

The role of workplace safety and personal contribution in sustaining work ability: A pilot study among Italian preschool teachers

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Abstract

Background: The emergence of the COVID-19 pandemic has changed the way teachers, particularly at the preschool level, must manage their work to maintain health and safety. Yet, there is a lack of studies that have examined the role of organizational safety procedures on the well-being of teachers who returned to work during the pandemic crisis. The present study aimed to analyze workplace safety's role in affecting preschool teachers' work ability.

Methods: A longitudinal study design was utilized. The study was conducted on preschool teachers employed in the public Educational Services of a medium-sized city in Piedmont (a region in North-West Italy). The study included individuals from the preschool teacher population ($n=108$). Data was gathered through self-report questionnaires at two time points during the second wave of the pandemic.

Results: Based on Structural Equation Modeling ($\chi^2(df = 32) = 47.021, p < .01, \chi^2/df = 1.46, CFI = .98, TLI = .97, RMSEA = .06$ (90% CI: .02, .10), SRMR = .05), all hypotheses were confirmed, highlighting that the relationship between workplace safety and work ability was positive and fully mediated by preschool teachers' personal contribution to safety (indirect effect CI 95%: 0.037- 1.094).

Discussion and Conclusion: The results were discussed regarding their relevance to safety management, sustainability, and promotion of workplace well-being in light of the potential spread of the current pandemic.

Take-home message: Current results highlighted the importance, especially in a health-emergence scenario (such as the COVID-19 pandemic), that organizational management invests in supporting workplace safety, as it contributes to preserving work ability and worker's well-being.

Keywords: COVID-19 workplace safety; Job Demands-Resources model; workplace well-being; work ability.

Cite this paper as: Guidetti G, Viotti S, Sottimano I, Bacci G, Converso D. The role of workplace safety and personal contribution in sustaining work ability: A pilot study among Italian preschool teachers. *J Health Soc Sci.* 2023;8(3):195-208. Doi: 10.19204/2023/THRL3.

Received: 29 August 2023; Accepted: 14 September 2023; Published: 15 September 2023

INTRODUCTION

Preschools provide an essential service to support families and the community at large in caring for children and promoting their emotional and cognitive development. Studies have shown that the learning program offered, the attention and care given to children, and the relationships between teachers and families are inextricably linked to the well-being of preschool teachers [1-3]. In this sense, it has been demonstrated which elements can influence the well-being and the quality of the working life of preschool teachers, highlighting the role of a physically and psychologically demanding environment and the need to provide and develop adequate professional and personal resources [4-8].

The emergence of the COVID-19 pandemic, as in other professions where proximity to users is a particular source for spreading the virus, has changed how teachers manage their work [9]. In Italy, as in most other European countries, after the forced closures in March 2020, the authorities issued regulations for reopening educational institutions and preschools, simultaneously ensuring the resumption of activities, health, and safety of teachers and users [10,11]. Most preschool employees then returned to work as early as September 2020 and faced significant changes due to certain elements. Since physical contact with users cannot be avoided, these work environments are an important source of exposure to the virus [12] and the associated fear of becoming infected [13]. Thus, if more stringent safety measures are needed and serve as buffers to reduce the negative impact of COVID-19, they may also lead to increases in workload, overtime, and fatigue, as well as concerns that these changes may impact child outcomes or communication with families [14-16]. The results emerged from a qualitative German study involving child-care managers, evidenced that the main changes after reopening - the measure of fixed staff compositions (i.e., group settings), the stricter handling of symptomatic management, which further complicated adequate staffing, the reinforcement of intensified hygiene and cleaning practices - increased the mental and physical effort for individual professionals. In this vein, the authors evidenced that the preventive measures to combat COVID-19 not only entail short-term implementation efforts but may also have medium-term and long-term consequences as they can affect the child-care profession's physical, social, and organizational work characteristics [4]. Therefore, while these COVID-19-related demands and challenges can represent a deterioration in psychological well-being for preschool teachers [14,17], it should also be noted, according to Rudolph and colleagues [18], that this crisis also presents several opportunities, particularly when considering the various resources that can be made available by work organizations to face new challenges and promote teachers well-being. According to the JD-R model, job resources refer to the workplace's physical, psychological, social, or organizational aspects that reduce stress reactions while promoting work motivation, personal growth, and development [19]. This model, which focuses on the role of context-specific workplace characteristics, has been widely used to explain organizational processes that influence the health, well-being, and performance of workers in various occupations [20,21].

More recently, Demerouti and Bakker [22] have argued that the JD-R model can be applied to identify and analyze job resources that have become further important for maintaining workplace health, well-being, and safety in light of the COVID-19 crisis. Among these, organizational provision of solid safety measures was identified as a key resource for improving working conditions in occupations that continued or suddenly resumed work during the pandemic [18,23].

With this in mind, this study aims to provide further insight into the role of workplace safety management in influencing the well-being of preschool teachers who returned to work during the

COVID-19 pandemic crisis by embedding hypothesis development within the Job Demand-Resource (JD-R) model [9]. Specifically, the role of COVID-19 workplace safety, a measure of safety climate, in providing a safe work environment in the face of COVID-19 is considered a pandemic-specific job resource that can counteract the decline in preschool teachers' well-being. Given this goal, it should also be emphasized that safety outcomes have been operationalized primarily through critical events but less so in terms of positive conditions for health and well-being [24]. Thus, the relationship between these elements should be further explored, particularly in studies addressing the psychosocial correlates of COVID-19. In this sense, we followed Truxillo and colleagues [25], who emphasized the need to deepen the impact of COVID-19 on work ability, a concept of great importance in understanding well-being and quality of life at work. Moreover, we were also interested in understanding the mechanism by which COVID-19 workplace safety may affect work ability levels.

As the JD-R model argues, workplace resources can also indirectly affect worker well-being by promoting the growth of personal resources. Personal resources are "aspects of the self that are generally associated with resilience and refer to an individual's sense of being able to successfully control and influence his or her environment"[26] and have been incorporated into the JD-R model as mediators between job characteristics and well-being [27]. This hypothesis is consistent with the safety climate literature, which offers insights into the role of personal processes related to safety, such as behaviors, intentions, and motivations, as potential mediators between organizational safety management and safety outcomes. Recently, it has been evidenced that, among a sample of public administrative employees who continued working in their presence during the pandemic outbreak [28], being personally involved in managing COVID-19-related safety at work emerged as a protective factor for emotional exhaustion. By integrating the role that personal processes play in the workplace safety literature and the JD-R statement about the role that personal resources exert, the present study wants to make a step forward by assessing if the personal contribution to safety can be a personal resource able to mediate the relationship between workplace safety and work ability.

In conclusion, some recent contributions have focused on preschool's work demands and well-being under COVID-19 by evidencing stressful situations and increased psychological strain [15-18]. On the other hand, despite the preschool teachers' status as essential workers [29], the role of protective factors that can be available from work organization to sustain their personal involvement in safety practices and their well-being has been largely overlooked. To accomplish this objective, a longitudinal study was conducted to assess COVID-19 perceptions of workplace safety and employees' personal contribution to safety at Time 1. After three months, occupational well-being was measured at Time 2 by assessing teachers' work ability.

COVID-19 safety in the workplace: Theoretical background and hypothesis development

Within organizational safety literature, the safety climate concept describes how workers perceive management's commitment to safety. Organizational policies, practices, and procedures related to workplace safety are valued and rewarded to prevent negative safety outcomes such as accidents, injuries, and lower well-being [25]. In integrating this concept into the JD-R model, research has shown that safety climate can be considered a job resource that makes the stressor more controllable by preventing risky behaviours [30] or increasing job satisfaction [21], especially in a work context with high risk and hazard potential. With the advent of COVID-19, organizational safety researchers recognized early on that the pandemic outbreak would have significant implications for workplace safety management in various work contexts. Indeed, safety systems face challenges related to a new form of prevention for most nonhealthcare organizations, namely, preventing illness due to viral transmission. Therefore, in addition to the usual accident or injury prevention, the need to understand how safety is managed in relation to the prevention of viral infections and their psychosocial correlates has been highlighted [32-34].

This suggests that, especially in occupations that provide care and services to users, the organization's implementation of COVID-19 safety policies and procedures is valued as an important job resource. In this sense, Converso and colleagues [32], following Mariani and colleagues [34],

proposed a conceptualization of COVID-19 safety climate as a measure of workplace safety to create a safe work environment in the face of COVID-19. Specifically, this measure focuses on the organization's non-technical skills, including employee perceptions of how the organization develops and prioritizes situational awareness, decision-making, communication, and strategies to manage fatigue due to COVID-19. In the context of preschools, this would help teachers manage new safety demands, promote a healthy and safe return to work, and have a lasting coexistence with the virus. The concept of work ability may be helpful in understanding how COVID-19 workplace safety can positively impact such issues.

Originally developed in occupational medicine, work ability was defined as a person's physical and mental ability to meet job demands [35]. Later, it also attracted attention in the field of work and organizational psychology because of its predictive power for subsequent work-related health and well-being, performance, and quality of retirement [36-38]. Therefore, most research has focused specifically on the antecedents of work ability to gain insight into preventing its decline during working life [39]. The emergence of the COVID-19 pandemic is known to have presented several challenges and the growing of work-related stressors [40] that, if not adequately addressed, could jeopardize individuals' ability to perform their jobs and do them safely. Despite this, few studies examine work ability in the context of the pandemic [41-43], reflecting interest, particularly in the education sector, in the stressors of forced home working [44]. Indeed, educators and teachers at all levels have had to adapt quickly to online teaching and technological demands, while organizations have had to address safety concerns related to the virus to ensure a safe return to work.

Because work ability is a measure of the extent to which workers feel able to perform their jobs in relation to the physical and mental demands of the job, a safety-enhancing work environment should help alleviate workers' safety concerns and improve work ability levels. Evidence on the protective effect of the safety environment on work ability is mainly from the pre-COVID period and is currently sparse. For example, Brandt and colleagues [45] demonstrated how elements of the safety climate predict workers' future physical and mental work ability in a prospective cohort study conducted between 2012 and 2014. Therefore, further evidence on this topic should be obtained and some gaps filled by using a COVID-19-specific workplace safety measure. For these reasons, and according to the JD-R model [19,22] it could be hypothesized that COVID-19 workplace safety is a relevant workplace resource that can prevent the decline of work ability. Following these assumptions, the first objective of the present study is to analyze the relationship between COVID-19 workplace safety and work ability measured at two time points during the pandemic with a lag of three months. Specifically, it can be hypothesized that:

H1. COVID-19 workplace safety at T1 is positively associated with work ability at T2.

Numerous research studies have shown that an organization's safety climate shapes safety-related attitudes and behaviors of employees [46,47]. Through subjective normative influence and sensemaking on individuals and groups within the organization, safety climate can influence how workers evaluate safety and develop knowledge, motivations, and intentions [24]. In the context of the COVID-19 pandemic, Bazzoli and Probst [31] demonstrated that employees' perceptions of the COVID-19 safety climate were negatively associated with moral disengagement, which served as a mediator for predicting future COVID-19 prevention behavior. The authors argued that during the pandemic, employees were exposed to subjective norms about how the organization valued and reinforced workplace policies to counter the spread of contagion. Thus, the more positive the perception of the COVID-19-specific safety climate, the more likely employees are to internalize positive attitudes and develop less moral disengagement toward safety, a prerequisite for behaving according to normative rules about safety. Therefore, based on these previous empirical findings, it can be concluded that COVID-19 workplace safety, which is expected to promote the use of safe and healthy work practices by employees [32], can be the subjective normative process for shaping employees' contribution to a healthy and safe return to work. Personal contribution to safety is then a measure of individual engagement in the safety process to counter the spread of contagion, which can be considered a personal resource according to the JD-R model [26].

Following these assumptions, the second aim of the present study is to analyze the relationship between COVID-19 safety in the workplace and personal contribution to safety, both measured at Time 1 during the pandemic. Specifically, it can be hypothesized that:

H2. *COVID-19 workplace safety (T1) is positively associated with personal contribution to workplace safety in relation to COVID-19 (T1).*

The hypotheses presented above predict a positive relationship between COVID-19 workplace safety and work ability, and between COVID-19 workplace safety and personal contribution to safety. By extending H1 and H2, it could be hypothesized that personal contribution to safety could act as a mediator in the relationship between COVID-19 workplace safety and work ability. On the one hand, this hypothesis is supported in the light of the JD-R model. As stated above, it has been evidenced that a resourceful work environment can be a driving force for the development and growth of personal resources, which in turn are positively related to well-being outcomes [24].

This hypothesis is also supported in light of the safety climate literature who evidenced the mediating role of individual processes between safety climate and outcomes [24,31,46].

Therefore, it can be argued that through the process of internalized norms and values shaping personal contributions to healthy and safe work practices, COVID-19 workplace safety may positively affect well-being outcomes such as work ability. In this case, it can be hypothesized that:

H3. *COVID-19 workplace safety (T1) is positively associated with work ability (T2) by the mediating role of COVID-19's personal contribution to safety (T1).*

METHODS

Data collection and participants

As part of an agreement between the Department of Psychology and the public educational services of a medium-sized city in Piedmont (a region in North-West Italy), a project focusing on well-being at work was developed during the 2021 COVID-19 pandemic wave. A longitudinal study was carried out to evaluate workplace safety perceptions regarding COVID-19 and employees' individual contributions to safety at Time 1. Following this, occupational well-being was assessed at Time 2, three months later, by measuring the work ability of teachers.

Both questionnaires were sent by email. The first questionnaire was sent in January 2021 (T1) and the second in May 2021 (T2). Regarding the pandemic scenario, the contagion index RT in Piedmont during January 2021 was around one. On January 11, 2021, this area was classified as a "yellow zone," which means a travel ban between regions and autonomous provinces and a curfew from 10 p.m. The yellow zone also included that many activities were subject to restrictions (shortened opening hours, closure of shopping centers on holidays except for basic needs stores), many activities were closed (gyms, swimming pools, etc.), and remote work was strongly recommended for offices.

Scales and measures

Major study variables were collected with a self-report questionnaire using the following items and scales:

Workplace safety regarding COVID-19 (Time 1).

It was measured using the Safety at Work questionnaire (SAPH@W), developed by Converso and colleagues [32]. It investigated the employee perceptions about the management and the prevention of the COVID-19 risk contagion in the workplace and it consisted of four subscales, each including 4 items (5-point Likert scale ranging from 1 "Not at all" to 5 "Completely"). The first subscale focused on efficacy and effectiveness of the organizational communication on COVID-19 item (e.g., item: "In your opinion, in your workplace there is the opportunity to communicate effectively with the supervisor on risks related to COVID-19", $\alpha=.88$). The second subscale investigated the promptness, foresight and care of the organizational decision-making process regarding COVID-19 (e.g., item: "Regarding contagion risks by COVID-19, in your opinion, your employer organization is able to prioritize when decisions need to be made", $\alpha=.95$). The third subscale regarded the situational awareness of contagion risks and trends in the workplace (e.g., items: "In your opinion, your employer organization is able to identify specific contagion risks by COVID-19 in your job"; $\alpha=.92$).

The fourth subscale examined organizational ability to recognize and care for workers' fatigue specifically due to the pandemic (e.g., use of prevention devices, isolation, cognitive and emotive burden). (e.g., item: "In your opinion, your employer organization is able to recognize the possible effects of such behaviors on physical fatigue", $\alpha=.94$).

Personal contribution to workplace safety in relation to COVID-19 (Time 1).

It consisted of 4 items from SAPH@W investigating the personal contribution regarding the four dimensions of workplace safety regarding COVID-19 (the four dimensions cited above). A sample item is: "Do you feel able to provide information to other employees regarding how to tackle contagion risks by COVID-19?" using a 5-point answers scale (from 1 "Not at all" to 5 "Completely", $\alpha=.86$).

Work ability (Time 2).

It was measured using two subscales from the work ability personal radar (WA-PR), developed by Ilmarinen and colleagues [48]. The first dimension consisted of 5 items ($\alpha=.79$) and measures the perceived ability to respond to job demands (e.g., item: 'Assume that your work ability at its best has a value of 10 points. How many points would you give your current work ability? (0 means that you cannot currently work at all). The second is health and functional capacity (two items, e.g. 'How is your state of health in relation to your work?', $\alpha=.79$); The answer options range from 0 to 10 (where 0 represents the worst evaluation and 10 represents the best evaluation).

Background variables (Time 1/Time 2).

Age, marital status, having under 14 children (yes/no) and, other family member to take care(yes/no) were collected in the questionnaire. The model to test study hypotheses was controlled by age since it is well-established that age and work ability are inversely correlated [49].

Data analysis strategy

All data analyses were carried out with SPSS 29 (IBM, Armonk, NY, USA) and Mplus 8 (Computer Software, Los Angeles, CA, USA). Prior to testing the proposed hypotheses, Confirmatory Factor Analyses (CFA) was performed to check psychometric properties of the constructs considered as well as to ascertain the absence of common method bias. The fit of the CFA model was assessed with the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). For the TLI and CFI, values higher than 0.90 were considered indicators of a good model fit [50,51]. An SRMR value equal to or less than 0.09 also indicated a good model fit [52]. Finally, an RMSEA value lower than 0.08 indicated an acceptable model fit [53]. In addition, the Akaike information criterion (AIC) and Bayes information criterion (BIC) were used to compare the alternative (non-nested) measurement models [54]. The model with the lowest AIC and BIC was considered the best-fitting model. Pearson's correlations were performed in order to check the significance and the direction of the relationships among all the variables considered. In order to test the relationships hypothesized in the sample, structural equation modeling (SEM) was conducted using ML. The fit of the model was assessed with the ratio of χ^2 to the degrees of freedom (df), the CFI, the TLI, the SRMR, and the RMSEA. The mediating effect of personal contribution to safety on the relationships of workplace safety with work ability was assessed through the bootstrapping procedure that was applied to test the significance of the indirect effects [55].

Ethical aspects

Despite this situation, schools were open, especially preschools, so preschool teachers had to work in presence. In May 2021, during the second survey, the Piedmont was still in the yellow zone, but there were signs of a decrease in the number of infections (RT index just below one).

The research protocol was developed in compliance with Italian Law 101/2018 on protecting privacy in the workplace and was in accordance with the provisions of the 1964 Declaration of Helsinki (as revised by Fortaleza, 2013). All ethical guidelines for research involving human subjects were followed in this study. The questionnaire was accompanied by a cover letter that openly described the purpose of the research and the anonymity of the data collection and treatment. This cover letter

also clearly stated the voluntary nature of participation in this study. All participants signed an informal consent form.

RESULTS

The questionnaire was sent to all 410 educators employed in the service. Of them, 108 (dropout rate: 74%) answered both questionnaires.

All participants were female with an average age of 49.17 (sd=10.94). The majority were married or living with a partner (80.6%), 21.3% has at least child, and 12% has another family member to take care for (e.g. not self-sufficient elderly).

Preliminary analyses

CFA suggested a good fit to the data of the measurement model. In particular, global fit indexes were found to be satisfactory: $\chi^2(df = 278) = 490.420, p < .01, \chi^2/df = 1.76, CFI = .91, TLI = .90, RMSEA = .07$ (90% CI: .07, .10), SRMR = .07; AIC= 5646.42; BIC=5904.34. Moreover, each item significantly loaded on its corresponding factor (communication: $.65 \leq \lambda \leq .94$; decision making: $.89 \leq \lambda \leq .93$; situational awareness: $.71 \leq \lambda \leq .94$; fatigue management: $.89 \leq \lambda \leq .91$; personal contribution: $.59 \leq \lambda \leq .89$; work-related health time 2: $.77 \leq \lambda \leq .85$; work ability time 2: $.67 \leq \lambda \leq .84$). Comparison with the one-factor model ($\chi^2(df = 299) = 1174.33, p < .01, \chi^2/df = 3.92, CFI = .64, TLI = .61, RMSEA = .17$ (90% CI: .16, .18), SRMR = 0.16, AIC= 6288.346, BIC= 6491.549) also suggested the absence of common method bias. The internal consistency of all scales has been further confirmed by Cronbach's alphas values, ranging from .79 and .95 (Table 1).

Table 1. Descriptive statistics (means with standard deviations for continuous variables, frequencies with percentage for nominal variables) Cronbach's alpha, Pearson's correlations and ANOVA tests.

	M(ds)/Freq(%)	Cronbach's alpha	1	2	3	4	5	6	7	8
1. Communication (time 1)	15.59 (3.28)	.88	1							
2. Decision making (time 1)	13.36 (3.93)	.95	.77**	1						
3. Situational awareness (time 1)	12.96 (3.97)	.92	.85**	.76**	1					
4. Fatigue management (time 1)	10.46 (3.78)	.94	.71**	.70**	.74**	1				
5. Personal contribution (time 1)	13.99 (2.71)	.86	.59**	.66**	.59**	.52**	1			
6. Work ability (time 2)	35.74(6.00)	.79	.29**	.38**	.34**	.35**	.42**	1		
7. Work-related health (time 2)	14.51(2.76)	.79	.27**	.28**	.21*	.30**	.33**	.52**	1	
8. Age	49.17 (10.04)	--	.26**	.17	.19*	.14	.19*	-.13	-.10	1
9. Children (age<14)	23 (21.3%)	--	.05	1.07	1.05	.23	1.04	.35	.18	
10. Other family member to take care for	13 (12%)	--	.25	.00	.00	.04	.02	.48	.87	

11. Married/living with partner	87(80.6%)	--	.73	.12	.12	.22	.25	.38	.67
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Note: ** significant at 0.01 (two tail); *significant at 0.05 (two tail).

As shown in Table 1, Pearson's correlations between major study variables were found to be all positive and significant. Age was found to be positively and significantly associated with communication ($r=.26$), situational awareness ($r=.19$), and personal contribution ($r=.19$); surprisingly, it was not found to be significantly related to work ability and work-related health. In addition, ANOVA tests showed that having children (age < 14), other family member to take for (e.g. elderly parents), and marital status were no significantly associated with any of the major study variables (i.e., Workplace safety T1, Personal contribution to safety T1, Work ability T2).

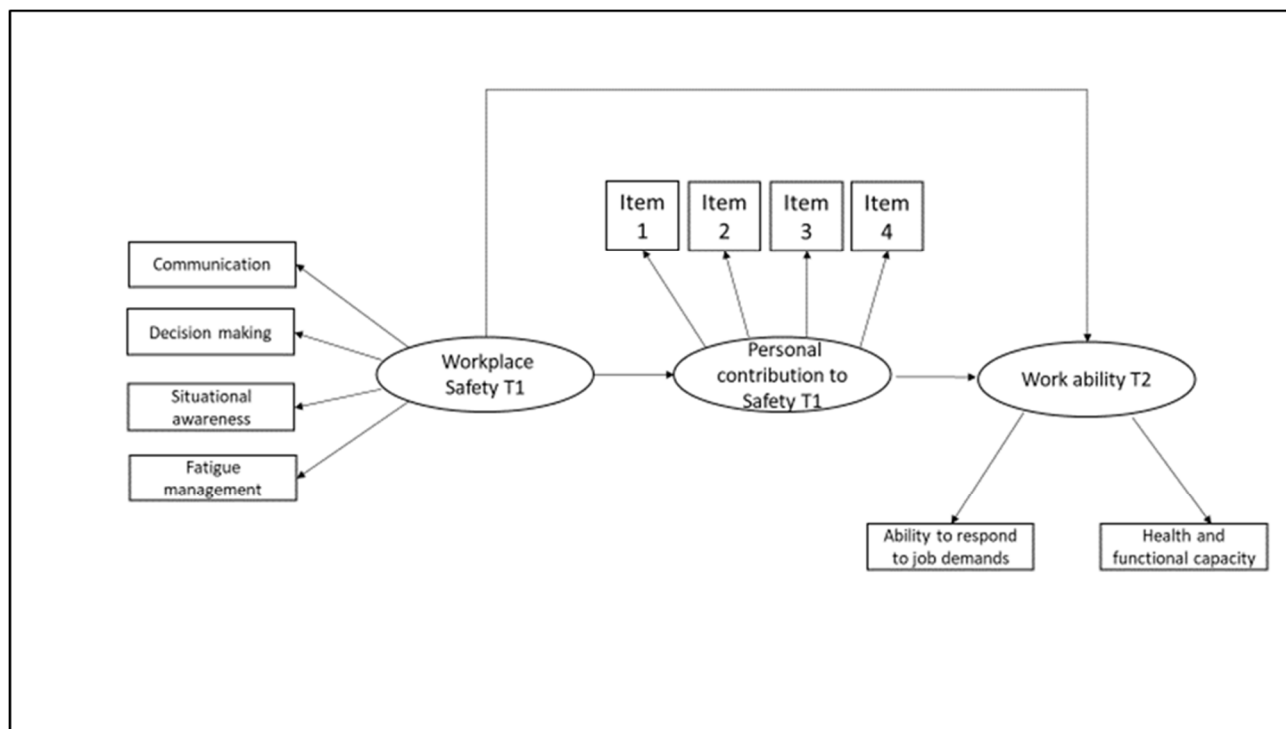


Figure 1. Structural equation model representing the mediating role of personal contribution to safety between workplace safety regarding COVID-19 and work ability.

Figure 1 reported the structural equation model used to test the study hypotheses. The global fit of the model was satisfactory: $\chi^2(df = 32) = 47.021$, $p < .01$, $\chi^2/df = 1.46$, CFI = .98, TLI=.97, RMSEA = .06 (90% CI: .02, .10), SRMR = .05. By inspecting the single paths, workplace safety at time 1 was found to be significantly and positively associated with personal contribution to safety at time 1 ($\gamma=.38$, $p=.02$); in turn, personal contribution to safety at time 1 was found to significantly and positively predict work ability at time 2 ($\beta=.68$, $p=.0001$). In this model, the relationship between workplace safety at time 1 and work ability at time 2 was found to be not significant ($\gamma=.19$, $p=.15$). The indirect effect of personal contribution at time 1 between workplace safety at time 1 and work ability at time 2 was found to be significant, suggesting the mediating role of personal contribution (CI 95%: 0.037-1.094). Moreover, after removing personal contribution by the model, the relationship between workplace safety at time 1 and work ability at time 2 was found to be positive and significant ($\beta=.45$, $p=.001$; global fit indexes: $\chi^2(df = 8) = 8.344$, $p < .40$, $\chi^2/df = 0.12$, CFI = .99, TLI=.99, RMSEA = .02 (90% CI: .00, .10), SRMR = .03). This finding further confirmed the mediating role of personal contribution at time 1 in the relationship between workplace safety at time 1 and work ability at time 2, suggesting a condition of total mediation.

In addition, to check the strength of our hypothesis, the model was controlled by age. The global fit indexes suggested goodness of the model $\chi^2(df = 39) = 64.023$, $p < .40$, $\chi^2/df = 0.01$, CFI = .97, TLI = .95, RMSEA = .08 (90% CI: .04, .11), SRMR = .05) and the mediating role of personal contribution to safety at time 2 in the relationship between workplace safety at time 1 and work ability at time 2 has been confirmed as well (γ workplace safety at time 1 \rightarrow personal contribution time 1 = .33, $p = 0.3$, β personal contribution time 1 \rightarrow work ability at time 2 = .66, $p = .0001$, indirect effect CI(95%) = .06-1.14).

Finally, to further strengthen our findings, we provided evidence to exclude that personal contribution, in addition to a mediating role, plays a moderating role in the relationship between workplace safety and work ability. A series of moderating regression analyses using SPSS have been carried out to do this. At step 1 ($R^2 = .14$, $p < .001$), only workplace safety T1 has been included as an independent variable, showing a significant effect on workability T2 ($\beta = .27$, $p < .001$). At step 2 ($R^2 = .20$, $p < .001$), after including in the model personal contribution T1 ($\beta = .27$, $p < .001$), the effect of workplace safety on work ability stopped being significant ($\beta = .31$, $p = .008$). At step 3 ($R^2 = .20$, $p < .001$), the interaction effect between workplace safety T1 and personal contribution T1 has been added, showing a non-significant effect on work ability T2 ($\beta = -.01$, $p = .38$). Based on this findings, we excluded the moderating role of personal contribution in the relationship examined.

DISCUSSION

In contrast to the attention paid to the challenges that the COVID-19 pandemic posed to the management of work-from-home for many occupations, there has certainly been less attention paid to the well-being of workers in occupations that returned to work during the pandemic [18,27]. Regarding the education sector specifically, on the one hand, distance learning has presented a number of challenges to teacher well-being and the quality of teaching [56], whereas on the other hand, preschool services have had to address safety management to keep services open and ensure the health of workers and users. The present study aimed to improve knowledge about how workplace safety management can be a job resource of health and well-being for preschool teachers who returned to work during the pandemic, by considering its impact on work ability.

To achieve this goal, a longitudinal study was conducted to assess COVID-19 perceptions of workplace safety and employees' personal contributions to safety at Time 1. After three months, occupational well-being was measured at Time 2 by assessing teachers' work ability. The relationships between the variables were hypothesized in light of the JD-R model [19,22] and previous findings on the role of safety climate in influencing health and well-being and the mediating role of individual processes [31,47]. In the context of the present study, the results showed that COVID-19 workplace safety operationalized as the employees' perceptions of how the organization develops and prioritizes COVID-19 safety management, a set of non-technical organizational skills to prevent and manage the spread of contagion at work [32], was positively and significantly associated with work ability (H1). On the one hand, this finding is consistent with the sparse existing evidence [45]. On the other hand, it contributed to workplace safety as a functional resource to prevent a decline in work ability. Furthermore, the hypothesis (H2) about the positive relationship between COVID-19 workplace safety and personal contribution to the management of COVID-19 workplace safety was confirmed. This finding is thus consistent with the importance of organizations' safety management practices in shaping employee safety-related attitudes and behaviors [46,47], a process that can also be read in light of the norm of reciprocity.

As pointed out by Hofmann and Morgeson [57], individuals who feel that their organization supports their health and safety tend to reciprocate with a more active commitment to safety. Finally, the analyzes revealed a significant indirect effect, proving that T1's personal contribution to safety mediated the influence of T1 workplace safety on T2 work ability. Consistent with previous research, this finding confirms the central role of employees' attitudes toward health and safety issues, which represents the mechanism by which organizational strategies can positively affect their well-being and quality of work life. This finding is therefore consistent with the JD-R model which argued that job resources, as is COVID-19 workplace safety, can be a driver for the development of personal engagement in safety practices, which in turn sustains occupational well-being and higher levels of

work ability. On the contrary, no interaction effect has emerged. This finding, other than strengthening the results on the mediation role, evidence that personal contribution to safety does not act as a booster effect of workplace safety. This is consistent with the JD-R model [22], which posits that resources can buffer the impact of job demands on outcomes instead of job resources. In light of the results of the present study, some implications for practitioners and future research can be underlined. First, the conceptualization of workplace safety management belongs to a newer field of research that focuses on COVID-19 prevention [31] instead of widespread attention to injury or accident prevention. This particular focus is, therefore, intended to enable more targeted interventions that are useful for COVID-19 safety management in the workplace. Specifically, this approach was used to expand the study of workplace safety as a resource for sustaining work ability, focusing on the preschool educational context. As Truxillo and colleagues [25] argue, the pandemic has indeed presented significant challenges that may have strengthened or otherwise altered the relationships between work ability and its antecedents, bringing workplace safety analysis to the forefront. Nevertheless, work ability has been largely neglected in relation to COVID-19 impacts, limiting understanding of how to prevent its decline or promote its maintenance. This goal is particularly relevant to work contexts where employee well-being can significantly impact the quality of work and service provided. It is well known that threats to educators' physical and mental health are detrimental to themselves, the stability of their care programs, and the children they care for [3].

Because the study of work ability in preschool and early childhood education settings has underscored its predictive power for quality of working life and mental health [38,58], the present findings, particularly in times of increased stress and COVID-19-related challenges [13-15], may be relevant to providing appropriate interventions for prevention or health promotion. As the pandemic morphs into an endemic, interventions should be activated to monitor preschool teachers' perceptions of organizations' COVID-19 safety management and their personal contributions to safety practices over time. Action should then be taken to maintain or enhance the organizational skills that constitute COVID-19 workplace safety. Training for managers and decision-makers should aim to promote situational awareness of contagion risks and trends in the workplace by providing up-to-date information on the evolution of the pandemic. The decision-making capacity of management should also be promoted so that decisions are made quickly, considering priorities and potential consequences. In addition, the quality of communication with teachers about COVID-19 should be managed. One of the most important factors in workplace safety is the presence of supervisors and a team with whom staff can openly discuss safety concerns [24]. Preschool leadership should, therefore, find ways to involve teachers more in decision-making and communicate safety policies and procedures rather than just providing top-down information and training. Through supportive relationships, organizations should also help address and communicate workers' safety concerns related to the virus and support strategies for managing fatigue due to COVID-19. The need to address fatigue management has also recently been recognized through guidelines that include strategies for managing fatigue in the workplace during COVID-19 [59]. In this sense, workplace health promotion programs, stress management, even with the support of mandatory health surveillance, and psychological counseling services can be a tool that organizations can use to recognize and support fatigue [59-62]. Our findings then indicate that strengthening these dimensions of workplace safety can have significant implications for organizational learning. Namely, workplace safety has been shown to be a functional resource for developing employee contribution in implementing and adopting safety measures. Moreover, they also have implications for health promotion, as these efforts can, in turn, support work ability, a dimension of occupational well-being that is itself a health resource that can lead to the building of other resources or the prevention of burnout [8,58] prerequisites for healthy organizational outcomes [63].

Despite the interesting implications of the present findings, it should be noted that the study is not without limitations. First, the study has included a non-randomized sample involving a restricted percentage of preschool teachers of a public institution in northern Italy; this might have limited the

generalizability of the results to similar and to other professional contexts. In addition, despite the strength of the longitudinal design, future studies should collect data over multiple waves with a greater time interval between measurements and control by baseline data (e.g., cross-lagged design). Third, dispositional variables (e.g., personality traits) might have affected the relationship among major study variables; to strengthen our findings, future research might include dispositional aspects as control variables in the study design. Finally, the survey is based on self-report data only, and objective information on safety measures, health, and work ability should therefore be measured in future studies to limit the risk of common method bias. For these reasons, this pilot study has allowed us to highlight preliminary results that future research on these specific topics should further develop. Expanding the application of the Job Demands-Resources model as a theoretical framework, studies should even assess COVID-19-related job demands, such as workplace risk perceptions, increasing work overload and fatigue to cope with safety issues, as well as teachers' opinions about the effectiveness of workplace safety measures, to analyze their impact on occupational well-being and how workplace safety can act as a buffer. Moreover, to expand the analysis on the buffering role of personal contribution to safety, future studies may analyze such interaction by considering its moderating role in the relationship between salient COVID-19 pandemic job demands, such as increased workload and work ability.

CONCLUSION

In conclusion, the results of the present study can, therefore, be indicative for practitioners to preserve and promote the quality of working life among preschools and kindergarten institutions through actions aimed at fostering workplace safety. Moreover, by favoring the direct involvement of teachers, these interventions can, therefore, represent organizational learning levers for long-term challenges. Indeed, even if the pandemic is over, at least in emergency terms, the future challenge lies precisely in the ability to live with the virus, especially for third-sector organizations, as are preschools.

Author Contributions: Study design and conceptualization: D.C., I.S., G.B., S.V., G.G.. Data analysis: S.V. Manuscript drafting: G.G, S.V. Critical review of the manuscript: G.G., S.V., G.B., D.C.

Funding: No funds were received for the present study.

Acknowledgments: None.

Conflicts of Interest: None.

Data Availability Statement: Data are available on request from the author.

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