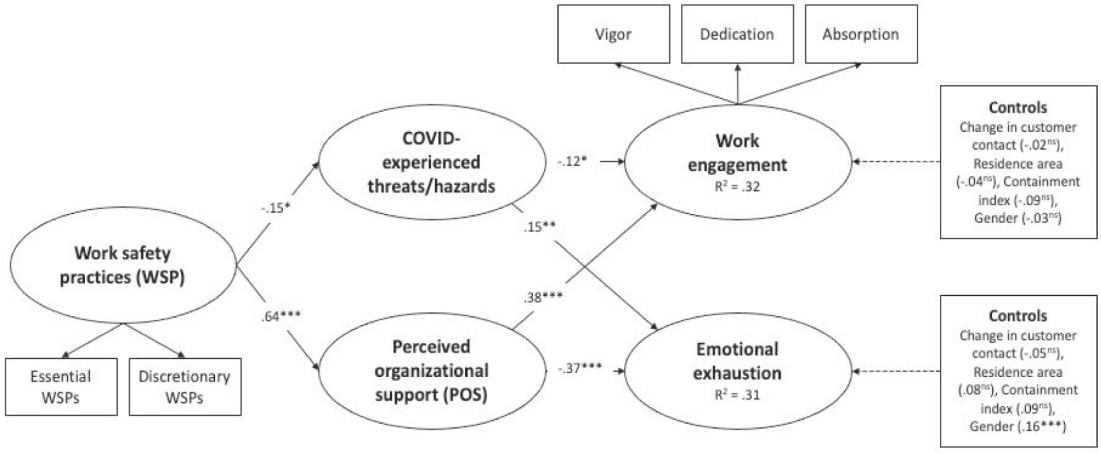
second-order reflective measure comprised of three dimensions capturing employee engagement in terms of vigor (6 items), dedication (5 items), and absorption (6 items). In our study, five items from the original scale were removed due to low factor loadings. The resulting reliabilities were in the acceptable range: vigor (5 items, α = 0.83), dedication (4 items, α = 0.90), and absorption (3 items, α = 0.74). Consistent with our measurement of WSP, and based on acceptable dimension-level reliabilities, we utilised item parcelling to measure the second-order work engagement construct (3 items, α = 0.90).

Control variables. Trend data in relation to the spread of COVID-19 suggests that perceptions of safety may vary based on exposure to risk. To assess the impact of risk exposure, we included four controls that capture gender, change in customer contact (i.e., the extent to which the quantity of contact with customers decreased, remained the same or increased as a result of the COVID-19 pandemic), residence area (urban, rural or suburban), and containment index. The latter represents the COVID-19 containment and health index measured by Blavatnik School of Government and University of Oxford (BSG & Ox, 2020) for each US county. It reflects the extent to which the various measures were put in place to contain the virus and protect citizen health, based on eleven factors (sample factors: school/workplace closure, restrictions on gathering size, testing policy and contract tracing).

3. Results

Descriptive statistics, reliability estimates, average variance explained (AVE), and inter-construct correlations are provided in Table 2. This data can be used to establish the integrity of the measurement model (Fornell & Bookstein, 1982). Further, Cronbach alpha statistics exceeded the 0.7 threshold recommended by Nunnally and Bernstein (1967), and AVEs associated with each latent construct (see Table 2) exceeded the recommended threshold of 0.5 (Fornell & Larcker, 1981). Discriminant validity was also observed as the bivariate correlations did not exceed the square root of the associated AVEs (Fornell & Larcker, 1981). These findings support the integrity of the measurement model.

Two other data integrity issues common to survey-based research are common method bias and endogeneity. The use of a time-lagged data for the measurement of the independent and dependent variables reduced the risk of common method bias (Podsakoff et al., 2003). To test for the influence of endogeneity bias on the paths depicted in Fig. 1, we undertook two-stage least squares (2SLS) regression analysis using the EndoS macro within SPSS (Daryanto, 2020). Hausman's specification tests (Joint F-statistic) confirmed the hypothesized directionality, and the overidentifying restriction tests (J-statistic) confirmed the validity and relevance of all instruments used in our study. While the 2SLS analysis provided support for the use of instrument variable estimation over ordinary least squares, this approach is problematic in our case as it



*$p < .05$. **$p < .01$. ***$p < .001$; *ns* - not significant.

Fig. 2. Structural equation modelling (SEM) results.

Table 3
Results research model, path estimates.

	Path	Path estimates	Accepted
Hypothesis 1a	FLE-perceived WSP will negatively influence experienced risks/hazards	−0.15*	Yes
Hypothesis 1b	FLE- experienced risks/hazards will negatively influence work engagement	−0.12*	Yes
Hypothesis 1c	FLE- experienced risks/hazards will positively influence emotional exhaustion	0.15**	Yes
Hypothesis 1d	The relationship between WSPs and FLE wellbeing outcomes (work engagement and emotional exhaustion) will be mediated by FLE experienced risks/ hazards	0.26***	Yes
Hypothesis 2a	FLE-perceived WSP will positively influence POS	0.64***	Yes
Hypothesis 2b	POS will positively influence FLEs work engagement	0.38***	Yes
Hypothesis 2c	POS will negatively influence FLEs emotional exhaustion	−0.37***	Yes
Hypothesis 2d	The relationship between WSPs and FLE wellbeing outcomes (work engagement and emotional exhaustion) will be mediated by POS	−0.26***	Yes

Note: Path estimates are standardized. *p < .05; **p < .01; ***p < .001.

does not adequately capture the dual processes theorized in our model. Accordingly, we opted to use structural equation modelling (SEM) in AMOS 27 (Arbuckle, 2017) to test the hypotheses. Unfortunately, as there is no known solution for the treatment of endogeneity bias in SEM, we encourage caution in interpreting the parameter estimates as the 2SLS analysis suggests that these estimates will likely be conservative. The results from the SEM analysis are presented in Fig. 2.

The first set of hypotheses proposed a negative influence of WSPs on risks/hazards (H1a), negative influence of risks/hazards on work engagement (H1b), positive influence of risks/hazards on emotional exhaustion (H1c), and mediated by risks/hazards, influence of WSPs on work engagement/WSP and emotional exhaustion (H1d). Consistent with our predictions, FLE-perceived WSPs negatively influenced experienced risks/hazards (H1a: β = -0.15 SE = 0.063, p = .011); while FLE-experienced risks/hazards negatively influenced work engagement (H1b: β = -0.12, SE = 0.094, p = .025) and positively influenced emotional exhaustion (H1c: β = 0.15, SE = 0.094, p = .002). These results provide support for hypotheses H1(a through c).

Further, consistent with our second set of hypotheses, we found that FLE-perceived WSPs positively influenced POS (H2a: β = 0.64, SE = 0.108, p = .001) which, in turn, positively influenced FLE work engagement (H2b: β = 0.38, SE = 0.067, p < .001) and negatively influenced emotional exhaustion (H2c: β = -0.37, SE = 0.066, p < .001). The full summary of direct path estimates can be found in Table 3.

To test our mediation hypotheses 1d and 2d, we calculated the bootstrapped confidence intervals for the indirect effects with 2000 samples (Zhao, Lynch, & Chen, 2010). Both the indirect effects - WSPs to work engagement (β = 0.260, p < 0.001, 95% CI [0.185; 0.346]) and WSPs to emotional exhaustion (β = -0.260, p < .001, 95% CI [-0.342;-0.179]) were significant. Next, we compared the fit of a partial mediation model (M1; with both direct and indirect effects), full mediation model (M2; with indirect effects only), and a direct-effects-only model (M3) with the data. The model comparison presented in Table 4 reveals that the partial mediation model exhibited a significantly better fit than either the full mediation ($\Delta\chi^2$ (2) = 7.423, p < .05) or direct-effects models ($\Delta\chi^2$ (2) = 135.7, p < .001), suggesting that in addition to risks/hazards and POS, there might be a direct relationship between WSPs and FLE wellbeing outcomes.

All the indirect effects in the model are presented in Table 5.

4. Discussion and theoretical implications

We proposed and tested a model of FLE workplace safety informed by JD-R theory. This model framed WSPs as antecedent to FLE wellbeing outcomes, where the influence of WSPs on work engagement and emotional exhaustion were mediated by job demands (risks/hazards) and resources (POS). Using time-lagged data, we confirmed the applicability of JD-R theory and demonstrated that employees working in workplaces implementing WSPs experienced lower levels of perceived risks and hazards during the pandemic, which in turn, influenced their work engagement and emotional exhaustion levels. In parallel, WSPs were also associated with higher levels of POS, and consequently better work engagement, and lower levels of emotional exhaustion. Overall, these findings highlight the important antecedent role that WSPs play in enhancing employee wellbeing via two complementary processes that emphasize the need to simultaneously reduce strain and enhance resources in the face of pandemic-induced threats to workplace safety.

These findings contribute to the frontline service literature. In particular, we extend the literature related to FLE wellbeing (Subramony, Groth, Hu, & Wu, 2021) by examining how an FLE's experience—shaped by the safety practices implemented in the workplace—impacts perceptions of wellbeing. Previous research related to workplace safety has typically focused on individual and organizational outcomes related to employee adherence to safety policies (Subramony & Groth, 2021) or the consequences of a lack of safety such as

Table 5
Confidence intervals for indirect effects.

		Bootstrap bias-corrected percentile method		
	Standardized estimates	Lower	Upper	p-value
Indirect effects				
WSP on WE via CHR	0.018*	-0.006	0.083	0.042
WSP on EE via CRH	-0.023*	-0.095	-0.013	0.013
WSP on WE via POS	0.242***	0.311	0.619	0.001
WSP on EE via POS	-0.237***	-0.649	-0.331	0.001
WSP on WE (Total effects)	0.260***	0.185	0.346	0.001
WSP on EE (Total effects)	-0.260***	-0.342	-0.179	0.001

Note: WSP = work safety practices, CRH = COVID risks/hazards, POS = perceived organizational support, WE = work engagement, EE = emotional exhaustion.
*p < .05, **p < .01, ***p < .001.

Table 4
Comparison of hypothesized model with alternative models.

Models	Description	χ^2 (df)	RFI	RMSEA	NFI	CFI	Δ χ^2 (df)
M1 (partial mediation)	WSP → CRH, POS, WE, EE; CRH → WE, EE; POS → WE, EE.	66.66 (25)	0.873	0.073	0.952	0.968	..
M2 (full mediation)	WSP → CRH, POS; CRH → WE, EE; POS → WE, EE.	74.08 (27)	0.869	0.075	0.947	0.964	7.42 (2)*
M3 (direct effects only)	WSP, CRH, POS → WE, EE	202.41 (27)	0.643	0.145	0.854	0.867	135.7 (2)***

Note: WSP = work safety practices, CRH = COVID risks/hazards, POS = perceived organizational support, WE = work engagement, EE = emotional exhaustion, RFI = relative fit index, RMSEA = root mean square error of approximation, NFI = normed fit index, CFI = comparative fit index. *p < .05, **p < .01, ***p < .001. Refer to Table B1 in Appendix B for alternative presentation.

accidents (Hofmann et al., 2017). The present study extends this literature by showing that the consequences of unsafe work environments can extend to employees' physical and psychological wellbeing and influence perceptions of workplace psychosocial climate. This is particularly significant in service settings, where recent COVID-related research has shown that employees fear infections more than they do significant industrial or environmental threats (Niemi, Kniffin, & Doris, 2021).

Our study suggests that in addition to reducing FLE's fears (i.e., strain process), and enhancing perceptions of organizational support (i.e., motivation process), the proper implementation of WSPs can lead to wellbeing and increased personal resources of FLEs. Drawing on Social Cognitive Theory, Schaufeli and Taris (2014) suggest that these additional personal resources can contribute to dynamic gain cycles (or gain spirals when personal resources are depleted). This is consistent with Dollard and Bakker (2010) who argued that enhanced wellbeing and an improved psychosocial climate can have a reciprocal influence, helping to mitigate perceptions of demands (e.g., COVID risks/hazards) and enhance perceptions of resources (e.g., organizational support) over time.

Finally, our study adds to our understanding of how significant macro-environmental changes interact to influence perceptions of safety and wellbeing. The findings reported here make an important and timely contribution by examining how WSPs adopted in response to COVID-19 mitigate employee experience of threats/hazards and reinforce perceptions of organizational support in a service setting (Voorhees et al., 2020). Further, we provide evidence bolstering emerging evidence suggesting that organizational support during times of crises can help reduce employee exhaustion (Chen & Eyoun, 2021) and positively influence job attitudes (Oh & Han, 2021). These results are consistent with the notion that employees who perceive their employer to consider their well-being, reciprocate this support by holding positive job-related attitudes (Eisenberger et al., 1986), and utilize employer support as a resource to cope with stress (Schaufeli & Bakker, 2004). We confirm that these resource- and reciprocity enhancing characteristics of organizational actions during critical events such as pandemics can have a beneficial effect on employee work outcomes. In doing so, we also provide a valuable extension to JD-R theory and the work of Nahrgang et al. (2011) by showing that WSPs, at least in the current research context, are antecedents to safety-related job demands, job resources and employee wellbeing outcomes.

5. Managerial implications

Results from this study offer many important practical implications for managers of FLEs. In particular, the study highlights the importance that employees place on workplace safety practices, a concern often overlooked by service organizations - outside of traditionally high-risk sectors that place more emphasis on safety in the context of accidents and injuries linked to physically dangerous and demanding work (e.g., healthcare, construction, and transport). We found that FLEs with lower perceived levels of WSPs had heightened risk perceptions, felt more unsafe at work and exhibited higher fear perceptions about the pandemic – and these higher risks were positively associated with emotional exhaustion, and negatively associated with work engagement. These findings validate the importance of safety practices for many service jobs and the benefits of managers implementing, communicating, and investing in physical and psychosocial workplace safety.

Many of the practical actions that managers can adopt to improve wellbeing outcomes are simple and often low investment activities, such as actively encouraging (and role-modelling) frequent and thorough hand-handwashing, allowing workers to stay home if not feeling well, facilitating work environments with clear distances between co-workers and routinely cleaning and disinfecting surfaces. In addition, consistent communication also services as an important practice in reducing strain. Different sectors face different challenges, although the principles derived from the findings will apply to each. For example, in the food retail sector, FLEs who were elevated to "essential service" status, found themselves working for organizations unprepared for the necessary extra steps needed to protect employees. Not only have hospitality FLEs faced additional pressure of dealing with the fear of contracting the virus while at work particularly those providing direct services to international visitors in hotel quarantine, but many faced the threat of job loss, reduced hours and pay cuts (Baum, Mooney, Robinson, & Solnet, 2020). Results of this study suggest that relatively simple safety practices could significantly mitigate the severity of the consequences. In the financial services sector, firms should focus on health and safety efforts as a top priority, via wellness check ins and virtual mental health gatherings, offering support services such as access to counselling services extended to employees and their families. Practices can also include identifying innovative ways to communicate through pulse surveys and other online forums to regularly check on the wellbeing of their workers over time.

Managers in all service organizations face competing priorities, increasing service quality, improving productivity and efficiency and providing a safe workplace, each of which form facets of an organizational climate. This research highlights the added complexity and importance of perceived workplace safety for FLEs who require not only protection (real and perceived) from *physical* threats (in this case from becoming infected with a virus) but equally important is a balanced focus on workplace *psychosocial* safety. This balance starts with policies and procedures but necessitates compliance and support for both essential and discretionary workplace safety practices (and ensuring that increased safety measures are not perceived as further strain on employees) (Hansez & Chmiel, 2010). Finally, findings from this research suggest the potential importance of managers normalising mental health and psychosocial related matters through routine communications about these topics, offering organizational benefits long after the end of the current threat and providing a stronger, more sustainable organizational functioning with or without future external shocks.

6. Limitations and future research

The current study also has important limitations. First, while our time-lagged data collection approach addresses many of the concerns raised by Rindfleisch et al. (2008) regarding cross-sectional survey-based research designs, the timing and closeness of the T1 and T2 data collection episodes (4 weeks) may not be sufficient to fully ameliorate these concerns. The decision to delay the initial data collection until August-September 2020 was intended to allow sufficient time for employees to have experienced the potential demands and form perceptions regarding the level of organizational support; it is nevertheless possible that our data was subject to temporal erosion (Marini & Singer, 1988). The aim is to ensure proximal relevance by ensuring that data is collected as close to the causal event as possible so as to avoid memory and inference problems arising (Bradburn, Rips, & Shevell, 1987). Likewise, the timing of the subsequent data collection activity must also allow sufficient time for the desired effect to manifest. Unfortunately, there is little guidance in the literature regarding an appropriate period of delay between an organizational intervention and the observed impact on employee wellbeing. In deciding on a four-week delay, we were guided by the work of Rudolph and Baltes (2017) who employed a similar time-lag when studying the impact of flexible work arrangements on work engagement.

Some limitations in the current paper point to opportunities for future research. For instance, the present paper focused on two specific measures of employee wellbeing—work engagement and emotional exhaustion. Future research could employ different measures, or even employ a specific global measure that covers the domain of employee wellbeing. Similarly, the present study investigated the mediating influence of a specific job demand (COVID-19 experienced threat/hazard) and a specific resource (perceived organizational support). Future

Table A1
Measurement scale items.

	Standardized Factor Loadings	t-value	Cronbach alpha, composite reliability, AVE
Essential WSP			
Promoting frequent and thorough hand washing and hand sanitizing	*0.730*	14.539	α =0.91, CR = 0.91, AVE = 0.50
Encouraging workers to stay home if they were sick.	*0.699*	13.703	
Encouraging respiratory etiquette (e.g., covering cough/ sneezes)	*0.734*	14.67	
Promoting appropriate physical distance between coworkers	*0.772*	15.75	
Providing suitable masks and gloves at all times	*0.639*	12.204	
Appropriate monitoring of body temperature	*0.566*	10.496	
Discouraging workers from using other workers' phones, desks, or other work tools/ equipment	*0.711*	14.038	
Restricting the number of personnel entering isolation areas	*0.695*	13.595	
Conducting routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment.	*0.760*	15.384	
Promptly identifying and isolating potentially infectious individuals	*0.714*	14.102	
Discretionary WSP			
Developing non-punitive sick leave policies	*0.747*	15.121	α = 0.92, CR = 0.92, AVE = 0.60
Ensuring that sick leave policies are consistent with public health guidance	*0.837*	17.908	
Clearly communicating sick leave policies with workers	*0.793*	16.479	
Maintaining flexible policies that permit employees to stay home to care for a sick family member.	*0.782*	16.154	
Clearly addressing workers' concerns about pay, leave, safety, health, and other issues that may arise during infectious disease outbreaks.	*0.818*	17.265	
Discontinuing nonessential travel to locations with ongoing COVID-19 outbreaks.	*0.575*	10.762	
Developing emergency communications plans, including a forum for answering workers' concerns and internet-based communications, if feasible.	*0.783*	16.184	
Providing workers with up-to-date education and training on COVID-19 risk factors and protective behaviors (e.g., cough etiquette and care of PPE).	*0.813*	17.099	
Minimizing contact among workers, clients, and customers by replacing face-to-face meetings with virtual communications and implementing telework if feasible.	*Deleted*		
Establishing alternating days or extra shifts that reduce the total number of employees in a facility at a given time, allowing them to maintain distance from one another while maintaining a full onsite work week.	*Deleted*		
Training workers on how to use protecting clothing and equipment	*Deleted*		

research could investigate the impact of alternative demands and resources. Future research could also empirically examine the dynamic nature of the relationships depicted in the model through the use of longitudinal methods. Alternatively, the use of experiments could also help to resolve potential endogeneity issues in the absence of a suitable method for controlling for this source of bias within SEM.

In summary, this research provides a glimpse of how WSPs implemented during a pandemic can mitigate FLE-experienced risks/hazards, and build POS, thus setting in motion a virtuous cycle of engagement and wellbeing. Outside the context of pandemics, this research helps improve our knowledge and understanding of how service employees feel and react during a crisis situation and how organizations can improve managing of their critical frontline employees.

CRediT authorship contribution statement

Mahesh Subramony: Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Maria Golubovskaya:** Writing – review & editing, Visualization, Methodology, Formal analysis, Conceptualization. **Byron Keating:** Writing – review & editing, Writing – original draft, Validation, Methodology, Funding acquisition. **David Solnet:** Writing – review & editing, Writing – original draft, Project administration, Conceptualization. **Joy Field:** Writing – review & editing, Writing – original draft, Resources, Investigation. **Melissa Witheriff:** Writing – original draft, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Psychometric properties of the workplace safety practices (WSP) scale

A.1. Analysis of unidimensionality

Workplace safety practices were measured using items from the United States Occupational Safety Health Administration (OSHA, 2020) guidelines. To examine the proposed measurement model, we followed the guidance of Anderson and Gerbing (1988) and conducted an exploratory factor analysis (EFA) to initially assess the underlying structure of the measurement model and identify candidate items for removal. An EFA using maximum likelihood extraction and Promax rotation on the T1 dataset revealed two factors corresponding to the hypothesized subscales of "essential WSP" and "discretionary WSP." Both factors had eigenvalues exceeding 1, and the two factors accounted for 57% of variance. Three items were removed from the discretionary WSP subscale due to cross-loading, with the reliability of the final "essential WSP" and "discretionary WSP" subscales observed to be 0.904 and 0.920, respectively.

Confirmatory factor analysis (CFA) was then conducted using the T2 data in AMOS 27 (Arbuckle, 2017), with the resulting model compared to a common-source factor model where all items loaded onto a single

Table B1
Comparison of hypothesized model with alternative models (Alternative format).

IV	DV	M1 (Partial)	M2 (Full)	M3 (Direct)
WSP	COVID risks/ hazards	−0.15*	−0.15*	–
	POS	0.64***	0.64***	–
	Work engagement	0.19**	–	0.17**
	Emotional exhaustion	−0.12	–	−0.098
COVID risks/ hazards	Work engagement	−0.12*	−0.13*	−0.12*
	Emotional exhaustion	0.15**	0.16**	0.15**
POS	Work engagement	0.38***	0.49***	0.43***
	Emotional exhaustion	−0.37***	−0.45***	−0.41***
Controls:				
Change in customers	Work engagement	−0.016	−0.032	−0.016
Residence area		−0.035	−0.055	−0.037
Containment index		−0.085	−0.075	−0.087
Gender		−0.031	−0.031	−0.036
Change in customers	Emotional exhaustion	−0.045	−0.035	−0.045
Residence area		0.078	0.091	0.081
Containment index		0.093	0.086	0.094
Gender		0.159***	0.158***	0.164***
χ^2 (df)		66.7 (25)	74.1 (27)	202.4(27)
RFI		0.873	0.869	0.643
RMSEA		0.073	0.075	0.145
NFI		0.952	0.947	0.854
CFI		0.968	0.964	0.867
$\Delta\ \chi^2$ (df)		–	7.4 (2)	135.7 (2)

Note: RFI = Relative Fit Index; RMSEA = Root Mean Square Error of Approximation; NFI = Normed Fit Index; CFI = Comparative Fit Index. *p < .05, **p < .01, ***p < .001.

factor. The results confirmed the superiority of the proposed two-factor model (χ^2 [df = 134] = 292.17, NFI = 0.913, CFI = 0.950, IFI = 0.951; RMSEA = 0.062) over the common-source model ($\Delta\ \chi^2$ [df = 1] = 176.32; p < 0.001). This analysis confirmed the unidimensionality of the two subscales. The CFA also allows for the preliminary assessment of discriminant and convergent validity using established nonparametric quality criteria: factor loadings should be greater than 0.50 (indicator reliability), composite reliability should exceed 0.70 (construct reliability), and the average variance extracted (AVE) should be greater than 0.50 (convergent validity) and larger than the squared correlation with any other construct (discriminant validity). The data presented in Table A1 shows that the measurement model exceeded all of these benchmarks with factor loadings in the range 0.566-0.837, composite reliabilities above 0.90, with AVEs above 0.50 and exceeding the squared correlation between the two dimensions (0.786, p < .01).

A.2. Convergent and discriminant validity

A multitrait-multimethod matrix (MTMM) was then computed to provide a more detailed analysis of the convergent and discriminant validity of the measure. We administered the WSP items along with (i) 30 items selected from a commonly used Work Safety Scale (WSS; Hayes, Perander, Smecko, & Trask, 1998) that measures perceptions of workplace safety across three dimensions (job, co-worker and supervisor); and (ii) six items selected from the "Big Five" mini-markers of personality (Soucier, 1994) to measure perceptions of openness and conscientiousness (3 items each).

The "essential WSP" dimension had a moderate correlation with WSS dimensions (ranging between 0.298 and 0.654) and a weak, non-significant relationship with the personality mini-marker dimensions (ranging between 0.063 and 0.119). Likewise, the "discretionary WSP" dimension had a moderate relationship with WSS dimensions (ranging between 0.250 and 0.672) and a low correlation with the personality mini-marker dimensions (ranging between 0.067 and 0.160). These results provide further evidence for discriminant validity (Campbell & Fiske, 1959). In addition, two CFA models were tested specifying different relationships between WSP and WSS. The first model assumed that all items loaded on one latent construct. The second model assumed that the three WSS dimensions loaded on a latent 'WSS' construct and the two WSP dimensions loaded on a latent "WSP" construct. Results indicate that the second model provided a significantly better fit to the data than the first model ($\Delta\ \chi^2$ (6) = 3855.29, p < .001). Based on this analysis, we are confident that the requirements for convergent and discriminant validity for the proposed measurement model have been established.

Appendix B

Table B1.

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