



Workplace Interventions in Response to COVID-19: an Occupational Health Psychology Perspective

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Abstract

The outbreak of COVID-19 has imposed significant threats to individuals' physical health and has substantially changed the socioeconomic order and the nature of our work and life all over the world. To guide organizations to design effective workplace interventions to mitigate the negative impacts of COVID-19, we take the occupational health psychology (OHP) perspective to propose a framework that highlights important areas for organizations to intervene in order to better protect workers' physical health and safety and to promote workers' psychological well-being. Specifically, we integrate the prevention-based public health model with the Total Worker Health (TWH) and OHP-based approaches to propose a comprehensive set of primary, secondary, and tertiary interventions that target different groups of employees with varied exposure risks to the new coronavirus. We believe these proposed interventions can contribute positively to the development of healthy and safe work. Implications of these proposed interventions for workers, organizations, and policy makers are also discussed.

Keywords COVID-19 · Occupational Health Psychology · Total worker health · Intervention · Prevention model

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic. The outbreak of COVID-19 has resulted in several million confirmed cases with hundreds of thousands of deaths in the United States alone (Dong et al. 2020), and

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the global spread of COVID-19 continues. To date, COVID-19 has affected 215 countries and territories (in sum—tens of millions of cases and well over a million deaths) with over 30 countries/regions (e.g., Italy, the United States, Canada, UK, Spain) declaring a state of emergency due to COVID-19. COVID-19 directly affects the physical, financial, and psychological well-being of those living in close proximity to the outbreak areas. More importantly, it has widespread influences on the cognition, attitudes, and behaviors of the global population because of its potential threat to physical health. In response to this crisis, governments in the United States and around the world have implemented mandatory stay-at-home orders and other social distancing measures (e.g., school closure, closing non-essential businesses, cancellation of large public events, suspension of non-essential travel, closure of public facilities, border closure).

These changes in response to COVID-19 have considerable impact on the workplace and employees. Essential personnel (i.e., those working in the essential industries such as healthcare, law enforcement, food and agriculture, and energy) continue to work on-site and they (and their family members) are exposed to high risk of infection from COVID-19 when carrying out their job duties. Non-essential personnel have been requested to work from home and they are facing challenges to perform effectively with new work arrangements (Chong et al. 2020; Trougakos et al. 2020). Eventually, when the economy reopens, they will have to return to working on-site. To deal with these challenges, organizations have taken various steps to manage these substantial changes. Major retail corporations (e.g., Costco, Walmart), for example, offer personal protective equipment such as masks and gloves for their workers while interacting with customers and restocking the products. Many organizations, such as higher education institutions, have provided training and support to help employees adapt to working remotely. Finally, companies such as Amazon and Apple have engaged in corporate social responsibility activities to benefit external stakeholders, such as donating masks and medical supplies to healthcare professionals.

While these workplace actions help mitigate the negative impact of the COVID-19 pandemic, Occupational Health Psychology (OHP) can offer unique insights for designing effective workplace interventions to help both organizations and employees cope with the COVID-19 crisis. In the face of COVID-19, employees' safety and health are of primary importance, as both are key elements in achieving an organization's desired productivity and efficiency. Thus, OHP, with its focus on creating safe and healthy working environments (Quick et al. 1997; Sauter et al. 1999), can shed light on promoting workforce safety, health, and productivity in the context of COVID-19.

Specifically, emerging from psychology and integrating multiple disciplines, OHP concerns the quality of work life, the protection and improvement of workforce safety and health, and the development of healthy workplace (Quick et al. 2003). A healthy work environment enables employees to maintain both physical and psychological health and high performance (Quick et al. 2003; Sauter et al. 1999). As COVID-19 imposes threats to employees' health and productivity, OHP provides a psychology-based theoretical foundation for intervention approaches that treat and prevent illnesses and protect and enhance workforce health and productivity (Anger et al. 2015).

The public health prevention model (Tetrick and Quick 2003) offers a typology to differentiate workplace interventions that target different groups of employees. Different groups of employees (e.g., essential personnel vs. non-essential personnel) may experience varied levels of risk of getting sick from the virus. Specifically, the public

health prevention model groups interventions into three categories: primary, secondary, and tertiary interventions (Schmidt 1994). Primary interventions target employees who are not at a particularly high level of risk; secondary interventions target employees who are at risk of illness or injury, whereas tertiary interventions target employees who are suffering from illness or injury (Tetrick and Quick 2003). Applying this research in the context of COVID-19, we categorize employees into three groups and organize intervention strategies that are specific for each group.

In determining the focus of COVID-19-related workplace interventions, the Total Worker Health [TWH] approach (National Institute for Occupational Safety and Health [NIOSH], 2018) and the Occupational Health Psychology (OHP) approach both serve as general guidelines in conceptualizing and categorizing these interventions. TWH has been defined as a “strategy integrating occupational safety and health protection with health promotion to prevent worker injury and illness and to advance health and well-being” (NIOSH, 2018). While the TWH approach suggests different workplace practices to promote employee well-being and organizational effectiveness (e.g., DeJoy and Southern 1993; DeJoy and Wilson 2003), the PATH (Practices for the Achievement of Total Health) Model (Grawitch et al. 2006) is OHP-specific and provides a more concrete approach to connect workplace interventions with employee health and productivity. Refining and expanding on these two approaches, we highlight eight areas for designing workplace interventions to help employees cope with COVID-19, namely, physical health and safety, work-life balance, job and financial security, psychological well-being, training and skill development, virtual work and alternative work arrangements, recognition, and involvement.

The purpose of the current paper is to propose an OHP-based framework to guide organizational interventions in response to COVID-19 and discuss the potential benefits of these interventions to the workplace and workforce. Specifically, we propose a taxonomy (see Table 1) that integrates the prevention-based public health model, the TWH principles, and the OHP-based approach to highlight a variety of different primary, secondary, and tertiary intervention opportunities. These interventions can focus on addressing concerns related to employee safety, physical health and psychological well-being, and productivity, in the context of COVID-19. We also acknowledge the fact that employees and organizations differ in their capability, capacity, and resources in coping with COVID-19. We conclude the paper with implications of these proposed interventions for workers, organizations, and policy makers facing the continuing challenges brought on by COVID-19.

From a theoretical perspective, our research takes the OHP angle to comprehensively articulate how workplace interventions can be designed to effectively manage workforce health, safety, and productivity in face of a pandemic crisis (see also Sinclair et al. 2020 for a general review). Bridging the literature on the prevention-based public health model and the Total Worker Health approach, our proposed framework offers a comprehensive approach to conceptualize and organize healthy workplace practices in face of life-threatening events such as COVID-19. From a practical perspective, our framework will equip organizations and managers with a systematic approach to design appropriate organizational practices and policies and cultivate healthy organizational climate to help employees adapt to the threat brought on by COVID-19. Our integrative framework will also shed light on how organizations and managers can transform negative crisis and challenges into opportunities to boost workforce safety, health, and performance.

Table 1 Workplace Interventions in Response to COVID-19: A Taxonomy

	Primary	Secondary	Tertiary
Physical health and safety	• Reduce exposure risk by disinfecting the workspace with a special attention to high-touch surfaces and object (e.g., phones, elevator buttons, washrooms. • Provide PPE (e.g., masks, face shield, eye protection, hand sanitizer). • Ban all non-essential business travel.	• Offer alternative work arrangements/accommodation for at-risk worker population (e.g., reduced working hours; implement “no-contact” service and work procedures). • Increase the distance between workstations/desks and between employees and customers. • Offer voluntary coronavirus testing	• Plan for rapid isolation of a symptomatic employee. • Relax sick leave policy to support employees in staying home when infected with COVID-19 or having symptoms.
Work-life balance	• Training employees on different boundary management strategies. • Offer flexible working hours	• Provide resources to support those with family responsibilities (e.g., tips for childcare; support for eldercare). • Hire temporary workers to distribute workload.	• Expand the Employee Assistance Program (EAP) to help alleviate the distress associated with work-family conflict • Provide tangible support (e.g., no-contact food delivery) for employees and their families dealing with infected cases.
Job and financial security	• Offer alternative arrangements than layoff (e.g., executives taking pay cuts; work-sharing program; furlough). • Postpone non-critical projects that require capital expenditure to redirect resources for employee retention.	• Offer pay raise or bonus for frontline employees. • Offer various leaves of absence for employees with family members who are affected by COVID-19 (e.g., family caregiver leave; emergency leave).	• Provide additional insurance/emergency funds to support infected workers. • Offer sick leave with pay to support infected workers.
Psychosocial well-being	• Provide unlimited access to self-care apps for mental health and psychological support service. • Provide support for employees who practice social isolation and work remotely.	• Provide free therapy and/or counseling services to all frontline employees. • Provide support to frontline employees when they experience avoidance from their community due to fear or stigma.	• Separate infected employees from having an identity defined by COVID-19 (e.g., COVID-19 cases) to reduce personal identity stigma. • Share positive and hopeful stories of people who have experienced

Table 1 (continued)

	Primary	Secondary	Tertiary
Training and skill development	• Provide COVID-19 related education and information. • Inform employees of orders, directions and guidance from Public Health agent pertinent to COVID-19; • Inform employees of their rights and obligations related to workplace health and safety in the context of COVID-19. • Design and offer training programs related to digital/virtual work • Provide technical support and facilities for virtual work. • Encourage communications via email and/or teleconferencing. • Foster employee sense of professional community. • Oral or written award/praise for employees who advocate for and/or comply with workplace health and safety measures and procedures.	• Provide cross-training and job rotation opportunities (e.g., from higher-stress to lower-stress functions). • Invite COVID-19 safety trainers to provide on-site or virtual training to frontline employees.	COVID-19 (e.g., recovery) with infected employees and their family. • Provide emotional support to infected employees using “psychological first aid.” • Provide general guidance for infected employees (e.g., self-isolation, protecting family members).
Virtual work and alternative work arrangements		• Combine on-site and virtual work arrangements for essential personnel.	• Implement virtual work arrangements for infected employees until they are fully recovered from COVID-19.
Recognition		• Reward for using safety equipment and proper hygiene while working on-site. • Reward for identifying and reporting any potential risks of COVID-19 infection at the workplace.	• Reward infected employees for avoiding spreading the virus to colleagues or clients (e.g., inform the supervisor immediately, stay home, practice self-isolation and social distancing).
Involvement	• Encourage employees to share ideas and suggestions to improve		• Involve infected employees in the decision-making regarding the

Table 1 (continued)

Primary	Secondary	Tertiary
workplace health and safety in the context of COVID-19. • Encourage employees to share ideas and positive experiences of managing COVID-19 crisis (e.g., work-life balance, managing anxiety).	• Form health and safety committee/taskforce and involve frontline employee representatives. • Encourage self-managed teams among frontline employees for protecting and promoting workplace safety and health.	process of returning to work.

Prevention and Public Health Model

As mentioned earlier, the public health model of prevention emphasizes three possible intervention opportunities, namely, primary, secondary, and tertiary interventions (Schmidt 1994). Primary interventions are designed to keep illness or injuries from happening and these interventions usually target the entire workforce (Walker and Shinn 2002). These interventions are preventative in nature, with the goal to minimize exposure risk through sanitizing the environment and altering the risky behaviors that may result in illness or injuries (Schmidt 1994). Secondary interventions are designed to “reverse or preclude harm from exposure to known risk factors” (Walker and Shinn 2002, p. 4) and these interventions target employees who are potentially at risk of illness or injury. The goal of secondary interventions is to use effective screening tools to identify illness or injuries in their earliest stages, before the onset of other more serious symptoms or health effects (Schmidt 1994). Tertiary interventions seek to decrease harm among the most seriously impacted individuals. These interventions target employees who are suffering from illness or injuries (Tetrick and Quick 2003), with the goal of supporting affected employees to better manage the symptoms, to slow or stop the progression of the illness or injuries, and to facilitate their return-to-work efforts (Schmidt 1994).

Applying this intervention typology in the context of COVID-19, we can categorize the workforce into three groups: those employees who are currently at low risk of coronavirus infection (e.g., those who follow social isolation and are working from home); those employees who are at high risk of coronavirus infection (e.g., those who are working on-site and/or have close and frequent interactions with potentially-infected others at or through work); and those employees who are already infected with coronavirus. These three groups of employees are the focal populations for primary, secondary, and tertiary interventions, respectively. We integrate these three intervention categories with the different areas under Healthy and Safe Workforce and Workplace discussed below to propose a taxonomy for organizational interventions designed to support each group of employees. Table 1 presents our examples of workplace interventions that aim to protect and improve workforce health, safety and productivity for different groups of employees with varied level of risks of COVID-19 infection.

Total Worker Health and Occupational Health Psychology: Areas for Interventions

Total Worker Health refers to a holistic approach designed to improve the safety, physical health, and psychological well-being of workers, thereby achieving the goal of enhancing workforce productivity (NIOSH, 2018). TWH recognizes that employment condition, including employment status (e.g., full-time employment; under- versus over-employment), the physical and psychosocial work environment, and the work organization, is a critical social determinant of health, such that it may affect workers’ long-term health and well-being through its effect on the distribution of money and resources (Benach et al. 2007). This approach emphasizes the importance of protecting worker safety, health, and well-being by reducing occupation-related injuries,

preventing occupational diseases, alleviating occupational stress, and encouraging work-life balance in order for workers and their employers to reach their productivity goals.

Specifically, the TWH approach highlights three major areas of concern: Workplace, Employment, and Workers (Schill and Chosewood 2013). Workplace issues focus on addressing the physical and psychosocial work environmental risk factors that may threaten workers' safety, health, and well-being. For example, hazard exposure risks and poor safety climate can be viewed as potential physical and psychosocial threats to worker safety, respectively. Employment issues focus on policies and practices designed to preserve and cultivate human resources in the workplace. For example, addressing the psychological and economic concerns related to job insecurity and unemployment (Punnett et al. 2020), precarious employment conditions (e.g., underemployment or contingent work; Benach et al. 2014), and costs and availability of healthcare and benefits are human resource policy issues that are relevant to the employment category. Finally, the Workers area of concern focuses on identifying opportunities to promote optimal functioning of the workers (e.g., work-family balance; health-promotion campaigns) and vulnerable populations (e.g., younger/older workers; workers with disability; migrant workers; Schill and Chosewood 2013) that may be at-risk for occupational injuries, illnesses, and ill-being. Importantly, the TWH approach is intended to bring benefits to not only the individual workers, but also to their organizations by enhancing innovation, productivity, and efficiency and reducing the costs associated with injuries and illnesses (NIOSH, 2018).

Occupational health psychology offers complementary perspectives to the TWH approach. The focus of OHP is to prevent illnesses, injuries, and distress among the workers by creating a healthy work environment (Tetrick and Quick 2011). A healthy organization is expected to maintain employee productivity and satisfaction, even in times of external turbulence (Cooper and Cartwright 1994). The PATH (Practices for the Achievement of Total Health) Model (Grawitch et al. 2006) offers a framework to understand the OHP-based approach to intervention designs (Tetrick and Quick 2011). The PATH Model highlights five primary workplace practice areas that can be enhanced to promote occupational health. These five areas are: work-life balance, employee growth and development, health and safety, recognition, and employee involvement.

Work-life balance related workplace practices facilitate successful boundary management for workers to minimize conflicting demands between the work and non-work domains. Practices such as flexible work arrangements and financial support for childcare/eldercare (Kelly et al. 2008) can be viewed as examples designed to facilitate work-life balance. Employee growth and development practices include workplace training and development opportunities designed to re- or up-skill employees, to cultivate the human resource capacity, and to offer career advancement opportunities for workers (Grawitch et al. 2006). Health and safety related practices aim at enhancing the psychosocial work environment, thereby protecting workers from injuries and illnesses, and promoting their physical and psychological health (Grawitch et al. 2006). For example, organizations can foster a strong safety climate to promote workers' adherence to safety rules, or promote health-related behaviors (e.g., exercising) to enhance worker health. Recognition refers to organizational practices that acknowledges the positive behaviors and contributions made by workers. In the context

of OHP, practices such as tangible rewards or public acknowledgement may be used to promote positive behaviors contributing to workers' health and safety (Tetrick and Quick 2011). Finally, employee involvement refers to the practices to actively solicit employee inputs to inform policies, practices, and programs related worker safety, health, and well-being. Taken together, organizational practices that focus on these five areas are expected to enhance employee physical and psychological health and well-being, and lead to overall organizational improvement. In this case, organizations can gain competitive advantages through improved individual performance, reduced withdrawal, and lower injury and illness rates (Tetrick and Quick 2011).

When considered together, both the TWH and OHP-based approaches share important similarities. First, both perspectives emphasize the importance of a healthy workforce. In particular, they highlight the importance of achieving occupational safety through injury and disease prevention and promoting employee well-being via distress reduction and work-life balance. Second, both perspectives recognize the benefits of a healthy workforce for the productivity outcomes of the workplace. The TWH approach acknowledges that organizational practices aimed at promoting worker safety, health, and well-being will have downstream effects on organizational effectiveness and community functioning (NIOSH, 2018). The OHP-based approach also noted the importance of organizational improvement through building a healthy and safe workforce (Tetrick and Quick 2011). Third, both perspectives recognize the important roles that organizations must play in designing the physical and psychosocial work environment to promote the health, safety, and well-being of the workers. Finally, both approaches acknowledge the importance of considering individual workers' needs and circumstances to maximize the potential impact of the organizational practices on worker health, safety, and well-being. These similarities offer important guidance for determining the content areas of promoting workforce safety and well-being and encouraging workplace productivity. Below we discuss two critical content areas—healthy and safe workforce and healthy and safe workplace—for organizational interventions in response to COVID-19.

Healthy and Safe Workforce

Both the TWH and OHP-based approaches emphasize the importance of organizations implementing policies and practices to promote the health and safety of the workforce by reducing injuries and diseases, promoting well-being, and alleviating distress of the workers and their families. In the context of the COVID-19 pandemic, these policies and practices can address four specific areas.

Physical Health and Safety First, organizational policies and practices can aim to promote workers' physical health and safety. In the context of COVID-19 pandemic, workers face the threat of contracting the novel coronavirus because of their required work activities, which represents a direct threat to their physical health and safety. Both the TWH and OHP-based perspectives offer suggestions for what organizations can do to promote the physical health and safety of workers when facing the challenge of COVID-19. Among the three areas of concern highlighted by the TWH approach (Schill and Chosewood 2013), the area of Workplace factors is the most relevant.

Organizational policies and practices can focus on the control and elimination of the potential exposure risk for coronavirus among workers while performing work activities. For example, organizations' primary interventions targeting employees with relatively low-risk of coronavirus infection can focus on disinfecting the workspace with a special attention to high-touch surfaces and object (e.g., phones, elevator buttons). Redesigning face-to-face work activities to be performed remotely can also reduce the physical contact.

Organizations may also leverage the existing safety and health climate to promote worker adherence to these new procedures and practices designed to protect workers. For employees with relatively high-risk for COVID-19, the secondary interventions may include the temporary suspension of work activities that require workers to engage in interpersonal interactions to reduce the exposure risk. For essential workers who must work on-site, organizations can offer alternative work arrangements/accommodation (e.g., reduced working hours, implement "no-contact" service and work procedures) and/or increase the distance between workstations/desks and between employees and customers. Moreover, providing personal protective equipment (e.g., masks; gloves) for essential workers can also reduce the exposure risk. Finally, organizations can cover the costs of testing for COVID-19 to contribute to better surveillance and tracking of the infection. For example, JP Morgan Chase agreed to cover their employees' COVID-19 testing co-payment through its expanded medical program (Minaya 2020).

For employees who have been infected with coronavirus, organizations' tertiary interventions may include planning for rapid isolation of a symptomatic employee and relaxing sick leave policy to support employees in staying home if infected or having symptoms. Many organizations have expanded their leave policies in response to COVID-19 (Just Capital 2020). For example, Verizon Communications launched a new leave-of-absence policy during the pandemic, which provides 100% of pay for up to eight weeks, or 60% of pay for up to 16 weeks for their workers. Similarly, Target offered a 30-day paid leave for high-risk employees, including those who are 65 years old or older, pregnant, and those with underlying medical conditions that make them more vulnerable to the virus (Minaya 2020).

Work-Life Balance As many regions and countries implement stay-at-home or lockdown policies (e.g., closure of non-essential businesses, schools, childcare centers) in order to control crowd movement and the spread of COVID-19, the changing nature of work and life can threaten the work-life balance of workers. The OHP-based approach suggests that policies related to flexible work arrangements (Kelly et al. 2008) can be effective in helping workers establish and manage boundaries between the work and non-work domains. Flexible work arrangements can also help reduce work-family conflict, which may occur as work and non-work domains place incompatible demands on workers' time, energy, and other psychological resources (Greenhaus and Allen 2011). In particular, organizations' primary interventions targeting low risk employees may include flextime, or flexibility in work schedule, to allow workers flexibility in when they work, other than the organization-designated "core period," during which all employees are expected to be available (Baltes et al. 1999) in addition to virtual work arrangements. Other flexible work arrangements, such as compressed workweeks, where a workweek is compressed into fewer than five days by increasing employees'

number of daily working hours, can also offer flexibility in terms of work schedule (Latack and Foster 1985). We recognize that these time- and location-based flexible work arrangements may not only help workers manage their work-life balance, but also facilitate their achievement of their productivity goals. We discuss the latter implications in the section on healthy and safe workplace (i.e., virtual work and alternative work arrangements).

For employees with a high exposure risk to coronavirus, provision of resources to support those with family responsibilities (e.g., tips for childcare; support for eldercare) will help workers achieve work-life balance (Bond et al. 2005). In addition, organizations may consider hiring temporary workers to help reduce the workload for those essential employees who have family obligations. Other financial support, such as paid leave, can be offered by organizations to help this group of employees better meet demands from the non-work domain (Bond et al. 2005). Finally, adapting Employee Assistance Program (EAP) offerings can help employees to better manage non-work demands. For example, funds that have been allocated for providing in-person childcare can be redirected to offer subscriptions to online educational or tutoring services. These services can help workers with school-age children to better meet the demands to facilitate their children's educational activities at home (e.g., preparing the materials necessary for class instruction, assisting with homework). EAP offerings can also be expanded to cover smart devices and monitoring services to provide regular check-ins and constant connections with elders, which may substitute for the in-person eldercare.

For employees infected with coronavirus, tertiary organizational interventions may involve providing tangible support (e.g., no-contact food delivery) for employees and their families dealing with infected cases. Moreover, expanding EAPs to offer online mental health services to employees and their family members may also alleviate the distress associated with work-family conflict for infected employees and their family members. Organizations can also expand their EAP to provide additional financial assistance to infected workers. For example, companies such as Verizon Communications have adjusted their policies to offer additional care support for employees' dependents, such as financial assistance for employees with sick children (Just Capital 2020).

It should be noted that strategies implemented by organizations to help protect workers' physical health and safety, such as requesting employees to telework to reduce exposure risk to the novel coronavirus, may actually represent a threat to workers' work-life balance in the context of COVID-19 pandemic. Workers who were thrust into telework arrangements without adequate preparation and support may lack the proper equipment and hardware (e.g., broadband internet connection) and technological competence to complete their work offsite (for details, please see our discussion regarding interventions in the training and skill development section below). Moreover, they may be unable to work at home because of the emerging demands and responsibilities from the non-work domain (e.g., lack of childcare, closing of school or eldercare facilities) associated with COVID-19. These complications suggest that the areas of concern for creating a healthy and safe workforce are not completely independent from one another.

Job and Financial Security Third, as the government mandated the closure of nonessential businesses in response to COVID-19 pandemic, workers can face serious threat

to their job and financial security. To this end, both the Employment and Workers dimensions of the TWH approach are relevant for guiding organizations to develop policies and practices to support workers' job and financial security (Schill and Chosewood 2013). The Employment aspect of the TWH approach suggests that organizations' primary interventions targeting employees with a low exposure risk can include providing alternative arrangements (e.g., executives taking pay cuts; work-sharing program; furlough) rather than laying off employees. Organizations will also need to explore alternative business models and/or postpone non-critical capital expenditure to help provide job and financial security for the employees.

The Workers aspect of the TWH approach highlights the importance of considering vulnerable populations that may be negatively affected by the COVID-19 pandemic. Thus, organizations' secondary interventions can include providing pay raise or bonus for essential employees working on-site and having a high exposure risk. For example, in the United States, companies such as Kroger, Walgreens, Walmart, and Home Depot have all offered cash bonuses or increased hourly pay for their onsite workers (Minaya 2020). Moreover, older adults, as well as those with an underlying health condition (e.g., asthma), have been found to be vulnerable to the novel coronavirus (Center for Disease Control and Prevention 2020). Thus, organizations can offer older workers and those with underlying health conditions additional protection against the COVID-19 without jeopardizing their job and financial security. Older workers and those with underlying health conditions could be assigned to lower exposure positions at work (e.g., shifts during off-peak hours) or given support, such as technological assistance, to make their shift to virtual work easier (Kanfer et al. 2020; Kooij 2020). Providing these high-risk workers with additional paid leave may also help create a sense of stronger job security. For example, both Target and Home Depot have provided their high-risk workers with additional paid leave (Minaya 2020). Lastly, for employees who have already contracted coronavirus, organizations' tertiary interventions can involve providing enhanced healthcare and other benefits (e.g., additional insurance coverage; emergency funds; sick leave with pay) and reassure workers about their job security.

Psychosocial Well-Being Finally, COVID-19 represents a significant, acute stressor that may threaten workers' psychosocial well-being for several reasons. First, nonessential workers who must adapt to alternative work arrangements face work-related stressors, such as role ambiguity (i.e., uncertainty about how to perform one's job given the alternative arrangements) and increased workload and job demands. These stressors have been linked to reduced well-being and productivity (e.g., Eatough et al. 2011; Rosen et al. 2010). Additionally, telecommuters may face the challenge of professional isolation from colleagues (Gajendran and Harrison 2007), which may restrict their networking and career development opportunities. The social and professional isolation resulting from alternative work arrangements may also threaten workers' psychosocial well-being. Second, workers, especially those considered as essential personnel who must physically report to duty, face the threat of a potentially deadly infection. This constant reminder of death can trigger anxiety, fear, and other negative emotions (Grant and Wade-Benzoni 2009; Mo and Shi 2020; Pyszczyński et al. 2015), and result in maladaptive coping responses such as aggression and disengagement (Sliter et al. 2014; Stein and Cropanzano 2011). Third, workers who are infected with coronavirus may not only suffer from physical pain and symptoms (e.g., fever, cough, chest pain) but

may also experience psychological distress (e.g., fear, anxiety, physical isolation from family, stigmatized identity) due to the infection. In addition, the social isolation resulting from the stay-at-home policy implementation is another stressor for all workers.

Providing employees with psychological support, as highlighted by both the TWH and the OHP-based approaches, may be particularly important for organizations to maintain and enhance employees' psychosocial well-being during the COVID-19 pandemic. For employees with a low exposure risk, organizations' primary interventions can provide workers with unlimited access to self-care apps for mental health and psychological support service. Starbucks, for example, has expanded its benefits program to provide mental health services and apps to its employees (Peiper 2020). This is especially important for employees who practice social isolation and work remotely. For employees with a high exposure risk, organizations' secondary interventions can provide free therapy and counseling services to all frontline employees through their EAPs. Given that positive interpersonal interactions with and support from coworkers represent an important type of psychological resources for workers (Ten Brummelhuis and Bakker 2012), organizations may encourage employees to participate in structured communications to share their experiences related to the COVID-19 pandemic, which can be an effective way to facilitate peer support (Tetrick and Quick 2011). Supervisors, for instance, could host virtual social sessions and lead structured discussions designed to elicit positive discussions among workers.

For employees developing COVID-19 symptoms, organizations' tertiary interventions can focus on providing resources such as financial assistance with medical expenses and online mental health services directly to infected employees. Organizations could also provide psychological support to infected employees using "psychological first aid." Psychological first aid (PFA) is originally designed to reduce the initial distress and foster adaptive coping for individuals who have experienced trauma or disaster (Vernberg et al. 2008). Organizations may arrange to have trained PFA providers contact infected employees and their family members to offer emotional and psychological support and assess the need for additional services. Organizations may also work to communicate positive and hopeful stories of people who have experienced COVID-19 (e.g., recovery) to infected workers and their families to help foster resilience during the challenging recovery time.

Healthy and Safe Workplace

Both the TWH and OHP-based approaches also emphasize the important roles that organizations must play in designing the physical and psychosocial work environment to promote the health, safety, and well-being of the workers. Indeed, a healthy and safe workplace not only reduces injuries and diseases for workers, but also benefits worker productivity and work motivation (Tetrick and Quick 2011). In the context of the COVID-19 pandemic, the related policies and practices can be implemented in four specific areas.

Training and Skill Development First, training and skill development programs focus on providing workers with opportunities to gain additional skills, knowledge, and

experience (Grawitch et al. 2006). Conventional training and skill development programs broadly aim at teaching employees how to perform their current jobs and preparing them for future occupational demands (Noe et al. 2017). In the midst of COVID-19 pandemic, the extreme situation warrants organizations to prepare their employees with additional skills and knowledge to confront exceptional challenges in both health and productivity domains. In particular, organizations' primary interventions targeting employees with a low exposure risk may include providing them with training related to COVID-19, which can be helpful in equipping employees with necessary knowledge to perform their tasks without getting infected. Such training and skill development programs ought to be designed to educate the broader workforce to minimize the potential risk of getting infected, alleviating employee concerns by addressing their "root causes" (Quick et al. 1997). As they launch training programs to inform employees about COVID-19, many organizations also will need to adopt new work procedures to keep business running while reducing employee exposure (e.g., virtual work as discussed below). As such, for employees who need to change their regular work patterns to online or remote work, additional training programs offering associated skills or knowledge can be effective (Kalleberg et al. 2000). In addition, organizations may also reinforce orders and directions from public health agencies pertinent to COVID-19.

Employees with a high exposure risk are likely to experience increased job demands and stress due to carrying out their job duties on-site during the pandemic. Thus, organizations' secondary interventions may include providing cross-training and job rotation opportunities (e.g., from higher-stress to lower-stress functions) to frontline employees to help them deal better with job demands and maintain productivity. Moreover, organizations may consider inviting COVID-19 safety trainers to provide on-site or virtual training to their frontline employees to improve their safety knowledge and skills.

Finally, organizations' tertiary interventions can provide general guidance for infected employees (e.g., self-isolation, protecting family members). This will contribute positively to their recovery process and help them protect their family members. These training and skill development programs can assist organizations to maintain employee productivity amid the pandemic by helping workers work more safely and improving employee morale (e.g., Christian et al. 2009; Clarke 2010).

Virtual Work and Alternative Work Arrangements Alternative work arrangements, such as virtual work, focus on providing employees with flexibility in employment relationship, work schedule, or the place where the work is completed (Spreitzer et al. 2017). Typical alternative work arrangements offered to employees include home-based work, part-time work, and flexible scheduling (Tetrick and Quick 2011; Mas and Pallais 2017). In particular, virtual work, which offers flexibility in terms of where the work can be completed, is becoming the "new normal" by allowing employees to "work from dispersed locations and interact using computer-mediated communication" (Raghuram et al. 2019, p. 308).

In response to the COVID-19 pandemic, virtual work has become a necessity for most organizations to balance employee safety and well-being with business operational needs. Indeed, organizations in many countries are shifting their regular operation to online or providing employees with other alternative work arrangements to

ensure employee health while keeping organizations functioning amid the pandemic (Liang 2020; Lufkin 2020). In addition to virtual work, other time-based flexible work arrangements, such as flextime or compressed workweeks, can also offer flexibility in terms of work schedule, as well as reducing the exposure risk by limiting the number of days employees need to report to work onsite. These flexibility practices are implemented as a result of the extreme situation, where neither employers nor employees have a choice, and the priority is on protecting employees' health and well-being.

In addition to implementing virtual work practices, other forms of work arrangements can be offered to employees to confront the challenges arising in their work and family roles. For instance, employees may not be able to attend work at regular work hours due to the closure of public transportation or because they are taking care of children when schools are temporarily closed. In these cases, alternative work arrangements regarding time and task allocation can be provided to create a family-friendly work environment. For employees with a low exposure risk, organizations' primary interventions may include providing technical support and equipment for virtual work and encouraging work communications via email and/or teleconferencing. In addition, scheduling regular online meetings may not only motivate employees but can also foster their sense of professional affiliation and community in the face of the social isolation and lockdown orders. For employees with a high exposure risk (e.g., who have to work on-site), organizations' secondary interventions may consider the combination of both on-site and virtual work arrangements for essential personnel to reduce their exposure risk. Lastly, for infected employees, organizations' tertiary interventions can include implementing virtual work arrangements for this group of employees during their recovery from COVID-19. Given that COVID-19 may lead to severe symptoms in many cases, employees who are unable to work during their recovery should be covered by the expanded paid leave policies. This will be very important to mitigate the spread of COVID-19 in the workplace as some employees may continue reporting to work when they start experiencing symptoms, if they believe that revealing symptoms may jeopardize their likelihood of continued employment.

Recognition Third, conventional recognition programs in organizations address the importance of rewarding employees or providing positive feedback for their contributions and achievements (Grawitch et al. 2006; Noe et al. 2017). As recognition programs are usually designed to be contingent on the completion of certain work or tasks by the focal employee, such programs serve to promote employee productivity (Amabile 1993). During the COVID-19 pandemic, the purpose of workplace recognition programs needs to shift to promote proper employee health and safety behaviors. For example, for employees with a low exposure risk, organizations' primary interventions may include generating new incentives and create appreciation programs to recognize employees' effort in contributing to a healthy and safe workplace (e.g., oral or written award/praise for employees who advocate for and comply with workplace health and safety procedures). This may not only include individual worker's effort in complying with workplace health and safety procedures but can also be group-based in recognizing work teams that carry out the best practice in promoting safe operations. In addition, as employees with a low exposure risk are likely to shift to virtual work, recognition is also important to ensure employees that their work efforts are visible. Accordingly, recognition approaches based on people, work practice, job dedication, and results (Brun and Dugas 2008) can be implemented systematically to ensure that

organizations have sufficient conduits to reward employees' efforts, contributions, and professional achievements during the COVID-19 pandemic. Importantly, recognition can take forms in not only monetary rewards, but also social recognition (e.g., via organization newsletter), which can signal caring and appreciation from the organization.

For employees with a high exposure risk, organizations' secondary interventions may include rewarding employees for using safety equipment and proper hygiene while working on-site. In addition, organizations should also reward frontline employees for identifying and reporting any potential risks of coronavirus infection at the workplace. Finally, for infected employees, organizations' tertiary interventions can include rewarding infected employees for avoiding spreading the virus to colleagues or clients (e.g., informing the supervisor immediately, staying at home, practicing self-isolation and social distancing).

Involvement Finally, involvement interventions and practices focus on ensuring employees' opportunities to participate in decision-making process (Grawitch et al. 2006; Leana et al. 1992). Different from recognition programs that motivate employees by rewarding them for their contribution and effort, involvement interventions aim at motivating employees intrinsically by facilitating their sense of ownership and providing them with more opportunities to shape their own work (Leana et al. 1992; Wang and Fang 2020). Research has shown that providing workers with opportunities to participate in the decision-making process leads to higher perceptions of fairness regarding the eventual decision (Lind et al. 1990).

In the context of the COVID-19 pandemic, the utility of involvement programs should be particularly salient. For example, telecommuting literature shows that people working from home tend to experience more difficulties in developing bonds with their supervisor and coworkers (Golden 2006; Handy 1995) and are more disconnected from work (Turtle 2011). Involvement interventions are designed to promote employee inclusion, which should alleviate such negative psychological experience and benefit both employers and employees. For example, for employees with a low exposure risk, organizations' primary interventions may include encouraging employees to share ideas and positive experiences of managing COVID-19 crisis (e.g., work-life balance, managing anxiety, coping mechanisms). In addition, companies can also encourage employees to share ideas and suggestions to improve workplace health and safety in response to COVID-19. For employees with a high exposure risk, organizations' secondary interventions may include forming a health and safety committee and involving employee representatives in the committee to improve workplace safety together. Moreover, organizations should encourage self-managed teams among employees for protecting and promoting workplace safety and health.

For infected workers, organizations need to show extra efforts to guarantee their involvement in work-related decision-making processes. Organizations' tertiary interventions should provide infected workers with the option to offer their input when updating work procedures regarding how to best reallocate workloads and resources to support the infected employees. Safety policies and procedures can also benefit from the perspectives of the infected workers. Encouraging infected workers to share their views can help alleviate their concerns regarding workplace safety while recovering from infection.

Discussion

This paper proposed a taxonomy for workplace interventions designed to promote safe and healthy workforce and workplace amid COVID-19 pandemic. Integrating the prevention model from public health with the TWH and OHP-based approaches, we identified eight specific areas for primary, secondary, and tertiary workplace interventions. Organizations may implement policies and practices to promote the safety and health of their workforce by focusing on areas such as physical safety and health, work-life balance, job and financial security, and psychosocial well-being. Moreover, organizational policies and practices focusing on areas such as training and skill development, virtual work and alternative work arrangements, recognition, and involvement can promote the safe and healthy workplace during the pandemic. These interventions may target employees who are at different levels of risk for coronavirus infection to prevent contracting the virus, to ensure early detection of symptoms, and to support infected employees to achieve full recovery and facilitate their return-to-work.

Implications for Workers

Our proposed taxonomy of organizational interventions has implications for employees' health, safety, psychological well-being and productivity. First, this taxonomy is among the first to consider the needs and concerns of different groups of employees during the COVID-19 pandemic. As a result of the spread of COVID-19, the nature of work has changed substantially. Different groups of employees may face different challenges and demands at work and in life and they may experience different levels of exposure risk. Our taxonomy offers target-specific interventions that incorporate employees' differential needs and concerns, and points to the potential for organizations to help effectively address these concerns.

Second, although our taxonomy categorizes interventions into primary, secondary, and tertiary programs designed to help employees with different exposure risk levels, employees also have different traits and characteristics that may make them more susceptible to or resilient against the challenges brought on by COVID-19. For example, individuals with high core self-evaluations have a fundamental positive evaluation about themselves and their abilities (Johnson et al. 2011; Judge et al. 1998). These individuals will likely have a more positive outlook for the future and believe that they can overcome the pandemic-related difficulties. Indeed, research suggest that those with higher core self-evaluations are less likely to perceive environmental demands as stressors (Kammeyer-Mueller et al. 2009), less vulnerable to the negative effects of stressors (e.g., Harris et al. 2009; Yuan et al. 2014), and more likely to engage in problem-focused coping (Kammeyer-Mueller et al. 2009). These organizational interventions may be particularly beneficial for individuals with lower levels of core self-evaluation, as they reflect contextual and structural resources that can help those with lower core self-evaluations cope with the demands related to COVID-19.

Other research has pointed to approach versus avoidance motivations as another important individual difference variable (Elliot and Thrash 2010). Individuals with high levels of approach motivation tend to be guided by the pursuit of desirable or positive outcomes, whereas individuals with high levels of avoidance motivation tend to focus on preventing negative consequences of their behaviors. These motivational

characteristics suggest that individuals may respond differently to the organizational interventions included in our taxonomy. For example, owing to the sensitivity towards negative information and urgency to prevent negative events (Johnson et al. 2013; Lanaj et al. 2012), workers with higher levels of avoidance motivation may respond more positively towards interventions designed to protect employee physical safety and health, and to garner workers' job and financial security. On the other hand, because of their orientation towards positive information and interests in achieving desirable outcomes (Johnson et al. 2013; Lanaj et al. 2012), workers with higher levels of approach motivation may be more responsive to interventions focusing on recognition and involvement. Taken together, considering how personal traits may affect individual workers' responses towards these interventions will be an important way to expand the proposed taxonomy.

Finally, it is important to consider how individual workers may form long-term reactions towards these organizational interventions designed to respond to the crisis of COVID-19. Presumably, this pandemic will eventually end with the development of vaccines and more effective treatment, and workers and organizations will resume their normal operation. As the recovery and resumption process unfolds, workers may form a particularly positive impression towards organizations that offer these interventions when they need the assistance the most. Organizations which clearly communicate that they care about their employees by providing material (e.g., masks, safety gear) and social support (e.g., empathetic and encouraging communications from supervisors) will likely be viewed more favorably by workers. This positive evaluation will likely solidify the social exchange relationships between workers and their organizations (Cropanzano and Mitchell 2005), making them more motivated to contribute effort to their work in order to reciprocate the support they have received from their organizations. Thus, these interventions may not only have immediate positive implications for individual workers' safety, health, and well-being, but also long-term benefits to the employees and organizations as a whole.

Implications for Organizations

Our taxonomy of workplace interventions can not only benefit the entire workforce but also bring positive changes to the workplace, which contribute to the organizational effectiveness. First, our framework provides general guidance to organizations in designing new workplace practices and programs to deal with the challenges brought on by COVID-19. Specifically, our taxonomy highlights the challenges faced by different groups of employees with varied levels of exposure risk to coronavirus. Such categorization of the workforce enables organizations to design diversified programs and policies targeting at distinct employee groups, which can maximize the effectiveness and utility of these interventions. In addition, taking the TWH and OHP-based approaches, our research highlights eight areas that organizations should prioritize when coping with the COVID-19 crisis. These areas guide the direction of organizations' investment in developing new mechanisms to mitigate the impact of the pandemic. Thus, our taxonomy can support the organization's efficient deployment of resources to develop programs that are most critically needed to support their employees.

Second, taking the OHP perspective, the central theme of our taxonomy focuses on improving workforce health and safety. Prior research has documented the importance of

workforce health and safety for organizational performance (e.g., Forteza et al. 2017; Miller and Haslam 2009). Businesses may have to shut down (at least temporally) and disinfect the premise when they have confirmed cases of COVID-19 among their workforce, which compromises continued organizational performance. This issue makes health and safety policies especially important to ensure the continued success of organizations during this pandemic. In addition, considerable research has identified the detrimental impacts of stress and depression on both employee and organizational outcomes (e.g., Chiang and Chang 2012; Ongori and Agolla 2008). The aforementioned interventions can be viewed as an investment of resources from organizations to protect their workforce. This not only offers immediate payoff (e.g., availability of safe and healthy workers to perform business functions during the pandemic), but also has long-term implications. For example, these practices may help reduce the long-term expenses of insurance premiums and hiring and training new employees. Moreover, these interventions may contribute to a trusting and mutually beneficial employment relations (Cropanzano and Mitchell 2005).

Finally, intervention areas identified in our taxonomy will also contribute to the development of a safe and healthy workplace, characterized by high productivity that is not disrupted easily by environmental turbulence (Cooper and Cartwright 1994; Tetrick and Quick 2011). Specifically, providing adequate training and development for workers' career advancement, and utilization of technology to facilitate alternative work arrangements can not only address the immediate needs associated with COVID-19 pandemic, but also foster the development of workforce competency and agility to adapt to unexpected changes. Through employee involvement, organizations may identify alternative work designs or innovative ways to better utilize their human resources to further develop and maintain a healthy and safe workplace, contributing to the organizational goals.

Implications for Policy Makers

Beyond the immediate and long-term benefits for workers and organizations, our taxonomy is also useful for policy makers. First, as policy makers develop and implement new rules and regulations to combat the spread of the coronavirus, our taxonomy suggests that these new rules and regulations should consider work organizations as a critical partner in the successful implementation of policies designed to protect citizens. It is important for policy makers to consider the implications of any rules and regulations for workers, their family, and the broader community. Moreover, public policies that complement organizational efforts to protect and promote workers' safety, health, and well-being will likely result in wider acceptance. The protection of individual workers' health and safety will pay off in terms of their motivation, productivity, and their organizations' effectiveness and success, ultimately addressing broader economic concerns.

Second, policy makers may also use our taxonomy to determine how to provide necessary support and resources to individual workers directly or to organizations to augment their effort to support workers. For example, the local government may consider opening emergency childcare centers to help essential workers balance their work and family demands. In addition, government should consider policies aimed at aiding organizations in their plan to retain their workforce, thereby protecting workers' job and financial security (e.g., interest-free business loans). Government can also collaborate with organizations to develop work-sharing programs with the purpose of

avoiding layoffs by providing workers with employment insurance benefits while their work hours are reduced. Finally, deferral of tax payment and/or waiving tariffs on medical goods (e.g., masks, gloves) can be offered to organizations to encourage them to provide necessary resources and support (e.g., personal protection equipment) to their workforce.

Conclusion

Integrating the TWH and OHP-based approaches with the prevention model, we proposed a taxonomy of organizational interventions that can be implemented to support a safe and healthy workforce and workplace. This taxonomy not only can inform organizational practices, but also have public policy implications, such that public resources can be deployed to augment organizational practices to protect and promote worker safety, health, and well-being.

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Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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