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Individual and organizational vulnerability and resilience factors in the COVID-19 pandemic

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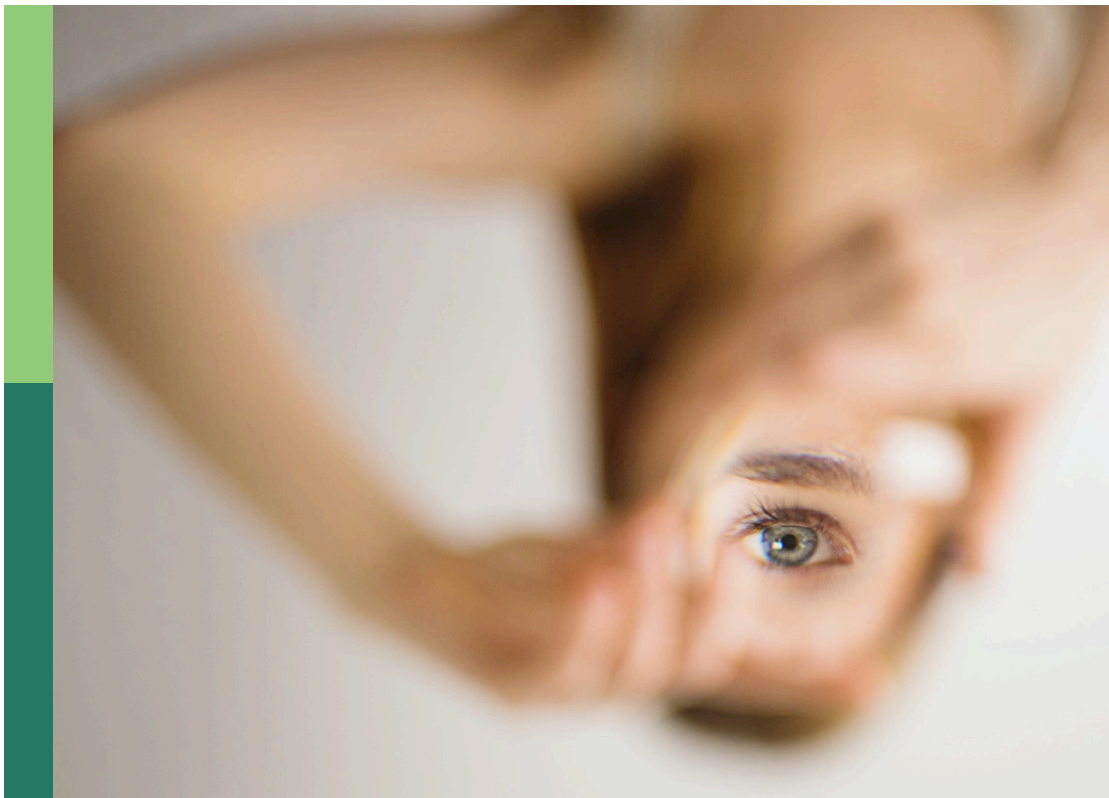

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Individual and organizational vulnerability and resilience factors in the COVID-19 pandemic

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Editorial: Individual and organizational vulnerability and resilience factors in the COVID-19 pandemic

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Editorial on the Research Topic
Individual and organizational vulnerability and resilience factors in the COVID-19 pandemic

In the beginning the psychological concepts of vulnerability and resilience have been conceptualized as opposing characteristics of individuals. In more recent research vulnerabilities and resilience factors have been treated as characteristics that may be individual, social or organizational (see for example Paton et al., 2001). Furthermore, an individual, group or organization may be characterized by different vulnerability and resilience factors at the same time. Research has also shown that vulnerability is not defined by one characteristic alone because intersectionality is often the care (Ryder and Boone, 2019).

One example for intersectionality is that women are more vulnerable in the COVID 19 pandemic. This finding is important but studies from an intersectional perspective show the additional predictive value of socioeconomic factors, cultural factors and the type of occupation may define how vulnerable or how resilient women can be in a certain social environment (see for example Fordham, 1999). A high number of studies on COVID 19 vulnerabilities show the necessity to focus also on the resilience factors that often accompany potential vulnerabilities. Recent literature about COVID 19 has emphasized specific individual and organizational as well as systemic vulnerabilities that may be characteristic in all pandemics. The same applies for risk factors. The COVID 19 pandemic gives us a chance to further broaden our knowledge about vulnerability and resilience aspects on all levels (individual, social, organizational). For this we need an interdisciplinary and multimethod approach. This has been reached in the given situation because COVID 19 has promoted cooperation and networking between scientists from distant disciplines and origins. With this in mind we collected articles from different disciplinary perspectives: medicine, science, social sciences, public health. Our preferred focus was on mixed method approaches. By analyzing resilience and vulnerability from different angles and on different levels we wanted to gain new insights into the topics.

The following Research Topic of articles gives an overview over different target groups, countries and different perspectives on vulnerability and resilience factors during the pandemic.

Some articles focus on groups that have been emerged as vulnerable during the pandemic like young adults (Kulcar et al.), women and the healthcare and social sector (Riedel et al., 2022a,b). Other articles focus more on the concept of resilience and the factors enabling resilience on each of the above-mentioned levels.

As the studies in this Research Topic show, resilience plays an important role in emergent adulthood. The authors Fu and Wang have shown that for young adults' risk perception of COVID-19 can predict anxiety symptoms. They also showed that quality of life influences both risk perception of COVID-19 and anxiety as a mediator. Resilience on the other hand seems to buffer these effects. A high individual resilience score reduces the effect of risk perception on anxiety. Individual resilience was measured using the CD-RISC by Connor and Davidson (2003). The scale includes five factors: (1) notion of personal competence, high standards and tenacity, (2) trust in one's instincts, tolerance of negative affect, and strengthening effects of stress, (3) positive acceptance of change, and secure relationships, (4) control, and (5) spiritual influences. From these findings the authors conclude that risk communication plays an important role in anxiety management in young adults. At the same time the focus should be on resilience building and quality of life.

Regarding social resources in young adults Kulcar et al. (2022) found that COVID 19 measures heavily influenced young adult's friendships. They experienced major challenges in building new relationships and had difficulties in successfully maintaining existing friendships. As a result, social support by friends diminished, which led to a lack of social resources and loss of resilience. This longitudinal mixed method study could show that the pandemic measures had significant negative effects on friendships for university students.

Talić et al. analyzed resilience and vulnerability factors in students of a military University. Their study investigated individual personality traits (for example extraversion, neuroticism) as well as organizational resilience factors (for example commitment to the organization and satisfaction with study). Furthermore, the researchers investigated health related factors (for example loneliness, quality of life, COVID-19-related stress). Coping strategies were also measured. The authors assumed that coping style would have an influence on stress and psychological wellbeing. The results showed that resilience factors could not predict change in wellbeing over time. But the researchers found some evidence for mediation effects of more active coping styles and the use of social support. Organizational resilience factors plaid a role togethers with personality traits for the wellbeing of the students.

Park et al. used the concept of psychological capital (PsyCap) as a trait influencing both sport community involvement and life satisfaction in Generation Z. Furthermore, the authors referred to the stress process model. Results showed distress modulated the mediation effect of PsyCap especially in Generation Z (Gen Z). Results also showed vulnerability of global sport communities and Gen Z to COVID-19. The authors concluded that support in stress management is of utmost importance for sports fans' community involvement and life satisfaction. Gen Z were more distressed during the pandemic than other participants. Successful stress management was an important prerequisite for the use of community involvement to promote positive resources.

Li and Zhu could show in a Chinese student population that psychological stress had an influence on the students' sense of control as well as on their safety compliance. In this study perceptions of stronger safety regulations enhanced the link between student stress and safety compliance. Future pandemic measures in Universities can profit from these findings.

For young adults we conclude that their dependence of social networks made them especially vulnerable and individual factors like secure relationships and self-reliance as well as active coping but also organizational resilience factors like organizational commitment and community involvement play a role in their wellbeing.

For studies in the healthcare sector we assume that a multilevel approach to resilience is even more important. Panari et al. studied Care Unit identification and perception of safety, as well as personal work engagement in nurses. Their findings show that both aspects seem to be protective against burnout and psychological distress. All interventions done to promote team identification as well as a focus on safety measures for healthcare professionals may positively impact nurses' wellbeing.

A Brazilian researcher team (Pereira-Lima et al.) studied nurses in a low-income country where especially negative effects of the pandemic could be found. Their research showed that dissatisfaction with workplace was rather high and perceived safety very low. Workplace dissatisfaction was significantly linked to emotional exhaustion and depersonalization. Effective support and improvements of workplace safety and quality was seen as crucial for maintaining physical and mental health of nurses in this setting.

Kaltenbrunner et al., an Austrian researcher group, did an interview study with managers in the healthcare sector. Their findings show that Individual personality traits like pragmatism or flexibility and their attitudes like for example optimism are very important for their own resilience as well as the resilience of their teams. Most important was a joint (crisis) understanding between managers and teams expressed for example in a common sense of direction. Furthermore, a focus on social connectedness and a caring attitude were important resilience factors. These attitudes and traits helped to maintain and adapt NPOs' functioning during the pandemic. This study is a good example of a multilevel approach to resilience that emphasizes the interaction of individual and organizational resilience factors.

Regarding healthcare personnel we thus can say that the care orientation of the management is one of the most important resilience factors during the pandemic and that organizational resilience factors play a crucial role in maintaining wellbeing and health of staff (see also Juen et al., 2021; Kreh et al., 2021). This finding might be important also for other sectors in the workforce.

In their study on the French workforce Sandrin et al. examined how a psychological safety climate (PSC) influenced work performance. They analyzed psychological distress and post-traumatic growth during COVID 19 immediately before the second lockdown in France (when cases were steeply rising and vaccination was not yet available). The results show that the safety climate had a positive influence on post-traumatic growth (PTG). Safety climate furthermore influenced work performance and reduced

psychological distress. This study shows how important the factor of perceived safety is for wellbeing and performance of healthcare workers during a pandemic.

This study confirms one of the five principles, the principle of safety, that Hobfoll et al. (2007) have named as important resilience factors after emergencies.

Doing a narrative analysis of 48 articles Siller and Aydin analyzed vulnerability and resilience in minority and marginalized individuals and groups: In their view the following three aspects are most important: social inequality must be taken into account because inequality creates vulnerable contexts. In most cases vulnerability has historical roots in the given contexts. In the pandemic these historically grown inequalities lead to special vulnerability factors (communication barriers as well as special risk factors). The authors also assumed that these marginalized and minority groups showed specific resilience during the pandemic. Their results show that this is the case and that a special focus on minority groups and marginalized groups is necessary when looking at disasters. This study is a good example of conceptualizing vulnerability as an integral part of resilience.

We define vulnerability with UNISDR as "*The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards*," (UNISDR, 2015, p. 10). These circumstances are always defined by situation and history. From a Public Health perspective, we see vulnerability as a heightened risk for loss in a crisis situation often including a weakened ability to react in an adequate manner (see also Vaughan and Tinker, 2009). This heightened risk of some population groups in a disaster is closely linked to inequality.

Regarding gender effects of the pandemic we see that for example in a study done by Saloshni and Nithiseelan. In South Africa they studied women workers in vulnerable employment situations for example as domestic help in private households, traders in the informal economy, and small-scale agriculture with no employment contracts or health insurance cover. The study shows the link between socioeconomic and health risks during COVID 19. Although the South African government implemented policies to support workers and reduce the risk faced by vulnerable workers long-term policies aimed at socioeconomic protection are not in place.

A group of Turkish researchers (Demirkaya et al.) analyzed predictors of job quitting during the pandemic and found a significant correlation between depression and work location. The Perceived effect of COVID (PEoC) increased fear, internal and external entrapment, and depression. Also, this study shows the negative effect of life circumstances.

Eckhard et al. presented a measure to assess the psychosocial impact of the SARS-CoV-2 pandemic. The presented measure is based on the International Classification of Functioning, Disability, and Health (ICF) and was developed during the first lockdown in Germany in April 2020. FACT-19 measures stress (pre and post) as well as context factors like barriers and protective factors the authors developed the measure from a former stress barometer a brief screening instrument for emergency situations. The results indicated the suitability of the measure that includes pre-pandemic stress, facilitators and barriers.

Using examples from the COVID 19 pandemic the article Research Topic as a whole is able to show that vulnerability and resilience cannot be treated as opposing concepts. Even people in vulnerable contexts have resilience factors in themselves, in their group and communities as well as in their organizational structures. We can always find resilience and vulnerability factors in any given context. Furthermore, intersectionality plays an important role, vulnerability comes from living in vulnerable circumstances and is closely linked to inequality. And last, we have to always view resilience and vulnerability on the levels of the individual, the social (team/group/community) as well as on the organizational level.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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ORIGINAL RESEARCH
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The Effect of Risk Perception on Anxiety in Emerging Adulthood Under the Local Outbreak of COVID-19: A Conditional Process Analysis

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This study aims to explore the influence mechanism of COVID-19 risk perception on anxiety in emerging adulthood in the context of public health events of the second round of COVID-19 outbreaks and provide support for exploring the path of mental health after the normalization of the epidemic situation. An online questionnaire, combined with community social work, was used in this study, and data of 522 emerging adults were collected in February 2021. The Perceived Risk of COVID-19 pandemic scale (PRCPS), the generalized anxiety disorder 7-item (GAD-7) scale, the scale of affect balance, and the connor-davidson resilience scale (CD-RISC) were used to investigate. The results showed that: first, the risk perception of COVID-19 in early adulthood was positively predictive of anxiety symptoms [$B = 0.110$, $p < 0.05$, 95%CI = (0.042, 0.176)]. Second, the affective quality of life plays a mediating role between the risk perception of COVID-19 and anxiety [$B = 0.108$, 95%CI = (0.060, 0.161)]. Thirdly, resilience plays a moderating role between the risk perception of COVID-19 and anxiety, the higher the resilience of emerging adulthood, the weaker effects of the risk perception of COVID-19 negative prediction of anxiety [$B = -0.110$, $p < 0.001$, 95%CI = (−0.170, −0.049)]. Therefore, to control the anxiety of emerging adulthood in public health events, we should pay attention to the propaganda and management of epidemic information, improve the quality of life, and attention should be paid to the emerging adulthood with low resilience.

Keywords: COVID-19, emerging adults, risk perception, anxiety, resilience

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INTRODUCTION

The COVID-19 pandemic, which outbreaks in late 2019 has greatly impacted the normal operation of the world economy and society. The WHO announced the outbreak of COVID-19 as a public health emergency of international concern. In the winter and spring season of 2020–2021, large-scale local outbreaks were detected in the rural areas of Hebei, Jilin, and Heilongjiang provinces, and more than 2,000 cases were reported in total (Gao, 2021). Viral panic, conspiracy ideation, and contagious fear during the COVID-19 pandemic filled everyone's life and perceived lot of risks (Bratu, 2020; Lăzăroiu and Adams, 2020; Popescu Ljungholm and Olah, 2020). Risk perception

in terms of virus anxiety and emotional contagion shaping the COVID-19 pandemic fear (Dobson-Lohman and Potcovaru, 2020; Lăzăroiu et al., 2020; Nemțeanu et al., 2021). In addition to posing a major threat to physical health, the COVID-19 pandemic also poses a threat to mental health due to people's long-term fear and uncertainty during the epidemic (Adhanom Ghebreyesus, 2020; Hyland et al., 2020). People get depression, anxiety, and psychological stress (Duncan, 2020). And due to the COVID-19, about 24.9% of college students have experienced anxiety (Cao et al., 2020).

Especially for young people, emerging adults are most impaired (Wirkner et al., 2021). According to Arnett (2007), emerging adulthood (18–25 years old) is the age of instability due to residential, love, work, and education changes and a self-focused age because emerging adults have little in the way of social obligations, duties, and commitments to others, which leaves them with a great deal of autonomy in running their own lives. The mental health problems of emerging adults in their early adulthood may be more serious. The uniqueness of early adulthood is that they do not think they are adults or teenagers. Most of them do not have a stable family and living environment (Arnett, 2000). Therefore, emerging adults are one of the groups most may affected by the COVID-19 epidemic, and they have not yet obtained a stable occupational environment and spouse support. When dealing with major public crisis events, the insufficient coping ability of young adults in adulthood will cause mental health problems (Gariepy et al., 2016; Li et al., 2021). A longitudinal study of depression and anxiety among young adults affected by the epidemic in the United States found that they were indeed under great pressure, and the psychological and social stressors brought by the COVID-19 epidemic related to their depression and anxiety (Kujawa et al., 2020).

Risk perception is an individual's subjective feeling and understanding of external objective stressors, which will be affected by psychological, social, and even cultural factors (Xi et al., 2020). Studies have shown that the perceived risk of the COVID-19 pandemic (PRCP) can positively predict Generalized Anxiety Disorder (GAD; Oyetunji et al., 2021; Yin et al., 2021). But there are also different results, Musche's study on diabetic patients found that their risk perception is higher than that of the control group, but the level of GAD is no different from that of the control group (Musche et al., 2021). Therefore, PRCP may have a moderating variable in predicting GAD. According to the psychological stress model, combined with stressors, appraisal, social environment, and disorders, which have helped to elucidate the determinants of health in which stress can be an integrative variable (Lemyre and Lalande-Markon, 2009). And Kumpfer and Bluth (2004) resilience framework operationalized resilience as an internal factor which has the characteristic of a dynamic change process by combining the construct internal self-characteristics and resilience processes. Resilience helps reduce the negative impact of adversity on individuals and improve adaptation and growth (Huang et al., 2019). In different individuals, even the stress induced by the same stimulus with different situation will have different effects. Thus, the individual's resilience factors can help them deal with the negative effects of stress (Wilks and Croom, 2008).

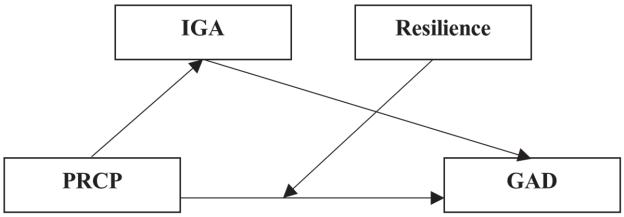

FIGURE 1 | Hypothesized conditional process model.

According to the common-sense model (CSM) in risk perception theory, the CSM hypothesizes that individuals create mental representations of their illness based on the concrete and abstract sources of information available to them in order to make sense of and manage the problem. People typically make simultaneous cognitive and emotional representations of their illness (Hagger and Orbell, 2003). Combined with the model of emotion dysregulation proposed by Mennin et al., heightened intensity of emotions, poor understanding of emotions, negative reactivity to emotions, and maladaptive management of emotions—best reflected the structure of four commonly used measures of emotion function and dysregulation, it is believed that the vicious circle mode of emotional dysregulation will bring more avoidance behavior, lead to negative emotional experience and the concurrent symptoms of GAD (Mennin et al., 2007). And emotion can be used as an mediating variable when GAD is affected (Marganska et al., 2013). Therefore, emotional experience may play a mediating role in the model of PRCP affecting GAD.

H1: PRCP will have a positive correlation with GAD.

H2: Resilience will moderate the effect PRCP has on GAD.

H3: The effects of PRCP on GAD will be partially mediated by the IGA.

The overarching aim is to understand the conditional process that GAD is affected by PRCP through IGA, and the extent of GAD affected by PRCP is different for people with different levels of resilience. This study uses the "conditional process model," a tool for understanding causal processes, to understand the mechanism of independent variables affecting the dependent variable proposed by Hayes (2013). It is used to estimate the direct and indirect pathways through which a variable transmits its effects, as well as to model how the size of those effects depends on (or are conditional on) the value(s) of one or more moderators (Hayes, 2013). We summarize our hypotheses in **Figure 1**.

MATERIALS AND METHODS

Participants

A total of 704 data were collected in February 2021 in the form of an online questionnaire and combined with community social work in Sichuan Province of China. There is no extensive epidemic

in Sichuan, but there have been large-scale local outbreaks in rural areas of other provinces in China, such as Hebei, Jilin and Heilongjiang (Gao, 2021). People perceive the risk of the epidemic, but life has returned to normal. Invalid questionnaires were filtered or according to the following steps: Remove data with an answer time of fewer than 300 s, Find similar (according to IP, submission time, age, residence, etc.) to filter duplicate questionnaires, The Mahalanobis distance is used to exclude data outside the 0.001 standards (Aguinis et al., 2013). A total of 522 valid questionnaires were collected, with an effective rate of 74.15%. The included baseline sample was 37.2% men, 53.1% women, and 9.8% nonbinary. Mean age was 21.77 years ($SD = 2.26$). 7.8% were married, 91.8% were unmarried, and 0.2% divorced.

Measures

Perceived Risk of COVID-19 Pandemic Scale

Perceived Risk of COVID-19 Pandemic Scale was used to assess the PRCP of emerging adults (Xi et al., 2020). The scale consists of nine questions, which are divided into three dimensions: emotional feeling, e.g., I worry about getting infected with COVID-19 (None of the time, Rarely, Some of the time, A moderate amount of time, A lot of the time, All of the time), cognitive judgment, e.g., I am sure I will NOT get infected with COVID-19 (Strongly disagree, Disagree, Somewhat disagree, Somewhat agree, Agree, Strongly agree), and psychological representation of unusual severity, e.g., Getting COVID-19 is something I have (Never thought about, Rarely thought about, Thought about some of the time, Thought about often), options range Likert 4–6 points scoring, and 1 reverse scoring question. Cronbach's $\alpha = 0.843$. The Cronbach's coefficient for the present study was 0.843 (total score).

Index of General Affect

Campbell's Index of General Affect Scale was a tool to describe the emotional state of oneself over a while through positive and negative emotions (Campbell, 1976), it's an absolute emotional state (Ash, 2000). There are eight items on the scale, to ask our respondents to react to a series of paired adjectives, describing their lives in positive or negative terms, presented in the semantic differential format. Thus, they were asked to describe their lives in general as falling at a point they chose in the space between interesting and boring, enjoyable and miserable, lonely and friendly, rewarding and disappointing, and the like from 1 to 7. The Cronbach's coefficient for the present study was 0.961 (total score).

Generalized Anxiety Disorder-7

A Chinese version of the Generalized Anxiety Disorder-7 (GAD-7) scale was used to assess the subject's anxiety symptoms. The GAD-7 has been previously used in Chinese populations and was found to have good reliability (Cronbach $\alpha = 0.90$; Cronbach $\alpha = 0.90$; Tong et al., 2016). In our study, seven items assess the frequency of anxiety symptoms over the past 2 weeks on a four-point Likert scale ranging from 0 (never) to 3 (nearly every day). The total score of GAD-7 ranged from 0 to 21, with increasing scores indicating more severity resulting from anxiety (Spitzer et al., 2006). The Cronbach's coefficient for the present study was 0.956 (total score).

Resilience

The Connor-Davidson resilience scale (CD-RISC; Connor and Davidson, 2003) was used to evaluate the resilience in the present study. The scale was developed based on concepts of hardiness, adaptation, and stress endurance and validated in diverse samples. Initial factor analyses identified five factors: (1) notion of personal competence, high standards and tenacity, (2) trust in one's instincts, tolerance of negative affect, and strengthening effects of stress, (3) positive acceptance of change, and secure relationships, (4) control, and (5) spiritual influences, and the Chinese version was tested by Yu and Zhang (2007). The scale has a total of 25 items and uses a five-point scoring, from "0 to 4" to indicate "not at all to almost always." The Cronbach's coefficient for the present study was 0.987 (total score).

STATISTICS

SPSS 24.0 was used for descriptive statistics, and the MATRIX macro compiled by Hayes et al. is used for inferential statistics (Hayes, 2013). Hypothesis 2 predicts that PRCP will positively influence GAD while hypotheses 3 predict that IGA will mediate the involvement PRCP GAD link. To test hypotheses 2 and 3, Preacher and Hayes' (2008) mediation analysis, i.e., PROCESS Macro (model 5) was used. The specific steps are as follows: First, conduct common method deviation analysis; Second, descriptive analysis and Pearson correlation analysis of main variables; Third, use the PROCESS plug-in, select the independent variable, mediating variable, moderate variable, and dependent variable into the corresponding option box, in turn, select model 5, set the sample size to 5,000, select the nonparametric percentile bootstrap method for deviation correction, the confidence level of the confidence interval is 95%, and the grouping condition is mean and mean plus or minus a standard deviation.

Common Method Deviation Test

The Harman single factor method was used to detect the common method deviation. The exploratory factor analysis results of 49 items show that there are seven factors with eigenvalues higher than 1, and the variance interpretation rate of the first factor is 46.16% (<50%), indicating that there is no serious common method deviation in this study (Podsakoff et al., 2003; Malhotra et al., 2006).

RESULTS

Descriptive Statistics and Correlations Among PRCP, IGA, Resilience, and GAD

Most of the correlations between the variables were statistically significant. The correlation coefficients had different signs depending on particular variables. The PRCP was positively associated with GAD, and negatively associated with IGA and

TABLE 1 | Intercorrelations and descriptive statistics for gender, marital status, age, PRCP, IGA, GAD, and resilience ($N = 522$).

	M	*SD*	1	2	3	4	5	6
1. Gender			1					
2. Marital status			0.014	1				
3. Age	21.970	2.257	0.035	−0.206***	1			
4. PRCP	21.730	6.890	0.125**	0.019	−0.169***	1		
5. IGA	41.243	11.530	−0.276***	−0.143**	0.097*	−0.252***	1	
6. GAD	4.384	3.743	0.245***	0.104*	−0.108*	0.267***	−0.637***	1
7. Resilience	69.470	20.803	−0.186***	−0.083	0.158***	−0.241***	0.612***	−0.473***

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE 2 | Mediation between different levels of resilience to GAD.

	SD	*B*	*SE*	LLCL	ULCL
Direct	−1	0.219	0.047	0.127	0.312
	0	0.110	0.033	0.042	0.178
	1	−0.000	0.046	−0.090	0.089
Indirect		0.108	0.025	0.061	0.158

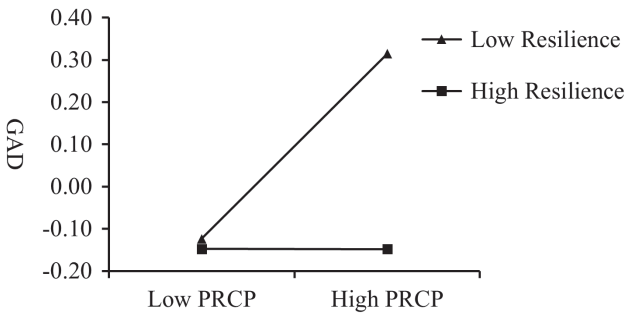

FIGURE 2 | The association between PRCP and GAD is moderated by resilience.

resilience. The IGA was negatively related to GAD but positively related to resilience. The GAD was negatively related to resilience. The correlation between gender, age, marital status, PRCP, IGA, resilience, and GAD were analyzed. There is a significant correlation between demographic variables and other variables except for marital status with IGA and resilience. Therefore, gender, age, and marital status will be included in the control variables. See **Table 1** for details. H1 was verified.

Conditional Process Analysis

The Bootstrap mediation effect test method was used to test concerning the conditional process model (Model 5) proposed by Hayes. The results were shown in **Tables 2, 3**.

Resilience score was divided according to M, $M + SD$, and $M - SD$ and three elastic levels were obtained: medium, low and high. The direct impact of PRCP on GAD under different elastic levels was analyzed. As shown in **Table 2** and **Figure 2**, it is found that under the high level of resilience, the direct effect of PRCP on GAD is not significant, and only under the medium and low level of resilience, the direct effect of PRCP on GAD is significant. The confidence intervals of 95% CI were [0.127, 0.312], [0.042, 0.177], and [−0.090, 0.089] at −1, 0 and +1 SD, respectively. The smaller the slope, the higher the impact of PRCP on GAD. H2 was verified.

As shown in **Table 3**, the indirect effect is 0.108, and the confidence interval 95% $CI = [.\ 061, 0.158]$ does not include 0, indicating that the mediating effect is significant. It shows that PRCP has a positive predictive effect on anxiety GAD, and the IGA plays as a mediating variable between PRCP and IGA. H3 was verified.

DISCUSSION

The purpose of this study is to explore the impact of epidemic risk perception on anxiety after major public health events become normalized. Evaluating and controlling the mental state after public health events can effectively reduce the resulting diseases to be minimized (Sharot, 2011). We are mainly concerned about the 18–25-year-old emerging adults because most of them have not obtained a stable professional environment and spouse support. In the face of major public events, the lack of coping ability of young adults may bring corresponding mental health problems. It is found that the effects of PRCP on GAD will be partially mediated by the IGA, and emerging adults with lower resilience after they are perceiving the risk, they are more likely to be anxious.

Firstly, it is similar to previous studies our research results confirm the H1 that the GAD of emerging adults is significantly related to the PRCP (Oyetunji et al., 2021; Yin et al., 2021). For previous studies that do not support this result (Musche et al., 2021), we introduced resilience as a moderator variable to test. The final results support our H2 that resilience moderates the effect PRCP has on GAD. The direct effect of PRCP on GAD is not significant for people with a high level of resilience, but significant for people with a low level of resilience. From the perspective of resilience process theory, people with a high level of resilience have stronger dispositional resilience and are more likely to perceived more social support (Montpetit et al., 2010). In addition to social support, there is also the impact of individual ability. Dratva studied the relationship between College Students' risk perception and GAD at Swiss university, shows that the GAD level of health students on campus is significantly lower (Dratva et al., 2020), expertise and experience on infection risks and health may have played a role. Resilience moderate the effect PRCP has on GAD explains the contradictions of previous studies. The research

TABLE 3 | Effect of the conditional process model.

	IGA				GAD			
	B	***SE***	***p***	**95%CI**	***B***	***SE***	***p***	**95%CI**
Common	1.138	0.556	<0.05	[0.046, 2.230]	0.042	0.453	0.924	[−0.847, 0.932]
Age	0.019	0.019	0.301	[−0.017, 0.056]	−0.014	0.015	0.352	[−0.044, 0.016]
Gender	−0.397	0.065	<0.001	[−0.526, −0.269]	0.092	0.055	0.093	[−0.015, 0.200]
Marital status	−0.456	0.150	<0.01	[−0.751, −0.162]	0.043	0.122	0.722	[−0.196, 0.283]
PRCP	−0.211	0.042	<0.001	[−0.292, −0.129]	0.110	0.035	<0.01	[0.041, 0.178]
IGA					−0.513	0.043	<0.001	[−0.597, −0.428]
Resilience					−0.122	0.042	<0.004	[−0.204, −0.038]
Int					−0.110	0.031	<0.001	[−0.170,-0.049]
	$R^2 = 0.144$				$R^2 = 0.447$			

on diabetes patients is special for disease experience. From the perspective of Kumpfer and Bluth (2004) resilience framework theory, previous experience will make their resilience level higher. Therefore, even if their risk perception is high, there is no difference in anxiety under the effect of resilience. It helps researchers to understand the process mechanism of resilience and the mechanism of GAD caused by our perception in the face of stressful events. Therefore, in the specific work, we should pay attention to improving the level of resilience. The three-factor structure of resilience, social support, and perceived social support are key elements, as well as relevant health knowledge (Dratva et al., 2020), better education, and economic prosperity (Ruscio et al., 2017), etc. These factors can effectively reduce the incidence of GAD. For COVID-19, people know that they can have vaccines and medical care can be guaranteed (Jaspal and Breakwell, 2021), which are powerful and very effective channels to enhance resilience and reduce GAD.

For people with higher resilience, there is no significant correlation between their PRCP and GAD, combined with GAD's emotional disorder theory, we know that GAD symptoms are mainly caused by emotional disorders (Mennin et al., 2007). Like Watson's research showing emotional disorder strong and consistent associations with GAD (Watson and Naragon-Gainey, 2014). Therefore, PRCP may affect GAD through the emotional state. Therefore, the third hypothesis is that the IGA, which contains both positive and negative emotional state index scores, plays a meditating role in PRCP. The results of the current study support H3. That PRCP can lead to a decline in our IGA, which will slide from positive to negative. In this sliding process, the GAD symptoms will also increase as a result of the change of emotional state, which is consistent with previous studies (Ning et al., 2020; Mohammadkhani et al., 2021). Therefore, in the specific work, if we can pay attention to the scientific and rationality of risk publicity and improve the IGA, we can effectively block the formation path of GAD from PRCP and help to reduce the occurrence of GAD.

The conditional process model of H2 and H3 in this study shows that improving the level of residents' resilience, paying attention to the active publicity in the process of epidemic risk, and regulating residents' emotions can help to reduce GAD.

This study confirms two very effective hypotheses, but there are also some limitations. The moderator variables of the mediating path have not been explored clearly. The subject of this study is aimed at emerging adults. This study used a cross-sectional data set, which is liable as far as behavioral analysis is concerned. Such data cannot be used to explain cause and effect explicitly (Maxwell et al., 2011). It is the age of identity explorations, the age of instability (Arnett, 2007). However, for teenagers and adult groups, whether their GAD will be affected by the same conditional process model needs further research and discussion.

CONCLUSION

In the face of major public health events, people will feel very anxious. It can be seen from the conditional process obtained, the higher PRCP, the more GAD. On the other hand, if we have enough resilience, such as enough medical knowledge or perceived support from society and family, PRCP will no longer have an impact on GAD. In the face of public health events, it may be wise to give priority to dealing with emotions. Intervention against negative emotions or improve positive emotion can effectively block the path of PRCP affecting GAD. This study further complements our understanding of the conditional process of GAD under COVID-19 risk.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local

legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

BW contributed to conception and design of the study and wrote sections of the manuscript. HF organized the database, performed the statistical analysis, and wrote the first draft of the manuscript. All authors contributed to the article and approved the submitted version.

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Sense of Control and Safety Compliance in the Prevention of COVID-19: A Framework Based on Conservation of Resources Theory

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Drawing on conservation of resources theory, this study examined how and when sense of control influence safety behavior (e.g., safety compliance and safety participation). Linear regression analysis was performed on data collected from 481 students in 58 classes at a university. The results indicated that psychological stress mediated the negative effect of sense of control on safety compliance, as well as the positive effect of sense of control on safety participation. They further showed that perceptions of stronger safety regulations heightened the positive relationship between student psychological stress and safety compliance, and buffered the negative effects of psychological stress on safety participation. These results provide a benchmark against which the effectiveness and relevance of epidemic prevention and control in higher education institutions can be assessed.

Keywords: sense of control, psychological stress, safety compliance, safety participation, perceived safety regulation

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INTRODUCTION

Noncompliance with safety policies and passively participation in safety management have been commonplace during efforts to prevent and control outbreaks of COVID-19 and its continued spread, thus adding to the risks it poses to society. For example, some people do not accept neighborhood management rules, or they advocate the violation of epidemic control policies. In colleges and universities, students can be ignorant of epidemic safety control policies and fail to actively participate in safety management (e.g., by helping their roommates report lower body temperatures and not wearing masks at school). Coupled with the crowdedness and relatively high population densities of higher education environments, these behaviors may result in large groups becoming infected in college and university communities. Therefore, the higher education environment has emerged as a key research target in the investigation of COVID-19 prevention and control (Cheng et al., 2020; Wang et al., 2020).

Given the importance of safety-related behaviors, including safety compliance (i.e., behaviors that individuals need to carry out to maintain safety; Neal and Griffin, 2006) and participation (i.e., behaviors that do not directly benefit an individual's personal safety but do help improve conditions that support safety; Neal and Griffin, 2006), studies have thoroughly explored the

antecedents of these behaviors (e.g., Griffin and Neal, 2000; Neal and Griffin, 2006; Griffin and Hu, 2013; Kark et al., 2015; Hofmann et al., 2017). However, several problems remain to be addressed.

First, research exploring the relationship between the sense of control felt by higher education students and their safety behaviors during the COVID-19 pandemic remains largely lacking. Previous research indicated that individuals with sense of control engaged in violations of the norms (Miller and Mulligan, 2002; Leiter et al., 2009); however, Yu et al. (2021) believed that employees lacking of sense of control can increase their violations. The SARS-CoV-2 virus that causes COVID-19 is highly contagious, is often quite harmful, and has a long incubation period, resulting in uncertainty among the public (e.g., Dobson-Lohman and Potcovaru, 2020; Faasse and Newby, 2020; Lăzăroiu et al., 2020; Ljungholm and Olah, 2020; Maier and Brockmann, 2020). Therefore, in the context of the COVID-19 pandemic, the factors influencing the behavior of individuals are complex (Duncan, 2020; Sampson, 2020; Stevens, 2020), on higher education campuses in particular, with their dense populations and atmospheres of high uncertainty, students feel a lower level of control and show some differences compared to the general public in their safety behaviors for COVID-19 virus management. Therefore, the relationship between their sense of control and their safety behaviors in this context requires further research.

Second, previous studies have not fully elucidated the mechanism through which an individual's sense of control influences their safety behavior. Drawing on psychological ownership theory, Liu et al. (2012) demonstrated that a greater sense of control can increase individuals' sense of psychological ownership and motivate them to engage in the behaviors expected of them by their organization or leader (Liu et al., 2012). Meanwhile, drawing on the theory of planned behavior, Leiter et al. (2009) found that individuals with a sense of control overestimate their confidence when dealing with potential hazards and show risk-taking behavior. Further, studies drawing on conservation of resources theory (Hobfoll and Shirom, 2000; Hobfoll, 2001) have suggested that individuals' behavioral patterns are influenced by the resources available to them. When resources (e.g., time, energy, cognitive attention, and willpower) are in abundance, individuals are more concerned with making a difference and tend to adopt facilitative behaviors to optimize their current environment and expand their resources. However, when resources are in short supply, individuals are more concerned with avoiding potential losses and display avoidant behaviors to maintain their current limited resources. Accordingly, higher education students with a higher sense of control may be expected to feel lower psychological stress and thus be strongly motivated to actively participate in safety management so as to expand their own resources (e.g., Halbesleben et al., 2014). Conversely, higher education students with a lower sense of control may be expected to feel higher psychological stress and thus comply with safety regulations in an effort to avoid potential loss of resources (e.g., Halbesleben et al., 2014; Jiménez et al., 2017). In light of the COVID-19 pandemic, there is an urgent need to further undertake research that explores the mechanism through which an individual's sense of control influences their safety behavior.

Third, while previous studies have examined the contextual role of organizational or team culture on individual behavior in relation to "soft measures" (i.e., safety management measures that operate *via* encouragement or reward, such as the creation of a positive culture and provision of support or reward), they have not considered how harsh measures (i.e., safety management measures that operate *via* punishment, such as penalty, taunting, and the expression of negative emotions) and strict safety management systems can also magnify the positive effects of environmental factors (e.g., safety-specific transactional leadership) on individual safety behaviors (Smith et al., 2016). In the context of disease outbreak management, harsh measures (i.e., safety management measures by punishment, such as penalty, taunting, and expressing negative emotions) convey the message that participation in safety management is advocated by the epidemic control authorities and that violations of epidemic safety control policies will be severely punished (Huang et al., 2004). Such regulations provide guidance for individuals in their adoption of strategies to cope with the threats posed by the disease. Therefore, the situational role of harsh safety measures on the relationship between psychological stress and individual safety behavior needs to be explored.

Therefore, this study drew on conservation of resources theory to put forward and tests a mechanism through which individuals sense of control influences their safety compliance and participation in relation to COVID-19 prevention and control measures at a university. We proposed that psychological stress mediates the negative effect of sense of control on safety compliance and mediates the positive effect of sense of control on safety participation (see **Figure 1**). Further, this research tested the moderating effect of safety regulations and examined whether they served as a boundary condition to delimit the effect of students' psychological stress on their safety compliance and participation (see **Figure 1**). Our results provide a benchmark against which efforts directed toward COVID-19 safety management in higher education can be assessed.

THEORETICAL BACKGROUND AND HYPOTHESES

The Conservation of Resources Theory

Conservation of resources theory (Halbesleben, 2006; Hobfoll, 2011) argues that individuals are motivated to protect their current resources and acquire potential resources. Previous research has suggested that when work resources (e.g., time, energy, cognitive attention, and willpower) are abundant, individuals focus on potential gains and think about how to improve their environment, thus adopting facilitative behaviors to expand their current work resources expand. Conversely, when work resources are scarce, individuals focus on potential losses and think about how to protect their resources from further depletion and loss, thus adopting avoidant behaviors to maintain their current work resources (Halbesleben, 2006). As this theory can describe the behavioral strategies that individuals take to actively handle their work resources under stress, it has been widely used to explain

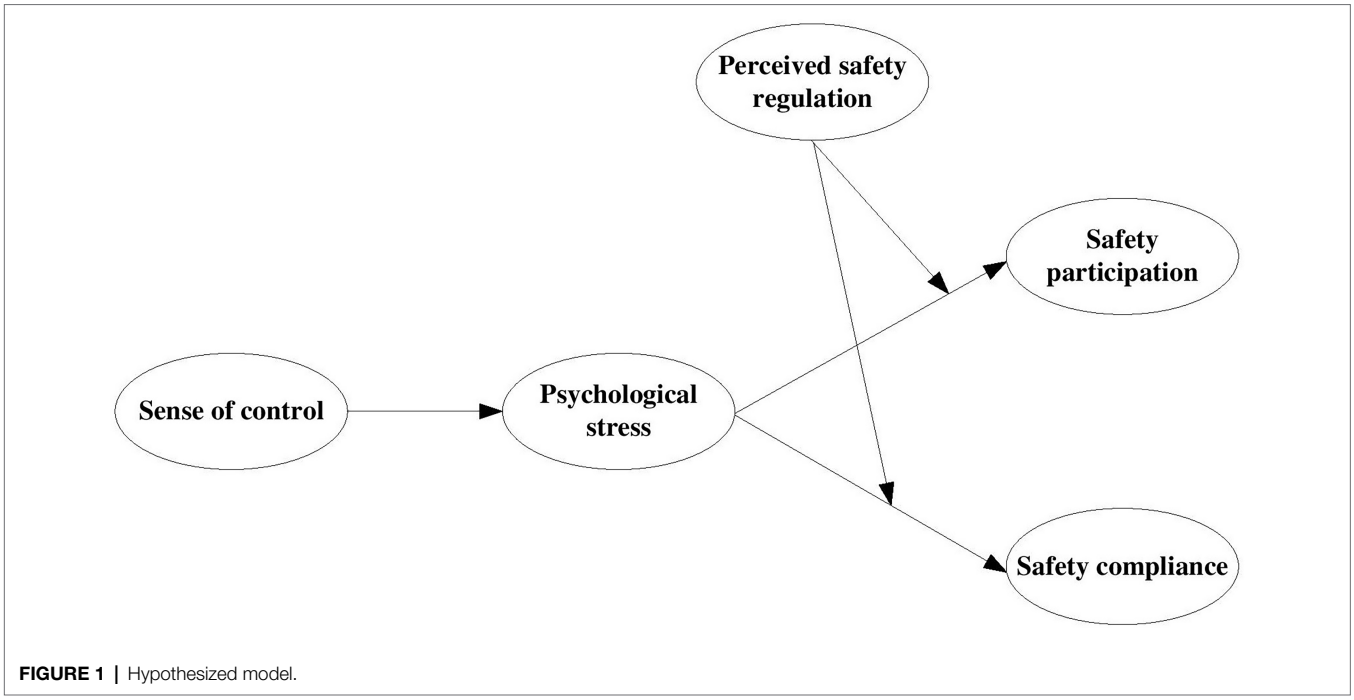

FIGURE 1 | Hypothesized model.

differences in individual behavioral patterns for relevant contexts (Grandey and Cropanzano, 1999; Brotheridge and Lee, 2002; Halbesleben, 2006).

We attempted to use conservation of resources theory to explain how and when sense of control influences safety behaviors among higher education students in the context of epidemic prevention and control in higher education institutions. The SARS-CoV-2 virus is highly contagious, has high infectivity, and has a long incubation period. Collectively, these properties create difficulties in detecting the spread of the virus, thus greatly disrupting the lives of teachers and students. While efforts are being undertaken to ensure effective prevention and control of COVID-19 in higher education institutions, students have to cope with not only their course schedules to meet their daily academic requirements, but also the risks associated with the spread of the virus and the protection of their own safety. Taken together, these burdens can lead to the rapid consumption of the students' resources. In this scenario, students with a low sense of control may be expected to be more sensitive to losses such as being infected with COVID-19 due to their violation of safety policies and being punished for violating the regulations of their institution. They may tend to comply with the institution's epidemic control system to preserve their limited resources and to avoid the negative consequences of infection.

In contrast, students with a high sense of control may be expected to be more sensitive to gains such as realizing the social value of self and winning respect from others. Such individuals may be inclined to participate in activities related to their institution's epidemic management to improve the COVID-19 situation and facilitate their own resource acquisition.

The Mediating Role of Psychological Stress

Having a sense of control can help higher education students alleviate their psychological stress. Sense of control refers to the belief that an individual has mastery over his or her life (Gurin et al., 1978; Kay et al., 2009). A lower sense of control means that individuals lose mastery of their environment, are more constrained by it, and thus have a higher level of life uncertainty and feel a higher level of psychological stress (Lachman and Weaver, 1998). Research has also indicated that individuals facing highly uncertain environments develop higher levels of psychological stress (Debus et al., 2012; De Berker et al., 2016; Lemée et al., 2019). During an epidemic, higher education students are not only faced with uncertainty regarding the future epidemic situation, but also struggle to respond effectively to the situation. Therefore, they experience a low level of control. In this scenario, students perceive a higher risk of viral infection and more serious infection hazards. They therefore have higher psychological stress. Previous research has indicated that individuals facing highly uncertain environments develop higher levels of psychological stress (Debus et al., 2012; De Berker et al., 2016; Lemée et al., 2019).

Psychological stress may reinforce individuals' safety compliance. Psychological stress is defined as an unfavorable person-environment relationship (Lazarus, 1993), in which the highly stressed individual seeks to adapt to the environment to achieve a more favorable person-environment relationship, such as by following rules. Conservation of resources theory suggests that higher education students who experience higher psychological stress during the epidemic prevention and control may struggle to effectively and simultaneously cope with the risks posed by the COVID-19 virus and the requirements of their study tasks. To avoid facing the adverse effects of the

external environment's adverse effects on themselves, they may tend to comply with the institution's epidemic control system. For example, they enter or leave the school only according to the school's requirements, will wear masks according to the institution's regulations, wear masks, and report their body temperature daily and punctually. Indeed, the results of previous studies indicate that they are likely to adopt risk-averse behaviors, such as compliance with safety regulations (Kark et al., 2015; Xia et al., 2017), to avoid unfavorable outcomes (Cooper et al., 2012). Thus, we proposed the following hypothesis:

> *H1a*: Psychological stress mediates the relationship between higher education students' sense of control and their safety compliance.

Psychological stress can also reduce individuals' adoption of safety participation behaviors (e.g., Wang et al., 2018). Karabay (2014) found that, when individuals experience high levels of psychological stress, they focus more on their own work and engage in fewer organizational citizenship behaviors due to their limited resources. Conservation of resources theory suggests that higher education students with lower levels of psychological stress during an epidemic are better positioned for potential gains. Such individuals may tend to actively participate in epidemic safety management to enable effective control over the epidemic, reduce risks to the public.

Some previous studies also suggest that individuals with a stronger sense of control tend to engage in approach behavior (Keltner et al., 2003; Xu et al., 2020), such as participating in epidemic safety management. Thus, we proposed the following hypothesis:

> *H1b*: Psychological stress mediates the relationship between higher education students' sense of control and their safety participation.

The Moderating Role of Safety Regulations

Strong safety regulations can reinforce the positive relationship between the psychological stress of higher education students and their safety compliance. The strength of safety regulations reflects the importance of implementing the safety policy and the monitoring process associated with the safety procedures (Huang et al., 2004). Safety regulations are an important indicator of a group's safety practices (Zohar, 2000; Neal and Griffin, 2006). Stronger safety regulations indicate to group members that "ignoring safety policies can lead to serious consequences," and that safety hazards can escalate into safety incidents and cause individuals to be severely punished. The risk of punishment drives members to examine their own safety behaviors and consider the likelihood and severity of consequent adverse outcomes.

In the context of COVID-19 prevention and control in higher education institutions, stronger safety regulations indicate to students that failure to comply with regulations may lead to serious epidemic risks and may cause the student to be punished. Hence, students treat safety compliance as a way to maintain the status quo and avoid possible losses, and tend to adhere to the institution's epidemic control measures—for example, by wearing masks at school, avoiding crowded parties, and not leaving the campus freely to contact the general public. On the contrary, weaker safety regulations indicate to students that responses to the epidemic that deviate from the regulation recommendations will not lead to adverse outcomes. For example, regardless of the psychological pressure faced by individuals, they will form the perception that they are not susceptible to the virus even if they do not wear masks. Huang et al. (2004) showed when safety regulations are weak, safety violations will not lead to serious safety problems, which engenders a low level of safety compliance. Studies have also indicated that higher levels of safety regulations will enhance the role of environmental factors in shaping individual safety compliance (Probst, 2004; Clarke, 2006; Griffin and Hu, 2013). Therefore, we proposed the following hypothesis:

> *H2a*: Safety regulations moderate the relationship between psychological stress and safety compliance, such that the relationship is more strongly positive when safety regulations are stronger, and vice versa.

Stronger safety regulations also indicate to students that participation in epidemic safety management is an effective way to control the spread of the virus and is valued by the institution. In this situation, under conditions of psychological stress, students treat participation in safety measures as an important way to realize the social value of self and actively engage in epidemic safety management to expand their resources. For example, they may express positive views of the epidemic safety control measures to other students and encourage them to comply.

Conversely, weaker safety regulations indicate to students that participation is not a means of improving public health. In this situation, under conditions of psychological stress, then, college students realize that participation in epidemic safety management does not help them gain personal resources, so they do not actively participate in carrying out. Studies have indicated that placing a priority on safety can influence the effects of environmental factors on safety participation (Clarke and Ward, 2006) and that a culture that prioritizes safety can buffer the negative effects of locus of control on safety participation (Cigularov et al., 2009). Thus, we proposed the following hypothesis:

> *H2b*: Safety regulations moderate the relationship between psychological stress and safety participation, such that the relationship is more strongly negative when safety regulations are weaker, and vice versa.

MATERIALS AND METHODS

Sample and Data Collection

More than 492 college students from 58 classes in a mainland China university participated by completing two surveys. To reduce common method bias, we used a two-wave lagged design with 2 weeks in between each data collection stage. In the first-round survey, college students reported on their sense of control, their psychological stress, and the perceived safety regulations. Two weeks later, the same students reported on their safety

compliance with and participation in safety practices. In the first round of data collection, 490 college students completed the questionnaire; in the second round, 485 completed the questionnaire. After matching the responses, we were left with 481 valid questionnaires. The final sample included 264 males (54.9%) and 217 females (45.1%), of whom 33.7% were freshmen, 38% were sophomores, 25.8% were juniors, and 2.5% were seniors.

Measurement

All of the scales used in this research were translated into Chinese using a rigorous back-translation process (Brislin, 1980). Specifically, we set up a research group consisting of two safety management researchers, two PhD in English candidates and three undergraduate students. We then translated the scales into Chinese and ensured that the undergraduate students fully understood the measurement questions. The two PhD in English candidates then back-translated the Chinese scales into English and compared the back-translated scales with the originals to ensure precision of meaning. Additionally, drawing on Kark et al. (2015), we specifically emphasized the context of COVID-19 in our scales (i.e., we added an introductory phrase indicating the epidemic management context, such as "During the COVID-19 pandemic," to each measurement entry). To reduce common method bias, the variables were measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree), except for safety regulations, which was measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree).

Sense of Control

Three items developed by Lachman and Weaver (1998) were used to measure sense of control. This scale contains items such as "[During the COVID-19 pandemic,] there is little I can do to change many of the important things in my life" ($\alpha = 0.82$).

Psychological Stress

The four items from Motowidlo et al. (1986) were used to measure of psychological stress. A sample item is "I feel a great deal of stress because of COVID-19" ($\alpha = 0.92$).

Safety Compliance

We adapted scale of Neal and Griffin (2006) to measure safety compliance in the context of the COVID-19 pandemic. For example, the original item "I use all the necessary safety equipment to do my job" was changed to "[During the COVID-19 pandemic, to prevent and control the spread of COVID-19] I use all the necessary safety equipment in my daily life" ($\alpha = 0.86$).

Safety Participation

We adapted scale of Neal and Griffin (2006) to measure safety participation in the context of the COVID-19 pandemic. For example, the original item "I promote the safety program within the organization" was changed to "[During the COVID-19 pandemic, to prevent and control the spread of COVID-19] I promote the epidemic safety program within our university" ($\alpha = 0.85$).

Perceived Safety Regulations

We adapted three items from Huang et al. (2004) to measure perceived safety regulations in the context of the COVID-19 pandemic. The original item "Employees always receive disciplinary action for a safety rule violation" was changed to "[During the COVID-19 pandemic] students always receive disciplinary action for violating a safety rules that prevent the spread of COVID-19." The other two items are "During the COVID-19 pandemic, there has been a Safety Control Department in our university that works toward creating a safer work environment to prevent the spread of COVID-19 in the university" and "During the COVID-19 pandemic, students should be disciplined for violating safety rules that prevent the spread of COVID-19" ($\alpha = 0.96$).

Control Variables

Drawing on previous research (Neal and Griffin, 2006; Kark et al., 2015), we controlled for individual demographic factors including grade level and gender. Drawing on finding of Kark et al. (2015) that an individual's regulatory focus has a significant impact on safety behavior, we also controlled for an individual regulatory focus. Specifically, nine items were used each to measure individual promotion focus (Lockwood et al., 2002; $\alpha = 0.95$) and prevention focus (Lockwood et al., 2002; $\alpha = 0.94$) on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Data Analysis

We first used Mplus 7.0 (Muthén and Muthén, 2012) to test the indirect effect of sense of control on safety compliance *via* psychological stress and the indirect effect of sense of control on safety participation *via* psychological stress. Then, also using Mplus 7.0, we tested the cross-level moderating effects of perceived safety regulations. Lastly, drawing on Dawson (2014), we plotted the moderating effects of perceived safety regulations.

RESULTS

Taking into consideration our sample size, we carried out item parceling by randomly creating three parcel items for constructs of more than three items (e.g., Little et al., 2002; DeRue and Wellman, 2009). The confirmatory factor analyses indicated that the seven-factor model (sense of control, psychological stress, safety compliance, safety participation, perceived safety regulation, promotion focus, and prevention focus) fits the data well ($\chi^2 = 209.18$, $df = 168$, CFI = 0.99, TLI = 0.99, RMSEA = 0.02, and SRMR = 0.03) and significantly better than the other models (See **Table 1**). The results from Harman's one-factor test (Podsakoff et al., 2003) showed that no single factor accounted for the majority of the covariance among the latent factors (less than 20.9%), which indicated that common method bias did not have a substantial impact on this study. Descriptive analyses of the variables are shown in **Table 2**. Individual sense of control was significantly negatively related

TABLE 1 | Confirmatory factor analysis for testing structure validity.

Model	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA	SRMR
Seven factors (baseline model): sense of control, psychological stress, safety compliance, safety participation, perceived safety regulation, promotion focus, and prevention focus	209.18	168	1.25	0.99	0.99	0.02	0.03
Six factors: collapsing promotion focus and prevention focus	1679.58	174	9.65	0.81	0.77	0.13	0.11
Five factors: collapsing promotion focus and prevention focus, collapsing safety compliance and participation	2619.78	179	14.63	0.69	0.64	0.19	0.14
Four factors: collapsing promotion focus, prevention focus and perceived safety regulation, and collapsing safety compliance and safety participation	4062.04	183	22.20	0.51	0.44	0.21	0.17
Three factors: collapsing promotion focus, prevention focus, perceived safety regulation, safety compliance, and safety participation	4737.31	186	25.47	0.43	0.35	0.23	0.19
Two factors: collapsing promotion focus, prevention focus, perceived safety regulation, safety compliance, safety participation, and psychological stress	6198.78	188	32.97	0.24	0.15	0.26	0.19
One factor: collapsing all the variables	6601.38	189	34.93	0.19	0.10	0.26	0.19

TABLE 2 | Descriptive statistics and variables correlation.

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Grade	1.97	0.83									
2. Gender	0.55	0.50	−0.04								
3. Promotion focus	3.96	0.81	0.04	−0.04	(0.95)						
4. Prevention focus	3.41	0.93	−0.02	0.09	0.05	(0.94)					
5. Sense of control	2.96	0.65	0.00	0.03	0.22**	−0.21	(0.82)				
6. Psychological stress	3.06	0.80	−0.06	−0.05	−0.12**	0.11**	−0.39**	(0.92)			
7. Safety compliance	3.88	0.71	−0.03	0.04	0.02	0.11*	−0.18**	0.33**	(0.86)		
8. Safety participation	3.92	0.78	0.07	0.04	0.07	−0.15**	0.17**	−0.36**	−0.10*	(0.85)	
9. Safety regulation	5.33	1.27	−0.09*	−0.05	−0.05	0.06	−0.32**	0.13**	0.27**	0.04	(0.96)

n = 481; 1 = freshmen, 2 = sophomores, 3 = were juniors, and 4 = seniors. 0 = female, 1 = male. Cronbach's alphas are in the parentheses on the diagonal.
**p < 0.05; **p < 0.01, two-tailed.*

to psychological stress ($\gamma = -0.39$, $p < 0.01$), safety compliance ($\gamma = -0.18$, $p < 0.01$), and positively related to safety participation ($\gamma = 0.17$, $p < 0.01$), while psychological stress was significantly positively related to safety compliance ($\gamma = 0.33$, $p < 0.01$) and negatively related to safety participation ($\gamma = -0.36$, $p < 0.01$).

Mediation Effect Test

Hypotheses 1a and 1b suggested that students' sense of control negatively affects safety compliance *via* psychological stress and positively influences safety participation *via* psychological stress. After controlling for the students' gender, grade, promotion focus, and prevention focus (See **Table 3**), we found that sense of control was negatively correlated with psychological stress ($\beta = -0.47$, $p < 0.01$), psychological stress was positively related to safety compliance ($\beta = 27$, $p < 0.01$), and psychological stress was negatively related to safety participation ($\beta = -0.34$, $p < 0.01$). The results from our 20,000-sample bootstrapping analysis indicated that the indirect path from sense of control to safety compliance through psychological stress was significant (−0.13, 95% CI [−0.174, −0.078]). Therefore, Hypothesis 1a was supported. Meanwhile, the path from sense of control to safety participation through psychological stress was also significant (0.21, 95% CI [0.097, 0.220]). Thus, Hypothesis 1b was also supported.

To more clearly represent the results of our data analysis, we conducted a full-model path analysis (**Figure 2**). The results showed that the indirect effect of "sense of control → psychological stress → safety compliance" was significant, while the indirect effect of "sense of control → psychological stress → safety participation" was also significant. These results suggest a divergent indirect path through which sense of control has an effect on individuals' safety behavior.

Moderation Effect Test

Hypotheses 2a suggested that perceived safety regulations moderate the relationship between students' psychological stress and safety compliance.[1] We found that when perceived safety regulations were high (+1 *SD*), the effect of students' psychological stress on safety compliance was positive and significant (0.39,

[1]The results did not change significantly when we added the control variables, so we present the results with the focal variable only (i.e., including sense of control, psychological stress, safety compliance, safety participation, and perceived safety regulations).

TABLE 3 | Meditation effect analysis.

Variables	Model 1		Model 2	Model 3	
	Safety compliance	Safety participation	Psychological stress	Safety compliance	Safety participation
Direct effect					
Gender	0.04 (0.06)	0.06 (0.07)	−0.08 (0.06)	0.06 (0.06)	0.04 (0.07)
Grade	−0.02 (0.04)	0.06 (0.04)	−0.06 (0.04)	−0.01 (0.03)	0.04 (0.04)
Promotion focus	0.06 (0.04)	−0.10** (0.04)	0.03 (0.04)	0.05 (0.04)	−0.09** (0.04)
Prevention focus	0.12** (0.04)	0.14** (0.03)	0.02 (0.05)	0.12** (0.03)	0.15** (0.04)
Sense of control	−0.19** (0.06)	0.17** (0.06)	−0.47** (0.06)	−0.06 (0.06)	0.01 (0.06)
Psychological stress				0.27** (0.04)	−0.34** (0.06)
Indirect effect				95% CI, 20, 000 repetitions	
Sense of control → psychological stress → safety compliance				−0.13 [−0.174, −0.078]	
Sense of control → psychological stress → safety participation				0.21 [0.097, 0.220]	

n = 481. CI, confidence interval.
***p < 0.01.*

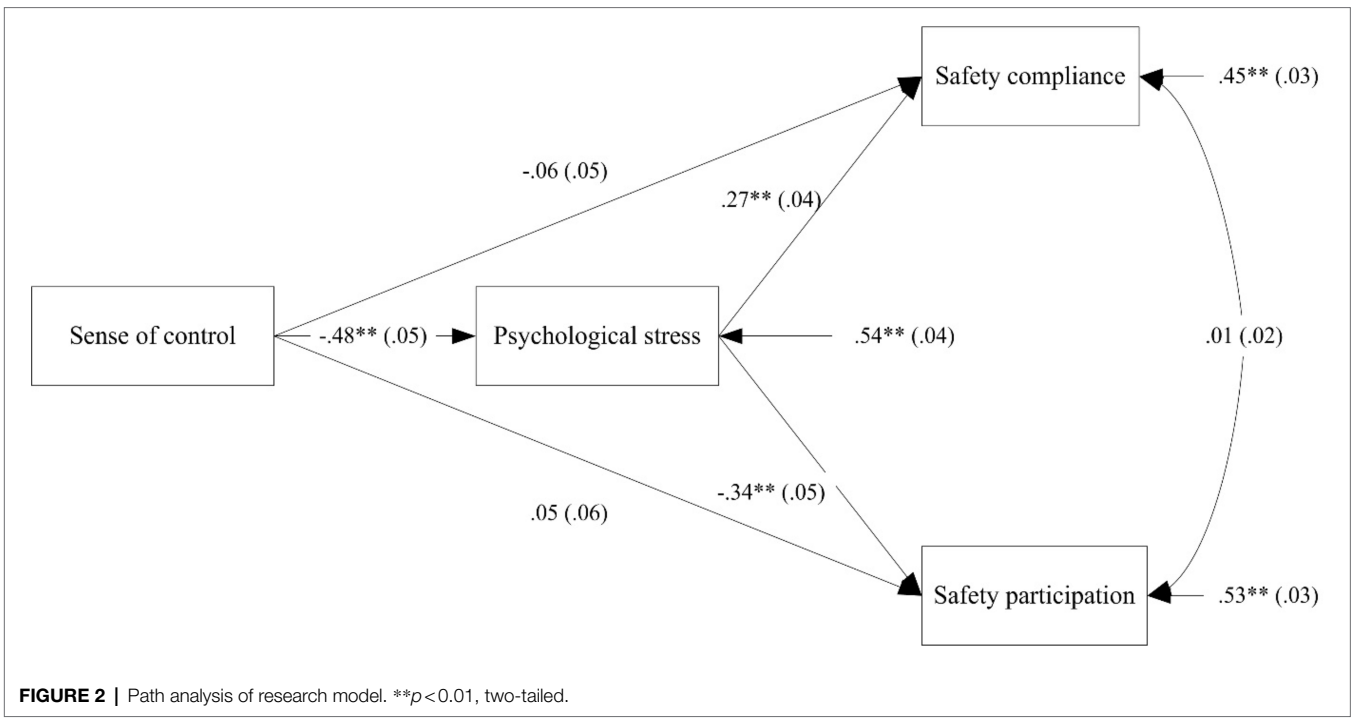

FIGURE 2 | Path analysis of research model. **$p < 0.01$, two-tailed.

95% CI [0.303, 0.483]; See **Table 4**). When perceived safety regulations were low (−1 *SD*), the effect of psychological stress on safety compliance was also positive and significant (0.14, 95% CI [0.006, 0.278]). Further, there was a significant difference in the indirect effect of individual psychological stress on safety compliance when perceived safety regulations were high vs. low (0.25, 95% CI [0.093, 0.409]). Therefore, Hypothesis 2a was supported.

Hypotheses 2b suggested that perceived safety regulations moderate the relationship between students' psychological stress and safety participation. The results showed that the effect of students' psychological stress on safety participation was negative and significant when perceived safety regulations were high (+1 *SD*, −0.17, 95% CI [−0.317, −0.015]). This effect was also negative and significant when perceived safety regulations were low (−1 *SD*, −0.52, 95% CI [−0.646, −0.399]). Further, there was a significant difference in the effect of individual psychological stress on safety participation when perceived safety regulations were high vs. low (0.36, 95% CI [0.185, 0.528]). Therefore, Hypothesis 2b was supported.

Following Dawson (2014), we plotted the moderating effect of perceived safety regulations on the relationship between students' psychological stress and safety compliance to visualize this effect (see **Figure 3**). Compared to the effect under perceived low safety regulations, the positive relationship between students' psychological stress and safety compliance was magnified under the condition of perceived high safety regulations. This suggests that stronger safety regulations convey the message that students may be severely punished for violating rules aimed at preventing and controlling COVID-19 spread, thus inclining students

TABLE 4 | Moderation effect analysis.

Dependent variable	Moderator perceived safety regulation	Effect (P_{Y1M})	95% CI
Safety compliance	Low (−1 *SD*)	0.14* (0.07)	[0.006, 0.278]
	High (+1 *SD*)	0.39** (0.05)	[0.303, 0.483]
	Diff	0.25** (0.08)	[0.093, 0.409]
Dependent variable	**Moderator perceived safety regulation**	**Effect (P_{Y2M})**	**95% CI**
Safety participation	Low (−1 *SD*)	−0.52* (0.06)	[−0.646, −0.399]
	High (+1 *SD*)	−0.17** (0.08)	[−0.317, −0.015]
	Diff	0.36** (0.09)	[0.185, 0.528]

n = 481.
*$p < 0.05$; **$p < 0.01$.
P_{Y1M} refers to the effect of safety compliance on psychological stress, P_{Y2M} refers to the effect of safety participation on psychological stress; and Diff refers to the mediation effect difference between a high level and a low level of perceived safety regulation.
CI, confidence interval.

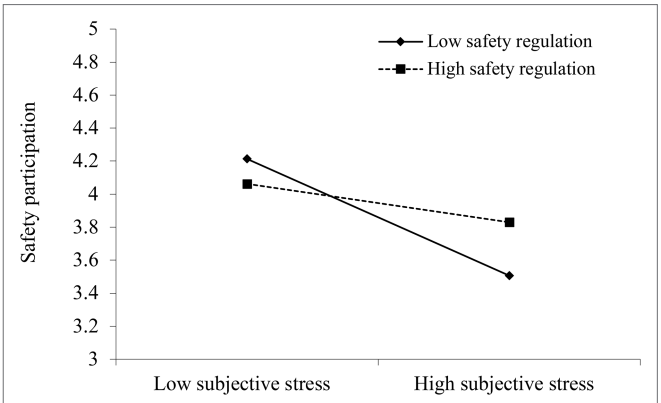

FIGURE 4 | Moderation effect of perceived safety regulation on relationship between psychological stress on safety participation.

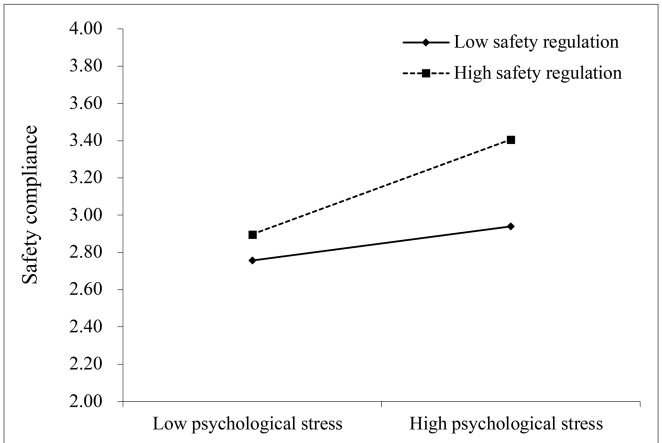

FIGURE 3 | Moderation effect of perceived safety regulation on relationship between psychological stress and safety compliance.

toward complying with those rules to avoid possible punishment and losses. In contrast, the positive relationship between psychological stress and safety compliance was buffered, which suggests that weaker safety regulations convey the message that violating the rules will not lead to adverse results. In this case, students may turn a blind eye to safety regulations for the prevention and control of COVID-19 spread and demonstrate a low level of safety compliance.

We also plotted the moderating effect of perceived safety regulations on the relationship between students' psychological stress and safety participation (see **Figure 4**). The results suggest that stronger safety regulations signal the valuation of participation in epidemic safety management by the university. Therefore, students tend to treat safety participation as a way to realize social value of self, which prompts them to participate in epidemic safety management. In comparison, weaker safety regulations convey the message that participating in epidemic safety management has nothing to do with the prevention and control of COVID-19 spread. In this case, students may be careless about their safety and engage in safety measures only to a limited extent.

DISCUSSION

Drawing on conservation of resources theory, this study proposed and tested the mechanism underlying and boundary conditions delimiting the effect of students' sense of control on safety compliance and safety participation in relation to the prevention and control of COVID-19 spread. The results showed that students' perceived psychological stress mediated the negative effect of sense of control on safety compliance, as well as the positive effect of sense of control on safety participation. Further, perceived safety regulations reinforced the positive relationship between psychological stress and safety compliance, and buffered the negative relationship between psychological stress and safety participation.

Theoretical Contributions

Our research makes several key theoretical contributions.

First, it deepens our understanding of the mechanisms underlying the effects of sense of control on safety behavior using conservation of resources theory. A previous study focusing on a motivational perspective found that a lower sense of control triggers individuals to focus on their short-term benefits and prompts them to engage in avoidance behaviors (Mittal and Griskevicius, 2014). Drawing on conservation of resources theory, this study adds to that finding by showing that in the context of COVID-19 safety management, students who perceive a lower sense of control face higher psychological stress and tend to engage in avoidant behaviors to preserve their limited resources, thereby exhibiting a higher level of safety compliance. Meanwhile, students who perceive a higher sense of control face less psychological stress and tend to expand their resources, engage in activities to realize their social values, and exhibit higher levels of safety participation. In this way, our study explains the divergent effect of sense of control on safety

behaviors with psychological stress as the mediator. It therefore enriches our understanding of the effects of sense of control in a safety management context.

Second, by introducing the concept of perceived safety regulations, this study verifies the boundary conditions under which individuals' psychological stress influences their compliance with regulations and their participation in regulation implementation. It therefore extends research on the contextual mechanisms underlying the relationship between psychological stress and safety performance. Previous studies have focused on the contextual effects of soft measures on the relationship between environmental factors, such as safety climate and individual safety behaviors (Zohar, 2000; Neal and Griffin, 2006; Xia et al., 2020). However, strict regulatory or punitive measures can also reinforce the influence of environmental factors on individuals' safety behaviors (Huang et al., 2004). Focusing on harsh measures, this research indicates that stronger safety regulations signal to students that failure to comply with safety regulations for the prevention and control of COVID-19 spread may result in serious safety risks and severe punishment for violators, thus strengthening the positive relationship between psychological stress and safety compliance. In addition, stronger safety regulations convey the message that participation in activities for the prevention and control of COVID-19 spread is valued by higher education institutions and is an important way for students to realize their social values, thus buffering the negative relationship between psychological stress and safety participation. Therefore, by focusing on harsh measures in safety management, this study deepens our understanding of the contextual effects of safety regulations that influence the impact of individual psychological stress on safety behavior.

Third, by introducing conservation of resources theory to the context of epidemic control in higher education institutions, this study contributes to conservation of resources theory. It adds to previous research that has used this theory to explain the process by which environmental conditions affect individual safety behavior through resource depletion in safety management situations (Bacharach et al., 2008; Hammer et al., 2016; Kelloway, 2017). While efforts are being undertaken to prevent and control the spread of COVID-19 in higher education institutions, students have to cope with not only their course schedules to meet their daily academic requirements, but also the risks of virus infection and the protection of their own safety. In this situation, students' resource consumption is more pronounced, while their safety behavioral patterns also vary considerably due to the different resources in their possession. This study differs from previous studies by focusing on the context of prevention and control during the COVID-19 pandemic and thus expands the range of scenarios to which conservation of resources theory has been applied.

Practical Implications

We expect our study to have practical implications for the prevention and control of COVID-19 spread in higher education institutions. First, we found that a greater sense of control negatively affects safety compliance *via* psychological stress but positively impacts safety participation *via* psychological stress. Therefore, epidemic prevention and control departments in higher education institutions should be aware of the divergent effects of the sense of control on safety behavior. Due to their lack of knowledge about COVID-19, students may generally have a lower sense of control and show a higher level of safety compliance. However, due to concerns about their own health and the desire to avoid risks, students may tend to decline to participate in safety management activities. Therefore, managers could encourage students to actively participate in safety management by emphasizing that cooperation produces the best result, or by awarding and recognizing the residence or class that engages in safety participation. Support comes from research that has shown that shared goals promote individuals' proactive behavior in safety management (e.g., Neal and Griffin, 2006).

Second, we found that perceived safety regulations reinforce the positive effect of psychological stress on safety compliance and buffer the negative effect of psychological stress on safety participation. Thus, managers in higher education institutions would be well advised to increase their efforts in implementing safety regulations, to enhance students' compliance with safety regulations for the prevention and control of virus spread and to encourage them to fully engage in pandemic-related safety activities. For example, managers could develop stronger publicity campaigns to make students aware of the consequences of violating prevention and control policies. Managers could also award prizes to students who comply with safety regulations and actively participate in safety management activities, and punish those who break the rules.

Limitations and Future Research

Like any research, this research has limitations. First, the sample for this study was obtained from a single university. Moreover, the differences in perceived safety regulations among the members of different classes were relatively small, so the data were not suitable for cross-level analysis. Therefore, it was difficult to parse out the cross-level moderating effect of perceived safety regulations on the relationship between sense of control and safety compliance. Chowdhury and Endres (2010) concluded that cross-level analyses are effective for distinguishing between-group from within-group effects and for observing the effects of high-level variables on multiple dimensions of individual behavioral patterns. Thus, future research could expand the range of sample source and use cross-level analyses to explore the contextual effects of group safety regulations on the relationship between students' sense of control and their compliance.

Second, all of the variables in our study were measured by self-report, which may have led to the results being influenced by the participants' sense of social desirability (Crowne and Marlowe, 1960). Thus, future research could use other-rated measures of individual safety compliance or participation. For example, researchers could ask teachers or administrators to rate students' safety compliance and participation, or use objective indicators to measure individual behavior, such as the number of violations or points for participation in safety management activities. This study also used a survey research method, which

could not verify the causal relationship between the variables. Future research could use an experimental approach to verify the causal relationship between sense of control and safety behavior. Specifically, researchers could prime different levels of sense of control in different groups, then observe whether there were significant differences in safety compliance and safety participation between individuals in the experimental group and control groups.

Third, several alternative mechanisms might potentially explain the relationship between individuals' sense of control and their safety behavior. For example, according to the theory of planned behavior (Ajzen, 1991), individuals with a higher sense of control believe that they are in control of the external environment and thus show a greater tendency to comply with and participate in safety activities. Also, according to social learning theory (Bandura, 1977), individuals with a low sense of control are more sensitive to losses and tend to imitate the behavior of others in an effort to reduce the impact of uncertainty; thus, they may be expected to willingly comply with safety measures to prevent and control the spread of COVID-19. Thus, future researchers could draw on these alternative theories to explore other mechanisms underlying and situational conditions determining the relationship between students' sense of control and their safety compliance and participation.

CONCLUSION

By focusing on safety management of the COVID-19 pandemic at a university, this study examined how and when sense of control affects student's safety compliance and safety participation. Based on two-wave time-lagged data collected from 481 students in 58 classes, our findings showed that students' psychological stress mediated the negative effect of sense of control on safety compliance and mediated the positive effect of sense of power on safety participation. Moreover, we found that perceived safety regulations strengthened the positive relationship between students' psychological stress and safety compliance, and buffered the negative effects of psychological stress on safety participation. Our research advances the understanding of the underlying psychological mechanisms through which sense of control affects safety behavior in the context of COVID-19 pandemic management in higher education institutions, and of how perceived safety regulations affect this psychological process.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

This study was reviewed and approved by Academic Committee of Zhejiang University. Written informed consent was obtained from all participants for their participation in this study, in accordance with the Declaration of Helsinki.

AUTHOR CONTRIBUTIONS

PL mainly proposed the initial idea and basic model for this research, wrote the introduction part, and contributed to collect and analyze the data of this study. HZ mainly provided his knowledge to perfect the research model and develop the theatrical hypotheses. All authors contributed to the article and approved the submitted version.

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Sport Community Involvement and Life Satisfaction During COVID-19: A Moderated Mediation of Psychological Capital by Distress and Generation Z

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How can sport community involvement influence life satisfaction during a pandemic? Self-expansion theory posits that individuals seek to gain resources such as positive interpersonal relationships for growth and achievement. By considering psychological capital (PsyCap) as a dispositional resource intervening between sport community involvement and life satisfaction, we examined an empirical model to test the chain of effects. Based on the stress process model, distress and generational group (Generation Z vs. others) were tested as moderators. Participants ($N = 233$) responded to the scale item questionnaire for model assessment. Supporting the hypothesized relationships, the model was supported with a significant moderated-moderated mediation. The mediation effect of PsyCap was stronger when distress level was lower and such interaction effect was amplified for Generation Z (Gen Z). Whereas the global sport communities and Gen Z were found to be more particularly vulnerable to COVID-19, our findings suggest that there are psychological pathways for fans to maintain their resilience. It is foremost imperative to lower the stress level of sport fans for their community involvement to positively affect life satisfaction. Gen Z were more stressed during the pandemic but individuals who managed to cope with stress were able to leverage community involvement to boost positive psychological resources. Acknowledgment of these effects brings implications for better management strategies and provides avenues for new research.

Keywords: sport community involvement, psychological capital, life satisfaction, distress, generation Z, COVID-19

INTRODUCTION

Sport organizations and Generation Z (Gen Z) took a big hit from the COVID-19 pandemic. Restrictions on social gatherings led to cancelling sporting events (Woodford and Bussey, 2021) and Gen Z faced reduced job opportunities and lower payments (Glasper, 2020). Sport fan communities around the globe are currently challenged to seek strategies for returning

to normal after the pandemic. Whereas sport organizations provide a unique context that exemplifies organizational vulnerabilities to COVID-19, a large body of research suggests positive effects of sporting experiences resilient to such hardship.

The benefits of sports to society have been widely recognized for many years (Coalter, 2007). Individuals can improve their physical and psychological well-being by participating in community sports, and they can also gain at both individual and social levels by joining fan clubs that support certain athletes or teams (Vail, 2007). Social connections among members of a fan community have positive psychological effects by reinforcing a person's sense of camaraderie and identification, as well as creating a sense of belonging and care, all of which can improve overall life satisfaction (Wann et al., 2015).

Participating in organized sport consumption activities can also help improve psychological well-being by allowing individuals to build up personal-psychological capital (also known as PsyCap). In other words, engaging in community activities can lead to positive appraisals of life circumstances and accentuate the potential for personal achievement, which in turn can derive a sense of fulfillment across a variety of life domains (Bockorny and Youssef-Morgan, 2019). While the concept of PsyCap has received considerable attention in the organizational behavior literature in general, there has not been much research on how this concept could be applicable to benefit the subjective well-being of sport fans.

Foremost, there is a clear gap in the literature examining sport community involvement as an antecedent of PsyCap. Whereas several researchers investigated the value of psychic income and community welfare effects of sports (e.g., Warner and Dixon, 2013; Ouyang et al., 2020), there is a limited empirical study examining the association of sport community involvement with PsyCap. In addition, while there are evidences indicating a positive relationship between job involvement and PsyCap (e.g., Demir, 2018; Rani and Chaturvedula, 2018), the role of involvement in a non-occupational community setting gained little attention. The current investigation expands the boundary conditions of the stress process model (Pearlin et al., 1981) by incorporating self-expansion theory (Aron and Aron, 1996) into the PsyCap literature as we test whether perceptions of community interactions can improve positive psychological resources.

Although previous studies on PsyCap have been conducted in industrial–organizational contexts, its potential to play an important role within the context of sports fan communities cannot be ignored. In most PsyCap organizational behavior studies, scholars have focused on participants' main occupations (e.g., employees, students) not in non-occupation settings. The sports fan community can serve to improve participants' self-confidence and self-actualization regardless of their main occupation, making it an important vehicle for self-development and positive psychology (Doyle et al., 2016). A study on involvement in the sport fan community may provide important implications for PsyCap literature, as PsyCap research on leisure activities and relevant phenomena such as the sports fan community has been far ignored. Furthermore, we attempted to address an imperative question that sport management practitioners are currently facing: How can professional sport organizations better understand the psychological state of the younger generation facing the pandemic?

In particular, Gen Z has recently received scholarly interest due to its unique personality and organizational behavior that is different from previous generations (Puiu, 2016; Cilliers, 2017). Gen Z members, in general, enjoy forming bonds with others and seeking new ideas or experiences through such relationships, as well as engaging in community activities (Seemiller and Grace, 2017). However, they are relatively vulnerable to stress as they are not resilient under pressure (American Psychological Association, 2018; Cartwright-Stroupe and Shinners, 2021). Nevertheless, Gen Z has received very little attention in the sport fan community context.

Given that Gen Z members prefer to be in the company of others and are prone to stress (American Psychological Association, 2018), they are likely to face exceptional adversity during the COVID-19 pandemic, which strains and disrupts various restorative life activities. Regarding the positive social and personal benefits that sport fans' community engagement may provide, investigating the effects of involvement in a sport community on Gen Z members under stressful conditions can provide useful insights into explaining their psychosocial outcomes.

Therefore, in this study, we investigated how Gen Z members' sport fan community involvement can positively affect their life satisfaction, under pandemic-induced stressful circumstances. Using self-expansion theory and the stress process model, we incorporated PsyCap as a mediator between community involvement and life satisfaction, as well as how stress and belonging to Gen Z affects this relationship.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Sport Community Involvement and Life Satisfaction

The concept of involvement has been defined in several ways: As a person's subjective assessment of how one concerns and cares for, and perceives the importance, personal relevance, and significance of, an attitude (Zaichkowsky, 2012). Involvement, as an activated attitude, affects one's motivational state of mind regarding to an object or activity (Mittal and Lee, 1989) and elicits engagement in behaviors to accomplish relevant objectives and goals (Poiesz and de Bont Cees, 1995). The operational definition of involvement has been widely used to better understand people's motives and behaviors in a variety of settings (e.g., education, leisure, work; Zaichkowsky, 2012). Studies on involvement have been extended to comprehend why people get involved in certain activities (e.g., participating in sports; attending sporting events), especially given the fact that community activities have been recognized to positively improve an individual's psychological state.

A major feature of community involvement is in how people's interest and personal importance attached to such engagement and participation affects their mental state. Moore et al. (2006) showed that assessing involvement can help better understand and forecast the advantages for both

individual (e.g., pleasure, enjoyment, a sense of belonging) and community (e.g., social capital) levels. Numerous researchers have found that community involvement generates positive psychological states including personal well-being (e.g., Gorrell, 2001; Irvine and Warber, 2002; McMahon et al., 2004). Addressing the inherent need to socially engage with others and forge bonds, participation in community activities can positively impact a person's subjective well-being (Atkinson et al., 2020).

In the spectator sport setting, fans form a community around the team they support and, through this specific community, participate and engage in a variety of fan activities (e.g., attending games, participating in team events, cheering for the team). While researchers have extensively investigated involvement in various sport settings (e.g., sport participation, Funk et al., 2007; viewership, Bee and Havitz, 2010), there has been little study particularly focused on sport fan communities. In this study, we operatively defined sport community involvement as the degree of belonging that followers of sport teams feel regarding their fan communities and the importance they place on participating in relevant fan activities. Further, we highlight self-expansion theory (Aron and Aron, 1996), which has been widely used to examine the relationship between community involvement and life satisfaction, as a useful tool for better understanding the values of sport community involvement.

Self-expansion theory was developed to explain the drive that impacts affection, cognition, and behavior in close relationships (Aron and Aron, 1996). This theory focuses on the individual's inner motive to grow through acquiring resources that help them achieve their goals (Aron et al., 2005). Self-expansion can take place in a strong relationship that provides opportunity to grow, ultimately resulting in high degrees of positive affect (Aron and Aron, 1996). Through the opportunities for inner growth provided by communal activities, community membership, and involvement, people can attain personal and social goal through positive interpersonal interactions that generate positive affects (McLaughlin-Volpe et al., 2005).

People tend to receive more opportunities for self-expansion through socially engaged experiences within their community, which ultimately leads to greater life satisfaction. Kara and Sarol (2021) articulated that involvement in group activities lead to setting a specific and feasible goal, promoting regular involvement in the activity, and fulfilling the desire for personal growth and social bonds. Being involved in a certain activity triggers a process of experiences where people tend to seek the meaning of the activity, give meaning to their lives, and further consider how it fits into their lifestyle, which may in turn foster positive life evaluations (Sato et al., 2016). With reference to the importance of community involvement in one's positive affect, we can reasonably expect sport community involvement to have a positive influence on the life satisfaction of sport fans. Therefore, we established the following hypothesis:

> *Hypothesis 1*: Sport community involvement will positively affect fan's life satisfaction.

Mediating Role of Psychological Capital

Compared to others, people seeking for self-expansion are more likely to obtain additional resources in order to accomplish their own objectives (Aron and Aron, 1996). Among various available resources, Jurek and Besta (2021) highlighted the importance of enhancing an individual's PsyCap in order to evoke positive attitudes and behaviors in the organizations to which they belong. PsyCap refers to the developmental capacity of individuals including state-like and motivational cognitive constructs such as hope, efficacy, optimism, and resilience (Luthans, 2002). PsyCap is highlighted as one of the core constructs in the positive organizational behavior perspective for its significance in individual growth from the actual self to the possible self (Luthans et al., 2007). Within organizational settings (i.e., business and management), PsyCap has been considered a prominent factor for employee growth, organizational behavior outcomes (e.g., job performance), and well-being (Avey et al., 2010; Newman et al., 2014). Considering such positive aspects in the sporting context, the role of PsyCap in one's accomplishments and well-being has been adapted and empirically examined across different settings with various targets such as coaches (Kim et al., 2017, 2019), sport administrative employees (Kang et al., 2021; Kim et al., 2021), student-athletes (Kim et al., 2020), and residents of sporting event host cities (Sato et al., 2020).

Examining the mediating role of PsyCap within the mechanism that underlies the influence of a specific life domain (i.e., sport community) augmenting life satisfaction can provide a deeper understanding of the process of enhancing sport fans' life satisfaction. Wright et al. (2002) proposed that people want to be a part of certain communities because it allows them the chance to expand their horizons and reach personal growth and development goals. In terms of how to improve one's PsyCap, Tu (2020) maintained that facilitating social relationships among people plays a crucial role in leisure participants' psychological development. These results suggest that sport community involvement can contribute to an individual's growth and development. Specifically, individuals can gain greater confidence in dealing with challenges when they receive support from other members in their community (i.e., efficacy), allowing them to discover new ways to achieve their goals (i.e., hope). Also, a sport fan community member's optimism and resilience can be strengthened by their belief that there will be support and help from other group members when they face difficulties, allowing them to think positively about the future instead of becoming frustrated (Sagi et al., 2021).

PsyCap is closely associated with subjective well-being, which can be defined as "a person's cognitive and affective evaluations of his or her life" (Diener et al., 2002, p. 63). While subjective well-being is an umbrella-like construct that encompasses a wide range of positive psychological responses, it has been used interchangeably with life satisfaction (Diener et al., 1999; Gupta and Shukla, 2018). There is numerous empirical evidence demonstrating that PsyCap can exert a positive influence on life satisfaction (e.g., Choi and Lee, 2014; Bockorny and Youssef-Morgan, 2019). This is because

PsyCap can serve as (1) cognitive resources and a reservoir from which members of the community can draw to impact individuals' well-being, and (2) an avenue for boosting people's immunity to stressors or even shaping the ways they appraise and define events (Avey et al., 2010).

PsyCap equips people to reframe events as motivational challenges rather than debilitating threats, in turn helping them to gain a sense of fulfillment or satisfaction (Riolli et al., 2012). For example, Park et al. (2004) argued that individuals with a high level of efficacy and hope tend to have a more positive view about the future and, as a result of this belief, they have a positive persona that helps them maintain a more positive attitude in their own lives. Furthermore, resilience and optimism are positively associated with adaptive coping responses and negatively correlated with negative emotions in adversity, which in turn can impact the subjective well-being of an individual (Andersson, 1996). To sum up, four sub-constructs of PsyCap (i.e., efficacy, hope, optimism, resilience) synergistically enhance one's life satisfaction.

The function of PsyCap resources assisting individuals to interpret situations in a positive and beneficial manner builds a case for the mediating role of PsyCap between the effect of sport community involvement on members' subjective well-being. Based on the self-expansion theory and existing findings, PsyCap can help members of sport communities feel motivated, energized, and adaptable when facing adversity (e.g., a global pandemic). As a result, two direct effects among three key factors are investigated in the current research (i.e., from sport community involvement to PsyCap; from PsyCap to life satisfaction), leading to the following hypothesis:

> *Hypothesis 2*: Fan's PsyCap will mediate the relationship between sport community involvement and life satisfaction.

Moderating Effects of Distress

Numerous recent studies have focused on individuals' distress levels in facing a global pandemic (e.g., Ang et al., 2021). As a generic term, distress has been linked to mental tension and or strain and is often perceived as a nonspecific bodily response to a stimulus. The subjective feeling of distress is triggered by a stimulus (i.e., a stressor) or environmental demands (Krannich et al., 1988). In the field of spectator sport, distress has been studied mostly in terms of its effects on fans' well-being, particularly given the onset of the COVID-19 pandemic as a stressor. Studies found that the pandemic has imposed numerous restrictions on sports fans and their communities, putting them under a significant level of stress (Schellenberg et al., 2021). Further, it was evidenced that fans' anxiety over when they will be able to return back to participating in fan activities without worrying about the disease was stressful and perceived as a threat to their self-identity (Schellenberg et al., 2021).

The stress process model, commonly employed to better understand the effects of distress on an individual (Pearlin et al., 1981), has been a primary sociological lens for comprehending the relationships among stressors, individual resources, and mental health. In this model, stressors are defined as "the broad array of problematic conditions and experiences that can challenge the adaptive capacities of people" (Pearlin, 2010, p. 208). In other words, the stressors can be viewed as external forces hindering one's ability to function normally, thus constituting a primary attribute of poor mental health (Wheaton et al., 2013). Based on the stress process model, external stressors can exert a direct negative effect on an individual's mental health (e.g., depressive symptoms). Additionally, the stressors negatively affect personal resources (e.g., self-esteem and self-mastery) and ultimately their mental health.

In facing the COVID19 pandemic, the aforementioned relationships can be differed according to fans' levels of distress caused by a lack of in-person social interactions through participation in sport community activities. Such people are more inclined to satisfy their intrinsic personal and social needs through their perceived involvement in sports communities and, in doing so, their self-improvement is more dependent on the perceived social support from and interaction with others (Aron and Aron, 1996; McLaughlin-Volpe et al., 2005). The pandemic has limited the ability of those heavily involved in the sports community to engage in community activities, and the resulting stress can affect their PsyCap and lead to a consequent deficit in life satisfaction. Conversely, the effect of such stress may be relatively smaller for fans who are less involved in sports community activities, as they may satisfy their intrinsic desires by other means. In this respect, it is hypothesized that the extent to which an individual can enhance their PsyCap through sports community involvement varies depending on their level of stress. Accordingly, we established the third hypothesis as follows.

> *Hypothesis 3*: Distress moderates the mediation effect of PsyCap.

Moderating Effects of Generation Z

Gen Z refers to those who are born between 1995 and ending around 2010. During this time span, various events occurred such as the advancement of technology, movements regarding social issues (e.g., equality), and an unsteady economy (Turner, 2015; Hampton and Keys, 2017). Exposed to those events, Gen Z relishes socializing with other people, sharing ideas and experiences through community involvement, and influencing other people's thoughts and behaviors (Turner, 2015; Hampton and Keys, 2017). With those characteristics, Gen Z has become the mainstream of modern society, and thus scholars have actively attempted to understand the features of Gen Z and their impact on various parts of society. For instance, some scholars looked into how the characteristics of Gen Z interplays within the educational system (e.g., Hampton and Keys, 2017; Chicca and Shellenbarger, 2018) and others came to learn how the life experiences of Gen Z differ from others in the context of tourism (Robinson and Schänzel, 2019) and public policies (Giachino et al., 2022).

Among the various characteristics, Gen Z may be more prone to stress and its negative consequences as a result of the social circumstances surrounding them. For instance, Gen Z has grown by witnessing and naturally being exposed to the advancement of cutting-edge technology (Seemiller and Grace, 2017), which allowed them to obtain a lot of information in a short amount of time (Hampton and Keys, 2017). It also, however, engendered unintended consequences. They lack patience and are reluctant to engage in in-depth problem-solving thought processes (Turner, 2015; Hampton and Keys, 2017). Compared to other generations, Gen Z tends to stress out and feel depressed more easily with more severe consequences (Turner, 2015). Overall, studies indicate that Gen Z possesses unique characteristics, which may influence a variety of psychological and behavioral outcomes in a variety of situations. This also highlights the need to understand the numerous viewpoints regarding Gen Z that occur in distinct contexts.

As emphasized earlier, the stress process model explains how stressors can exert a stronger negative impact on the mental health of certain people than others (Pearlin et al., 1981). In this sense, Gen Z can be more vulnerable to stressors than other generations when facing the COVID-19 pandemic. Previous studies found that interpersonal or face-to-face social interactions cannot be completely replaced by other forms of social interaction (Turkle, 2011; Turner, 2015). Thus, the COVID-19 pandemic may increase Gen Z's stress levels by hindering their in-person social interactions through sport community involvement, impacting their mental health. As a result, we postulated that the aforementioned hypothesized relationship (H3) could differ for Gen Z members compared to other generations. Accordingly, the following hypothesis was generated:

Hypothesis 4: Gen Z moderates the mediation effect of PsyCap moderated by fans' distress.

MATERIALS AND METHODS

Participants

We recruited sport fans *via* Amazon Mechanical Turk. Two screening questions were used at the beginning of the survey to verify whether the participants were sport fans or not. Specifically, participants were asked to answer an open-ended question regarding their favorite sport team and indicated their level of identification with the team. Further, we utilized a fraud and bot detection system (i.e., reCAPTCHA) as protection against fraud and abuse in collecting data. We removed invalid responses from the analysis. Of the 331 contacts, a total of 233 responses were deemed usable: 156 males (66.95%) and 77 (33.05%) females. As for Gen Z, 98 survey participants (42.06%) belonged to Gen Z, while 135 participants (57.94%) did not. Gen Z showed higher levels of distress ($M = 4.58$, $SD = 1.51$) compared to non-Gen Z ($M = 4.07$, $SD = 1.87$; $F = 4.95$, $p < 0.05$). In terms of the academic completion levels, 9 participants were high school graduates, 11 participants engaged in some college but had no degree, 9 had an associate's degree (2 years), 166 had a bachelor's degree (4 years), 36 had a master's degree, and two had a doctoral degree. Majority of the respondents were Asian or Pacific Islander ($n = 138$, 59.2%) followed by White or Caucasian ($n = 56$, 24.0%), Black or African American ($n = 15$, 6.4%), Hispanic or Latino ($n = 12$, 5.2%), Other ($n = 9$, 3.9%), and American Indian or Native American ($n = 3$, 1.3%).

Measures

We adapted items from the previous studies, and their reliability and validity have been adequately assessed. The selected items were revised and reworded for this research, considering content relevance, representativeness, and item clarity. Specifically, we adopted 10 items from the revised personal involvement inventory (RPII), established by Zaichkowsky (1994), to measure sport community involvement. Twelve items from the PsyCap instrument (Luthans et al., 2007) were adopted to fit the context of the sport fan community. Five items relating to life satisfaction were adopted from the study by Pavot and Diener (2008). Finally, 11 items measuring distress symptoms were adopted from the Symptom Checklist-90 (SCL-90) scale (Derogatis and Cleary, 1977). The wording of items is listed in **Appendix**.

Statistical Analysis

The collected data were screened, and the basic assumptions were checked to further analysis. To test our hypotheses, a moderated-moderated mediation model was constructed and tested using PROCESS macro for SPSS (Model 11; Hayes, 2018). Based on the hypothesized relationships, we set sport community involvement as the independent variable, life satisfaction as the dependent variable, PsyCap as the mediator, and distress and generation as a first and second moderator, respectively (see **Figure 1**). Specifically, in this analysis, we tested the hypothesized direct (H1) and indirect paths (H2) as well as checked conditional indirect effects where the two-way (H3) and three-way interactions (H4).

RESULTS

Descriptive statistics of study variables are displayed in **Table 1**, and the path coefficients and confidence intervals are presented in **Table 2**. Hypothesis 1 proposed that sport community involvement will positively affect life satisfaction, which was not statistically significant ($b = -0.05$, $SE = 0.03$, 95% $CI = -0.11$ to 0.01). However, other results revealed the significant mediation effect of PsyCap in the relationship between sport community involvement and life satisfaction (H2) conditional on the two-way interaction between sport community involvement and distress (H3) and on the three-way interaction of sport community involvement, distress, and the Gen Z (H4).

The index of the moderated-moderated mediation was statistically significant ($b = -0.13$, $SE = 0.06$, 95% $CI = -0.25$ to -0.01), indicating that the mediation effect of PsyCap on the relationship between sport community involvement and life satisfaction depends on the levels of distress and

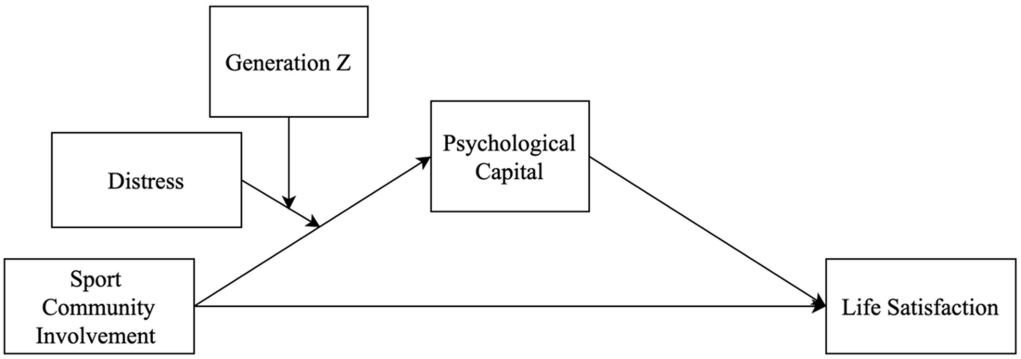

FIGURE 1 | Research model.

TABLE 1 | Descriptive statistics and correlations for study variables ($N = 233$).

	1.	2.	3.	4.
1. Sport community involvement	1			
2. PsyCap	0.13*	1		
3. Distress	−0.41**	0.03	1	
4. Life Satisfaction	0.03	0.77***	0.15*	1
M	4.80	5.46	4.28	5.30
SD	1.55	0.84	1.74	1.01
Skewness	−0.30	−1.53	−0.59	−1.35
Kurtosis	−1.16	4.04	−1.10	2.62
Cronbach's α	0.97	0.92	0.98	0.86

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

their generation. Specifically, for Gen Z, the mediation effect of PsyCap moderated by distress was −0.06 ($SE = 0.03$, 95% $CI = -0.14$ to -0.01), while for those who do not belong to Gen Z was −0.19 ($SE = 0.06$, 95% $CI = -0.31$ to -0.09). Based on the result, it can be also explained that the mediation effects of PsyCap moderated by distress were statistically significant regardless of whether the fans belong to Gen Z or not, supporting hypothesis 3. At the same time, the mediation effect of PsyCap moderated by distress changed from −0.06 ($SE = 0.03$, 95% $CI = -0.14$ to -0.01; not Gen Z) to −0.19 ($SE = 0.06$, 95% $CI = -0.31$ to -0.09; Gen Z) conditional on whether fans belong to Gen Z, supporting hypothesis 4.

Taking a more careful look at the three-way interaction results (see **Table 3**), when the distress level is low (16th percentile), the effect was stronger for Gen Z ($b = 0.72$, $SE = 0.21$, 95% $CI = 0.35$–1.16) compared to those who do not belong to Gen Z ($b = 0.27$, $SE = 0.11$, 95% $CI = 0.10$–53). Next, when the distress is moderate (50th percentile), the effect was significant only for Gen Z ($b = 0.12$, $SE = 0.05$, 95% $CI = 0.02$–0.23), but not for those who do not belong to Gen Z ($b = 0.06$, $SE = 0.06$, 95% $CI = -0.07$–0.16). Lastly, when the distress level is high (84th percentile), the effect was not statistically significant for both Gen Z ($b = -0.03$, $SE = 0.05$, 95% $CI = -0.13$–0.06) and those who do not belong to Gen Z ($b = 0.01$, $SE = 0.07$, 95% $CI = -0.15$–0.12). The three-way interaction results were visualized in **Figure 2**.

DISCUSSION

The current study shed light on the underlying psychological processes explaining the impact of sport community involvement on life satisfaction. During the COVID-19 pandemic outbreak, in particular, we expected PsyCap to intervene this process as a positive psychological resource essential to maintaining individuals' subjective well-being. Moreover, regarding the stress process model and research on Gen Z, we expected this relationship to be moderated by the level of stress where the level of stress would also depend on whether the individual belongs to Gen Z or not. Empirical evidence supported the proposed model by the significant mediation effect *via* PsyCap and significant interaction effects by distress and Gen Z categorization. Previous literature has paid keen attention to the relationship between involvement and life satisfaction or related constructs (Sato et al., 2016; Kara and Sarol, 2021), but explanations of the intervening and dispositional variables have been insufficient. In this sense, the present study can add essential knowledge to the literature by further explaining the conditional processes between sport community involvement and life satisfaction.

The results of the moderated-mediation model indicated that sport community involvement was indirectly linked to life satisfaction through PsyCap. It is important to note that the direct association between sport community involvement and life satisfaction was not apparent when PsyCap was entered in the regression model. This implies the prominent role of PsyCap in explaining life satisfaction, which is consistent with previous literature (Choi and Lee, 2014; Bockorny and Youssef-Morgan, 2019), hence supporting Hypotheses 1 and 2.

Our findings confirm self-expansion theory by highlighting the mediating role of PsyCap. Specifically, results indicate that sport fans can enhance their motivations and goals for

TABLE 2 | Path estimates.

Predictors	*b*	*SE*	*p*	LLCI	ULCI
DV: PsyCap (R^2 = 0.13)					
Sport community involvement	0.41	0.15	<0.01	0.11	0.71
Distress	0.41	0.17	<0.05	0.07	0.75
Gen Z	−4.40	1.67	<0.01	−7.69	−1.10
Sport community involvement × Distress	−0.07	0.03	<0.05	−0.13	−0.01
Sport community involvement × Gen Z	0.75	0.28	<0.01	0.18	1.31
Distress × Gen Z	0.80	0.31	<0.05	0.18	1.41
Sport community involvement × Distress × Gen Z	−0.13	0.05	<0.05	−0.24	−0.03
DV: Life satisfaction (R^2 = 0.60)					
Sport community involvement	−0.05	0.03	0.07	−0.11	0.01
PsyCap	0.94	0.05	<0.001	0.84	1.04

DV, dependent variable; SE, standard error; LLCI, lower level of confidence interval; ULCI, upper level of confidence interval.

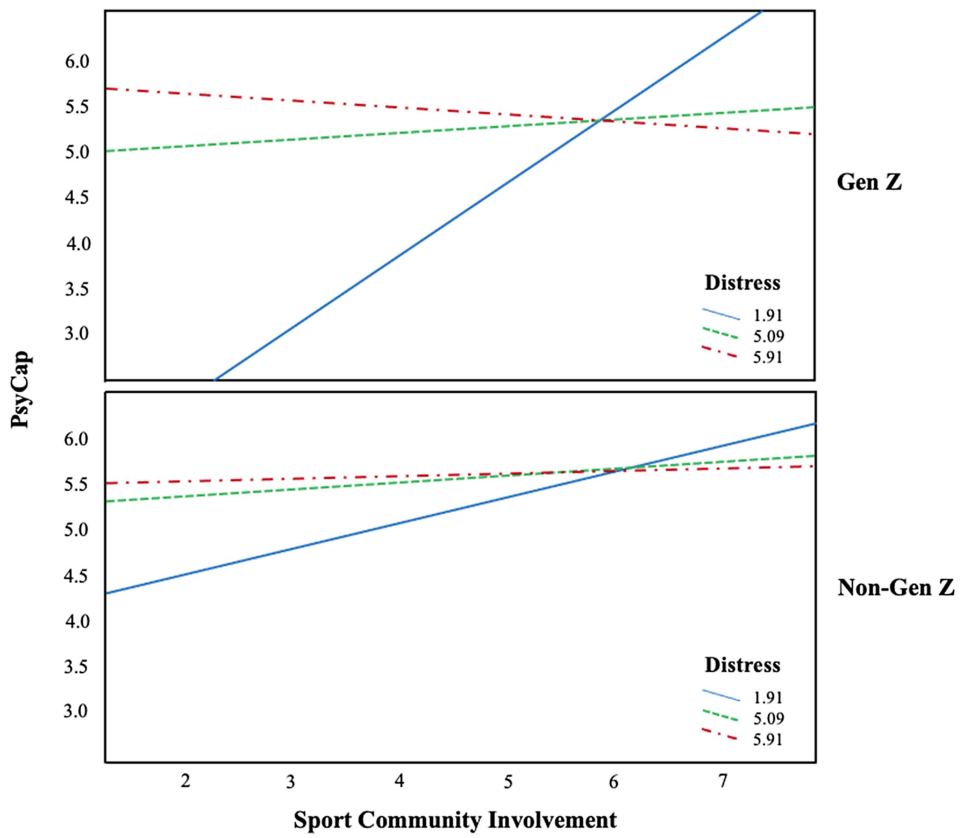

FIGURE 2 | The three-way interaction effect. Solid line represents low distress level at 16th percentile; dotted line represents medium distress level at 50th percentile; and dash-dotted line represents high self-esteem level at 84th percentile.

self-growth and development by engaging in social activities in their sport communities, which ultimately leads to increasing life satisfaction (Aron and Aron, 1996; Stenseng et al., 2012). The results support the previous evidence suggested by Li et al. (2014) and Huang and Zhang (2021), who presented that PsyCap acts as an important mediator between individuals' perception of social support from their social network and subjective well-being. Further, our findings broadly support the body of research linking sport community involvement with PsyCap (e.g., Morgan et al., 2019) and PsyCap with life satisfaction (e.g., Bockorny and Youssef-Morgan, 2019). We provide notable evidence confirming a pathway connecting sport community involvement with life satisfaction *via* PsyCap. Whereas previous studies mainly provided evidence linking two of the three key factors (i.e., sport community involvement and PsyCap; PsyCap and life

TABLE 3 | Conditional indirect effects of sport community involvement on life satisfaction *via* PsyCap.

Distress Level	Generation	Effect	Boot*SE*	BootLLCIs	BootULCI
Low	Non-gen Z	0.27	0.11	0.10	0.53
Low	Gen Z	0.72	0.21	0.35	1.16
Median	Non-gen Z	0.06	0.06	−0.07	0.16
Median	Gen Z	0.12	0.05	0.02	0.23
High	Non-gen Z	0.01	0.07	−0.15	0.12
High	Gen Z	−0.03	0.05	−0.13	0.06

Distress Level: Low = 1.9 (16th percentile), Median = 5.1 (50th percentile), High = 5.9 (84th percentile); SE: standard error; LLCI: lower level of confidence interval; ULCI: upper level of confidence interval.

satisfaction), we empirically examined the chain of effects among these factors.

Distress significantly moderated the effect of sport community involvement on PsyCap, supporting hypothesis 3. Sport community involvement affected PsyCap more positively when the distress level was low. It is imperative to consider this disordinal interaction as the effect of sport community involvement became significantly weaker when fans are stressed. As many restrictions have been placed on sports fans and their community involvement as a result of the pandemic, current study results are in accord with recent studies identifying the significant role of stress on fans (Schellenberg et al., 2021). Simultaneously, our results confirm and expand the stress process model (Pearlin et al., 1981), suggesting that such global pandemics or other disasters can act as an external stressor negatively affecting personal-PsyCap, resulting in a negative impact on mental health. Further, we found that Gen Z is experiencing higher levels of distress than others. The stress process model explained that stressors can exert a stronger negative impact on the mental health of certain people than others. In this regard, the demographic cohort information provides additional evidence to support the theoretical explanation and prediction of the stress process model.

The significant moderated-moderated effect further spotlights the importance of distress levels and generation differences based on the three-way disordinal interaction (**Figure 2**). The mediation of PsyCap showed stronger effects when distress level was low and this interaction effect was more so the case to Gen Z. Visualized in **Figure 2**, engaging in fan community activities was more impactful for less-stressed Gen Z group. For Gen Z fans, the indirect effect was prominent, especially when their distress level is low and medium (see **Table 3**). In contrast, for non-Gen Z fans, the indirect effect of sport community involvement through PsyCap was only significant when their distress level is low. It indicated that unless Gen Z's distress level is notably high, their life satisfaction can be improved by the increased level of PsyCap generated by sport community involvement. Such findings can encourage practitioners and policymakers in sport as the adaptive role of sport community involvement in relation to life satisfaction is further evidenced. However, it is also imperative to note that the role of sport community involvement is not necessarily effective in boosting PsyCap and life satisfaction when individuals are highly stressed out. Scholars need to provide evidence-based solutions based on the findings that it is important to keep the level of distress low for community members, specifically to a greater degree to Gen Z as they are more vulnerable to stress (Turner, 2015).

The findings of this study complement those of earlier studies, as we included distress and generational identity (specifically Gen Z and non-Gen Z) as moderating variables. Although Gen Z has become a major demographic group in society, there has not been adequate research on how their psychological well-being can benefit from sport community involvement. The findings evidence explanations and predictions of how the dynamics of distress, PsyCap, and well-being are organized differently across generations in the context of sport fan community involvement.

This study provides important theoretical contributions by expanding PsyCap's application beyond job settings. By examining the role of PsyCap in the sport fan community context, we confirmed fan community involvement as an antecedent of PsyCap which is not delineated by participants' occupations. This study also expands the boundary conditions of the stress process model (Pearlin et al., 1981) by incorporating self-expansion theory into the PsyCap literature. Laying the foundation for better understanding of specific phenomena related to sport fan communities is an arguably significant academic contribution.

Our study also highlights the important role of sport fan community involvement in improving participants' self-confidence and self-actualization leading to self-development and positive psychology. Considering that most previous studies discussed PsyCap primarily within the industrial-organizational context, the findings of this study contribute to our understanding of the role of leisure activities in promoting an individual's positive psychological development and subjective well-being.

PRACTICAL IMPLICATION

Our results suggest that when people are experiencing high levels of stress, community involvement has no effect regardless of generation. In this regard, continued efforts are needed to prepare and build a policy or program that can reduce people's stress. At the same time, our results show that community involvement is effective when people have normal or low levels of stress, highlighting the role of community involvement in increasing PsyCap and life satisfaction. This information indicates that developing effective community engagement strategies that stimulate people's interest and enthusiasm, while also generating a sense of community involvement, is crucial. More practically, it would be valuable for practitioners or managers in the sport community to use a variety of communication channels (on- and off-line) to increase fans' social interaction. Not only can the boundaries of the community expand through fan access channels, but the life satisfaction of the fans previously involved in the

community can also be boosted for a positive social capital. Taking a more careful look at the generation differences, it may be important to activate various alternative channels for Gen Z as they are known to be omnipresent online (Wood, 2013; Turner, 2015).

Gen Z showed stronger effects of sport community involvement on PsyCap when distress level was lower, compared to the non-Gen Z group. This is consistent with the viewpoint that Gen Z are the most vulnerable to stress (Turner, 2015) while being the least resilient to stress among all generations (Cartwright-Stroupe and Shinners, 2021). Practitioners must acknowledge the differences across generations to prepare for future contingencies. Whereas Gen Z were more distressed during the outbreak, those able to cope with the situation were able to leverage community involvement to boost their PsyCap. Together, these findings elucidate the importance of developing targeted community engagement strategies that take Gen Z's characteristics into account. For instance, since Gen Z is social and adept at handling technology (Turner, 2015), developing community activities that reflect these characteristics is necessary to generate positive psychological outcomes as well as to reduce their stress.

Practitioners should also focus their attention on establishing and promoting community activity programs that can enhance fans' PsyCap. Our results showed that fans' life satisfaction did not increase by the direct effect of sport community involvement but PsyCap mediated to yield positive outcomes. Therefore, the promotion of a program that allows fans to learn and grow as well as be entertained will create a beneficial community (McLaughlin-Volpe et al., 2005). Furthermore, if practitioners or managers of the sport community can develop a program that leads Gen Z to become more involved and engaged, then the sport community will be able to play a positive role as a social connection for Gen Z in difficult times, such as during the pandemic.

Applying the practical implications of our findings to the real world, it will be necessary to develop communication messages and promotional content that members of Gen Z, who are vulnerable to stress and prefer to form like-minded communities, can easily access and handle. Specifically, a strategy that facilitates fan community activities in new communicational environments such as the metaverse and other virtual worlds can be effective to the younger generation (Lee et al., 2021). Based on the self-expansion theory, virtual identities in stress-free environments could engage the younger generation seeking psychological revitalization and varieties. Technology-mediated objects and content such as non-fungible tokens (NFTs) and social memes disseminated through social media could be effective communication tools within sports fan communities. These methods can be applied not only to stress-sensitive members of Gen Z but also to their contemporaries with higher stress tolerances. Developing new content should include elements that Gen Z members can casually consume without being a stressor. For example, recent efforts by the NBA to use the metaverse as an additional viewing channel exemplifies how technology is being used to engage Gen Z fans. Aligning technology-based communication tactics with the current findings, Gen Z members' involvement in the online and offline communities warrants academic and managerial attention as such experiences can lead to more profound life satisfaction. Involved sport fans will not only merely participate in sports community activities but will acquire knowledge and share their experiences to co-create the community.

As shown in **Table 2**, the three-way disordinal interaction indicates that Gen Z members' level of distress exerts a relatively extreme effect on their PsyCap and life satisfaction, compared to the non-Gen Z group. In this regard, practitioners should devise strategies to address each of the conditions under which Gen Z members are expected to be under—either high or low levels of stress. Given that each member of Gen Z faces different levels of stress, customized direct contact messages, which are frequently used in professional sports promotions, may be an effective strategy. Now utilizing data analytic approaches dynamic contact algorithms acquire personal data through previous interactions and customize information based on individual users rather than generic audience characteristics. Such analytic solution provides practitioners with tailored approaches for each sports fan, engaging individuals with a customized selection of information and activities. Thus, practitioners can use such technology to deliver messages which will capture the attention of each individual Gen Z member and provide information while moderating or reducing their stress levels (i.e., pull strategy) rather than increasing stress as a spam message does (i.e., push strategy). Future studies could investigate algorithms to monitor and capture users' moods and distress.

LIMITATIONS AND SUGGESTIONS

Several factors may limit the generalization of this study's findings. Our study investigated a specific context: the sport community. The generalizability of our findings may be limited to different communities, such as those based on celebrities, politics, race, or gender. In future studies, therefore, if we compare and analyze various contexts, we can reveal a wider scope of how community involvement affects an individual. Next, due to the participants in our study skewing toward males more than females, generalizing our findings may be limited. This may be problematic in that there can be gender differences in associations between community activity and its outcomes (Ferris et al., 2013). We expect that a more valid result can be elicited by similarly examining the gender ratio; a more insightful result can be presented by comparing the differences between males and females. Lastly, generations other than Gen Z were not indicated in this study. Although the target generation of this study was Gen Z, various practical implications could be determined if other generations were investigated individually, as each generation has its own distinct characteristics (Seaman et al., 2018). Therefore, we propose to categorize, compare, and analyze other generations in a follow-up study.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Texas A&M Institutional Review Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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APPENDIX

Wording of scale items.

Construct/Scale type	Items
Involvement/ Semantic differential	1. Unimportant/Important 2. Boring/Interesting 3. Irrelevant/Relevant 4. Unexciting/Exciting 5. Means nothing to me/Means a lot to me 6. Unappealing/Appealing 7. Mundane/Fascinating 8. Worthless/Valuable 9. Uninvolving/Involving 10. Not needed/Needed
Psychological Capital/ Likert-type	1. I always look on the bright side of things regarding my future. 2. I'm optimistic about what will happen to me in the future. 3. Overall, I expect more good things to happen to me than bad. 4. I can think of many ways to get out of a jam. 5. Right now I see myself as being pretty successful. 6. I can think of many ways to reach my goals. 7. I feel confident about my ability. 8. I am able to achieve my goals. 9. I am capable of handling things in my life. 10. I tend to bounce back quickly after hard times. 11. I usually come through difficult times with little trouble. 12. It does not take me long to recover from a stressful event.
Distress/ Likert-type	1. Feeling no interest in things 2. Feeling lonely 3. Feeling blue 4. Feeling of worthlessness 5. Feeling hopeless about the future 6. Thoughts of ending my life 7. Nervousness or shakiness inside 8. Feeling tense or keyed up 9. Suddenly scared for reason 10. Spells of terror or panic 11. Feeling so restless you could not sit still
Life Satisfaction/ Likert-type	1. In most ways, my life is close to my ideal. 2. The conditions of my life are excellent. 3. I am satisfied with my life. 4. So far, I have gotten the important things I want in life. 5. If I could live my life over, I would change almost nothing.

Items used 7-point format. Likert-type ranged from strongly disagree to strongly agree.

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BRIEF RESEARCH REPORT
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Workplace Protections and Burnout Among Brazilian Frontline Health Care Professionals During the COVID-19 Pandemic

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Health care workers from low- and middle-income countries have been playing a critical role in overcoming the challenges related to the COVID-19 pandemic; yet little is known about the relationship between workplace protections and wellbeing of Brazilian health care workers during the pandemic. This study aimed to evaluate whether Brazilian health care workers were satisfied with their workplace measures to protect their physical and mental health during the pandemic, and to assess the associations of such levels of satisfaction with indicators of burnout. Licensed Brazilian health care professionals were recruited *via* popular media between 5/19/2020 and 8/23/2020 to complete an online survey including questions about their demographic/professional characteristics, satisfaction with their workplace protective measures during the pandemic, and validated questionnaires assessing neuroticism, resilient coping, and symptoms of burnout. Most participants reported being dissatisfied with their workplace measures to protect their physical (516, 56.3%) and mental health (756, 82.5%). In multivariable analysis adjusted for personal and environmental factors, dissatisfaction with workplace physical health protections was significantly associated with higher levels of emotional exhaustion (B = 1.08, 95% CI = 0.47–1.69) and depersonalization (B = 0.61, 95% CI = 0.10–1.12), and dissatisfaction with workplace mental health protections significantly associated with higher levels emotional exhaustion (B = 1.17, 95% CI = 0.40–1.95). Efforts to improve both physical and mental health protective measures are critical to guarantee that health care workers continue to provide care at their maximum capacity.

Keywords: burnout, occupational stress, health personnel (MeSH), physicians, nurses, workplace, COVID-19

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INTRODUCTION

Accounting for roughly 11% of all reported deaths from the coronavirus disease 2019 (COVID-19) worldwide (COVID-19 Data Explorer, 2022), Brazil has been particularly struck by the pandemic. Health care workers of all types have been playing a critical role in overcoming the challenges related to overwhelmed health care systems, political disputes, and increased risk for infection (Lancet and The Lancet, 2020; Nguyen et al., 2020).

Previous studies suggest that in addition to the stressors related to working under pandemic conditions, health care workers from low- and middle-income countries face additional challenges related to the lack of appropriate resources and workplace support to deal with a global healthcare crisis (Bong et al., 2020; Carter et al., 2020; Keller et al., 2020; Migisha et al., 2021). Conditions of high demands and limited resources, such as the beginning of the COVID-19 pandemic in Brazil and other low- and middle-income countries, are known to increase the risk for burnout and other poor wellbeing indicators among health care workers (Bakker and Demerouti, 2017; Preti et al., 2020; Barello et al., 2021; De Simone et al., 2021).

Given the well-established associations between health care workers' distress symptoms with negative outcomes to both health care professionals and their patients (Hall et al., 2016; Dyrbye et al., 2017; Pereira-Lima et al., 2019; Montgomery et al., 2021), understanding the role of workplace measures to protect not only the physical, but also the mental health of health care workers during situations of high demands and limited resources is critical not only during the COVID-19 pandemic, but also moving forward.

While previous studies point to a high prevalence of indicators of low wellbeing among Brazilian health care professionals during the COVID-19 pandemic (Campos et al., 2021; Salvador et al., 2021), to the best of our knowledge, no studies assessed whether Brazilian health care professionals' indicators of dissatisfaction with their workplace measures to protect their physical and mental health were associated with their symptoms of burnout.

Here, we evaluated whether Brazilian health care workers were dissatisfied with the measures adopted by their workplace to protect their physical and mental health during the early and most critical phase of the pandemic and assessed the associations of such indicators of dissatisfaction with symptoms of burnout among these professionals.

METHODS

Participants

Licensed health care professionals working across all Brazilian states were recruited *via* popular media (social media, television, radio, and institutional advertising) between 5/19/2020 and 8/23/2020, period that corresponded to the first wave of the COVID-19 pandemic in Brazil. Eligibility criteria included being a licensed health care professional currently working in a health care setting providing care to COVID-19 patients. Professional categories included in the study were: (I) physicians; (II) nursing workers (nurses, nurse technicians/aids, and radiology technicians), and (III) other (i.e., dentists, nutritionists, occupational therapists, pharmacists, physical therapists, psychologists, social workers, and speech therapists). The Institutional Review Board of the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto - Universidade de São Paulo approved the study and all participants provided their informed consent on the study online platform.

Data Collection

All participants completed a secure online survey *via* REDCap. Identifiable data (i.e., name, e-mail, and workplace) were used to confirm participants' eligibility *via* public data available at the correspondent professional board and later encrypted on the databases to protect participants' privacy.

Burnout indicators were measured using the emotional exhaustion and depersonalization subscales of the Abbreviated Maslach Burnout Inventory (aMBI) (Riley et al., 2018), which is a shortened version of the Maslach Burnout Inventory (Maslach et al., 1997). Both the emotional exhaustion and the depersonalization subscales of the MBI include three items ranging from 0 (never) to 6 (everyday). Each subscale is scored by summing up its items, with scores higher than eight for exhaustion and higher than five for depersonalization indicating high levels of burnout (Riley et al., 2018).

In addition to the aMBI, the study online survey inquired about participants' (I) demographic/professional characteristics (i.e., sex, age, professional category, and years of professional experience); (II) personal variables previously associated with mental health indicators among health professionals {i.e., neuroticism [NEO-FIVE Factor Inventory (NEO-FFI-R)] (Costa and McCrae, 1997) and coping style [Brief Resilient Coping Scale (BRCS)] (Sinclair and Wallston, 2004)]}; (III) infection-related concerns [i.e., "Are you concerned about being infected with COVID-19 and with its associated risk of death?" (Yes/No); "Are you concerned about the possibility of your family members being infected with COVID-19?" (Yes/No)"; "Do you feel that family members and close people have avoided contact with you because of your work?" (Yes/No)]; and (IV) satisfaction with their workplace physical and mental health protections: [i.e., "Are you satisfied with the measures adopted by your workplace to protect the physical health of health care professionals?" (Yes/No); and "Are you satisfied with the measures adopted by your workplace to protect the mental health of health care professionals?" (Yes/No)].

Statistical Analyses

We calculated summary descriptive statistics for the full sample of health care professionals.

Differences in the prevalence of dissatisfaction with workplace protective measures and indicators of burnout among different professional categories (i.e., physicians, nursing workers, and others) were respectively assessed with χ^2 and one-way ANOVA tests with Bonferroni *post hoc* correction.

We examined for the associations between dissatisfaction with workplace protections and burnout using multiple linear regression while accounting for all measured demographic, professional, personal, and infection-related concern variables. A two-sided $P < 0.05$ was considered statistically significant. All analyses were conducted using SPSS version 21 (IBM Corp.).

RESULTS

Nine hundred sixteen (60.2%) of the 1,522 health professionals who assessed the study platform completed the survey (**Table 1**).

TABLE 1 | Characteristics of participants (*N* = 916).

Characteristic	*N* (%) or Mean (SD)
Women, *N* (%)	730 (79.7)
Men, *N* (%)	186 (20.3)
Age, mean (SD)	35.2 (9.2)
Nursing workers, *N* (%)*	376 (41.0)
Physicians, *N* (%)	275 (30.0)
Other health care professionals, *N* (%)#	265 (28.9)

**Nursing workers included nurses, nursing technicians, and radiology technicians.* #*Other health care professionals included dentists, nutritionists, occupational therapists, pharmacists, psychologists, physiotherapists, and social workers.*

Of those, 730 (79.7%) were female, 376 (41%) were nursing workers, 275 (30%) physicians, and 265 (29%) other health care professionals (i.e., dentists, nutritionists, occupational therapists, pharmacists, psychologists, physiotherapists, and social workers). The average age of the participants was 35 years old (SD = 9), and on average, participating health care workers had 10 years of professional experience (SD = 9). Compared to national census data from non-participants (IBGE, 2000), health professionals participating in our study were more likely to be female (79.7 vs. 69.0%, $p < 0.0001$).

Indicators of Burnout

A total of 336 (36.7%) participants screened positive for indicators of high emotional exhaustion (i.e., EE-aMBI $\geq$ 9), and 167 (18.2%) for indicators of high depersonalization (i.e., DP-aMBI $\geq$ 6), indicating a high prevalence of indicators of burnout among this population. Mean scores for emotional exhaustion and depersonalization were 7.1 (SD = 5.1) and 3.0 (SD = 3.8), respectively.

With respect to levels of emotional exhaustion across different professional categories, no statistically significant difference was found between physicians (mean = 7.2, SD = 4.8), nursing workers (mean = 7.2, SD = 5.4), and other types of health care professionals (mean = 7.1, SD = 5.1) ($F = 0.65$, df = 2, $p = 0.52$). In contrast, levels of depersonalization significantly differed across professional categories ($F = 11.89$, df = 2, $p < 0.001$), with physicians demonstrating significantly higher levels of depersonalization than nursing workers [3.8 (SD = 4.3) vs. 3.0 (SD = 3.8), adjusted $p = 0.02$], and other health care workers [3.8 (SD = 4.3) vs. 2.2 (SD = 3.0), adjusted $p < 0.001$]; and nursing workers showing significantly higher levels of depersonalization than other health care professionals [3.0 (SD = 3.8) vs. 2.2 (SD = 3.0), adjusted $p = 0.03$].

Satisfaction With Workplace Protections

When inquired about whether they were satisfied with the measures adopted by their workplace to protect their physical and mental health during the COVID-19 pandemic, most health care professionals participating in the present study reported to be dissatisfied with their workplace measures to protect their physical (*N* = 516, 56.3%) and mental health (*N* = 756, 82.5%).

The frequency of dissatisfaction with both physical and mental health protective measures was high across all professional categories, with nursing workers presenting the highest prevalence of dissatisfaction with both physical and mental health protective measures, followed by physicians, and other health care professionals (**Table 2**).

Associations Between Workplace Protections and Burnout Indicators

In all multivariable models for burnout indicators, dissatisfaction with workplace protections during the COVID-19 pandemic remained significantly associated with higher levels of burnout, even when accounting for well-established personal and environmental risks for these problems among health care professionals.

Higher levels of neuroticism, lower levels of resilient coping style, and dissatisfaction with both physical and mental health protective measures were significantly associated with higher emotional exhaustion in multivariable models (**Table 3**).

Multivariable models for depersonalization included male sex, to be a physician or a nursing worker, higher levels of neuroticism, concerns with risk of infection and death, and dissatisfaction with physical health protective measures as variables significantly associated with higher levels of depersonalization (**Table 4**).

DISCUSSION

This study found that most Brazilian health care workers participating in the present study were dissatisfied with the measures adopted by their institutions to protect their physical and mental health during the COVID-19 pandemic, which was significantly associated with higher levels of burnout. Importantly, such associations remained significant even when accounting for well-established predictors of burnout among health care professionals.

In line with prior studies, higher levels of neuroticism (Patel et al., 2018) and lower levels of resilient coping style (Shoman et al., 2021) associated with higher levels of emotional exhaustion, while male sex (Purvanova and Muros, 2010), to be a physician or a nursing worker (Patel et al., 2018; Dall'Ora et al., 2020), higher levels of neuroticism (Patel et al., 2018), and concerns with risk of infection or death (Bashkin et al., 2021) associated with higher levels of depersonalization. The present study adds to these findings by demonstrating that dissatisfaction with institutional measures to protect health care professionals physical and mental health were strongly associated with higher levels of burnout, even after accounting for these factors.

This study was carried out during the early phase of the COVID-19 pandemic in Brazil, which was marked by a severe limitation of resources including the lack of available vaccines, insufficient number of hospital beds, wide-spread of false information about the disease on social media, lack of appropriate protective equipment, and a limited number of health care workers to attend the demands of a overwhelmed healthcare system (Fiocruz, 2021). Therefore, our results underscore the critical role of workplace measures to protect the wellbeing of

TABLE 2 | Health care professionals' reports of satisfaction with their workplace measures to protect their physical and mental health during the COVID-19 pandemic.

Satisfaction with workplace protective measures, *N* (%)	Physicians (*N* = 275)	Nursing workers (*N* = 376)	Other health care professionals (*N* = 265)	Total (*N* = 916)	χ^2 (*P*-value)
Physical health protective measures					
Satisfied	125 (45.5)	140 (37.2)	135 (50.9)	400 (43.7)	12.4 (0.002)
Dissatisfied	150 (54.5)	236 (62.8)*	130 (49.1)*	516 (56.3)	
Mental health protective measures					
Satisfied	47 (17.1)	51 (13.6)	62 (23.4)	160 (17.5)	10.5 (0.005)
Dissatisfied	228 (82.9)	325 (86.4)*	203 (76.6)*	756 (82.5)	

**Statistically significant difference between groups – compared to the group "other health care professionals", nursing workers were significantly more likely to be dissatisfied with their workplace measures to protect their physical and mental health ($p < 0.01$). Nursing workers included nurses, nursing technicians, and radiology technicians. Other health care professionals included dentists, nutritionists, occupational therapists, pharmacists, psychologists, physiotherapists, and social workers.*

TABLE 3 | Multivariable model of emotional exhaustion indicators among Brazilian frontline health care workers during the COVID-19 pandemic.

Variables	B (95% CI)	β	*P*-value
Demographic and professional characteristics			
Men	–0.02 (–0.72–0.68)	–0.002	0.957
Age	0.01 (–0.02–0.04)	0.02	0.510
Other health care professional	(Reference)	–	–
Physician	0.45 (–0.29–1.19)	0.04	0.233
Nursing worker	0.26 (–0.41–0.93)	0.03	0.448
Personal characteristics			
Neuroticism	0.27 (0.24–0.31)	0.48	**< 0.001**
Resilient coping	–0.13 (–0.22—0.04)	–0.09	**0.006**
Infection-related concerns			
Concern to be infected and death risk	0.10 (–0.65–0.86)	0.01	0.790
Concern with infecting family	–0.58 (–2.09–0.93)	–0.02	0.450
Family and close people avoiding contact	0.15 (–0.42–0.72)	0.02	0.603
Dissatisfaction with workplace protections			
Dissatisfaction with workplace physical health protection	1.08 (0.47–1.69)	0.11	**< 0.001**
Dissatisfaction with workplace mental health protection	1.17 (0.40–1.95)	0.09	**0.003**

R^2 = 0.33. Bold values indicates the statistical significance.

TABLE 4 | Multivariable model of depersonalization indicators among Brazilian frontline health care workers during the COVID-19 pandemic.

Variables	B (95% CI)	β	*P*-value
Demographic and professional characteristics			
Men	0.96 (0.37–1.55)	0.10	**0.001**
Age	–0.02 (–0.05–0.004)	–0.05	0.099
Other health care professional	(Reference)	–	–
Physician	1.42 (0.79–2.04)	0.17	**< 0.001**
Nursing worker	0.68 (0.12–1.25)	0.09	**0.017**
Personal characteristics			
Neuroticism	0.14 (0.11–0.17)	0.32	**< 0.001**
Resilient coping	–0.04 (–0.11–0.04)	–0.03	0.370
Infection-related concerns			
Concern to be infected and death risk	–0.98 (–1.61—0.35)	–0.10	**0.002**
Concern with infecting family	–0.63 (–1.89–0.64)	–0.03	0.334
Family and close people avoiding contact	0.29 (–0.18–0.77)	0.04	0.233
Dissatisfaction with workplace protections			
Dissatisfaction with workplace physical health protection	0.61 (0.10–1.12)	0.08	**0.019**
Dissatisfaction with workplace mental health protection	0.40 (–0.25–1.05)	0.04	0.230

R^2 = 0.17. Bold values indicates the statistical significance.

health care workers during situations of increased demands and limited resources.

Previous research has suggested that the acute distress during the COVID-19 pandemic may transfer to longer-term mental health consequences (McGinty et al., 2020). Given the well-established association of health professional burnout with negative outcomes to both health care professionals and their patients (Wallace et al., 2009), our findings suggest that health care professionals' dissatisfaction with their workplace protective measures is likely to have serious implications to patient care not only during this pandemic, but also in the long-term.

Limitations of the present study include its cross-sectional design and possible sample bias. Due to our convenience sample approach, it is possible that health care professionals with different levels of burnout and dissatisfaction with their workplace protective measures were more or less likely to choose to participate in the present study. In addition, even though all measures were taken to protect participants' confidentiality, participants needed to fill out their email and name in order to certify that they were active health care workers, which might have also introduced bias in our results. Importantly, health care workers' satisfaction with their workplace measures was measured through a questionnaire specifically designed for the present study, which limits the generalizability of our results. Additionally, it is possible that other personal and work-related factors not accounted by the present study could influence our results.

With estimates that the disturbances caused by the pandemic on the Brazilian and other low- and middle-income countries health care systems are likely to take a long time to be completely overcome, investments in increasing both physical protective measures and the access to evidence-based mental health care is imperative to improve both the wellbeing of health care workers and patient care. Further studies should focus on identifying specific workplace conditions associated with LAMIC health care worker's wellbeing and satisfaction with their workplace protective measures.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto – Universidade de São Paulo. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SL and FO conceived the ideas and study design. SL, IS, JC, JH, AZ, and FO contributed to the acquisition of the data. KP-L, SL, and FO analyzed and interpreted the data. KP-L and FO drafted the manuscript. KP-L, SL, IS, JC, JH, AZ, and FO critically revised the manuscript for important intellectual content. FO obtained study funding. FO and SL supervised the study. All authors contributed to the article and approved the submitted version.

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Getting Through the Crisis Together: Do Friendships Contribute to University Students' Resilience During the COVID-19 Pandemic?

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Social contacts and social support represent resources that contribute to resilience. However, the COVID-19 pandemic and the associated measures, including contact restrictions, posed challenges for young adults' social networks, in particular for their friendships. Employing a mixed-method approach, we investigated the pandemic's effects on friendships and their role in successfully navigating the crisis. We combined a qualitative approach based on narratives and in-depth interviews and a quantitative approach based on online surveys focusing on university students in Austria. Longitudinal data collections allowed investigating changes and developments as the pandemic progressed. Results indicate profound challenges for participants' friendships and difficulties in both building new and maintaining existing friendships. This also impaired the provision of social support by friends, scattering participants' social resources and diminishing their resilience rather than strengthening it. Altogether, the results of this longitudinal study suggest a lasting negative effect of the pandemic on friendships for students.

Keywords: COVID-19, relationships, social networks, social resource, resilience, young adults, emerging adulthood, wellbeing

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INTRODUCTION

COVID-19 emerged in 2019, spread throughout the world, and was declared a pandemic in March 2020 (World Health Organization, 2020). The pandemic persists over 2 years later and caused profound changes in the lives of people across all countries, population groups, and ages. However, early on, research emerged that observed young adults, especially students, as particularly vulnerable to the mental health impacts of the crisis (Braun et al., 2020; Salari et al., 2020; Xiong et al., 2020). Emerging or young adults are in a stage in their lives that is characterized by instability and insecurity (Arnett, 2000), for example regarding their education, their career paths, and their social networks, which leaves them vulnerable to the increased insecurities due to the crisis (Alonzi et al., 2020). Specifically, university students often move away from their families to begin their studies which deprives them of their established social networks to rely on for support during stressful times. At the same time, distance learning impedes establishing new contacts and making friends among fellow students (Besser et al., 2020). Understanding how friendships are affected can be crucial for understanding the mental

health impacts of the COVID-19 pandemic and the associated restrictions as differences in friendships and social support by peers might be a predictor of how students cope with the crisis and who is resilient.

In previous health crises, a substantial part of the affected population has been shown to be resilient (Bonanno et al., 2008). There are different definitions of resilience. In general, individuals who do not experience significant mental health or functional impairment during stressful and straining events can be considered resilient (Southwick et al., 2014). Resilience thereby depends on the availability of resources that help cope with the event (Abramson et al., 2015; Hobfoll et al., 2015). Abramson et al. (2015) defined social capital as one of four resilience attributes that enable resilience. On the level of individuals, social capital includes family, friends, and other social contacts as well as perceived social support. They further assumed that social support can activate resilience. For instance, through social contacts, knowledge and material assistance can be provided and emotion regulation can be supported which assists the individual in adopting adaptive coping strategies (Abramson et al., 2015). Through this mechanism, better outcomes regarding mental and physical health can result. This is what Cohen and Wills (1985) termed the buffer model of social support whereby social support buffers the negative effects of stressful events or circumstances. But social contacts are not only helpful during stressful events but also exert general beneficial effects on wellbeing (Cohen and Wills, 1985). Baumeister and Leary (1995) assumed social connection and belonging to be a fundamental human need. If this need is not met, negative effects up to psychopathological symptoms and disease can be the result. When individuals have enough social contact, they can trust that support is accessible when needed (Barrera, 1986). Therefore, the availability of social support can be assumed to contribute to resilience while a lack of social contacts has to be considered a vulnerability factor.

The COVID-19 crisis can be considered a stressful and straining event for most people. Therefore, social contacts and support might be particularly important during this time. Meanwhile, the pandemic and associated measures, including contact restrictions, are associated with increases in loneliness and social isolation. Studies comparing loneliness before and during COVID-19 found increased loneliness since the start of the pandemic compared to before, both in the general population (Bu et al., 2020) and in students (Lee et al., 2020). Generally, student status was reported to be an amplified risk factor for loneliness during the pandemic (Bu et al., 2020). In a study among university students in the United States at the beginning of the pandemic, 86% reported feeling socially isolated (Son et al., 2020) and in young German adults, 42% disclosed that they felt lonelier compared to before the pandemic (Lippke et al., 2021).

This vulnerability of young adults to feelings of loneliness and isolation can be attributed to the transition stage into adulthood that enhances their need for social contact. Young people need to meet various tasks growing up including the establishment of a successful social life and meaningful relationships (Roisman et al., 2004; Neyer and Lenhart 2007). During the transition into adulthood, attachment functions are transferred from family to peers (Hazan and Zeifman, 1994; Fraley and Davis, 1997). Research has demonstrated that the need for contact and proximity is typically met by peers and peers are most important to young adults for providing comfort and emotional support (Hazan and Zeifman, 1994; Fraley and Davis, 1997). Therefore, friends are deemed critical to this transition period which is also reflected in survey results among young Dutch adults during the COVID-19 pandemic among whom 94% indicated that friends are their source of social support (van den Berg et al., 2021). Simultaneously, due to the measures, social contacts were often restricted to the household as a core living unit. Long et al. (2021) hypothesized that loose contacts or newly established friendships might therefore be easily lost. This particularly applies to university students as they often establish new networks and make new friends during their studies. These new ties might not be strong enough to withstand the strains during the contact restrictions. Therefore, contacts with peers suffered more than contacts with family (Andresen et al., 2020; Wu et al., 2021; Zhang et al., 2021). This effect might be amplified as friendship relations appear to be less stable and require more maintenance including frequent contact and joint activities compared to family relations (Roberts and Dunbar, 2011). Further, spontaneous and unplanned interactions usually provide opportunities for both establishing and maintaining friendships as well as for low-threshold support (Long et al., 2021). These opportunities are largely lost due to the contact restrictions. Receiving support might therefore be bound to deliberately contacting people and asking for it, which constitutes a higher threshold. Correspondingly, MBA students in the United States reported an increased need for social support but friendship ties were not maintained between the students as their university switched to online teaching (Jo et al., 2021). This was partly due to the difficulties of having to arrange specific online appointments, technical issues, and problems of receiving emotional support online.

These difficulties in establishing and maintaining contacts as well as in receiving support from relationships have implications for wellbeing and mental health. Generally, loneliness is associated with mental health impairments during this pandemic (Liu et al., 2020; Xiong et al., 2020; Mäkiniemi et al., 2021; Rosenberg et al., 2021) while more social interactions were associated with better mental health outcomes (Forbes et al., 2021). More specifically, social support is associated with better mental health outcomes (Szkody et al., 2021; Turska and Stepien-Lampa, 2021; Wu et al., 2021). However, results on the social support provided by friends and its association with mental health are ambiguous. On one hand, there are studies reporting beneficial effects of contact with friends as well as friend support. Adults experienced more positive affect after they had had contact with their friends in a study in Ireland (Lades et al., 2020) and university students in Hong Kong reported fewer depressive symptoms when they received more peer support (Sun et al., 2020). Additionally, adults in the United States experienced more posttraumatic growth with higher support from their friends (Northfield and Johnston, 2021). On the other hand, there are studies reporting no effects

of friend support. In young adults in the United States (Liu et al., 2020) and in the Netherlands (van den Berg et al., 2021), friend support was not associated with better mental health. Liu et al. (2020) assumed that peers might not be able to adequately support each other during this crisis as they are all confronted with similar problems and cannot provide guidance or a different perspective. Contrarily, Nitschke et al. (2021) argued that social contacts might be especially helpful during the COVID-19 crisis as everyone experienced similar situations and therefore there is a high level of understanding.

Simultaneously, the COVID-19 crisis does not necessarily have negative impacts on relationships and the provision of social support as social networks are often able to adapt and restricted contacts can be compensated, e.g., using online platforms (Long et al., 2021). Accordingly, Stevic et al. (2021) reported that using smartphones to communicate with others was associated with higher friendship satisfaction 1 month later in Austrian adults. As Austrians reported more online than in-person contacts during the initial lockdowns (Nitschke et al., 2021), these alternative ways of contact might be helpful in protecting against loneliness and isolation. Moreover, the crisis might also hold opportunities for strengthened relationships and increased social support. In a German panel study, 55% of adult participants reported having more contact with others during the first lockdown (Schulze et al., 2020), and in a multinational study including 49 nationalities, about half of participants felt more connected to their families and one quarter to their friends since the start of the pandemic (Wu et al., 2021).

Taken together, we conclude that there is an elevated risk for loneliness during the contact restrictions implemented to contain the pandemic but also opportunities for friendships to evolve. There is further need to better understand the factors that influence whether relationships were perceived as support or rather not during the crisis. Additionally, further research is required investigating if and how social support provided by friends is related to mental wellbeing.

In this paper, we focus on different aspects of friendships of Austrian university students during the COVID-19 crisis:

- How did students' friendships change in the initial and later stages of the pandemic?
- What challenges were students confronted with regarding building and maintaining friendships?
- What role did friendships play for students' wellbeing during the crisis?

RESEARCH DESIGN AND METHODS

This paper is based on a mixed-method approach that comprises a qualitative study with narratives and in-depth interviews and a quantitative study based on the analysis of online survey data (see **Figure 1**). Both studies investigate the situation of Austrian university students during the COVID-19 pandemic and include longitudinal time frames. The studies were conducted in accordance with the Declaration of Helsinki and were approved by the Board for Ethical Issues of the University of Innsbruck.

The research presented in this article is comprised of multiple stages with each stage building upon the previous and qualitative and quantitative approaches triangularly complementing each other. In the first stage, a comprehensive qualitative study (narratives, Qual1-4, see **Figure 1**) that investigated University students' overall socio-spatial conditions during the COVID-19 pandemic was conducted (*cf.* Kaufmann et al., 2020, 2021; Bork-Hüffer et al., 2021). Parallelly a quantitative survey (Quan1) was conducted using an online questionnaire to investigate the situation of university students in Tyrol, Austria. Both studies suggested a further need to investigate changes in university students' social contacts and friendships during the pandemic and their relevance for wellbeing (Bork-Hüffer et al., 2020; Fischer, 2020; Kulcar et al., 2021). Based on these results, study participants of Qual1-4 were purposefully selected for in-depth interviews that focused on the role of friendships during the pandemic (Qual5). Building upon the preliminary analysis of the narratives and full analysis of the in depth-interviews on friendships (Schneider, 2021), a questionnaire was developed and implemented in another online survey (Quan2). Next, the large longitudinal dataset of narratives was screened for aspects regarding friendships and social contacts and analyzed against the background of the interview and survey results. Finally, results from all data and analysis stages were integrated to answer the research questions.

The Qualitative Study

The qualitative data used in this article were collected as part of the COV-IDENTITIES project which applied a longitudinal multi-method approach to accompany students through the early stages of the COVID-19 pandemic from April to November 2020. The multi-method design included, among others, written narratives and qualitative online interviews. **Figure 1** displays the five qualitative data collection phases (Qual1-5), including sample sizes.

Narratives have proven to be an effective qualitative method for exploring individual experiences with and reflections on complex processes of change (Laughland-Booÿ et al., 2018). The method gives adolescent participants their own voice and room for subjective descriptions and interpretations of their experiences and feelings (see Atkinson, 1998; Pabian and Erreygers, 2019) as well as more time to reflect on, structure, build, and revise their thoughts (see Schulze, 2010). Narratives are particularly suited to conducting research remotely and in crisis times, as they do not rely on stable broadband connections, adhere to research under social distancing conditions, and protect the health of the participants and involved researchers. Follow-up in-depth interviews were conducted with participants, who were purposefully selected from the participants of the narrative writing exercise with the objective to include perspectives from a wide continuum of experiences with friendships during the pandemic.

For the data collection of the narratives, participants received a written storytelling prompt for each narrative exercise in a Microsoft Word file. In the prompt, they were invited to write the narrative, file it in text-processing software, and return

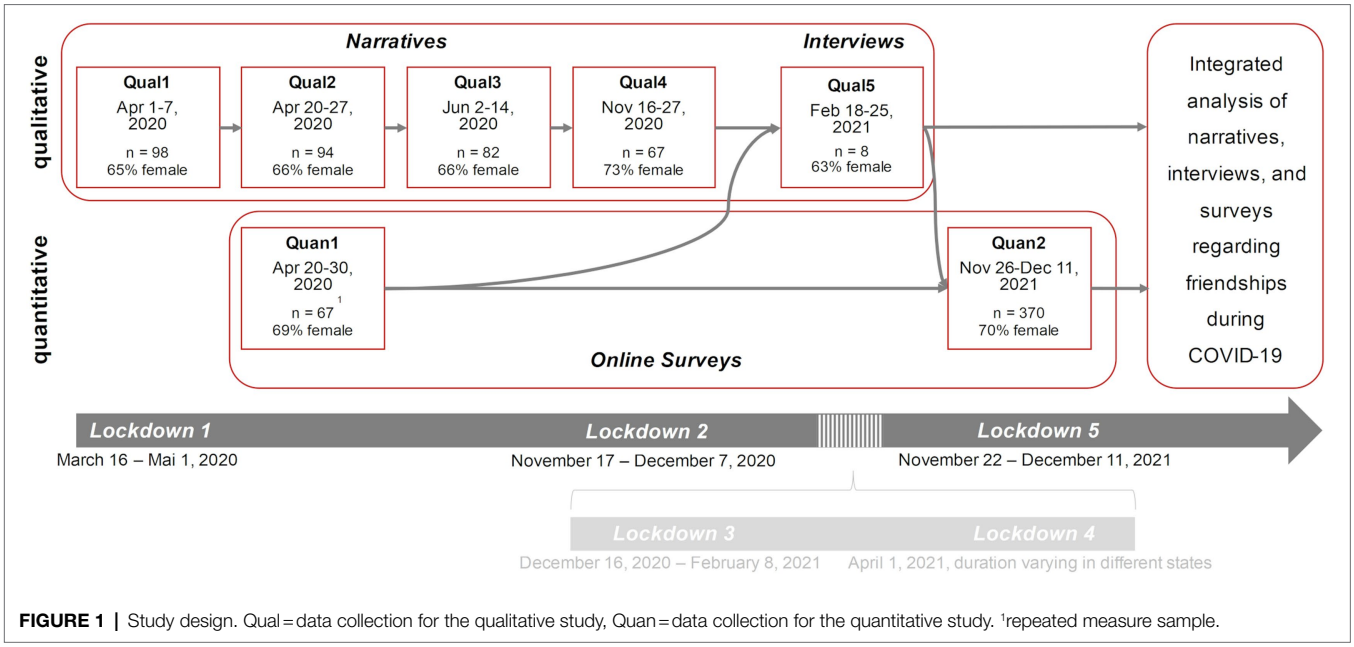

FIGURE 1 | Study design. Qual = data collection for the qualitative study, Quan = data collection for the quantitative study. [1]repeated measure sample.

the file to the researchers directly after completing it. The 341 collected narratives each range from one to four text pages. There was a larger share of female students among the sample (see **Figure 1**). Participants' age varied from 18 to 29 years, while one student was 36 years old. Narratives were submitted by participants in digitized form and thus immediately ready for analysis. Interviews were conducted *via* Zoom. The eight interviews lasted between 18 and 69 min and were transcribed for analysis.

As the narrative writing did not show much change in-between Qual1 and Qual2 since contact restrictions were mostly maintained in that period, in the consecutive presentation of the results, we present data primarily from the collection phases Qual1, Qual3, and Qual4. In addition, qualitative online interviews allowed a review of nearly one year of the pandemic with more specific questions about the topic of friendships of selected study participants. Pseudonyms are used in the presentation of the results.

The software MaxQDA was utilized for conducting a qualitative content analysis of the narratives and interviews following Mayring (2000, 2014).

The Quantitative Study

The quantitative study started in April 2020 during the first COVID-19 lockdown in Austria (Quan1; Fischer, 2020). German-speaking university students were recruited to participate in an online survey. The data collection was repeated several times during the pandemic. For this paper, we focus on a survey conducted between November 26 and December 11, 2021, (Quan2), when the fifth lockdown was imposed in Austria. At this point, the pandemic had lasted for 20 months and effects on friendships were no longer to be considered preliminary and transient. The survey included detailed scales on students' friendships based on the qualitative study. Students were recruited *via* a mailing list of the University of Innsbruck and by contacting students who participated in the first survey and deposited their mail addresses. Participants were included in the analysis when living in Austria at the time of the survey and when having a maximum of 5% missing values in the whole survey and no missing values in the relevant scales for this paper.

The final cross-sectional sample consists of $N = 370$ participants. With $n = 258$ (69.7%), the majority was female, $n = 108$ (29.2%) were male, and $n = 4$ (1.1%) did not assign to a binary gender. The mean age was 23.93 years ($SD = 6.44$). To analyze changes in the course of the COVID-19 pandemic, we additionally looked at longitudinal data from students who participated in Quan1 and in Quan2 and could be matched using a code. This code could be optionally entered by participants in each survey and was designed to ensure anonymity. The longitudinal sample included $N = 67$ students, containing of $n = 46$ (68.7%) women and $n = 20$ (29.9%) men with a mean age of 24.52 years ($SD = 3.51$) at Quan2.

Measures

The online surveys started by stating information about the research project. Participants could only proceed after providing informed consent. Demographic data were collected in both surveys. The surveys included additional scales that are not presented here as they are not relevant to the research question this article addresses. All presented scales were used in the Quan2 survey.

Wellbeing was measured using a German version of the WHO-5 (Bech, 1999; Brähler et al., 2007). The instrument consists of five items that are rated on a six-point Likert response format (0 *never* to 5 *all the time*). Wellbeing was measured in Quan1 and Quan2. Internal consistency for the scale was Cronbach's $\alpha = 0.87$ in the whole sample in Quan2.

Pandemic loneliness was measured using two items ("My social network has become significantly worse due to the crisis." and "The crisis makes me feel lonely."). The items were rated on a five-point Likert response format (1 *does not apply at all* to 5 *applies completely*). The items were used with reference to the lockdown instead of the crisis in the Quan1 survey. They were developed as part of an instrument to measure health-promoting behavior (Fischer, 2020). Factor analysis resulted in these two items as one factor (Kulcar et al., 2021). Internal consistency for the scale was Spearman Brown Coefficient = 0.77 in the whole sample in Quan2.

Contact restrictions during lockdowns were measured in Quan2 with one item referencing the current situation and one item referencing the first lockdown in retrospective. Participants were asked how much they restricted their physical contact. They rated their number of contacts on a sliding scale with the anchors *no physical contacts at all* and *as many contacts as before the pandemic*.

The following scales were developed based on the results of the qualitative study to specifically address university students' friendships during the COVID-19 pandemic (Schneider, 2021). The topics of friendship as a resource, challenges for friendships, and changes in friendships emerged from the qualitative analysis and were included in the survey. For all topics, items were phrased based on statements of interview participants. Items and factor analyses are presented in the **Supplementary Materials**.

Friendship as a resource consists of four items (e.g., "My friends are an important support for me during this crisis."). Answers were rated on a five-point Likert response format (1 *does not apply at all* to 5 *applies completely*). Factor analysis yielded one factor (see **Supplementary Table A.1**) and internal consistency for the scale was Cronbach's $\alpha = 0.83$.

Challenges for friendships is a seven-item scale (e.g., "It is difficult for me to maintain contact with my friends during this crisis.") that is answered on a five-point Likert response format (1 *does not apply at all* to 5 *applies completely*). Factor analysis yielded a single factor (see **Supplementary Table A.2**). Cronbach's $\alpha = 0.72$ was satisfactory.

Changes in friendships consists of nine items that are answered on a five-point Likert response format (1 *does not apply at all* to 5 *applies completely*). Factor analysis resulted in three factors (see **Supplementary Table A.3**): Loss of friendships (three items, e.g., "I hardly have any contact with some of my friends anymore because of the crisis.," Cronbach's $\alpha = 0.83$); Intensification of friendships (four items, e.g., "My friends and I have grown closer through the crisis.," Cronbach's $\alpha = 0.88$); Differentiation of friendships (two items, e.g., "The crisis made me realize who is really important to me.," Spearman-Brown Coefficient = 0.82). These three factors represent changes in friendships also reported in the interviews.

Analysis

Quantitative survey data were analyzed using IBM Statistics SPSS, Version 26. To investigate changes between the first lockdown and one and a half years later, the longitudinal sample was analyzed using t-tests for dependent samples based on Quan1 and Quan2. All further analyses are based on Quan2. Mechanisms of predictors of pandemic loneliness were investigated by testing a parallel mediation model with challenges as predictor; loss, intensification, and differentiation of friendships as mediators; and pandemic loneliness as outcome. The buffer hypothesis was tested for the effect of challenges for friendships on wellbeing with friendships as a resource as a moderator. For the mediation and moderation analyses, the macro PROCESS by Hayes (2018) was used. Significance of effects was accessed using 10,000 Bootstrap samples. Effects of friendship variables, including contacts during lockdown, friendships as resource, challenges, and pandemic loneliness, on wellbeing were assessed using a multiple hierarchical regression analysis.

RESULTS

The surveys in the beginning of the pandemic (Quan1) and after one and a half years of crisis (Quan2) enabled us to compare students' perspectives and examine changes. In the 67 students who participated in both surveys, pandemic loneliness increased from $M = 2.75$ ($SD = 1.19$) in April 2020 (Quan1) to $M = 3.15$ ($SD = 1.29$) in November/December 2021 (Quan2). This corresponds to a small but significant effect ($t(66) = -2.50$, $p = 0.015$, $d = 0.32$). Likewise, wellbeing decreased from $M = 13.40$ ($SD = 4.99$) to $M = 10.57$ ($SD = 6.03$) in the repeated measure sample ($t(66) = 3.83$, $p < 0.001$, $d = 0.51$). Means of the whole sample and the repeated-measure sample for both lockdowns are presented in **Figure 2**. Students who participated in both surveys reported slightly higher wellbeing and lower pandemic loneliness than students who participated only in Quan2 (wellbeing $M = 9.31$, $SD = 5.24$; loneliness $M = 3.40$, $SD = 1.23$). However, this pattern was consistent across surveys and the difference was nonsignificant (wellbeing $t(89.40) = -1.58$, $p = 0.118$; loneliness $t(368) = 1.48$, $p = 0.140$). Wellbeing and pandemic loneliness correlated negatively with $r = -0.47$ during the first lockdown and $r = -0.45$ after one and a half years of the pandemic (both $p < 0.001$).

The effects and developments in the course of the crisis are examined more in detail in the following sections. The qualitative results allow insights into changes and developments from April 2020 (first lockdown, Qual1) over June 2020 (full relaxation of measures, Qual3) to November 2020 (second lockdown, Qual4) and retrospectively as inquired in the qualitative interviews for the first year of the crisis (Qual5). The quantitative results give insight into students' perspectives and experiences after one and a half years of crisis during the fifth lockdown in Austria (Quan2). Results based on qualitative and quantitative data are merged.

Challenges for Friendships During the COVID-19 Pandemic

Students experienced multifaceted disruptions to their friendships during the pandemic. **Table 1** presents various challenges that were identified in the interviews and narratives and presented to the survey participants in Quan2. The most prominent

challenges were the difficulty of making new acquaintances with 68.4% fully agreeing and only a minority of 4.1% not experiencing this problem. The qualitative data (Qual1) of all data collection phases in this regard shows how students were stressed and worried about losing friendships which made them focus on finding ways to maintain existing friendships rather than making new acquaintances. Additionally, opportunities for meeting new people during social activities were lost.

Dissatisfaction with online meetings as a substitution for face-to-face meetings with friends represents a further central challenge with 53.5% of participants fully agreeing in Quan2 and only a small share of 4.6% not experiencing difficulties with online meetings at all (see **Table 1**). Perceived shortcomings of online socializing were reported in the narratives already during the first lockdown (Qual1), when participants characterized online meetings as "not as nice" (Elias, 23, Qual1), "not a proper replacement" (Nele, 23, Qual1), or "simply not a real thing" (Matteo, 21. Qual1) compared to face-to-face meetings. Some thought online meetings were more strenuous and that it was stressful to be constantly available *via* mobile media. Others complained about connectivity issues, not hearing the other party well, the distortion of voices online, or that they could not talk as openly about topics online as in face-to-face meetings. In turn, they particularly missed opportunities for physical closeness and bodily contact – "someone shaking your hand or hugging you" (Juna, 23, Qual1) or "a simple pat on the shoulder" (Alexander, 22, Qual1) –, the possibility of spontaneous social encounters, meeting others "without always having to make an appointment" (Julian, 29, Qual1), or the "input, which [you] get from other people" (Mara, 22, Qual1). As a result, online meetings had been used much less often after the release of the first lockdown (Qual3) and in the following second lockdown (Qual4), confirming the inadequacy perceived in online ways of mingling (see also section "Overall Changes in Friendships During the Crisis in 2020 and 2021").

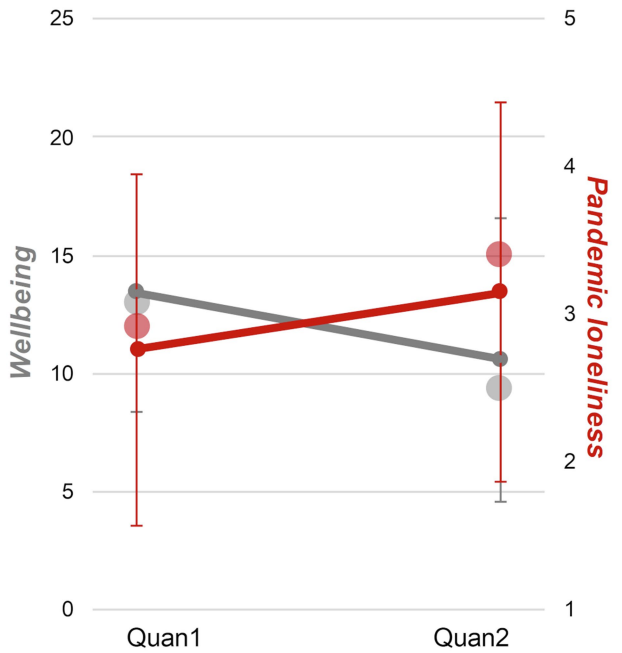

FIGURE 2 | Pandemic loneliness and wellbeing during different lockdowns. Line-diagrams indicate means and standard deviations of the repeated measure sample ($N = 67$), dots indicate means of the whole sample at each lockdown (Quan1 $N = 334$, Quan2 $N = 370$).

Offline activities that were missed, according to the qualitative study, were going out to concerts, to eat out, to a bar, playing, cooking, or doing sports together. The lack of social contacts during everyday activities played a particularly substantial role in Qual1 when students were adhering much stronger to pandemic measures, stay-at-home, and social distancing orders. This was expressed, for example, by Pia (20, Qual1) in early April 2020: "My roommate is not with me while I eat breakfast, my fellow students are not around me while I do my university affairs, and my best friend cannot accompany me to sports. The first impression was that my everyday life has not changed that much, but when you reflect on it, you realize that every action is missing a little something that has a big impact on the big picture."

A smaller number of students complained about a lack of topics to talk about (Quan2). Particularly during Qual1, participants mentioned that there were no happenings during the lockdown and thus "often nothing new to talk about"

TABLE 1 | Percentages of participants experiencing different challenges for their friendships due to the COVID-19 crisis.

	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Due to the crisis, it is difficult for me to make new acquaintances	4.1	3.8	7.0	16.8	68.4
To me, online contact is not a good substitute for physical meetings	4.6	10.3	13.0	18.6	53.5
The limited access to important meeting places (e.g., restaurants) puts strains on my friendships	14.3	20.5	21.6	22.4	21.1
During the crisis, it is difficult for me to keep in touch with my friends	15.7	20.8	20.3	28.1	15.1
The mood is less light-hearted when I meet with my friends compared to before the crisis	24.3	18.9	20.3	24.9	11.6
Due to the crisis, I am irritated and I have less patience with my friends	37.8	27.3	16.8	13.8	4.3
Since the COVID-19 pandemic started, I do not know anymore what to talk about with my friends	48.4	23.8	11.1	11.6	5.1

N = 370. Data collected at Quan2. Response options: 1—does not apply at all to 5—does apply completely.

(Alexander, 22, Qual1) or that they found it annoying or stressful that "it is anyways only corona that is talked" about (Hannah, 22, Qual1), which led some to avoid meeting with friends (online) during the first lockdown. During the fifth lockdown (Quan2), only 5.1% of participants completely resonated with this challenge. Challenges regarding participants' mood and associated strains for friendships also showed little prevalence in Quan2. The limited access to meeting places, difficulties to keep in touch with friends, and a weighed down mood were reported by a more substantial proportion of participants (see **Table 1**).

Overall Changes in Friendships During the Crisis in 2020 and 2021

As a result of the challenges, friendships changed to varying degrees and in different directions. The results of the qualitative study allow insights into the concrete ways in which the intensity and quality of students' contacts and friendships were affected. These findings reveal that the ways in which students perceived changes to the intensity and quality of their friendships variegated widely during the first lockdown (Qual1). They reached from evaluations that contacts were reduced "extremely" (Max, 25, Qual1) or "considerably" (Niklas, 22, Qual1) to others who reported spending "most of their days" talking with friends and family online (Jana, 24, Qual1) and thus experienced increased social exchange. Again, others in Qual1 did not feel much change to their friendships and said it was more appropriate to describe their experience as one of "physical distancing" rather than social distancing because "you do not actually give up social contact, just physical closeness" (Alexander, 22, Qual1).

Online Contacts as Replacement for In-Person Contacts

In Qual1, differences in the evaluation of changes in friendships were particularly connected to the intensity with which the students and their contacts were able to switch their relationships online and their experience of online socializing as well as their living arrangements. Particularly, WhatsApp, Skype, and telephone, but also Facetime, Facebook, Instagram, Zoom, HouseParty, online games, and online workout platforms were reported as media through which contact was sustained in Qual1. Students usually reported reaching out and experimenting with several of these media for keeping in contact with friends. After the relaxation of the lockdown (Qual3), participants often underlined how their use of social media had "definitely been reduced" (Leonie, 27, Qual3) since face-to-face meetings were possible again. Still, a smaller number of media were used in parallel in the follow-up lockdown of Qual 4 as the appeal of trying out new platforms had diminished. Videotelephony comprised a dominant form of communicating with friends, but also videochat, audio telephony, and text-based messages were used in all data collection phases of the qualitative study (Qual1-5).

Already in Qual1, online socializing was not perceived as an adequate replacement for offline sociability by many participants, but this feeling was expressed even stronger in Qual4, during the second lockdown. However, during the ruptures caused by the stay-at-home orders in Qual1, some found that social media were "a good and important option" (Nora, 23, Qual1) to remain in contact and updated on the well-being of others. Some elaborated on the possibility of social media to connect to those based elsewhere that allowed them to "digitally refresh" (Ben, 24, Qual1) old contacts such as friends from school and their places of origin, friends who had moved elsewhere, or international friends. In contrast, during the second lockdown in November 2020, the narratives (Qual4) reflect that online meetings were much less often used as a replacement for face-to-face meetings. Students complained, for example, that "the 'pleasure' in online meetings is gone since everyone anyways needs to participate in compulsory online meetings" (Amelie, 23, Qual4) or that "some people […] got used to not doing so much with different people" (Fiona, 23, Qual4) and thus also decreased their attempts to maintain friendships online.

Face-to-Face Meetings During Pandemic Restrictions

Face-to-face meetings with members outside of their own household, which were prohibited during the first lockdown, were still reported by a few students in Qual1. The described meetings took place mostly outside and often only with one, two, or three selected friends, by going for a walk, meeting them in a garden, or "over the fence" (Lena, 25, Qual1). The study participants often underlined in their accounts that this happened while keeping the required distance. Very few reported meeting their friends at their friends' or their own homes in Qual1. In June 2020 (Qual3), after pandemic measures were loosened, meetings with bigger groups, physical contact, and contacts in indoor spaces became more common again. However, traces of precautions taken to prevent the spread of the virus, prevailed in many of the participants' stories, reflecting the incision the pandemic had caused to young peoples' ways of mingling: "The other day we wanted to go out for a drink in the city again for the first time and then we went to sit outside [of the restaurant], even though the weather wasn't so good, I do not think we would have done that before. So, I spend time with my friends differently than I did before the crisis." (Louisa, 22, Qual3).

During the second lockdown in November 2020 (Qual4), students were less strict with reducing face-to-face contacts when compared to the first lockdown (Qual1) and many reported they would meet up with friends more often than during the first lockdown since they perceived it more difficult to "really stick strictly to the restrictions" (Katharina, 23, Qual4). This is illustrated by the quantitative data collected during the fifth lockdown (Quan2). Students were asked to evaluate their restriction of face-to-face contacts currently and retrospectively during the first lockdown. Results are presented in **Figure 3**. A Wilcoxon test revealed that students perceived a significant and strong decrease in physical contact restriction during the fifth lockdown compared to the first lockdown ($Z = -13.23$, $p < 0.001$, $d = 1.90$).

Co-habiting With Friends During Lockdowns

Students' living arrangements played a considerable role in their experience of socializing and their social resilience, particularly during the first lockdown (Qual1) but for some throughout the pandemic. Some students temporarily moved to live with friends or with their family during the first lockdown, which increased the support they had. Others already shared apartments prior to the pandemic. Although these students also had contact with a limited number of friends during the pandemic overall, they reported that spending time with their roommates helped them mitigate isolation and many benefitted from the mutual support: "I must mention that I do not live alone but with my favorite person, which of course makes the curfew more pleasant. We finally have time to cook together, build puzzles, do crossword puzzles, play games, or watch movies. I enjoy that a lot." (Amelie, 23, Qual1).

Then again, for some, this advantage was short-lived when "in an exceptional situation […] being now together 24/7" (Anna, 23, Qual1), sometimes in cramped living conditions, shared living arrangements caused stress and conflict among students. The relaxation in summer 2020 brought relief for some of them. For a few, the mental strains of co-living during the pandemic resulted in them moving out of shared living arrangements. To mitigate changes to online and offline sociability during the pandemic, students reported developing new rules in Qual1. These encompassed, for example, stricter rules on duties that roommates in shared apartments would hold but also rules that specified what could (not) be talked about in online meetings: "We are very strict with the rules and also sit down together over and over again to discuss if we are still at a dead end. We are open and honest with each other to make it work, but also strict with each other, which has led to many moral discussions. Everyone sets their boundaries differently, which is why it's hard to "correct" others." (Helena, 21, Qual1). "But since we all noticed that you should also have a space where current events should not be a topic for at least 2 h, just to get some distance for once, we decided not to bring up the COVID-19 pandemic during our conferences. It's working really well now, and it's hugely important for oneself." (Elisa, 24, Qual1).

Loss, Intensification, and Differentiation of Friendships

All in all, in the qualitative data collection rounds Qual3-5 throughout 2020, reports of overall reduced social contacts became more prevalent. Online socializing was by then no longer considered an adequate replacement by most, and a persistent decline in the number of relationships the longer the pandemic lasted, can be witnessed: "Yes, I just think that the worlds have shrunk a bit and so has the contact between them. And to be honest, I also think that some friendships have really suffered drastically as a result." (Helena, 21, Qual5).

This also resulted in profound changes in friendships that were particularly described in Qual3-5. On one hand, there were reports of the intensification of specific friendships—particularly with friends to whom face-to-face contact was maintained throughout the pandemic. On the other hand, as Julian (29, Qual3) noted, "particularly loose friendships fall into oblivion" the longer the pandemic lasted. Overall, the young adults described how they reflected more upon the quality of their existing friendships and more reflexively thought about which friendships to maintain in the face of the changed circumstances. They reported, for example, to focus on those who "were the favorite [people] to have around" (Emil, 25, Qual3), "who [they] really care about" (Alina, 26, Qual3), and who had shown care for them during the difficult time of the pandemic. Furthermore, in various phases of the qualitative study, participants reported a renewed appreciation of friendships and social contacts overall in their lives: "However, I already know that after the pandemic hopefully improves in a timely manner, I will pay much more attention to my social contacts as I have sensed how important they are for overall satisfaction and for 'soul life'. Whereas a few months ago I might have said that meeting up would not work out due to stress, current experiences have made me push meeting up ahead of work." (Theo, 28, Qual1).

The quantitative data (Quan2) were employed to assess how these changes in friendships relate to challenges posed by the pandemic and pandemic loneliness. Challenges for friendships had significant effects on loss ($B = 0.83$, $SE = 0.08$, $\beta = 0.50$, $p < 0.001$)

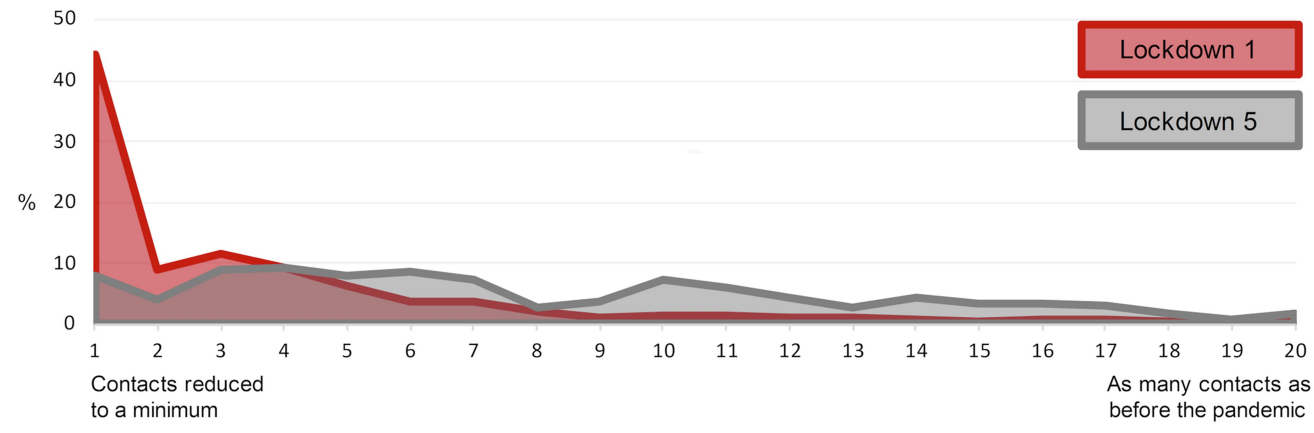

FIGURE 3 | Contacts during different lockdowns based on retrospective evaluation at Quan 2. $N = 370$. Contact restrictions during lockdowns was rated on a 20-point sliding scale.

and intensification of friendships ($B=-0.16$, $SE=0.07$, $\beta=-0.12$, $p=0.025$). Challenges were associated with increased loss of friendships and decreased intensification. There were no effects on differentiation of friendships ($B=0.17$, $SE=0.09$, $\beta=0.10$, $p=0.059$). The effect of challenges on pandemic loneliness ($B=1.09$, $SE=0.06$, $\beta=0.67$, $p<0.001$; total effect) decreased when the changes in friendships variables were included into the model; however, a direct effect was maintained ($B=0.85$, $SE=0.07$, $\beta=0.52$, $p<0.001$; direct effect). Simultaneously, loss of friendships was associated with increased pandemic loneliness ($B=0.25$, $SE=0.04$, $\beta=0.26$, $p<0.001$) as was differentiation of friendships ($B=0.11$, $SE=0.04$, $\beta=0.11$, $p=0.008$) while intensification was associated with decreased pandemic loneliness ($B=-0.10$, $SE=0.05$, $\beta=-0.08$, $p=0.044$). However, challenges exerted an indirect effect on pandemic loneliness only mediated by loss of friendships ($B=0.21$, $SE=0.04$, 95% CI [0.16, 0.34]) but there was no indirect effect mediated by intensification ($B=0.02$, $SE=0.01$, 95% CI [−0.01, 0.05]) or by differentiation of friendships ($B=0.02$, $SE=0.01$, 95% CI [−0.01, 0.05]). The effects are depicted in **Figure 4**.

Friendships as a Resource During the COVID-19 Pandemic and Students' Wellbeing

In **Table 2**, correlations between the friendship scales, wellbeing, and demographic data (age, gender) are presented. Wellbeing was higher in students who restricted their face-to-face contact less, who utilized friendships more as a resource, who perceived fewer challenges for friendships, and who felt less isolated. Challenges for friendships correlated strongly with pandemic loneliness and students who used their friendships as a resource during the crisis reported both fewer challenges and felt less isolated. Gender was not associated with wellbeing, but women used their friendships more as resources while men experienced more challenges for their friendships. Older students reported both higher wellbeing and less pandemic loneliness.

Appreciation of Friends' Social Support

In the qualitative data, participants described how their friends aided them in coping with the crisis. They explained how they purposefully decided to have in-person meetings because they "will all go crazy if [they] do not" (Valentina, 24, Qual1), that they did not feel lonely thanks to living with friends, and how talking with friends helped them to make their "fears clear to [them] and to play them out a bit, so that [they] could then put them aside again" (Finja, 26, Qual1) during the early stages of the crisis in Qual1. Students explained how they realized how much their friends meant to them and how important they were for their emotional wellbeing. As restrictions loosened, participants explained how they looked forward to seeing their "favorite persons again and spending time with them (Nora, 23, Qual3) and how they met their friends "way more consciously and really enjoy it" (Maja, 22, Qual3). Anna (23, Qual3) described the importance of meeting friends in person again: "I remember the first meeting with my group of friends very well. Here,

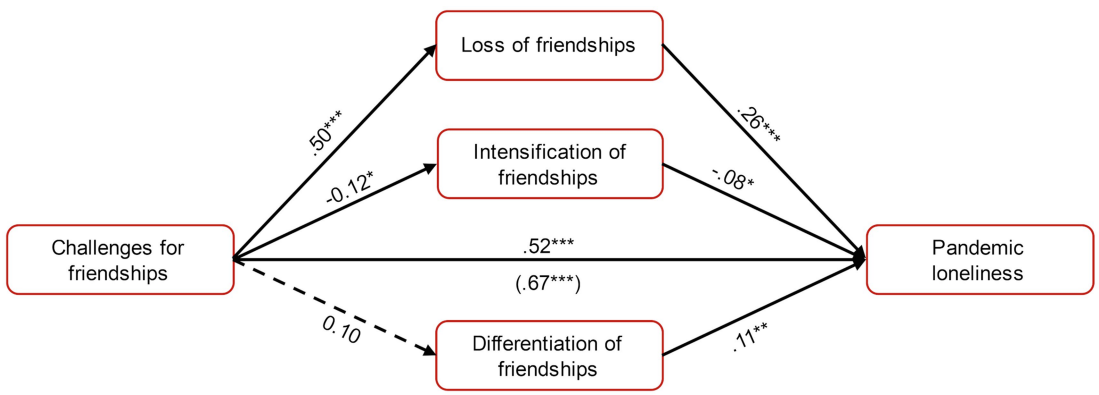

FIGURE 4 | Mediation model for challenges for and changes in friendships. Dotted lines represent non-significant effects. ***$p<0.001$, **$p<0.01$, *$p<0.05$.

TABLE 2 | Correlations of friendship variables, wellbeing and demographics at Quan2.

		1	2	3	4	5	6
1	Gender						
2	Age	0.18**					
3	Wellbeing	−0.01	0.22***				
4	Contact restrictions	0.04	−0.00	0.11*			
5	Friendship as a resource	−0.14**	−0.05	0.22***	0.17**		
6	Challenges for friendships	0.15**	−0.09	−0.41***	−0.07	−0.33***	
7	Pandemic loneliness	0.08	−0.22***	−0.45***	−0.15**	−0.39***	0.67***

N = 370, data collection Quan2; Gender 0 = female, 1 = male and others.
**p < 0.05; **p < 0.01; ***p < 0.001.*

I realized how important contact with other people is and I think no one has ever looked forward to a meeting as much as this one."

This importance of friends stayed prevalent during the second lockdown as participants explained that they met specific friends because it was "very important for [their] psychological wellbeing" (Katharina, 23, Qual4). One participant reviewed in an interview how they deliberately chose to violate the measures and meet friends because it was essential for staying mentally healthy: "And that's just when you do something like tobogganing or climbing again, then you realize how much that actually helps you or how well you feel after you have really met a few people again. So certainly the direct contact with friends I think helps the most for me." (Alexander, 22, Qual5).

Some students explicitly stated how important it was to be in contact with their friends when they were not feeling well: "You also realized that somehow, I do not know, everything can go badly, but as long as you have each other and get through it together, even if everyone feels bad you at least feel bad with the people you love." (Sophia, 22, Qual5).

Shared Experiences With Friends

Besides the general importance of connecting with friends in person, students explained during the in-depth interviews how being able to share difficult situations with their friends helped them. Thereby it was important to them that friends were in similar situations because students felt they otherwise might not be able to truly understand them. For example, they felt like they needed other university students to share experiences about problems at university due to the crisis because friends who were not students "cannot really empathize with a student" (Alexander, 22, Qual5). Therefore, they expected the most support from people who are in a similar situation as themselves. The shared experiences enabled a mutual understanding without having to explain much: "Most of it was actually common whining, I would say. You somehow coax each other but I feel like it was most beneficial when the other person was just as upset as oneself. Shared sorrow is half the sorrow somehow. I think it was extremely supportive when you realized the others are feeling as I do." (Juna, 23, Qual5).

The shared experiences were a foundation for providing "permanent support" (Sophia, 22, Qual5) for each other instead of specific moments of support.

Instrumental Support by Friends and Peers

In addition, participants reported receiving different forms of instrumental support. This support was predominantly focused on the university and was relevant at different stages of the pandemic. Students reported "completing tasks for university together" (Milan, 25, Qual1) with friends and roommates and creating online study groups in Qual1. As restrictions loosened during Qual3 but access to libraries and the university was still restricted, study groups stayed an important support system in students' everyday lives with groups now meeting in person more frequently, for example by "repurposing unused common rooms in [their] residential buildings" (Alexander, 22, Qual3). By meeting regularly for university tasks and studying, students were able to support each other and gain structure and regularity. They were able to "motivate each other but also relax together" (Sophia, 22, Qual4).

Effects of Friendships on Wellbeing

The quantitative data at Quan2 were used to analyze the effects of restricted contacts, utilization of friendships as resources, challenges for friendships, and pandemic loneliness on wellbeing after one and a half years of crisis in a regression analysis. As gender and age significantly correlated with some of the variables, both were used as control variables and entered into the model first. Subsequently, a hierarchical approach was implemented. As presented in **Table 3**, how much students reduced their contacts significantly predicted wellbeing with participants who had a similar number of contacts as before the pandemic reporting higher wellbeing ($B = 0.12$, $SE = 0.05$, $\beta = 0.11$, $p = 0.031$). However, this effect was rendered nonsignificant once other variables were entered into the model. The same was true for the utilization of friendships as a resource during the crisis. Students who were able to use their friendships as a resource reported higher wellbeing ($B = 1.26$, $SE = 0.30$, $\beta = 0.22$, $p < 0.001$) but this effect was nonsignificant after challenges for friendships were entered into the model. Students who reported more challenges for their friendships had lower wellbeing ($B = -2.57$, $SE = 0.35$, $\beta = -0.36$, $p < 0.001$). The effect was smaller but still significant after pandemic loneliness was entered as final predictor into the model ($B = -1.56$, $SE = 0.44$, $\beta = -0.22$, $p < 0.001$). Students who felt more lonely due to the crisis reported lower wellbeing ($B = -1.05$, $SE = 0.28$, $\beta = -0.24$, $p < 0.001$). The final model explained 25% of variance in wellbeing ($F(6,363) = 19.92$, $p < 0.001$, $R^2 = 0.25$). For cross-validation, the coefficients were used to predict wellbeing in a sample of students not living in Austria during the data collection ($N = 94$; $n = 55$ Germany, $n = 26$ Italy, $n = 13$ other). In this sample, $R^2 = 0.29$ was achieved which indicates that the results are robust across countries even if these countries are currently not under lockdown such as Germany. Finally, we tested the buffer hypothesis of social support by using friendships as a resource as a moderator for the effect of challenges on wellbeing. There was no significant interaction effect ($B = -0.10$, $SE = 0.38$, $p = 0.788$), thus the buffer effect was not confirmed.

Advantages of the Crisis

However, some participants were also able to discover advantages in the restrictions. This mainly related to enjoying meetings with smaller, more intimate groups of people compared to larger groups: "Friends [...] This is where it shifted from 'a lot of time with a lot of different people' to 'a lot of time with a smaller group of people'. This, I notice, relaxes me a lot" (Adrian, 21, Qual1).

Especially in Qual1, students explained how the restrictions helped them relax as they "never worried of missing out on something" (Amelie, 23, Qual1) and they "enjoy time alone without social obligations" (Sophie, 23, Qual1). During Qual3, some students started worrying about enjoying the time alone too much wondering if they were "antisocial" (Aaron, 26, Qual3) or that "switching to a 'normal' life afterward will be overwhelming" (Malia, 23, Qual4). Others "continue[d] to

TABLE 3 | Regression analysis to predict wellbeing.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Gender	−0.05	0.05***	−0.05	0.01*	−0.02	0.05***	0.03	0.11***	0.03	0.03***
Age	0.23***		0.23***		0.23***		0.19***		0.14**	
Contacts			0.11*		0.07		0.06		0.04	
Friendship as a resource					0.22***		0.10		0.06	
Challenges for friendships							−0.36***		−0.22**	
Pandemic loneliness									−0.24***	
R^2	0.05		0.06		0.11		0.22		0.25	
F	9.62***		8.03***		10.86***		20.43***		19.92***	

N = 370, data collection Quan2. Gender 0 = female, 1 = male and others.
**p < 0.05; **p < 0.01; ***p < 0.001.*

enjoy the time alone" (Emily, 23, Qual4) during the second lockdown at Qual4.

DISCUSSION

Overall, the results of both the qualitative and the quantitative study indicate a substantial impact of the pandemic and the associated measures on university students' friendships. These impacts were based on different challenges students faced during the pandemic and caused changes in the way participants interacted with friends but also in their friendship network in general. This included both the loss of friends and the intensification of friendships. Simultaneously, friendships and frequent contact with friends were important for students' mental wellbeing. Friends supported each other in coping with the crisis and students deployed different strategies to keep up a supportive network of peers. However, social support provided by friends was not effective in protecting against the negative impacts of the pandemic caused by disruptions of social contacts.

How Did Students' Friendships Change in the Initial and Later Stages of the Pandemic?

The pandemic had a persistent negative effect on both building and maintaining friendships. Participants reported increased pandemic loneliness in the course of the crisis despite restricting their face-to-face contacts less. Participants having more in-person contacts at later stages of the pandemic might be a result of this increasing loneliness. Students were less willing to restrict their contacts as the pandemic prolonged and they suffered increasingly under the measures while they did not know how much longer they would have to refrain from meeting their friends. While they were largely prepared to give up on in-person meetings at the beginning of the pandemic and online meetings were deemed an acceptable replacement for a short time, they quickly noticed the strain these contact restrictions put on their mental health they were not willing to accept. As a result, many students resumed meeting their friends in person, but our results indicate that the pandemic still was a burden for friendships. This resulted in the loss of friendships for some. This loss often concerned loose friendships while close friends were maintained in many cases. However, maintaining friendships is often costly regarding both time and effort (Dunbar, 2018) and friendships can be lost when contact and joint activities are too rare (Roberts and Dunbar, 2011), so this loss was not restricted to loose friendships. Contrarily, there were also reports of intensified and strengthened friendships which is in line with other studies on students (Vaterlaus et al., 2021). Particularly friends who were met face-to-face and who were experienced as being supportive and trustworthy did not decline in their importance and contact was maintained.

Even though strengthened relationships represent one result of the pandemic, the changing pattern of social networks might nonetheless have long-term implications. Young adulthood is usually characterized by a large network of acquaintances and friends compared to other age groups (Wrzus et al., 2013) and this network is crucial for their future lives (Roisman et al., 2004). As people get older, the size of their social networks typically decreases (Wrzus et al., 2013). During the pandemic and particularly during periods with strict contact restrictions such as lockdowns, young adults are not able to build a large circle of friends and acquaintances. It is unknown if this will be compensated by making more new contacts after the pandemic ends or by a smaller decrease of social networks as the young adults age especially due to the intensification of friendships in some. It is possible that some people will not be able to compensate for the missing opportunities of connecting with others during the formative period of young adulthood and will therefore be missing social support later in their life. At this point, we can only hypothesize about such future effects.

What Challenges Were Students Confronted With Regarding Building and Maintaining Friendships?

The changes in friendships can be led back to the challenges for friendships posed by the pandemic and the associated restrictions. During the first lockdown, participants strongly restricted their face-to-face contacts. However, many perceived this mainly as physical distancing while successfully shifting socializing online. The degrees of this shift to online communication varied and so did experiences and satisfaction. As Juvonen et al. (2022) found in young adults in California, satisfaction with

digital communication was predictive of their socio-emotional wellbeing during this pandemic. But for most participants in our study, online contacts were not deemed an appropriate replacement for in-person meetings as the pandemic prolonged. Important meeting places and offline activities were lost and physical contact and closeness as well as the opportunities to meet new people were dearly missed. This is in line with Andresen et al. (2020) who concluded that digital contacts are helpful for organizing friendships but not for maintaining them. Then again, the ruptures to social relationships that the pandemic caused might as well have been considerably larger without the possibility to keep at least a certain level of connection to others online.

Regarding the effects of challenges on changes in friendships, perceiving more challenges was associated with less intensification and more loss of friendships. While the effect on the intensification of friendships was weak, there was a strong effect of challenges on the loss of friends. Additionally, challenges were directly associated with more pandemic loneliness. These results suggest that not only the loss of friends was relevant but also the loss of a lifestyle characterized by regular in-person meetings, going out in public places, and making new acquaintances. The COVID-19 measures not only made the maintenance of friendships difficult but also impaired the typical student lifestyle which left students feeling restricted and lonely. Intensification of friendships was not able to meaningfully protect against this effect. There also might be reverse effects with people who were able to bolster their friendships interpreting the challenges as less prevalent while students who lost friends experienced them as prevailing. However, considering the predominant effect of challenges on pandemic loneliness, the implications remain largely unchanged with not only changes in friendships but also restrictions in student lifestyle contributing to loneliness and isolation.

What Role Did Friendships Play for Students' Wellbeing During the Crisis?

In the qualitative data, students explained how important their friends were to them during the crisis and how they supported them in maintaining their mental health. Contrarily, in the quantitative analyses, utilization of friendships as a resource did not have significant effects on wellbeing beyond the effects of challenges for friendships. Challenges for friendships seem to impair wellbeing regardless of available support from friends. The buffer hypothesis was not supported either. At the same time, experiencing challenges for friendships and feeling lonely was associated with reduced wellbeing. The results indicate that, during this pandemic, being in contact with friends represents a fundamental need for university students and failure to meet this need results in impaired wellbeing (Baumeister and Leary, 1995).

The failure to find significant effects of utilization of friendships as a resource can have several reasons. First, the impairment of friendships might prevent them from serving as a resource themselves. Students might be too preoccupied with maintaining their friendships to effectively employ them as a resource that protects them against pandemic stressors. This can be interpreted with regards to the Conservation of Resources Theory (Hobfoll, 1989) that posits the possibility of loss spirals. Loss spirals are characterized by the loss of one resource triggering the loss of further resources in accelerating speed as people are no longer able to employ their resources to protect against resource loss. The affected person can merely try to limit the damage. This might be the case for students whose friendships—and maybe also other parts of their lives—are severely impacted.

Second, many young adults move away from their hometowns to attend university and must leave their circle of friends behind which leaves them lonely even without a pandemic around (Juvonen et al., 2022). Therefore, they cannot rely on their former support system, but at the same time, the crisis makes the acquisition of new friends difficult. Hence, it could be argued that friendships were overall a limited social resource for university students during the pandemic.

Third, relationships often suffer if one person is in need of support, but close ones do not respond to this need because they are lacking the capacity to support others or because they do not realize the person is in need (Thoits, 2011). Since the COVID-19 crisis is challenging for most people, providing friends with support might be impeded and even if someone has the capacity to provide support, the person needs to become aware of the need for support. Realizing that friends are struggling might be more difficult with meetings restricted to online settings. The results of the qualitative study also reflect how online platforms were not perceived as a place where students felt comfortable to share their worries and not adequate for providing care to others. People might indicate that support provided by their friends is appropriate because they realize that it is the best they can do under the given circumstances. However, this support might not be sufficient to buffer the effects of pandemic strains.

Another aspect to consider is the assumption that people who have suffered through the same crisis as the person in distress can supply them with specific support (Thoits, 2011). Everyone being in a similar situation during the pandemic might indeed be comforting and students themselves explained that shared experiences are important to them. However, as none of the young adults got through a pandemic so far, providing support and hope based on experience might be more difficult compared to other situations. Results of the qualitative study also showed that being together in the same situation and being faced with restrictions to mutual offline activities also meant less distraction offered by others.

Strengths and Limitations

The present study employed a mixed-method approach and covers a broad period of time during the pandemic. The combination of qualitative approaches for in-depth analysis of students' experiences with quantitative approaches for the investigation of statistical effects in a larger sample allows well-founded conclusions regarding the friendships of university students. Nonetheless, our conclusions only regard university students in Tyrol, Austria, and cannot be generalized to other samples. This especially applies during pandemic times as every country and every region—sometimes even every university—employed different measures and restrictions. The utilization of measures that were specifically designed for this population further prevents generalizability. However, cross-validation with a sample of university students

living in other countries with different measures during the pandemic provided promising results.

Conclusion and Implications

Taken together, the COVID-19 crisis put profound strains on university students' friendships. Our results indicate considerable impacts that sustain one and a half years into the pandemic and made the utilization of friendships to support resilience difficult. The changes in friendships and friendship networks might have long-term implications for current young adults. Our results suggest a need for further research specifically on friendships during the COVID-19 crisis. Research should not only focus on analyzing effects retrospectively but should also investigate lasting effects and incorporate efforts to assist young adults in overcoming this crisis. This includes, among others, research on the effectiveness of different interventions. This is crucial as loneliness can be associated with maladaptive reactions such as social withdrawal (Vasileiou et al., 2019) or cognitive biases (Hawkley and Cacioppo, 2010) that might require specific interventions in some cases. Short-term interventions after the pandemic should also be considered to provide young adults the opportunity to compensate for the lack of contacts during the pandemic. These can include peer and buddy systems at universities or events. If further contact restrictions are necessary, measures should be implemented in a way that allows maintenance of contacts, for example in contact clusters (Wu et al., 2021).

DATA AVAILABILITY STATEMENT

The quantiative data presented in this article are included in the **Supplementary Material**. The qualitative data are not openly available to protect the participants' privacy. Further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Board for Ethical Issues, University of Innsbruck. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

TB-H and A-MS contributed to the conception and design of the qualitative study, collected data for the qualitative study, and performed the qualitative analysis. VK contributed to the conception and design of the quantitative study, collected data for the quantitative study, performed the statistical analysis, and wrote the first draft of the manuscript. VK and TB-H wrote sections of the manuscript. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.880646/full#supplementary-material

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REVIEW
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Using an Intersectional Lens on Vulnerability and Resilience in Minority and/or Marginalized Groups During the COVID-19 Pandemic: A Narrative Review

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Throughout the pandemic, the media and scholars have widely discussed increasing social inequality and thereby publicly pointed to often hidden and neglected forms of inequality. However, the "newly" arisen awareness has not yet been put into action to reduce this inequality. Dealing with social inequality implies exploring and confronting social privileges, which are often seen as the other side of inequality. These social constructs, inequality and privilege, are often discussed in light of vulnerability and resilience. This is particularly important in the context of the worldwide coronavirus disease 2019 (COVID-19) pandemic and efforts to end the pandemic, as both constructs are discussed regarding access to healthcare, vaccination, and education and knowledge, misinformation, social resources, economic resources, and so forth. Minority and/or marginalized groups may be particularly vulnerable to the impact of the COVID-19 pandemic. However, resilience factors in these groups may be neglected and underreported. This narrative review aims at illustrating the specific and intertwined aspects of resilience and vulnerability in minority and/or marginalized groups during the COVID-19 pandemic. To achieve this, we use an intersectional lens based on recommendations made by Moradi and Grzanka. A total of 48 articles were included in the narrative review. Most of them were commentaries focusing on social inequality, vulnerability, and/or resilience. Based on the dissection of articles at structural, systemic, and individual levels, we propose three hypothesis on vulnerability and resilience in minority and marginalized individuals and groups: (1) social inequality must be considered at a global level; inequality at a global level translates into a vulnerable context for an individual; (2) vulnerability is historically situated: vulnerability (experienced during the pandemic) is maintained and reinforced by history; (3) strength through collective (historical) hardship: vulnerability is not the opposite of resilience but may serve as an aspect of resilience. The conclusions drawn from this review show that we need to include diverse voices to advance concepts, such as vulnerability and resilience, in minority and marginalized groups. Additionally, these concepts are not necessarily in opposition to each other, but vulnerability should be understood as an integral part of resilience.

Keywords: COVID-19 pandemic, social inequality, resilience, vulnerability, intersectionality, narrative review

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INTRODUCTION

In March 2020, the coronavirus known as COVID-19 was declared a pandemic by World Health Organization [WHO] (2020a,b). In the opening remarks, the WHO director general was concerned by the lack of resources in some countries as well as the economic and social consequences that would result from the pandemic (World Health Organization [WHO], 2020b), thus indicating that social inequality, in terms of unequal distribution of or access to resources or positions and in terms of status or power, might be amplified by the pandemic. During the course of the pandemic, the social divide in societies has deepened, and social inequality has become more exposed (Kawachi, 2020). Thus, in this review, we focus on social inequality during the COVID-19 pandemic and explore the concepts of vulnerability and resilience in minority and marginalized groups.

Even before the pandemic, it was stated that "[t]he extent of inequality around the world is enormous" (p. 250) (Blackburn, 2008). Despite recognizing social inequality and its increase as problematic, it also "has become fashionable to ignore it" (p.250, ibid). The neglect of social inequality can be illustrated and comprehended with the Coin Model (Nixon, 2019). In this model, societal structures and systems of oppression, such as racism, classism, sexism, and ableism, are presented by a coin providing advantage or disadvantage for an individual depending on her/his group membership. Disadvantage for one social group usually means (unearned) privilege for another social group (Nixon, 2019). Advantages due to privilege are often considered to be based on meritocracy, thus cloaking privilege and inequality. However, again, the invisibility of privilege strengthens privilege in its power and persistence (Phillips and Lowery, 2020). Consequently, social inequality is not solely referring to an individual level but should be understood as the interplay between structural, systemic, and individual levels. In the sense of intersectionality, these levels are interconnected and intersecting. At the individual level, the social characteristics of diverseness, such as gender, ethnicity, and class, may intersect and create or shape inequalities resulting from social structures or systems of oppression (Crenshaw, 1989, 1991). At the structural and systemic levels, systems of oppression impact society and individuals. These systems relate to racism, sexism, heteronormativity, classism, ableism, homophobia, and so forth. The systems are also subject to structural forces from politics, history, legislation, economy, and colonialization, to name a few (McCollum et al., 2019). In this sense, we have to consider social characteristics in their interwovenness, in their relation to structures and systems, and as unique individual experiences. With such an understanding, we may gain insight into oppression and power and their expression in the form of privilege and inequality (Crenshaw, 1989; Warner and Shields, 2013; Hankivsky, 2014; Collins, 2015; Moradi and Grzanka, 2017).

Social inequality is often discussed with reference to minority and marginalized groups. These concepts are connected, as marginalized groups overlap with minority groups. Minority and majority groups are often defined in terms of, e.g., social categories, power, or group size (Seyranian et al., 2008). Marginalization, as defined by Hall et al. (1994), initially referred to individuals or social groups on the margins due to their identity or social characteristics, environment, associations connected to a social group, and experiences. Marginalization is thereby a process that limits access to and participation in power, social, and political roles. Since Hall et al.'s initial definition of marginalization, the concept has been expanded and adjusted to include intersecting identities and social characteristics, power relations, exclusion from dominant discourses, and globalization (Hall and Carlson, 2016). Marginalization is based on structural (e.g., laws), systemic (e.g., oppression, such as racism), and individual levels (e.g., discrimination) and the interaction between these levels (Baah et al., 2019).

On this note, it is apprehensible that experiencing or living in the pandemic is not the same for every one (Kawachi, 2020; Gubrium and Gubrium, 2021), but it is impacted by multiple individual and structural levels shaping everyday lives. The COVID-19 pandemic is often referred to as a crisis, a trauma (Bridgland et al., 2021), or a disaster [cf (Wisner et al., 2004)], which affects the individual, systemic, and structural levels of a society and which has national and global impacts. A crisis is a comprehensive concept, which includes trauma and disasters (Shaluf et al., 2003) and should thus be understood as a continuum (Dulmus and Hilarski, 2003). A crisis (e.g., critical turning points in the lives of individuals) is marked by its impact on individuals and, beyond the individuals, by its potential of being perceived as a threat and by disrupting life spaces (Eastham et al., 1970). A crisis may have negative and positive effects, but some concepts related to the crisis, e.g., traumatic stressors or disasters, are focusing mostly on negative aspects. It is not solely the event itself that is characterized as traumatic or stressful but also the perception of an event as stressful or traumatic (Dulmus and Hilarski, 2003), which might vary across individuals. Feminist views on trauma theory emphasized social locations and intersections in the construction of trauma (Burstow, 2003; Quiros and Berger, 2015) and multiple interpretations of the term "trauma" (Tseris, 2013). Black, postcolonial, and indigenous analyses added a social and political understanding of trauma to a clinical one, with the latter focused on (emotional) response to traumatic events (Pain, 2020, 2021). Social and political aspects can be located in collective trauma as a shared, collective experience and a transgenerational understanding of trauma (Pain, 2020), including the impact of trauma due to membership to specific groups (Burstow, 2003). In this sense, trauma has to be considered in the context of oppression, in which oppression is a traumatizing component (Burstow, 2003). This view is particularly meaningful for minority or marginalized groups.

In the context of the pandemic, social inequality coincides with vulnerability to the pandemic and vulnerability due to the impact of the pandemic. Vulnerability can be defined as "characteristics of a person or a group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard" (p. 11) (Wisner et al., 2004). Combinations and intersections of social characteristics, social systems, and structural elements shape risk and vulnerability to hazards (e.g., the pandemic). They impact the access to resources and (unequal) exposure to

hazards (Wisner et al., 2004). This underlines that experiencing the pandemic and its impact is, among other aspects, influenced by social inequality.

Vulnerability is usually seen as something undesirable and has the notion of resulting in "a barrier between two social worlds, which isolates and marginalizes the wounded."(p. 255) (Baiasu, 2020). Baiasu (2020) highlights that such an understanding of vulnerability also creates asymmetry, stigmatization, and marginalization. Vulnerability is also seen as pre-event aspect, which affects the chance of experiencing risk or harm (Cutter et al., 2008). Subsequently, the concept of resilience may be seen as a promise to overcome vulnerability and stigmatization, as resilience is often considered as a counterpart of vulnerability. In the context of mental health and social sciences, resilience has received considerable attention since its conceptualization. In the 1970s, resilience was observed in children growing up in adverse environments. Emmy Werner et al. found that not all of these children entered a vicious circle of adversity, violence, or crime, but some of them grew up to be mentally healthy and "successful" adults (Werner and Smith, 1982, 1992; Werner, 1989). Since then, resilience has been conceptualized as, e.g., individual, psychological, social, ecological, and community resilience (Quinlan et al., 2016), each highlighting specific aspects of resilience. In particular, a review on social resilience in the context of disaster concluded that resilience refers to the ability of social entities (e.g., individuals, families, organizations, and communities) that are connected to social mechanisms to cope, withstand, and/or recover from disasters (Saja et al., 2021). Such an understanding of resilience shows the interconnection to vulnerability. In the context of vulnerability social characteristics and mechanisms impede the capacity to cope, withstand, or recover (Wisner et al., 2004), whereas resilience refers to the interplay of mechanisms and characteristics enabling this very capacity (Saja et al., 2021). In this viewpoint, the social system "absorbs" the impact of a hazard (Cutter et al., 2008). Additionally, the adaptive function of resilience affects the time after a disaster. Nevertheless, resilience is not a stable and fixed phenomenon but is dynamic in nature and might vary over time (Cutter et al., 2008; Saja et al., 2021). Moreover, resilience is a contested concept (Davoudi et al., 2012), critiqued for centering on ableism, hegemony, and positivism (Hutcheon and Lashewicz, 2014). For example, resilience is embedded in a socially constructed context of crisis (Davoudi et al., 2012) and, thus, constructed itself. In this sense, resilience should be understood in its context with regard to subjectivity, meaning-making, and its potential to resume or increase connectivity (Hutcheon and Lashewicz, 2014). A socio-constructivist understanding of resilience allows for understanding the concept with its diverse trajectories and shapes. This perspective extends the concept beyond its (critiqued) normative function.

In this review, we focus on the understanding of resilience as an interplay between social systems and individuals. We see resilience as a capacity to adapt in times of adversity and as embedded in social processes that enable the process of resilience (Juen and Siller, 2013). Consequently, the resilience of an individual is understood in the context of social systems (e.g., community and state), which provide resources for the individual. We acknowledge that resilience is shared but also subjective and constructed. Multiple understanding of resilience and co-existing narratives of resilience illustrate the diversity and socio-constructivist nature of resilience as a concept (Powell et al., 2014). As can be derived from the definitions of vulnerability and resilience, vulnerability is ascribed to the context in which individuals and groups live, often labeled as disadvantaged, minority or marginalized, pre-event, whereas resilience is referred to during or post-event. In the context of vulnerability, we acknowledge that not individuals or groups are vulnerable, but that the situation and structures in which they are embedded create vulnerability.

As drafted in this introduction, we seek to understand vulnerability and resilience during the COVID-19 pandemic using an intersectional lens. By means of a narrative literature review, we explore these concepts in minority and marginalized groups in the context of social inequality.

METHODS

Using an Intersectional Lens

Intersectionality is sometimes discussed as a method (Bowleg, 2008; Winker and Degele, 2011), tool (Mattsson, 2014), framework (Hankivsky et al., 2014), lens, or even theory (Cho et al., 2013). In this context, we will use intersectionality as a lens to view and perceive scholarly literature on social inequality during the pandemic. We thereby draw this intersectional lens on recommendations made by Moradi and Grzanka (2017). These recommendations include reflecting on epistemological aspects, thus reflecting self-evident views on knowledge production and procedures, working interdisciplinary to challenge epistemological assumptions and biases, not limiting inequality to specific social groups and assuming majority or dominant social group as the reference group, and considering structures and mechanisms, as well as systems and dynamics in inequality over-focusing on individual aspects and identities (Moradi and Grzanka, 2017). The latter recommendation is particularly relevant in psychology (our institutional embedding), which, as a discipline, is often focused on individuals and groups but less on societal structures and social systems in which inequality is embedded.

In more specific terms, we first searched the literature on social inequality and vulnerability or resilience. After screening in several circular steps to narrow down the most relevant, the literature was dissected with an intersectional lens. We focused on concepts or social groups in the context of social inequality, discussion of structures or mechanisms producing and maintaining inequality, and the way vulnerability or resilience was produced or reproduced. During this process, our own reflections on our positionality and epistemology were used as stimulants to enrich the analysis and discussion of the literature.

Reflexivity

Discussing social inequality equates to listening to marginalized and, often, silenced voices. The intentional or unintentional

replication of oppression is to be avoided when researching and discussing social inequality. It is preferable to have marginalized voices shaping research, and it is necessary to reflect on one's self-conception in relation to the field of research. Particularly in the sense of intersectionality and from a feminist point of view, this endeavor includes uncovering own standpoints in research and in the subject of research. Feminist standpoint theory demands us to reflect and acknowledge our standpoints from which we speak about inequality (Harding, 1987, 1992; Haraway, 1988). Such reflexivity is understood as an integral part of the research, which should be explicit and go beyond mere lip service of stating one's social location (Sweet, 2020).

In this sense, the first author (HS) is a female and White researcher in a predominantly White academic environment. Her identity as cis-gendered, west-European socialized, middle-class woman provided her with limited experience of inequality. Experiencing inequality included sexism and an often encountered male preference in the academe. Her interest in social inequality and intersectionality arose from a gender inequality and heteronormative standpoint. Additionally, her research is informed by being trained in psychology but most often by working in interdisciplinary context, such as medicine, sociology, or pedagogy. This also informs the current dissection and sense-making of the scholarly literature in this review.

The second author (NA) is a sociologist working in (social) psychology and is interested in how different forms and mechanisms of social exclusion (e.g., interpersonal rejection, stigmatization, or discrimination) impact an individual at a group and a societal level. Exclusionary mechanisms have powerful negative consequences on individuals' physical and mental health. They shape behavioral responses like interpersonal aggression, antisocial behavior, and even (political) radicalization, resulting in reduced opportunities for successful societal participation. In contrast, social inclusion and connectedness foster social justice by contributing to individual well-being, cooperation, and prevention of social deprivation. Thus, the author is motivated by a social justice agenda that, in general, encourages research on this feminist standpoint.

SEARCH STRATEGY

To include relevant articles, several databases were searched. These databases were Web of Science and Core Collection, and *via* Ovid® we searched APA PsychArticles, APA PsychInfo, and Ovid Medline(r).

Search terms included "social inequality" or "privilege," "minor*" or "marginal*," and "COVID-19" or "corona." On Web of Science, this search strategy yielded 45 results. Of these, 1 was double, 4 were not related to COVID-19, 2 were in Spanish, and 1 could not be retrieved. *Via* Ovid®, 66 results were found. Of these, 4 were removed because they were duplicates, 24 were not related to COVID-19, and 9 did not focus on social inequality.

An additional search on the Web of Science included resilience and inequality (all fields) and COVID-19 or corona (all fields) and marginal* or minor* (all fields) and resulted in 12 results, *via* Ovid®, this search strategy yielded 28 results. Of the 28 results, 16 were not related to COVID-19 or inequality, and 1 was a proceeding. To double-check, another search was performed on resilience (all fields) and COVID-19 or corona or pandemic (all fields) and social inequality or minor* or marginal* (all fields). This search strategy yielded 205 results, 58 of these were included after initial screening of the titles. Despite not limiting the search to any specific language, only English articles were obtained. The inclusion of English articles only contributes to silencing other voices in this area. Unfortunately, discussion of such matter (e.g., implications of English as "lingua franca" in academic publications) is out of the scope of this article [see, e.g., (Pronskikh, 2018; Soler, 2019)].

Of the remaining 147 articles, the abstracts were read to determine inclusion in the narrative review. The inclusion criteria included focus on (1) vulnerability (explicitly) and/or resilience during the COVID-19 pandemic, (2) minority or marginalized social groups or individuals, and (3) social inequality and/or privilege. We searched for articles that discussed vulnerability and resilience.

The exclusion criteria included a general discussion of distress and vulnerability during the pandemic, no specific focus on vulnerability or/and resilience but on social justice, and increased social divide or increased inequality. Articles were excluded if they did not focus on social inequality, did not discuss social groups, or focused on something else than COVID-19 (also refer to **Figure 1**).

Overall, 48 articles were included in this narrative review. Most of the studies were conducted in the United States (n = 24), followed by the United Kingdom (n = 4), Israel (n = 4), and Canada (n = 4). The articles included surveys on several countries (n = 4), followed by reviews with no specific (named) country-specific domination (n = 2). Furthermore, articles focused on Malaysia (n = 2), China (n = 1), Germany (n = 1), Latin America (n = 1), and Nigeria (n = 1). Most of the articles focused on either exclusively or several of the following categories of social inequality: racism or ethnic/racial inequality (n = 19), LGBT, LGBTQI +, LGBTQI2S +, and sexual and gender minorities (n = 10), followed by diverse "vulnerable" groups (n = 5), socio-economic status, poverty, class (n = 9), ageism, older or elderly people (n = 2), chronic mental illness or psychiatric patients (n = 3), migrant workers, refugees, migrants (n = 2), chronic illness (n = 2), and sex workers (n = 1). Given the relatively short existence of the pandemic, 19 of the articles were of empirical nature, 26 were commentaries, perspectives, or (non-systematic) reviews, one was a systemic review, and one was a review on media and publications. An overview of the articles can be found in **Table 1**.

FINDINGS

Vulnerability

Vulnerability is used in terms of greater susceptibility to infection, adverse course of the disease, and mortality due to COVID-19 as well as vulnerability in terms of being adversely affected by measures established to contain the virus. Hence, vulnerability is influenced by different factors at the structural,

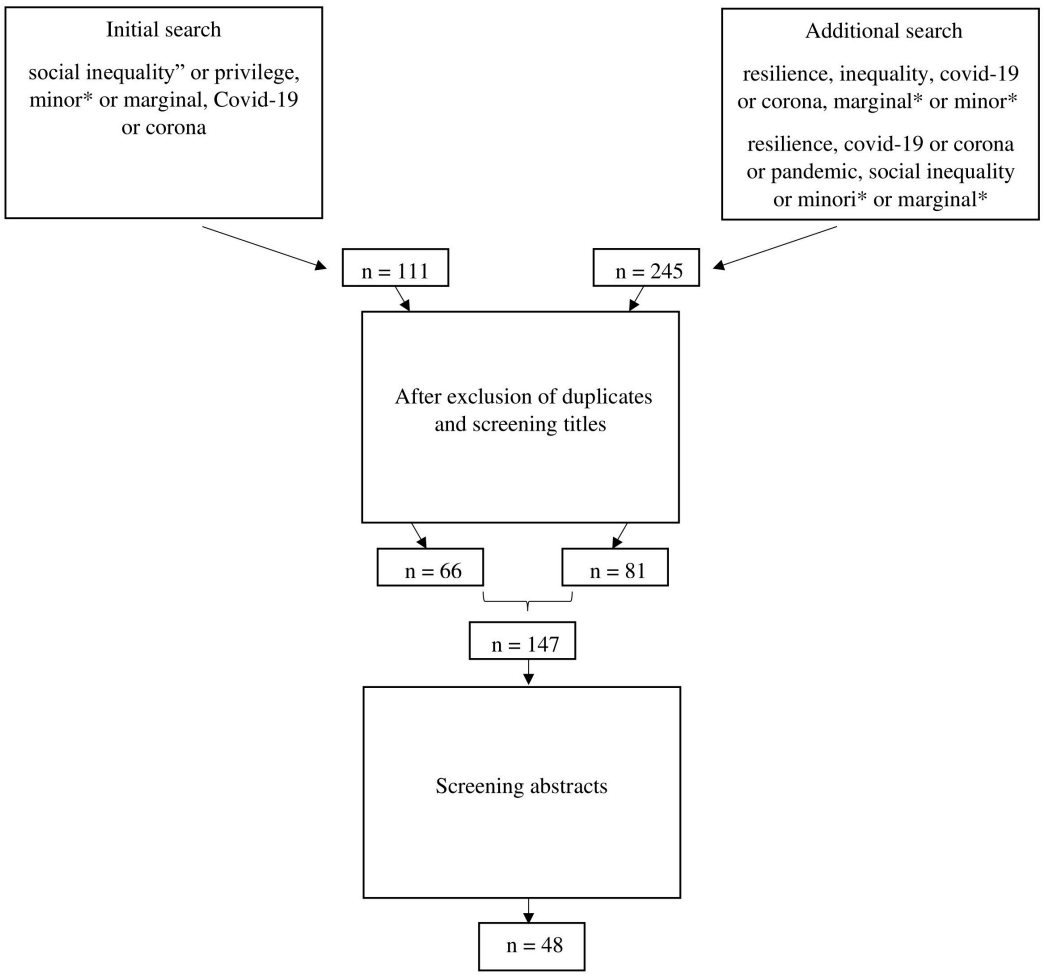

FIGURE 1 | Search strategy.

systemic, and individual levels. These levels interact (refer to **Figure 2**) and increase or deepen social inequality. In the following first step, we discuss factors that intensify disparities. In the second step, we illustrate the concept of resilience in this context.

Structural and Systemic Levels: Government and State

Vulnerability and social inequality included the structural and systemic levels simultaneously. The intersection of racism, low income, and classism is considered in the discussion of (racial/ethnic) inequality during the COVID-19 pandemic. Particularly structural and systemic racism creates socioeconomic disadvantages in terms of lower income or housing locations as discussed in an article from the United States (Bikomeye et al., 2021). In Germany, Haase (2020) pointed out that discrimination-free access to green spaces is shaped differently across groups, thereby emphasizing socioeconomic status and poverty. In the United States, access to green spaces was more often seen on the nexus to racism, which was related to low socioeconomic status (Bikomeye et al., 2021; Garcia, 2021). In Latin America, inequality in resource allocation and the lack of financial aid by the state resulted in the higher vulnerability of the population (Andia and Chorev, 2021). In this context, the state had the ability to increase or mitigate the vulnerability. Similar conclusions were observed in Malaysia, where authors discussed that the successful reduction of poverty before the pandemic was reversed by the impact of the pandemic on the population. Also in this context, state-led social protection plans were seen as one basis to mitigate socioeconomic vulnerability (Daud, 2021).

Structural and Systemic Levels: Education, Healthcare, and Housing

The COVID-19 pandemic uncovered racial/ethnic inequality worldwide. Additionally, recent social movements, such as #Blacklivesmatter, accentuated racism in its systemic and structural forms and its impact on individuals as reflected upon in a United States article (Bikomeye et al., 2021). These seemingly parallel running crises, the Black lives matter movement and

TABLE 1 | Overview of included articles.

No.	Authors	Country	Category of social inequality	Vulnerability/ Resilience	Type of article
1.	Abreu et al., 2021	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	R	Empirical study (qualitative)
2.	Ahmed and Jackson, 2021	United States	Diverse vulnerable groups	V	Commentary, perspective, review
3.	Andia and Chorev, 2021	Latin America	Socio-economic status, poverty, class	V	Commentary, perspective
4.	Aung et al., 2021	Malaysia	Migrant workers, refugees, migrants	V	Empirical study (quantitative)
5.	Bhaskar et al., 2020	United Kingdom dominated	Racism, racial/ethnic inequality Socio-economic status, poverty, class	V	Commentary, perspective, review
6.	Bikomeye et al., 2021	United States	Racism, racial/ethnic inequality	V	Commentary, perspective, review
7.	Blustein et al., 2021	United States	Diverse vulnerable groups	V + R	Commentary, perspective, review
8.	Buffel et al., 2021	United Kingdom	Ageism, older or elderly people	V	Commentary, perspective, review
9.	Chackalackal et al., 2021	South Korea, Mexico, Colombia, India, Nigeria, and Nepal.	Diverse vulnerable groups	V	Literature review on media and publications
10.	Cheah et al., 2021	United States	Racism, racial/ethnic inequality	V	Empirical study (quantitative)
11.	Chen et al., 2020	United States	Racism, racial/ethnic inequality	V	Commentary, perspective, review
12.	Cheng et al., 2021	United States	Racism, racial/ethnic inequality	R	Commentary, perspective, review
13.	Cohen et al., 2020	Israel	Racism, racial/ethnic inequality	R	Empirical study (quantitative)
14.	D'Amico et al., 2020	United States	Racism, racial/ethnic inequality	R (+V)	Empirical study (quantitative and qualitative)
15.	Daud, 2021	Malaysia	Socio-economic status, poverty, class	V	Commentary, perspective, review
16.	Diaz et al., 2021	United States	Chronic mental illness, psychiatric patients	V	Commentary, perspective, review
17.	Frisina Doetter et al., 2021	United States	Racism, racial/ethnic inequality	V	Empirical study (quantitative)
18.	Gao and Sai, 2021	United Kingdom	Racism, racial/ethnic inequality	V	Commentary, perspective, review
19.	Garcia, 2021	United States	Racism, racial/ethnic inequality	V	Commentary, perspective, review
20.	Gibson et al., 2021	China and United States	Chronic mental illness, psychiatric patients	V	Systematic review
21.	Goldbach et al., 2021	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	V + R	Empirical study (quantitative)
22.	Gonzalez et al., 2021	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	R	Empirical study (qualitative)
23.	Haase, 2020	Germany	Socio-economic status, poverty, class	V	Commentary, perspective, review
24.	Herbers et al., 2021	United States	Socio-economic status, poverty, class	R	Commentary, perspective, review
25.	Hiebert and Kortes-Miller, 2021	Canada	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	R	Empirical study (analysis of videos)
26.	Hunt et al., 2021	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	V + R	Empirical study (quantitative)
27.	Jones et al., 2021	United States	Racism, racial/ethnic inequality	V	Empirical study (qualitative)
28.	Kimhi et al., 2020	Israel	Racism, racial/ethnic inequality	R + V	Empirical study (quantitative)
29.	Kira et al., 2021	Arabic countries	Diverse vulnerable groups	V	Empirical study (quantitative)
30.	Krishnan et al., 2020	United States	Racism, racial/ethnic inequality	V + R	Commentary, perspective, review
31.	Lam, 2020	Canada	Sex workers	V (+R)	Commentary, perspective, review
32.	Leeming et al., 2022	United Kingdom	Chronic mental illness, psychiatric patients	V + R	Empirical study (qualitative)
33.	Lotta and Kuhlmann, 2021	Germany and Brazil	Migrant workers, refugees, migrants	V	Commentary, perspective, review
34.	Mahon and Mahon, 2021	general	Diverse vulnerable groups Racism, racial/ethnic inequality	R	Commentary, perspective, review
35.	McElroy-Heltzel et al., 2022	United States	Ageism, older or elderly people Socio-economic status, poverty, class Chronic illness	R (+V)	Empirical study (quantitative) (structured interviews)
36.	Mitchell et al., 2022	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	R (+V)	Empirical study (qualitative and quantitative)
37.	Morgan et al., 2022	Canada	Racism, racial/ethnic inequality Socio-economic status, poverty, class	R	Commentary, perspective, review
38.	Oginni et al., 2021	Nigeria	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	V + R	Commentary, perspective, review
39	Poteat et al., 2020	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities Chronic disease (HIV)	V (+R)	Commentary, perspective, review
40	Quinn et al., 2021	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	R	Empirical study (quantitative and qualitative)
41.	Saban et al., 2020	Israel	Racism, racial/ethnic inequality	R	Empirical study (quantitative analysis of registry data)
42.	Salerno et al., 2020	United States	LGBT, LGBTQI+, LGBTQI2S+, sexual and gender minorities	V	Commentary, perspective, review
43.	Sanchez et al., 2021	–	Socio-economic status, poverty, class	V	Empirical study (assessing jobs)
44.	Slobodin and Cohen, 2020	Israel	Racism, racial/ethnic inequality	V + R	Commentary, perspective, review
45.	Sullivan et al., 2021	United States	Racism, racial/ethnic inequality	V + R	Commentary, perspective, review
46.	Walubita et al., 2021	United States	Racism, racial/ethnic inequality	V	Commentary, perspective, review
47.	Waruszynski et al., 2021	Canada	Diverse vulnerable groups	V (+R)	Commentary, perspective, review
48.	Wu et al., 2021	China	Socio-economic status, poverty, class	R	Empirical study (quantitative)

LGBT (lesbian, gay, bisexual, transgender), LGBTQI+ (lesbian, gay, bisexual, transgender, queer/questioning and others), LGBTQI2S+ (lesbian, gay, bisexual, transgender, queer/questioning, two-spirited and others); V (vulnerability), R (resilience). In row vulnerability and resilience V + R indicates equal focus on both concepts, if one is missing there was no focus on this concept and if one is put in brackets, the focus was less on this concept.

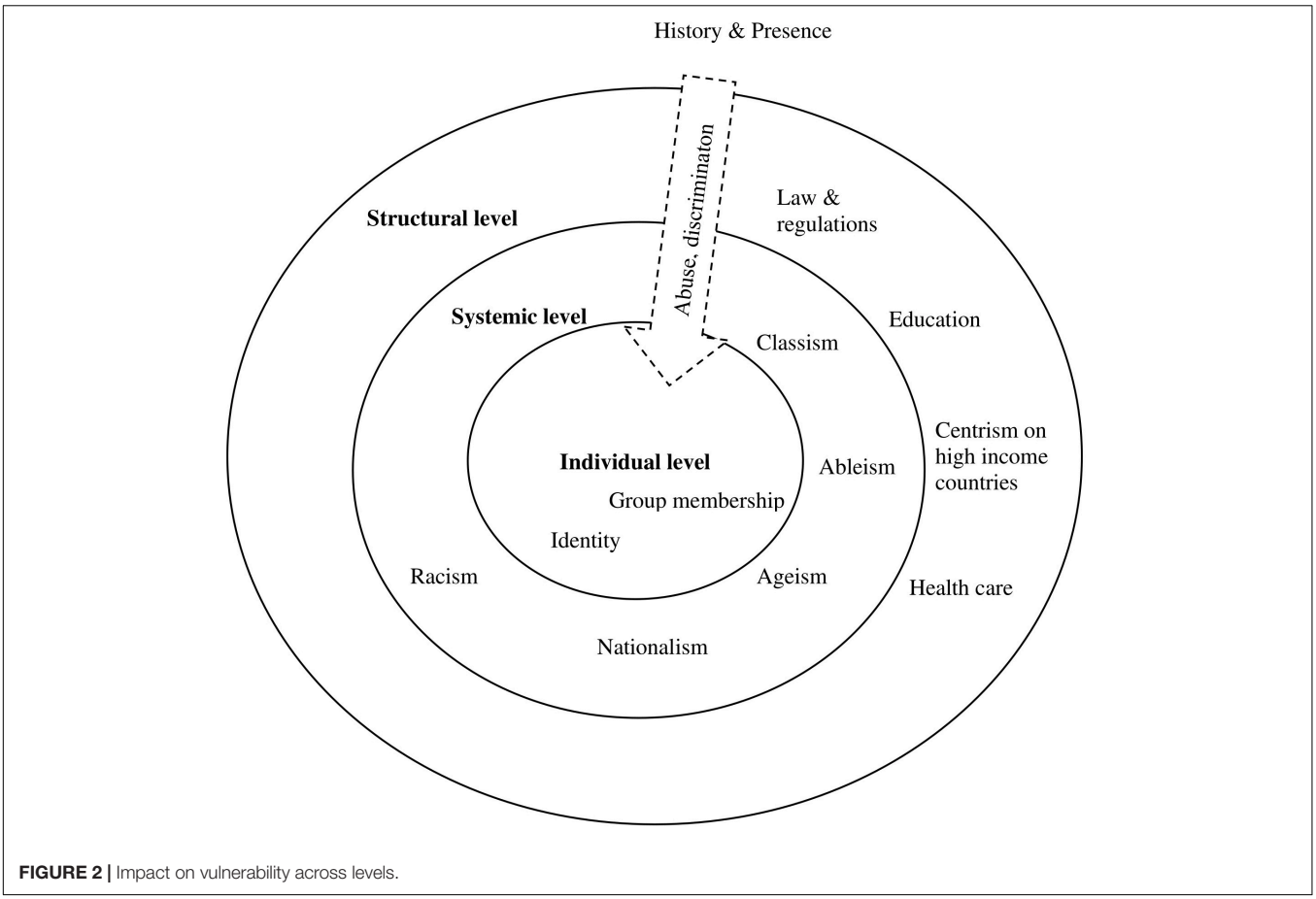

FIGURE 2 | Impact on vulnerability across levels.

the COVID-19 pandemic, are interconnected, as both are deeply rooted in structural and systemic racism. Structural racism shapes the life and well-being of Black and Indigenous people and people of color (BIPOC) and reveals disadvantages in the lives of BIPOC. In this context, systemic racism is embedded in institutions of education, health, or legal regulations. Thus, racism, in its structural and systemic forms, impacts communities and individuals in profound and diverse ways. Authors of the reviewed literature highlighted the impact of racism on education and schools, health, and healthcare, as these areas are prominently affected by the pandemic and measures to contain the spreading of the virus.

The intersection of racism with socioeconomic status was linked to the impact mitigating strategies had on vulnerability to the virus. Racial/ethnic inequalities were anchored in historical and structural disadvantages for BIPOC individuals, which resulted in lower income as shown in the Canadian context (Morgan et al., 2022). COVID-19 measures targeted individual responsibility and individual behavior by focusing on physical distancing, staying at home, washing hands, or/and wearing masks. These measures did and do not acknowledge structural aspects impeding the possibility to follow these recommendations, e.g., in the German and United States context (Haase, 2020; Ahmed and Jackson, 2021). At structural levels, impediments included crowded housing, dense cities, and employment and working conditions across several countries, such as Germany, South Korea, Mexico, Colombia, India, Nigeria, Nepal, and Malaysia (Haase, 2020; Aung et al., 2021; Chackalackal et al., 2021). Crowded housing and dense cities create fewer possibilities for physical distancing, thus increasing infections with COVID-19; additionally, such crowded housing arrangements are often connected to lower-income, which created a greater divide between people with different socioeconomic statuses and increased social and socio-spatial inequalities. Urban green spaces as resources for recreation are not equally accessible for all social groups in many countries. This meant that urban green spaces usually contributing to well-being and quality of life were not accessible for marginalized groups if green spaces were closed for the public. Such green spaces are particularly important in times of crises, when recreational facilities (e.g., swimming pools and athletic facilities) were closed as discussed in German and United States articles (Haase, 2020; Bikomeye et al., 2021). Closures as mitigating measures potentially increased vulnerability in lower-income, crowded, and dense housing areas, as these living arrangements were not considered. Additionally, jobs that can be performed at home, are unequally distributed across countries and states (Sanchez et al., 2021). This demonstrates that systems and structures reproducing vulnerability and the maintenance of

privilege and oppression have to be discussed at a global level (Sanchez et al., 2021).

In addition to current inequalities, United States perspectives emphasized that historic events influence vulnerabilities (Krishnan et al., 2020; Garcia, 2021) regardless of elapsed time. For example, United States-based commentaries pointed out that racism toward BIPOC patients deteriorates trust in the health care system (Walubita et al., 2021); recounts of the 1918 influenza pandemic reveal neglect and erasure of BIPOC in documentation of diseases and civic and healthcare participation. Consequently, disparities in health are sustained, emphasizing the need to collect diverse health data that go beyond the "norm" individual as critiqued in a United States article (Krishnan et al., 2020). As recited above, health disparities and vulnerability to diseases may be better inquired with a biological-social model (Garcia, 2021). This, in turn, acknowledges vulnerability beyond biological aspects but in interaction with intersections of structural, systemic, and individual relationships (Ahmed and Jackson, 2021). For example, based on the United States context, Garcia (2021) recounted the effect of the biological-social reinforcement or interaction on health, whereby biological aspects (such as chronic illness) interact or are exacerbated by social inequality (such as poverty).

Systemic Levels: Racism, Classism, and Schools

Concerns about racism in United States schools and education (D'Amico et al., 2020; Jones et al., 2021; Sullivan et al., 2021) focused on a dominant (hence White) group as norm when educating and teaching. Such approach to teaching was equivalent to invisibility of social resilience in diverse ethnic/racial groups (Mahon and Mahon, 2021), colorblindness (Jones et al., 2021), and lack of community cohesion or connection to traditional practices (D'Amico et al., 2020). This effect was even more pronounced in social groups with low socio-economic status as illustrated in the United States context (Herbers et al., 2021). COVID-19 measures, such as distance learning, deprived schools and education systems of additional benefits, such as nurturing relationships and routines (Herbers et al., 2021), interactions, sense of community, and a potential room for cultural connection and motivation for learning (Mahon and Mahon, 2021). This increased the potential vulnerability of some groups. However, schools and education cannot be treated as isolated entities. For example, Cheah et al. (2021) found in their study on 211 Chinese-American adolescents and parents in the United States that increased racial discrimination led to greater internalizing difficulties in the adolescents. However, this effect was mediated by biracial identity harmony and blendedness. Nevertheless, if parents warned against interacting with other racial-ethnic groups, adolescents also reported more internalizing difficulties. Racism in education is not limited to school settings and extends beyond this context. For example, in academia, anti-Asian racism was reported in a reflective piece from the United Kingdom (Gao and Sai, 2021), thereby demonstrating that racism also affects higher education across countries.

Schools and education as resource hubs can only function when actively including communities to counteract the effects of systems of oppression, such as racism. In this sense, different communities have different needs to survive and recover from the impact of the pandemic. To support diverse students, teachers should possess general awareness and acknowledgment of mechanisms of privilege and inequality. However, this does not appear to be the case. For example, a qualitative study with 42 school staff members in the United States showed that the staff members observed a connection between racial inequality and well-being and school achievements in their students but did not connect these to systemic or structural racism (Jones et al., 2021). Rather, they saw this effect resulting from low socioeconomic status. This highlights even more that there is a need to uncover the intersection of systemic mechanisms impacting individuals.

Systemic Level: Racism, Classism, and Health

Awareness of the impact of racism on health was focused upon in several publications. The observation related to different health systems and, in particular, systems in the United States was illustrated (Ahmed and Jackson, 2021). In general, the United States literature focused on the impact of structural and systemic racism, discrimination, and abuse on accessing and trusting healthcare (Chen et al., 2020; Ahmed and Jackson, 2021; Frisina Doetter et al., 2021; Garcia, 2021; Walubita et al., 2021). Healthcare systems are not neutral entities. Experiences of abuse, discrimination, or mistreatment, whether individual, collective, historical, or transgenerational experience, shape access to healthcare. In this context, access to healthcare is related with financial resources, healthcare availability, and trusting the medical and healthcare systems to care for a person. The impact of social inequality on COVID-19-associated vulnerability differs across ethnic/racial groups. It was shown that in Black and Hispanic communities in the United States, vulnerability due to social determinants and COVID-19 risk factors were significantly correlated with mortality in Black and Hispanic people but not in White people (Frisina Doetter et al., 2021). Additionally, several researchers from the United States, Canada, and Arabic countries have illustrated how racial discrimination worsened health (Chen et al., 2020; Kira et al., 2021; Waruszynski et al., 2021). Also, the social status within a social hierarchy in society contributed to vulnerability; in turn, the impact of the pandemic also influenced one's status in the social hierarchy in, e.g., Arabic countries (Kira et al., 2021). In this sense, racism, classism, and health are interconnected in shaping vulnerability.

The Individual Level: Focus on Intersecting Identities

When it comes to various minority groups and individuals, intersections of identities and social characteristics are highlighted that may stimulate vulnerability and marginalization. For example, Arab minority communities in Israel showed lower infection rates, which was (hypothetically) connected to younger age, social media use (in comparison to ultra-Orthodox Jewish communities that more often deter from social media use), cooperation between community leaders and governmental bodies, and distribution of medical knowledge due to the higher percentage of medically trained people in the community (Saban et al., 2020). Other studies on the Arab community in Israel showed a picture consistent with effects seen in other

minority groups: higher psychological distress, less resilience (Kimhi et al., 2020) but more confidence in the medical and healthcare systems, especially in suburban communities than in urban communities (Cohen et al., 2020). Overall, national identity struggles, discrimination, and social inequality in ethnic minority groups in Israel (Slobodin and Cohen, 2020) and Arabic countries (Kira et al., 2021) were exacerbated in the pandemic. These considerations bear resemblance to the discussion of racism in the United States.

Furthermore, minority and marginalized groups refer to older people, individuals with chronic illnesses, individuals with mental illnesses, migrants, refugees, and sex workers. At the beginning of the pandemic, older people were focused upon in terms of protecting them from the virus. In a United Kingdom article, intersecting identities in older people in terms of non-White ethnic/racial groups, disabilities, chronic illnesses, non-heterosexual orientation, or living arrangements, such as residential care, were stressed, as they were hardly considered in policies and mitigation measures (Buffel et al., 2021). These intersections may exacerbate adversities for older people and increase vulnerability in terms of loss of connection, support, and increase in isolation and loneliness. This may be particularly pronounced in deprived neighborhoods, as discussed in the United Kingdom (Buffel et al., 2021). Individuals with chronic mental illness also have to be considered with regard to their intersecting identities. Some identities might be connected to an increased risk of vulnerability: gender and sexual identity minorities, BIPOC, refugees or having a migration background, and individuals with lower income or living in poverty reported worse mental health in China, the United States, and the United Kingdom (Bhaskar et al., 2020; Gibson et al., 2021). Particularly, restricted access to (non-emergency) healthcare and isolation increased experiencing threats during the pandemic in psychiatric patients in the United Kingdom and the United States (Diaz et al., 2021; Leeming et al., 2022). Similarly, in the United States, gender-diverse individuals experienced more distress and less resilience (Salerno et al., 2020; Hunt et al., 2021), and more social isolation and interpersonal problems in terms of not being able to live their authentic self (Mitchell et al., 2022). Also, transgender women experienced increased inequality and hardship because of homelessness, unsafe jobs, and thus less possibility to protect themselves from the virus in the form of physical distancing. The effect of the pandemic and its mitigating measures further increased vulnerability in terms of, e.g., increasing poverty in the United States (Poteat et al., 2020). Employment was also an issue for migrant workers who might have had precarious working arrangements or were not documented; thus they experienced increased vulnerability because of the unsafe status of immigration in Canada, Germany, Latin America, India, South Korea, Nepal, and Nigeria (Lam, 2020; Chackalackal et al., 2021; Lotta and Kuhlmann, 2021). Overall, a lack of resources increased the vulnerability of diverse and marginalized groups in Malaysia and the United Kingdom (Bhaskar et al., 2020; Aung et al., 2021) but also, measures to contain the virus intensified the vulnerability to adverse outcomes of the pandemic. To avoid further discrimination and increase in vulnerability, any measure needs to be critically examined regarding potential misuse and abuse in terms of, e.g., profiling and further marginalization of individuals and social groups (Bhaskar et al., 2020).

Resilience

Resilience is often seen as a possibility to overcome vulnerability. During the pandemic, resilience is sought after to ease adverse outcomes for individuals (Goldbach et al., 2021). Resilience in the context of social inequality was mostly understood as a social mechanism, where the individual and systemic levels interact; however, it also included chrono-levels in terms of resources and strength drawn from the history of communities (refer to **Figure 3**).

Structural Level: Politics and Education

Relying on grassroots organizations and individual commitments to provide support and connectedness to individuals of a community was not seen as sufficient from a Latin American perspective (Andia and Chorev, 2021). An approach at a structural level was needed, such as political engagement, to recognize and integrate such grassroot and individual responses in an overall strategy to support communities, as discussed in Malaysia and Canada (Daud, 2021; Morgan et al., 2022). Structural levels also comprised long-term strategies in terms of adjusting educational materials to include diverse social groups. This referred to promoting social resilience in terms of providing information and education to various social groups beyond majority and dominant social groups (Mahon and Mahon, 2021). Nevertheless, structural levels were also influenced by individual commitments. In this sense, online meetings and online communities potentially increased the visibility of marginalized groups and influenced policies and structural vulnerability, as shown in a Nigerian article (Oginni et al., 2021). Online presence was connected to less risk and exposure because of not meeting face-to-face. Additionally, online meetings had a wider range for meeting with others and increasing the visibility of adversities or harm (Oginni et al., 2021). Thus, individual and community engagements were impacting structures and reduced vulnerability at a structural level.

Systemic Level: Overcoming Classism and Racism With Community Resources

Children, particularly in low-income and poor environments, were especially vulnerable to the (social) impact of the pandemic. Loss of education and social interaction, safety, and care were seen as central aspects of the impact. Thus, hardship and disruption due (but not limited) to COVID-19 affected those with low income and ethnic or racial minority groups more often. Schools or other formal educational systems provided children with positive and nurturing relationships, which Herbers et al. (2021) also referred to as adaptive systems. Due to restrictions in accessing these systems, particularly at the onset of the pandemic, children in less nurturing environments may have been exposed to even more disruptions. For example, connection and resources could be provided by or in schools. In this sense, schools could and should be hubs for exchanging resources and connect, as

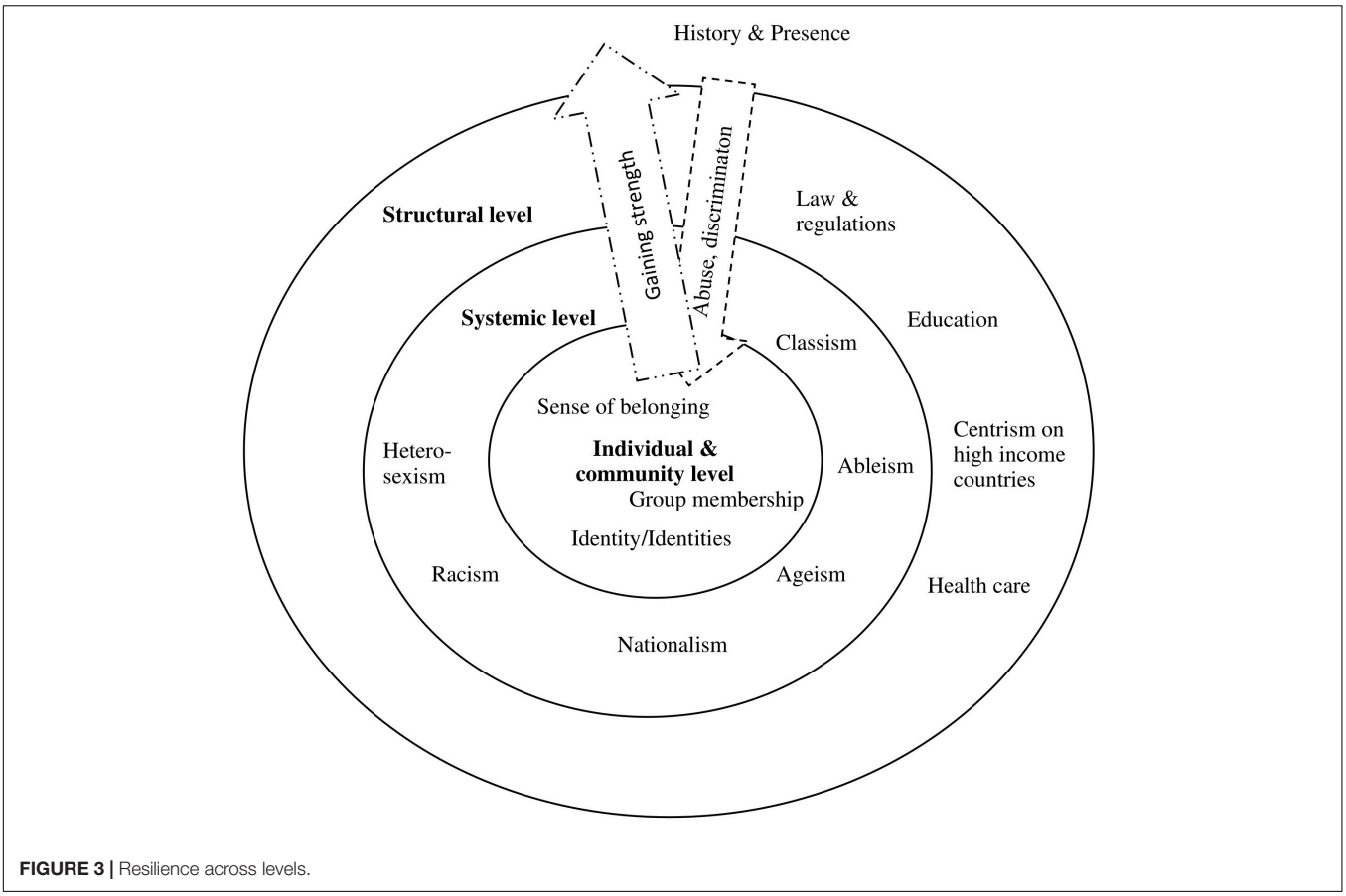

FIGURE 3 | Resilience across levels.

demonstrated in a United States article (Sullivan et al., 2021), thus moving beyond a mere institution to educate.

To promote connection and build on the efficacy of communities, central figures provided support and connectedness as well as information on and guidance in overcoming the pandemic. Such central figures were related to religious leaders in Israel (Slobodin and Cohen, 2020), local leaders, and representatives of communities in Canada (Waruszynski et al., 2021). Thus, any measure to contain the spread of COVID-19 should be coordinated with religious needs and in cooperation with religious leaders. In Israel, it was noticed that some initial measures stood in contrast to religious rules, but later measures included cooperation with religious groups to contain the spreading of the virus (Slobodin and Cohen, 2020). Thus, religious leaders supported the measures by calling for, e.g., prayers in families instead of larger groups. Other important figures in Canada were local leaders and representatives of diverse communities to reduce further marginalization and to empower communities by providing them with collective efficacy (Waruszynski et al., 2021). Barriers to participation and collective and self-efficacy of communities and individuals were not only present at individual levels but also related to systemic challenges. In this sense, understanding systemic constraints was important to implement interventions and increase resilience and mitigate adversity as discussed in the United States (Blustein et al., 2021).

Regarding low-income parents or ethnic or racial minority groups, it was found that physical distancing measures or quarantines were interwoven with privilege of space or resources. Privilege in terms of higher income and higher socioeconomic status protected individuals from adverse impacts of the pandemic in China (Wu et al., 2021). Higher socioeconomic status, hence higher class, granted access to hygiene supplies, consisted of financial security due to non-precarious employment status, and provided access to a community that offered further resources.

Community and Individual Levels: Strength From the Community and (Historical) Hardship

In LGBTQI2S+ (lesbian, gay, bisexual, transgender, queer/questioning, intersex, two spirited and other not named sexual and gender identities) populations, participants referred to resilience because of lessons learned from previous experiences with hardship, e.g., in the United States (Abreu et al., 2021; Gonzalez et al., 2021; Quinn et al., 2021), and radical acceptance of, e.g., their identity, and the everyday commitment to one's identity and acknowledgment of having a privileged position with access to resources and care (Gonzalez et al., 2021). Resilience referred to embracing collective and individual aspects at such a meta-level. Cheng et al. focused on their tripartite collective psychosocial resilience model in collective efforts to be supported as well as to differentiate between

personal–individual and collective aspects. The three arms of their model include critical consciousness of discrimination as common fate, critical consciousness-informed racial/ethnic identity, and advocacy (Cheng et al., 2021). According to their explications, perceiving and realizing racism as collective or common fate instead of targeting a specific individual, as well as committing or embracing one's ethnic identity and advocacy and solidarity in the community or group, may buffer the impact of (COVID-19 related) racism. Similarly, in a Canadian study, younger LGBTQI2S+ individuals also experienced support in online communities and strength from sharing information and educating others about, e.g., pride (Hiebert and Kortes-Miller, 2021). They also contributed to building and providing social resources by caring for the community. In turn, this also meant that, in an example from the United States, they benefited from giving, which increased their own feeling of resilience (Gonzalez et al., 2021) and collective and self-efficacy.

Sex workers and, particularly, migrant sex workers were additionally and intersectionally affected by discrimination, racism, and immigration status, which shaped their precarious situation and vulnerability. However, sex worker communities have proven to be resourceful and to rapidly respond to supporting sex workers in Canada (Lam, 2020). Thus, support by the community had various effects: it strengthened individuals in the community by providing them with resources, and it increased self-efficacy in individuals offering support to others. Resilience was experienced as a person-by-context interaction from a United States perspective (Herbers et al., 2021), thus highlighting that the context and the environment are detrimental in an individual's display or activation of resilience. A United States study also showed that optimism and resilience as traits were beneficial, as these characteristics buffered the impact of loss of resources on mental health in the elderly and chronically ill people (McElroy-Heltzel et al., 2022).

DISCUSSION

In this article, we searched for resilience and vulnerability in minority and marginalized groups during the COVID-19 pandemic. The pandemic may be viewed as a crisis or as trauma to grasp its impact. Sullivan et al. even referred to it as a disaster (Sullivan et al., 2021), which is also accurate as a disaster is conceptualized as an interplay between the hazard as such and its social impact (Wisner et al., 2004). Social consequences and increasing social divide in societies resulting from the pandemic were also mentioned at the onset of the pandemic (World Health Organization [WHO], 2020b) and are a global concern.

In our review, we found that the impact of the pandemic on social inequality is referred to in terms of the impact of mitigating measures to contain the spread of the virus or the government neglecting to implement timely measures. Derived from the analysis of the literature, it is the context of mitigating measures, which exacerbate social inequality and potential vulnerability [cf (Cutter et al., 2008)]. We argue that it is *potential* vulnerability, as we see (1) vulnerability in interaction with resilience but not in opposition to resilience and (2) vulnerability through structures and systems as having the potential to increase adverse effects on individuals and communities. In this sense, we do not see vulnerability as an irrevocable outcome for minority and marginalized groups but as a product of structures and systems creating adversity for minority and marginalized groups and individuals.

Based on our review, we deduced three working hypotheses:

> (1) Social inequality must be considered at a global level: inequality at a global level translates into a vulnerable context for an individual.

Whereas one focus has been on the impact of the pandemic on social inequality and roots of social inequality in systems of oppression, studies have also shown that we need to address inequality at a global level. For example, the unequal distribution of jobs that may be performed at home is not only evident at a national level but also in comparison between higher- and lower-income countries (Sanchez et al., 2021). Similarly, in their review on six countries ranging from Mexico and Colombia to Nigeria, South Korea, India, and Nepal, Chackalackal et al. (2021) concluded that measures to contain the virus focused on possibilities in high-income countries but were not necessarily translatable to lower-income countries. Additionally, the effects of climate change may affect those in crowded housing and with less access to urban green spaces and increase inequality even further, as discussed in an article with United States focus (Bikomeye et al., 2021). Urban green spaces are enjoyed in varying degrees in different countries, as urban green spaces may be restricted in their access (García de Jalón et al., 2020) or larger, desirable green spaces may not be available (Wendel et al., 2011). Therefore, social inequality in terms of privilege and oppression should not only be considered at societal and individual levels and with regard to the specific context of a country or a state. Inequality should be additionally assessed across countries and continents, thus on a global scale. Social inequality at a global level appears to be a larger representation of structural and systemic levels creating social inequality and vulnerability at societal and individual levels, and vice versa. This also implies that studies should provide more contextualized information, so future studies building on the findings can further investigate potential global and potential context/country-specific aspects. Thus, we need to consider the global impact on national inequality.

> (2) Vulnerability is historically situated: vulnerability (experienced in the pandemic) is maintained and reinforced by history.

The COVID-19 pandemic is not just a crisis at an international level impacting marginalized and minority groups to a great extent. It may also be experienced in relation to collective and historical trauma. Such collective trauma is experienced differently by diverse groups across countries (e.g., Canada, United States, and Arabic countries) and exacerbates the feelings of vulnerability or threat (Diaz et al., 2021; Kira et al., 2021; Waruszynski et al., 2021). Additional stressors, such as murders of members of the Black and people of color

community, further impede a sense of safety and contribute to the history and transgenerational trauma in the community, as shown by an example from the United States (Herbers et al., 2021). Vulnerability must be understood with its historic roots that are noticeable in today's social inequality. Thereby, potential vulnerability is transported by means of education, regulations, and measures to contain COVID-19, housing, and employment, and working condition, which are built on majority and high-income, thus privileged, context and neglect minority and marginalized voices (Mahon and Mahon, 2021). Whereas this potential vulnerability is situated at structural levels, it is translated to social groups and individuals through systems of oppression, such as racism, classism, ableism, and heteronormativity. The implications of what is defined as vulnerable and vulnerability has direct relevance for diverse social groups and individuals (Hutcheon and Lashewicz, 2014). By perpetuating the history of abuse and discrimination of marginalized groups, inequality is reinforced (Krishnan et al., 2020) and not reduced [refer also to Pain (2020)]. These mechanisms are noticeable in and maintained at the communal, societal, national, and global levels. Intensifying interdisciplinary approaches, e.g., Black, postcolonial, queer, and feminist theories and perspectives, in (e.g., health) research will deepen the knowledge of the meaning of vulnerability and further evolve concepts and mitigation strategies to decrease inequality during a pandemic or other crisis.

> (3) Strength through collective (historical) hardship: vulnerability is not the opposite of resilience but may serve as an aspect of resilience.

Vulnerability is not (only) seen in terms of hardship but also in terms of empowerment. For example, Gao and Sai (2021) stated, that "[w]riting through vulnerability liberates us to heal, to calm down, and to find meanings in our lived experiences" (p.188). In the United States, marginalized and minority groups found strength and resilience in their previous experiences with hardship (Gonzalez et al., 2021; Quinn et al., 2021), acknowledgment of collective fate (Cheng et al., 2021), and the history of their community or their ancestors (Abreu et al., 2021). Similar to revisiting the history of discrimination and abuse of marginalized groups, acknowledging these as well as contextualizing current vulnerability and inequality from such a historically informed perspective (Krishnan et al., 2020), resilience must be understood in terms of historically created vulnerability and through such vulnerability. Renewed or newly found connection to one's community (Mahon and Mahon, 2021), identification with values of a community (Hiebert and Kortes-Miller, 2021), and advocacy for (other) marginalized groups benefit (Abreu et al., 2021; Gonzalez et al., 2021; Quinn et al., 2021) resilience. This underscores the importance of feeling part of a community and a sense of belonging to a community. Resilience and interventions to stimulate or increase resilience referred to advocacy, connectedness, social support, and collective action to stimulate efficacy. This emphasized the interaction between an individual and the environment (Herbers et al., 2021). Self- and collective efficacy and social connectedness are well-established aspects fostering resilience in disasters (Hobfoll et al., 2007) and are prevalent in studies reviewed in this context. Beyond these aspects, identity and historical embedding of vulnerability and inequality may be particularly important for minority and marginalized and groups and individuals [refer to, e.g., (Hutcheon and Lashewicz, 2014)]. Thus, resilience has been found in the context of previous experiences with vulnerability (Gonzalez et al., 2021). This is particularly true if referring to vulnerability as discussed by Baiasu (2020), who also saw vulnerability as openness. Such openness may be discussed in terms of having experienced vulnerability, which in turn did not result in personally closing up to protect oneself but embracing these experiences to build strength. Further endeavors should acknowledge Black, postcolonial, indigenous, queer, and feminist perspectives in trauma and resilience research, as they have already pointed out the role of collective trauma and its social, political, and structural implications (Pain, 2020, 2021) but are not well-integrated in many trauma and resilience research studies. Additionally, it shows that multiplicity of resilience and resilience narratives has to be acknowledged and understood in their contextual, subjective, and constructivist embedding (Hutcheon and Lashewicz, 2014; Powell et al., 2014).

Fundamental Issues as Way Forward

This review underscores the necessity to acknowledge historical roots, definitions, and scope of fundamental concepts. As shown above, Hobfoll et al. (2007) showed distinct elements of resilience in disasters and large-scale emergencies. Some of these aspects can also be traced in this review. However, there appear to be distinct features of resilience in minority and marginalized groups, such as the role and acknowledgment of history and historical discrimination (Pain, 2020), having confidence in one's identity and standing by one's identity/identities, and finding strength in past adversities from ancestors and communities. Focusing on vulnerability and resilience has shown that these are not distinct entities, but that they are interconnected. Vulnerability is, thus, not a secluded entity and in opposition to resilience, which marks the desirable state. Whereas resilience is, per definition, embedded in the context of adversity and, thus, potential vulnerability (Werner, 2005; Rutter, 2012; Juen and Siller, 2013; Luthar et al., 2015; Baiasu, 2020; Kubacki et al., 2020), vulnerability is hardly understood as an integral part of resilience (Baiasu, 2020). Thus, future endeavors should focus on the meaning of vulnerability at the individual, systemic, and structural levels, and its implications for resilience. Intersectionality [e.g., (Moradi and Grzanka, 2017)] and socioecological models [e.g., (Bronfenbrenner, 1977; Bronfenbrenner and Evans, 2000)] provide useful frameworks to consider levels and interconnections in research. Such frameworks, even if not all levels are applied in a study, may elicit the specificity of findings and outcomes [refer to, e.g., (McCollum et al., 2019)]. The gained knowledge may help to embed and contextualize experiences at the individual and group-based levels regarding structural and historical elements and vice versa.

This review is not without limitations. The rapidly increasing number of articles on this topic may have led to missing important contributions to this field of research. However, even though we are confident that we have captured the most important aspects of vulnerability and resilience in the

social inequality context, we cannot rule out that we missed recent developments. Additionally, we used English search terms, which marginalizes publications published in other languages or published in other databases. This reinforces discourses in academia in which specific databases, languages, and institutions are dominant at the expense of others. As was also noticeable in the selected literature, one dominant discourse focuses on the United States. In reflection of social inequality during the COVID-19 pandemic, the increasing publication rate might also increase further social disparities in knowledge production. Many articles focused on minority or marginalized groups, as did we. However, this also supports an underlying (unnamed) assumption of having a reference group, which possesses power, resilience, and privilege. Critiques on the wording of minority and majority have been articulated by others as well (Seyranian et al., 2008). It is, thus, important to continuously take up a critical position toward terminology. Another limitation refers to the authors as researchers in the discussion of social inequality. Research findings also relate to the authors as researchers, our professional socialization, and epistemological understanding. By reflecting on these aspects in the authors as researchers, we are likely to advance our understanding of concepts of vulnerability and resilience in minority and marginalized groups across countries and locations. Also, by doing so, we might be more aware of how and when we reproduce social inequality or silence voices. Thus, the underlying perspective in this review also refers to speaking from a place of privilege as we (HS and NA) are, in many references, part of the "dominant" group, e.g., through our position as researchers.

CONCLUSION

Our review highlights that we need to critically review which voices have been neglected in the development of concepts. Gaillard and Mercer (2012) emphasized that "our inability to bring all actors, usually working at different scales and in dissimilar directions, together around the same table" (p. 101) causes a lack of collaboration between different actors in creating a dialog (Gaillard and Mercer, 2012). This statement bears resemblance to our review: diverse voices need to be visible in models and concepts focusing on marginalized and minority groups, vulnerability and resilience in the COVID-19 pandemic (as one example for adversities). As shown, resilience includes vulnerability in terms of acknowledging discrimination as collective and common fate (Cheng et al., 2021), in terms of historical discrimination, and in terms of structures at a global level that are reflected in each society and impact individuals. Understanding collective trauma in marginalized groups and its contribution in increasing vulnerability and inequality (Cheng et al., 2021; Kira et al., 2021) is important; another side of collective trauma from a present and historical point of view refers to providing strength and confidence (Baiasu, 2020; Abreu et al., 2021; Gonzalez et al., 2021; Quinn et al., 2021). Critical acceptance of one's identity (Gonzalez et al., 2021) or identities, as well as standing by these may provide a sense of belonging to the community. In relation to collective and historical trauma, such identities and belonging might elicit specific and unique constructions of resilience in minority and marginalized groups and individuals, as is also proposed by feminist, Black, queer, and indigenous approaches [refer to Burstow (2003); Tseris (2013); Pain (2020)].

AUTHOR CONTRIBUTIONS

HS and NA have both substantially contributed to writing this article, critically reviewed the findings, and discussed and revised the draft. HS conceptualized the idea, performed the search, and wrote the first draft of the manuscript. Both authors contributed to manuscript revision, read, and approved the submitted version.

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Perceptions of Safety and Stress Among Health Professionals: The Role of Care Unit Identification as a Protective Factor During the COVID-19 Pandemic

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The present study aimed to investigate the role of motivational process and coping resources in health professionals during the COVID-19 emergency examining the role of Care Unit Identification and safety climate perception as resources that can help nurses to cope with stressors. A cross-sectional research design was used and 218 nurses completed a self-report questionnaire measuring: Perception of safety, Care Unit identification, Work Engagement, Psychological Distress, and Burnout. Results revealed that Work Engagement was significantly related with Burnout ($b = -0.209$, 95%CI [−0.309; −0.109]) and Distress ($b = -0.355$, 95%CI [−0.529; −0.18]) especially when the Care Unit identification is high ($b = -0.303$, 95%CI [−0.448; −0.157] and $b = -0.523$, 95%CI [−0.772; −0.275], respectively). The safety perception was positively related to Work Engagement ($b = 0.315$, 95%CI [0.198; 0.433]) and had an indirect effect on psychological Distress ($b = -0.112$, 95%CI [−0.181; −0.042]) and Burnout ($b = -0.066$, 95%CI [−0.105; −0.027]). High levels of both Care Unit identification and perception of safety, along with personal work engagement, appear to protect nurses from burnout and psychological distress. Findings suggest that the effort to improve teamwork identification and ensures an adequate degree of perceived safety for healthcare professionals need to be maintained and reinforced as they positively impact nurses' wellbeing.

Keywords: health professionals, work engagement, teamwork identification, perception of safety climate, burnout, distress

INTRODUCTION

Since February 2020, health workers involved in the fight against the pandemic have faced a previously unthinkable reality. They have been forced to take complex and difficult decisions, with strong physical, emotional, and psychological pressures. The stressful working conditions resulting from prolonged working hours, the high numbers of serious patients in need of

treatment in atypical conditions, the unusual amount of bad news that has had to be communicated to their family members, and the social auto-isolation that was necessary to shield our relatives from possible contagion have strongly influenced the psychological state expressed by health workers (Bertelli et al., 2020). It is crucial that the impact of the pandemic on health professionals, their symptoms of discomfort, risk factors, and coping resources should be recognized and understood.

Stress Symptoms and Burnout in Health Professionals Resulting From the Pandemic

The nursing category was certainly one of the most affected by the emergence of COVID-19. Although the potential for contagion is present in every living and working environment, healthcare workers are at the greatest risk of exposure to the virus, and their commitment at the forefront of the health emergency also exposes them to increasing operational and emotional overload. In addition to the psychological effects of the state of emergency, health workers have experienced other unique problems and have been exposed to situations of distress with limited possibilities for resolution (Bertelli et al., 2020; Jun et al., 2020). They have had to face psychological stress due to the nature of their job. They have had to deal with a new contagious disease, be in close contact with infectious patients for long durations, redefine the care process with new working procedures or in different environments, and for some, separate themselves from their families to preserve them from possible contagion (Lai et al., 2020).

The pandemic has led to the continuous transformation of strategies, especially in areas with a high COVID-19 prevalence, and this has required workers to adapt accordingly. In addition, the exposure to biological risk, difficulties in finding personal protective equipment (PPE), the excessive workload, irregular work shifts, and anxiety about one's health have contributed to the development of stress or burnout (Lai et al., 2020).

Stress has been defined in the literature (Lazarus, 1966; Caprara and Borgogni, 1988) as a personal response to external or internal stimulation (stressors) in which the individual tries to restore balance and adapt to the environment. Burnout is defined as a syndrome that occurs more frequently within the caring profession. It is characterized by emotional exhaustion, depersonalization, and reduced professional efficacy (Maslach, 1982). Difficulties in coping with internal or external demands lead to a lack of self-efficacy as the demands of the job exceed the resources the person himself believes he or she possesses. Therefore, while stress typically constitutes a momentary reaction to the need for adaptation, job burnout is chronic (Schaufeli and Enzmann, 1998).

Theoretical approaches emphasize the role of personal, social, and organizational variables in the etiology of burnout and the prevention of possible negatives outcomes. For example, the organizational context defines the constraints and resources available for the worker, the quality of health assistance, the nature and value of relationships with patients and colleagues (Liu et al., 2020), and perceptions of being able to rely on personal abilities and social resources prevent negative health outcomes and generate positives ones (Oshio et al., 2018). The job demands-resources (JDR) model developed by Demerouti et al. (2001) can be used to understand the antecedents of burnout and to predict health workers' level of wellbeing.

JDR Model

Demerouti et al. (2001) state that the balance between positive characteristics called resources and negative ones defined as demands can explain the particular job performed by professionals. They describe job demands as "those physical, social, or organizational aspects of work that require physical or mental effort, and are therefore associated with certain physiological and psychological costs" (p. 501). Job resources, on the other hand, are described as "those physical, social, or organizational aspects of work that are characterized by one or more of the following aspects: they are functional to the achievement of job objectives; they reduce job demands and associated physiological and psychological costs; and they stimulate personal growth and development" (p. 501).

Demands and resources are part of the motivational process. Job resources satisfy the individual's psychological needs, such as autonomy or competence, and determine the extent of their commitment and motivation. Without adequate resources, the individual might be unable to cope with the demands and achieve their goals and even engage in withdrawal behaviors. Resources can therefore play a protective role by mitigating the negative effects of work demands.

It is widely accepted that burdensome job demands (such as excessive workloads or disruptions to the work–life balance) and insufficient job resources (e.g., social support, autonomy, learning opportunities, and feedback) can predict burnout. Conversely, sufficient resources can help the individual deal with the demands of the job and encourage engagement (Schaufeli et al., 2009). High levels of energy and dedication to work have a positive influence on health and performance (Bakker et al., 2008). The JDR model explains how resources and work engagement promote personal growth. It recommends the use of the tools needed to achieve objectives and to cope with job demands, thus reducing the likelihood of stress and burnout (Bakker and Demerouti, 2014). The present study focused on perceptions of safety and teamwork identification.

Perception of Safety and Care Unit Identification as Protective Resources

The JDR model shows how a secure working environment can be a motivational resource in emergencies. Zohar (1980) defined a climate of safety as "a summary of the molar perceptions that employees share around their work environments" (p.96). During the pandemic, health organizations stressed the importance of protective practices in ensuring the safety of workers and patients; at the same time, staff was asked to work faster (Manzano García and Ayala Calvo, 2020). Nurses were at high risk of exposure to the virus because they were providing intensive health assistance. Perceptions of safety may be framed in terms of individual protection, training

and supervision, information sharing, problems with colleagues, and scrupulousness in following contamination prevention procedures (Lai et al., 2020).

The degree of certainty that adequate protection would be provided to nursing staff influenced their capacity to cope (Fernandez et al., 2020). By contrast, uncertainty and disagreements about appropriate infection control measures had negative outcomes (Holroyd and McNaught, 2008). Insufficient investment in safety-related resources was another concern (Ives et al., 2009; Kang et al., 2018).

The pandemic had a strong impact on the quality of the nurses' working life. They no longer perceived their workplace to be a safe environment, and this threatened their psychological wellbeing (Ahmed et al., 2020).

During emergencies, a sense of belonging to a supportive team becomes very important (Kang et al., 2018). The literature has shown such identification was a predictor of satisfaction among nurses and that a feeling of connection helped them to manage psychological distress (Judge et al., 2001). In other words, identification with a team is a resource that can have positive outcomes on the health of staff (Kang et al., 2018). In the present context, care unit identification may be defined as the extent to which nurses felt part of a working group with a specific purpose, as well as part of a wider professional community (Caricati et al., 2013, 2015, 2020).

Some researchers (Sangal et al., 2021) have suggested that the sharing of workloads and an awareness of group cohesion help to build a sense of belonging and protect against stress and burnout. The adoption of measures based on autonomy, competence, and relatedness have encouraged nurses to seek support from supervisors and co-workers (Tang et al., 2020). Several other studies (e.g., Barello et al., 2020) have shown how social support and empathy help to reduce stress-related symptoms. Based on these findings, the main aim of the present study was to analyze the impact of COVID-19 on hospital nurses and to identify protective resources that might prevent psychological distress and burnout. The role of perceptions of safety in increasing work engagement and reducing stress and the moderating effect of care unit identification were investigated. It was hoped that the findings could be used to identify resources for the implementation of emergency interventions and human resource plans.

MATERIALS AND METHODS

Hypotheses

Based on the motivational process of JDR model explained above, we hypothesized that the perception of safety would have both a direct relationship with burnout (H1) and emotional psychological distress (H2) and an indirect effect through the mediation of work engagement (H3). This presupposed a relation between work engagement and two negative outcomes: burnout (H4) and psychological distress (H5). Particularly, according to Ahmed et al. (2020), we hypothesized that the relationship between safety perception and burnout was mediated by work engagement. Secondly, we hypothesized that work engagement has a mediational role between safety perception and psychological distress.

According to the literature concerning team support and identification, we also tested whether the two mediating relationships of the previous hypotheses were moderated by identification with the care unit. In particular, we hypothesized that work engagement reduced emotional psychological distress (H6) and burnout (H7) in nurses with higher levels of care unit identification. **Figure 1** depicts the tested model and expected paths.

Design and Setting

The study adopted a cross-sectional research design, and the data were collected using an online questionnaire. Before data collection, we shared instrument and research aims with the hospital general direction that authorized administration of the questionnaire. It was carried out in accordance with the American Psychological Association (APA) and National Association of Psychology ethical standards for the treatment of human subjects. Participants were informed that their participation was voluntary, that they could withdraw at any time, and that their data would be treated anonymously. They were also asked to read the informed consent form and agree to their involvement before completing the survey. The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

Participants

The study involved 218 nurses at a hospital in northern Italy. Of these, 77.1% worked in a COVID-19 care unit. Most of the participants (81.7%) were women. Age-wise, 28.4% of the sample were between 41 and 50; 25.2% were between 51 and 60; 23.9% were between 18 and 30; 20.2% were between 31 and 40; and 2.3% were between 61 and 70. Nearly half (41.9%) of the participants had worked in the hospital for 21–35 years; 25.7% for 6–20 years; 6.9% for more than 35 years; and 32.1% for less than 1 or up to 5 years. Data were collected from July to September 2020, after the end of the first wave of the pandemic.

Instrument

The instrument used was a self-report questionnaire containing the following scales: *Perception of Safety*. The Perception of Safety was measured using 11 items adapted from questionnaire developed by Akinboro et al. (2012). The Italian translation of the scale was adapted to perception of COVID-19 risk of contagion during pandemic in the hospital. Sample items were "The operators protection form COVID-19 infection has a high priority for the company management" and "The hospital staff received an adequate training to protect themselves from COVID-19 contagion." The perception of Safety was measured on a six-point Likert scale (1 = strongly disagree, 6 = strongly agree). The internal consistency of this scale was $\alpha = 0.88$.

Care Unit (CU) Identification was measured with the Italian five items of Caricati et al. (2015); sample items were "Being member of my CU is important to me" and "I am proud to belong to my CU" ($a = 0.95$). CU identification scale was measured

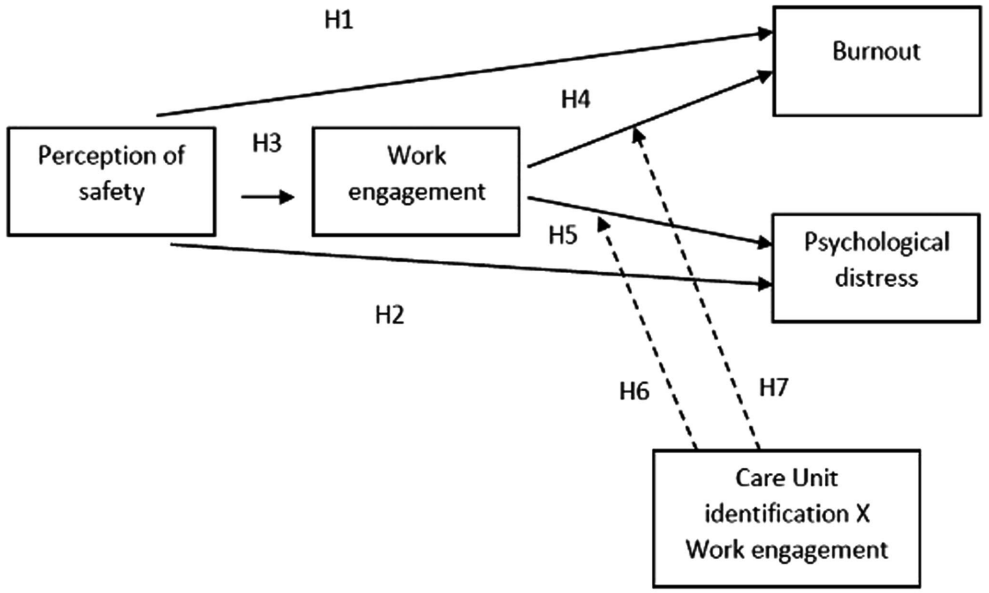

FIGURE 1 | The hypothesized model. Solid lines represent supposed direct and mediational effects. Dashed lines represent the hypothetical moderation effects of CU identification on relationship of Work engagement and negative outcomes (Burnout and Psychological distress).

on a six-point Likert-type scale (1 = strongly disagree, 6 = strongly agree). The internal consistency of this scale was $\alpha = 0.96$.

Work engagement was measured using nine items from the Italian version (Balducci et al., 2010) of the Utrecht Work Engagement Scale—UWES (Schaufeli et al., 2002). Sample items are: "When I get up in the morning, I feel like going to work" and "I am enthusiastic about my job." Participant was asked to response using a Likert scale (0 = Never, 1 = once a week or less, 2 = few times a month, 3 = once a week, 4 = few times a week, and 5 = every day). The internal consistency of this scale was $\alpha = 0.87$.

Psychological Distress was measured with the Italian version (Bottesi et al., 2015) of the Depression Anxiety Stress Scales-21 (DASS-21; Lovibond and Lovibond, 1995), which consist of 21 items measuring self-reported levels of anxiety ($a = 0.84$), depression ($a = 0.87$), and stress ($a = 0.88$). Items ask participants to indicate the extent to which they experienced negative emotional states in the last 7 days on a six-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often, and 6 = always). We considered to total score of the scale as the index of psychological distress; the internal consistency of the whole scale was $\alpha = 0.91$.

Burnout is measured using 10 items of the Italian version of the Professional Quality of Life Scale; ProQol Version_5 (Stamm, 2009). Sample items are: "I feel trapped by my job as a helper" and "I feel overwhelmed because my work load to seems endless." All items were scored on a six-point scale ranging from 1 = never to 6 = always. The internal consistency of this scale was $\alpha = 0.71$.

Analysis Plan

Zero-order correlations (Pearson's *r*) were firstly investigated to assess association among variables. We preliminary checked assumptions of multivariate normality using Henze–Zirkler test (Henze and Zirkler, 1990). The model was then tested with structural equation modeling on manifest variables considering burnout and distress as dependent variables, safety perception, and work engagement as independent variables and CU identification as moderator independent variable (see **Figure 1**). Variables involved in interactions were centered at their grand mean before being entered in the regression matrix. All analyses were performed using R (R Core Team, 2021), and structural equation model was tested with Lavaan package (Rosseel, 2012). As we did not know all parameters of the models to detect sample size, we run Monte Carlo simulation to estimate the frequency of significant paths (i.e., their power) considering estimates as starting values of the population. About 1,000 Monte Carlo replications with $n = 218$ were performed. Finally, we will report indexes (e.g., chi-square, comparative fit index, and RMSEA) of model for descriptive purposes only and for sake of transparency. Note that, however, we were not interested in the adequacy of the model as our primary interests were on the estimated effect of considered paths.

RESULTS

Preliminarily Analysis

Table 1 shows zero-order correlation and descriptive statistics regarding the measured variables. As indicated, the perception of safety was positively related with both work engagement and Care Unit identification, which was in turn positively and significantly correlated one to another. On the contrary, the perception of safety and CU identification were negatively related with burnout but were not correlated with psychological distress. Finally, the relationship between work engagement and the two

TABLE 1 | Descriptive statistics and zero-order correlation of measures.

	M	*SD*	2	3	4	5	6	7	8
1. Perception of safety	3.84	1.06	0.36**	−0.06	−0.27**	0.23**	−0.08	0.15*	0.11
2. Work engagement	3.91	0.93	-	−0.23**	−0.36**	0.50**	−0.04	0.20**	0.14*
3. Psychological distress	2.22	0.89		-	0.45**	−0.01	0.12	−0.15*	−0.16*
4. Burnout	2.59	0.61			-	−0.24**	0.04	−0.05	0.03
5. Care unit identification	4.96	1.22				-	−0.06	−0.01	−0.06
6. Gender (0 = men)	-	-					-	0.20	0.11
7. Tenure in hospital	-	-						-	0.89**
8. Age	-	-							-

*$p < 0.05$; **$p < 0.01$. $N = 218$.

TABLE 2 | Estimates from the structural equation modeling.

		B	*SE*	*Z*	95%CI	Beta	pwr
Work engagement							
	Safety perception	0.315	0.060	5.252**	[0.198; 0.433]	0.358	0.99
Burnout							
	Safety perception	−0.082	0.038	−2.148*	[−0.156; −0.007]	−0.142	0.57
	Work engagement	−0.209	0.051	−4.097**	[−0.309; −0.109]	−0.320	0.99
	CU identification	−0.065	0.037	−1.777	[−0.137; 0.007]	−0.131	0.49
	We × CU identification	−0.077	0.034	−2.284*	[−0.143; −0.011]	−0.186	0.77
Psychological distress							
	Safety perception	0.028	0.058	0.490	[−0.085; 0.142]	0.032	0.09
	Work engagement	−0.355	0.089	−3.985**	[−0.529; −0.18]	−0.355	1.00
	CU identification	0.047	0.052	0.899	[−0.055; 0.148]	0.061	0.16
	We × CU identification	−0.138	0.044	−3.123**	[−0.225; −0.051]	−0.218	0.86
Indirect effects							
	Security- > We- > Burnout	−0.066	0.020	−3.324**	[−0.105; −0.027]	−0.115	0.99
	Security- > We- > Distress	−0.112	0.035	−3.159**	[−0.181; −0.042]	−0.127	0.99

*$p < 0.05$; **$p < 0.01$. *We, Work engagement, CU, care unit, and pwr, power.* $N = 218$.

negative outcomes (psychological distress and burnout) was negative. Zero-order correlations also indicated that considered measures were not related with professionals' gender. Professionals with a longer work experience in hospitals appeared to report less psychological distress and perceive more safety and be more engaged. No significant correlation appeared between working experience and both burnout and CU identification.

Normality analysis revealed that data departed from multivariate normality (HZ = 1.829, $p < 0.001$), and then, we estimated model using maximum likelihood estimation with robust standard error which is robust to, and accommodate for, violation of the normality assumptions (Rosseel, 2012).

Model Testing

General fit of the model appeared to be poor [$\chi^2(2) = 51.13$, $p < 0.001$, CFI = 0.725, RMSEA = 0.336, $p < 0.001$, 90%CI[0.269, 0.407]]. This is not surprising as we were not aiming to test a model which explained as much variance as possible. Results of the tested model are presented in **Table 2**. Perception of safety was positively and significantly related with work engagement, $b = 0.315$, $SE = 0.060$, $Z = 5.252$, $p < 0.001$, and negatively with burnout, $b = -0.082$, $SE = 0.038$, $Z = -2.148$, $p = 0.032$, while it had no significant relationship with psychological distress $b = 0.028$, $SE = 0.058$, $Z = 0.490$, $p = 0.624$. Work engagement showed a negative and significant relationship with both burnout, $b = -0.209$, $SE = 0.051$, $Z = -4.097$, $p < 0.001$, and psychological distress, $b = -0.355$, $SE = 0.089$, $Z = -3.985$, $p < 0.001$. CU identification, instead, had no significant relationship with burnout, $b = -0.065$, $SE = 0.037$, $Z = -1.777$, $p = 0.076$, nor psychological distress, $b = 0.047$, $SE = 0.052$, $Z = 0.899$, $p = 0.369$. Importantly, however, the CU identification interacted with work engagement in predicting both burnout, $b = -0.077$, $SE = 0.034$, $Z = -2.284$, $p = 0.022$, and psychological distress, $b = -0.138$, $SE = 0.044$, $Z = -3.123$, $p = 0.002$ (see **Figure 2**). When we unpacked these interactions, we discovered that the effect of work engagement on both burnout and psychological distress was stronger when CU identification was high ($b_{\text{burnout}} = -0.303$, $SE = 0.074$, $Z = -4.082$, $p < 0.001$; $b_{\text{psychological distress}} = -0.523$, $SE = 0.127$, $Z = -4.126$, $p < 0.001$) than when CU identification was low ($b_{\text{burnout}} = -0.115$, $SE = 0.055$, $Z = -2.079$, $p = 0.038$; $b_{\text{psychological distress}} = -0.187$, $SE = 0.075$, $Z = -2.494$, $p = 0.013$).

Finally, we notice also that perception of safety had mediated indirect effects *via* work engagement on both burnout, $b = -0.066$, $SE = 0.020$, $Z = -3.324$, $p = 0.001$, and psychological distress, $b = -0.112$, $SE = 0.035$, $Z = -3.159$, $p = 0.002$, but these indirect effects were in turn moderated by CU identification as they

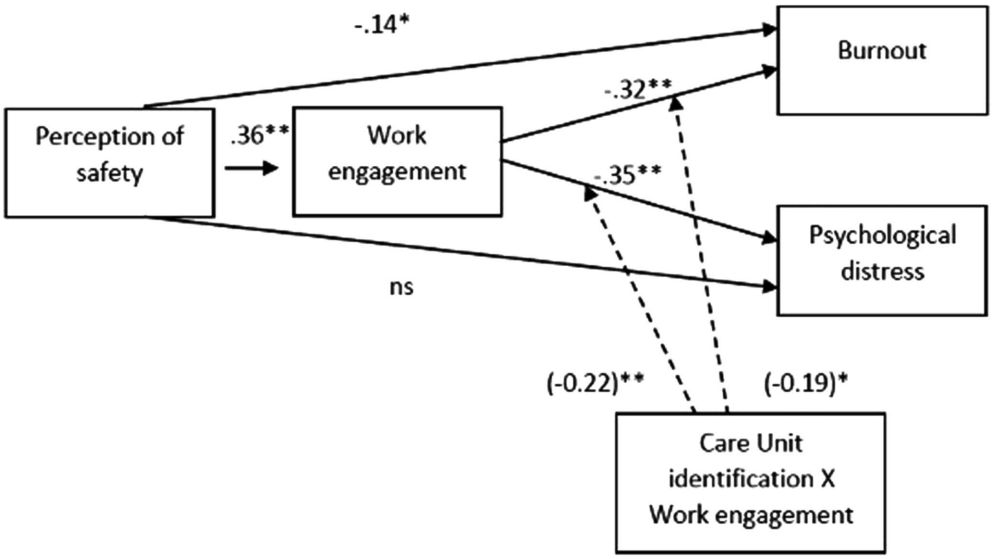

FIGURE 2 | The tested model (standardized betas are reported). Solid lines represent direct and mediational effects. Dashed lines represent the moderation effects of CU identification on relationship of Work engagement and negative outcomes (Burnout and Psychological distress); interaction betas are reported in brackets.

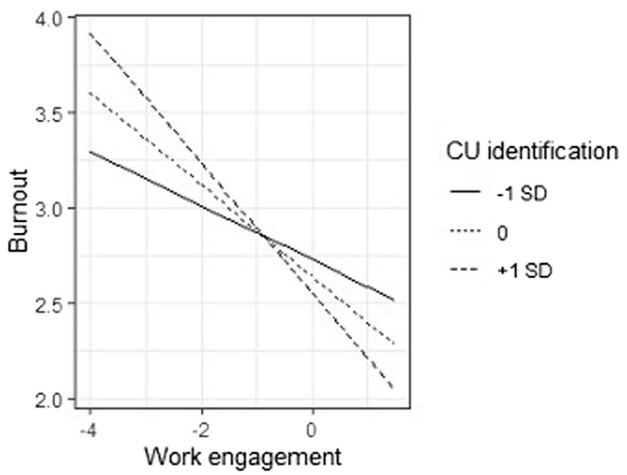

FIGURE 3 | Interactions between Care Unit (CU) identification and Work engagement on Burnout.

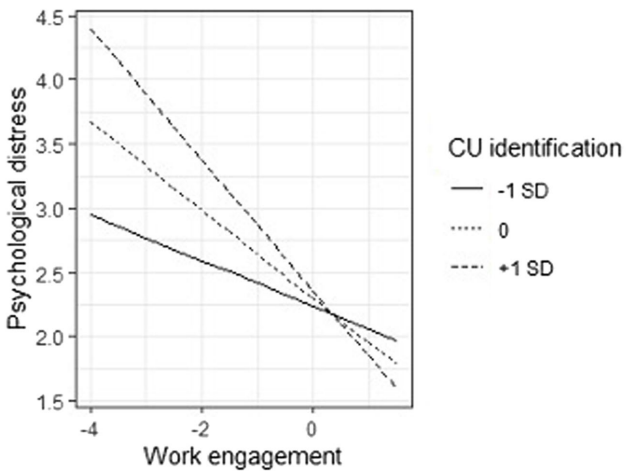

FIGURE 4 | Interactions between CU identification and Work engagement on Psychological distress.

were reduced for professionals who were weekly identified ($b_{\text{burnout}} = -0.036$, $SE = 0.019$, $Z = -1.913$, $p = 0.056$; $b_{\text{psychological distress}} = -0.059$, $SE = 0.027$, $Z = -2.184$, $p = 0.029$).

This model explained 12.8% of work engagement variance, 18.9% of burnout, and 17.6% of psychological distress (**Figures 3, 4**).

DISCUSSION

The pandemic has been a source of great stress both for individuals and groups. Health professionals represent one of the most affected categories. The present study aimed to investigate the consequences of the crisis on their wellbeing (nurses in particular) and to identify the protective resources that might prevent chronic psychophysical disorders.

Healthcare professionals often bear an excessive emotional burden due to the suffering of their patients, and they risk developing physical and psychological effects as a result of their strong emotional involvement. Factors, such as high workloads, difficult conditions, having to face stark choices, and the possibility of becoming ill personally (and seeing colleagues becoming ill) with no possibility of recovery, the great investment of energy, and the lack of personal space, are risk factors that can have a strong negative impact on health. However, the results of the present study show that the nurses did not experience too high levels of discomfort. Accordingly, the mean score of work

engagement was high and, notably, in line with average scores that have been reported in studies carried out in both pandemic (e.g., Allande-Cussó et al., 2021) and pre-pandemic years (e.g., Van Bogaert et al., 2014; Ghazawy et al., 2019).

The present study has examined not only negative psychological outcomes but also the motivational processes and protective resources that have been neglected by the pandemic literature. In line with the JDR model, the results show that perceptions of security represented an important protective resource affecting the possibility of reacting by professionals and triggering a motivational process. In fact, this resource influenced their engagement, which in turn, forestalled the onset of burnout and psychological distress. The results support the hypothesis that work engagement played a mediating role between the perception of safety and stress.

A sense that the organization had invested in building a safe working environment helped staff react proactively to the challenges of the emergency, which diminished the risk of burnout and negative psychological symptoms (Vogus et al., 2020).

Another important protective resource was identification with the care unit. The present study shows how the working climate and team identification improved motivation in a time of crisis. A strong sense of belonging played a moderating role by strengthening the relationship between work engagement and stress symptoms and burnout. A high degree of identification with the work team encouraged collaboration and predicted positive health outcomes (Caricati et al., 2020). Furthermore, group identification and support enabled members to be aware of their emotions, share their perspectives, and be more efficient and focused (Barello and Graffigna, 2020).

Limitations

The present study has several limitations. First, the use of cross-sectional questionnaires and a correlational design means that we must be cautious about inferring causal relationships between the variables. Second, the sample size was limited and consisted mostly of nurses, so the results cannot necessarily be generalized to other contexts.

CONCLUSION

Most research on the pandemic has highlighted the risk factors and negative effects. The protective resources that might prevent symptoms of psychological distress have often been overlooked. The present study demonstrates that health professionals have shown high levels of vigor, dedication, and engagement in their work. Motivational factors have to be understood if psychological distress and burnout are to be prevented. The study has highlighted two resources (organizational and working group-orientated) that could be used in interventions. A safe and secure environment would help individuals manage adverse events by developing resilience and the skills needed to resolve underlying related issues, and an effort by organizations to encourage team identification initiatives would be similarly beneficial.

Practical Implications

The results of the present study could help managers identify emergency planning resources. First, the study has management repercussions in terms of building effective teams at the micro-level. Managers should create a climate in which members feel safe, trustful of each other, and able to share knowledge and experiences. This will help teams work together to cope with the emergency. Second, from a governance perspective, the construction of a safe climate at a macro level will show workers that the organizational culture is supportive and attentive. Expectations of how adverse events should be interpreted and responded to can then be communicated more effectively.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors contributed to the study's conception and design. CP, LC, GG, NM, and AS performed material preparation and data collection. LC, CP, and CB performed analysis. CP, LC, and AB wrote the first draft of the manuscript. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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The Stress Barometer: Validation of a Bio–Psycho–Social Brief Screening Instrument of Pandemic Stress Reaction

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Background: To capture the psychosocial impact of the SARS-CoV-2 pandemic, a model based on the International Classification of Functioning, Disability, and Health (ICF) was developed during the first lockdown in Germany in April 2020. *FACT-19*, the questionnaire for the assessment of pandemic stress load, measures (1) pre-pandemic stress, (2) pandemic stress, and (3) contextual factors (functioning as facilitators or barriers). Derived from this model, the stress barometer as a brief screening instrument captures these factors. The purpose of this study is a preliminary validation of the instrument.

Method: The stress barometer was applied in conjunction with the Symptom-Checklist SCL-90-S at the beginning of the first lockdown in psychosomatic and psychotraumatological care in two federal states in Germany. The sample consists of $n = 341$ (68.6% female) from 18–73 years of age ($M = 49.36$, $SD = 11.4$).

Results: The structure of the short screening was examined in the overall sample using an exploratory factor analysis [Chi^2 (78) = 875.720, $KMO = 0.688$]. The results indicate a four-factor-structure that explains 59.5% of the total cumulative variance. The factors of the stress barometer correlate with the Global Severity Index (GSI, measured by SCL-90-S) with moderate to weak effects: pre-pandemic stress ($r_S = 0.431$, $p < 0.001$, $n = 295$), pandemic stress ($r_S = 0.310$, $p < 0.001$, $n = 298$), distal facilitator ($r_S = -0.155$, $p < 0.001$, $n = 312$), and proximal barriers ($r_S = 0.232$, $p < 0.001$, $n = 312$).

Discussion: The results indicate the suitability of the stress barometer to complement the measurement of the impact of pandemics with an ICF-oriented approach, taking into consideration pre-pandemic stress as well as interactions with facilitators and barriers. Further analysis will be necessary for a revision of the items of the scale.

Keywords: stress barometer, COVID-19, pandemic stress reaction, ICF-orientated, short screening

INTRODUCTION

As SARS-CoV-2 began to spread, the far-reaching psychosocial impacts of the pandemic quickly became apparent. The protective measures taken to contain the pandemic (e.g., quarantine, contact restrictions) are among others accompanied by social isolation, of which negative consequences for mental health have been proven (Röhr et al., 2020). Moreover, an increase in domestic violence has been recorded since the lockdown began (Kofman and Garfin, 2020). For working parents, school and daycare closure in combination with the shift to working from home represents a double burden of balancing work, childcare, and homeschooling, which at the same time is tightening gender differences (Feng and Savani, 2020). Furthermore, widespread closure of restaurants, retail, and the event industry go along with loss of income leading to economic existential fear (Blustein and Guarino, 2020). All in all, the courses of the disease itself, the impact of protective measures, and fear of infection led to a particular risk suspected among people with mental health disorders (Hossain et al., 2020; Javed et al., 2020; Yao et al., 2020).

Not only existing psychometric instruments have been applied to assess pandemic-related stress reaction since the beginning of the pandemic, but also several newly developed subjective scales have emerged, such as the fear of COVID-19 scale (Bitan et al., 2020), the COVID stress scales (CSS; Taylor et al., 2020), the pandemic stress index (Harkness et al., 2020), and the COVID-19 Pandemic Stress Scale (CPSS; Werner et al., 2021). These scales tend to follow a bio-medical perspective on pandemic-related stress reaction, focusing primarily on one dimension, e.g., fear and anxiety or perceived stress. So far, there has been little empirical attention on bio–psycho–social approaches.

We postulate that due to the dynamic evolution of pandemics, an exclusive consideration of psychological symptom burden or the assignment of diagnosis is not sufficient to assess their psychosocial impact. Instead, a more dimensional, bio–psycho–social approach is necessary to consider pre-existing risk factors as well as resources and barriers alongside the pandemic stress itself (Eckhard et al., 2021a).

A Bio–Psycho–Social Perspective on Pandemic Stress Reaction

To introduce a bio–psycho–social approach to determine the impact of pandemics, firstly an adequate classification system is needed at the base of a screening instrument. The International Classification of Functioning, Disability, and Health (ICF) was officially endorsed by the World Health Organization (WHO) in 2001 as the international standard for the description and measurement of functioning and disability (World Health Organization, 2002). Since then, the ICF is complementing the bio-medical system of the International Classification of Diseases (ICD).

The base of the ICF is the universally applicable bio–psycho–social model, in which the effects of a health condition (coded according to the ICD) on a person's activity and participation are displayed on interaction with their facilitating or inhibiting contextual factors. Functional health and disability are therefore defined as outcomes of the interactions between health conditions and contextual factors (DIMDI, 2005).

To approach the assessment of pandemic stress reaction from a bio–psycho–social perspective, a model called FACT-19 was developed in orientation to the ICF during the first national lockdown in Germany (Bering et al., 2020a). FACT-19 suggests a triangular model for the measurement of pandemic-related stress reactions (Bering et al., 2020c). It consists of the following three components:

1) Risk factors

Part one of the model is designed to capture pre-pandemic stress burden. Pre-existing risk factors such as traumatic experiences, general medical risk factors, or other stressful life experiences are thought to have a greater influence on the probability of developing long-term health effects after stressful experiences instead of acute psychological symptom burden, and are therefore examined (Bering et al., 2011).

2) Sources of pandemic stress load

The second part of the model aims to identify the individual pandemic-related stress burden. Considering the number of known psychosocial consequences of pandemics, four sources of pandemic stress load are proposed:

a. Lethal threat

Source A, lethal threat summarizes the confrontation of those affected and their relatives with a potentially lethal threat due to an infection with SARS-CoV-2, especially, and not only the elderly and people with previous illnesses are particularly at risk.

b. Economic existential threat

The term economic existential threat (Source B) describes the economic consequences of the pandemic. A widespread shutdown of restaurants, the event industry, and retail go alongside job loss, indebtedness, or insolvency of self-employment, leading to a perceived existential threat.

c. Isolation

In Source C, experiences in connection with isolation due to quarantine and contact restrictions are summarized. For many, the beginning of the pandemic meant balancing working from home with childcare and the assumption of homeschooling due to the closure of schools and daycare. These factors furthermore are accompanied by an increase in conflicts and domestic violence.

d. Fear dynamic

Fear dynamic (Source D) represents concerns and worries related to the pandemic: fear of infection with the virus and its health consequences, as well as worries related to possible social and economic consequences for those affected, their relatives included.

3) Facilitators and barriers

The third factor of the FACT-19 model represents the interaction with contextual factors, which in accordance with the ICF, can be perceived as moderating or reinforcing the experienced stress burden (e.g., social support and stable job and housing situation vs. lack of social network or debt). In terms of the pandemic, additional contextual factors can be identified: psychoeducation, health behavior education as resources or facilitators vs. visitation bans in hospitals, limited living space, COVID-19 reporting in social media as barriers (Eckhard et al., 2021a).

The Stress Barometer

Based on this theoretical model, the FACT-19 questionnaire for the assessment of pandemic stress load and the brief screening instrument stress barometer were developed at the beginning of the first national lockdown in Germany. The brief screening instrument, the stress barometer (Bering et al., 2020b), for the immediate and rapid measurement of subjective pandemic stress was implemented in psychotraumatological and psychosomatic care in two clinics in Germany and will be subject to the present study.

Given the psychosocial impact factors of the pandemic, the need for an effective screening instrument with practical applicability became apparent at the beginning of the pandemic. The intention to develop the stress barometer was to create a short, easy-to-perform, subjective questionnaire that can be applied and evaluated in a short amount of time. Furthermore, the aim was to capture not only the acute stress caused by the pandemic and its consequences but to consider the pre-pandemic stress (risk factors that can influence the perceived pandemic impact as well as contextual factors), following hereby a bio–psycho–social approach. The identification of the individual, dominant sources of pandemic stress load serves to efficiently provide the necessary support to those affected.

The present study aims at a preliminary evaluation of the short screening instrument, as well as an investigation of its suitability to measure pandemic stress experiences.

METHODS

Sample Description

Data were collected from two samples of psychotraumatological and psychosomatic care in Germany. The brief screening instrument was applied to Sample 1 continuously since the first national lockdown in April 2020. In Sample 2, data were collected in the period from July to November 2020. Considering the course of the pandemic, the data collection in Sample 2 started during a period of the pandemic when restrictions were being eased and ended with the beginning of the second national lockdown. Sample 1 consists of patients and rehabilitants of a clinic specializing in psychotraumatological and psychosomatic curative and rehabilitative care in Northrine-Westfalia. Sample 2 was generated in a psychosomatic rehabilitative clinic in Baden-Württemberg.

Participation was solicited based on the following eligibility criteria: a minimum age of 18, written consent to participate in the study, as well as permission to use the data for research purposes. A total of $n = 377$ participants conducted the survey of which $n = 36$ did not complete all questions and therefore were excluded in the present analysis due to incomplete data. Another exclusion criterion was the missing consent to the use of the data for research purposes.

The final overall sample comprised $n = 341$ participants (68.6% female), aged 18–73 years ($M = 49.36$, $SD = 11.4$). Among these, 17.6% were single, 57.77% married, 12.32% were divorced or separated, and 3.23% widowed. Of the participants, 12.32% had not received any vocational training, 63.05% had completed an apprenticeship, and 15.25% had obtained a university degree. At the time of the interview, 61.58%

TABLE 1 | Sociodemographic variables separated by samples.

	Sample 1		Sample 2	
	***N* (%)**	***M* (*SD*)**	***N* (%)**	***M* (*SD*)**
Age	130 (38.12 %)	43.7 (13.24)	211 (61.88%)	52.76 (8.49)
Sex				
Female	94 (72.3%)		139 (65.9%)	
Male	36 (27.7%)		72 (34.1%)	
Relationship status				
Single	31 (23.8%)		29 (13.8%)	
Married	64 (49.2%)		133 (63.3%)	
Divorced/separated	14 (10.8%)		28 (13.3%)	
Widowed	5 (3.8%)		6 (2.9%)	
School education[a]				
None	3 (2.3%)		2 (1.0%)	
Hauptschulabschluss	35 (26.9%)		49 (23.3%)	
Mittlere Reife	38 (29.2%)		75 (35.7%)	
(Fach)-Abitur	27 (20.8%)		43 (20.5%)	
(Fach-)Hochschulstudium	4 (3.1%)		30 (14.3%)	
Sonderschulabschluss	4 (3.1%)		0 (0.0%)	
Vocational training				
None	29 (22.3%)		13 (6.2%)	
Completed apprenticeship	72 (55.4%)		143 (68.1%)	
University degree	10 (7.7%)		42 (20.0%)	
Occupation				
Employed (trained activity)	22 (16.9%)		39 (18.6%)	
Employed (Specialist)	28 (21.5%)		87 (41.4%)	
Academic/senior service	4 (3.1%)		27 (12.9%)	
Self-employed	2 (1.5%)		4 (1.9%)	
Homemaker	4 (3.1%)		2 (1.0%)	
Pension	3 (2.3%)		4 (1.9%)	
Disability Pension	15 (11.5%)		11 (5.2%)	
Unemployed	25 (19.2%)		20 (9.5%)	
Student	8 (6.2%)		0 (0.0%)	

[a] *The schooling system in Germany is divided into primary and secondary education. The primary education consists of the Grundschule (elementary or primary school). The secondary education can be further divided into lower and upper secondary level, including different types of school: The Hauptschulabschluss is the final examination obtained after grade 9 at a Hauptschule. The Realschule on the other hand has a broader range for intermediate pupils. After grade 10 the Mittlere Reife can be obtained as a final examination. The Abitur is the final examination obtained at a Gymnasium after grade 12 or 13, which prepares pupils for higher education. The Sonderschulabschluss is the final examination obtained at a school for children with special educational needs.*

were employed (among these, 34.66% were trained employees and 65.34% were specialists) and 13.20% were unemployed, 1.76% were self-employed, 1.76% homemakers, 2.05% retired, and 7.62% retired due to reduced earning capacity. Of the participants, 2.3% were students at the time of the interview. The sociodemographic characteristics are displayed in **Table 1** separately for both samples.

Materials

The following instruments were applied in the present study.

Stress Barometer

The stress barometer is a newly developed brief screening instrument for the measurement of subjective pandemic stress experience. Identifying pre-existing risk factors, the dominant source of pandemic stress and the interaction with contextual factors, the brief screening Stress barometer aims to derive a profile of individual pandemic stress levels, based on which necessary therapeutic interventions and participation-oriented, rehabilitative services can be derived to provide practical support for those affected. Consisting of only ten-staged items, the stress barometer captures pre-pandemic stress (items 1–3, e.g., "How high do you estimate your burden due to physical illnesses before the COVID-19 pandemic?"), sources of pandemic stress (items 4–7, e.g., "How strongly do you feel threatened by economic impacts of the COVID-19 pandemic?"), facilitators and barriers (items 8–10, e.g., "Overall, how supported do you feel by your family?"). The answer scale of the stress barometer is ten-staged. Items 1–3 are rated on a scale from 0 ("not at all burdened") to 10 ("extremely burdened"). The answer scales from items 4–7 range from 0 ("not at all") to 10 ("extremely"). Items 8–10 are rated on a scale from 0 ("not at all supported") to 10 ("extremely supported"). The item contents are displayed in **Table 2**.

Symptom-Checklist SCL-90-S

The Symptom-checklist SCL-90-S is a 90-item questionnaire that was applied to assess the subjective physical and psychological symptom burden of the participants over the course of the last 7 days (Franke, 2014). The questionnaire consists of nine subscales (e.g., anxiousness, depressiveness, somatization, and compulsivity) as well as three global scales providing information about the response behavior for all items: the global severity index (GSI) measures basic psychological distress, the positive symptom total (PST) provides information about the number of symptoms for which distress is present, and the positive symptom distress index (PSDI) measures the intensity of the responses. The items are rated on a scale from 0 ("not at all") to 4 ("very strongly").

The GSI is considered a particularly good indicator of psychological distress because it summarizes the intensity of perceived distress across all 90 items (Franke, 2014). Therefore, it was selected as a global scale for further data analysis.

Procedure

Even though the FACT-19 questionnaire and the brief screening instrument stress barometer are based on the same theoretical model, the stress barometer does not consist of shortened items from the FACT-19 questionnaire. Instead, it was developed

TABLE 2 | Factor loading for the items of the stress barometer in the exploratory factor analysis.

Items	I	II	III	IV	communality
Factors relating to immediate time before COVID-19					
V1: physical illnesses	0.17	−0.154	**0.683**	−0.029	0.52
V2: traumatic experiences	0.123	−0.139	**0.64**	0.088	0.452
V3: stress due to others, not yet mentioned factors	0.083	−0.088	**0.722**	−0.071	0.54
Factors relating to the impact of COVID-19					
V4: fear of being threatened health wise, economically or socially	**0.849**	−0.075	0.116	0.024	0.74
V5: perceived threat due to contact/travel restriction, isolation or quarantine	**0.726**	−0.033	0.094	0.076	0.543
V6: perceived threat through economic consequences	**0.843**	−0.026	0	−0.01	0.712
V7: perceived lethal threat	**0.642**	0.05	0.239	−0.068	0.476
Contextual factors					
V8a: facilitator: support from family	−0.13	**0.831**	0.086	−0.086	0.722
V8b: barrier: missing support from family	0.014	**−0.769**	−0.013	0.082	0.598
V9a: facilitator: support from friends and acquaintances	−0.008	**0.737**	−0.095	0.002	0.552
V9b: barrier: missing support from friends and acquaintances	−0.139	**−0.495**	0.333	0.263	0.444
V10a: facilitator: protection due to precautions of the government	−0.195	0.25	0.047	**−0.748**	0.662
V10b: barrier: missing protection due to precautions of government	−0.127	0.003	0.03	**0.87**	0.773
Eigenvalues:	2.868	2.294	1.373	1.201	7.736
Explained variance (%):	22.06	17.64	10.56	9.24	

basis: n = 308, explained overall variance: 59.5%.

Extraction method: principal component analysis, values after Varimax rotation.

I = pre-pandemic risk factors, II = pandemic stress burden, III = proximal facilitators/barriers, IV = distal facilitators/barriers.

To highlight the assignment of an item to the corresponding factor, the value indicating the factor loading is marked in bold writing.

alongside as a short screening with the purpose of conducting a rapid, subjective overall assessment of the pandemic stress burden. According to the underlying triangular model, the items have been developed to measure a selection of pre-existing risk factors, the four sources of pandemic stress load, and three contextual factors.

The stress barometer and the symptom-checklist SCL-90-S were conducted in a paper–pencil format in both samples. The handling of participants who scored high is based on the individual pandemic stress load. The sources of pandemic stress and participation serve as a starting point for the initiation of necessary therapeutic interventions and participation-oriented, rehabilitative services. For a patient scoring high in Source B, economic existential threat, the instruments of social work and rehabilitation take effect (e.g., direct advice and mediation of state assistance or occupational rehabilitation measures as interventions for patients whose earning capacity is at risk in the long term). Given a dominance in Source C on the other hand, interventions might focus on psychosocial conflict resolution.

Practical support for the identified profile of individual pandemic stress burden was provided in Sample 1 in individual sessions and in Sample 2 in group therapy sessions.

Data Analysis

Exploratory Factor Analysis

To evaluate the structure of the brief screening instrument, an exploratory factor analysis is calculated. The suitability of the selected variables is tested by the inverse correlation matrix, the Kaiser–Mayer–Olkin Measure of sampling adequacy (KMO), and the Bartlett-test. The principal component analysis is chosen as the extraction method. To assess the factor loadings and the assignment of variables to the extracted factors, the rotated component matrix is considered. The resulting factors are then subsequently tested for their internal consistency as a measure of reliability.

Spearman's Rho Correlation

To investigate the suitability of the instrument for measuring the stress experience, Spearman's rho is used to evaluate correlations between the components of the stress barometer and the global severity index (GSI). Given the lack of normal distribution of the items (Shapiro–Wilk: $p < 0.05$), the Spearman rho correlation is applied to calculate the linear relationship between the variables as a non-parametric equivalent to the Bravais-Pearson correlation.

Regression Analysis

Furthermore, a multiple regression analysis is conducted to check the sample for any influence of sociodemographic parameters (age, gender, relationship status, education) and general symptom burden (GSI), as well as pre-existing risk factors on the pandemic stress load. Firstly, the F-test is performed to test whether the regression model is significant and therefore makes an explanatory contribution. Then, the regression coefficients (betas) are checked for significance via t-tests, performed for each regression coefficient. The corrected R^2 is used to evaluate how well the estimated model fits the collected data.

Descriptive Sample Comparison

Finally, a descriptive comparison of the two samples is carried out. To assess the instrument in different samples and furthermore compare the impact of the pandemic in them, mean differences are compared. Considering that the studied characteristics are not normally distributed in the population of both groups (Shapiro-Wilk: $p < 0.05$), the Wilcoxon-rank sum test is carried out as a non-parametric equivalent to the t-Test to check for mean differences in the samples. To assess the significance of the differences in the samples, the effect size (r) is calculated.

RESULTS

Explorative Factor Analysis: The Structure of the Stress Barometer

The structure of the stress barometer is evaluated by means of an exploratory factor analysis. Considering the preliminary theoretical assumptions, a three-factor structure of the brief screening instrument is expected. The Bartlett-test [$Chi^2(78) = 875.720$, $p < 0.001$] and the Kaiser–Meyer–Olkin value ($KMO = 0.688$) indicate the suitability of the items for the method. Commonly, the KMO value is required to be at least 0.60 to proceed with the analysis. According to Kaiser, a value of 0.50 is suggested as the lowest acceptable limit, even though a value above 0.80 is desirable (Kaiser, 1974).

The principal component analysis with varimax rotation suggests the presence of four factors with eigenvalues >1.0. The items of the stress barometer and the corresponding factor loads are displayed in **Table 2**. On this ground, a four-factor solution is chosen, which explains 59.5% of the cumulative total variance. Accordingly, the measurement accuracy of these is tested via internal consistency as a measurement of reliability: pre-pandemic stress (items 1–3; Cronbach's $\alpha = 0.520$) and sources of pandemic stress (items 4-7, $\alpha = 0.783$). For the remaining items, the factor analysis suggests a distinction between proximal (items 8–9) and distal contextual factors (item 10), which due to the bipolarity of the items will be further subdivided into facilitators and barriers. Due to the subdivision of each into two separate items, the item count in **Table 2** differs from the original number of items of the screening instrument.

Given that the factors consist of only two items, the measurement accuracy is tested via the Spearman–Brown coefficient. The following values are obtained: proximal facilitators (0.692) and proximal barriers (0.549). Preliminary theoretical assumptions suggest that items 8–10 each correspond to the general component contextual factors. To mark the subdivision indicated by the findings of the factor analysis, in the following they will be called proximal and distal facilitators and barriers.

Spearman Rho Correlation

To evaluate the suitability of the short screening, its components (pre-pandemic stress, pandemic stress load, and proximal and distal facilitators and barriers) are tested for correlations with the global severity index (GSI) of the symptom checklist SCL-90-S. Due to the bipolarity of the items, facilitators and barriers, that

TABLE 3 | Spearman rho correlation analysis for components of the stress barometer and the general-severity-index (GSI).

Items	*N*	*M* (*SD*)	1	2	3	4	5	6	7
1. pre-pandemic stress	308	5.81 (2.12)							
2. pandemic stress	311	4.82 (2.51)	0.299**						
3. internal facilitators	312	2.16 (1.69)	−0.086	−0.082					
4. internal barriers	312	0.732 (1.24)	0.120*	0.047	0.623**				
5. external facilitator	312	1.56 (1.56)	−0.043	−0.118*	0.279**	−0.298**			
6. external barrier	312	0.485 (1.28)	0.034	−0.059	−0.098	0.251**	−0.465**		
7. General Severity Index	325	1.33 (0.801)	0.425**	0.311**	−0.155**	0.232**	−0.217**	0.140*	

***The correlation is significant at the 0.01 level (two-tailed).*
**The correlation is significant at the 0.05 level (two-tailed).*

correspond to factors III and IV of the stress barometer, the items are included separately in the correlation analysis.

According to Cohen (1992), significant, moderate effects are confirmed between the GSI and pre-pandemic stress ($rs = 0.431$, $p < 0.001$, $n = 295$), as well as pandemic stress ($rs = 0.310$, $p < 0.001$ $n = 298$). Internal and external facilitators and barriers show significant but weak correlations with the symptom burden. For the components of the brief screening itself weak effects are confirmed between pre-pandemic and pandemic stress ($rs = 0.299$, $p < 0.001$ $n = 311$), pre-pandemic stress and internal barriers ($rs = 0.120$, $p < 0.05$ $n = 308$), as well as for pandemic stress and external facilitator ($rs = -0.118$, $p < 0.05$ $n = 311$). Furthermore, the results indicate strong to moderate effects for contextual factors: internal facilitators and barriers ($rs = -0.623$, $p < 0.001$ $n = 312$), external facilitator and barrier ($rs = -0.465$, $p < 0.001$ $n = 312$). Due to the bipolarity of the items corresponding to the contextual factors, a negative correlation coefficient is reasonable in terms of content. The results of the Spearman rho correlation are displayed in **Table 3**.

Regression Analysis

To evaluate if the variables make an explanatory contribution to the pandemic stress burden, the *F*-test is performed to test whether the regression model is significant. An influence of general symptom burden, pre-existing risk factors, and age on the pandemic stress burden is confirmed [$F_{(6, 266)} = 9.141$, $p > 0.01$, $n = 272$]. The analysis shows that the *t*-tests for the regression coefficient of age ($t = 2.180$, $p < 0.05$), general symptom burden ($t = 4.539$, $p < 0.01$), and risk factors ($t = 2.596$, $p < 0.05$) are significant and therefore have a significant effect on pandemic stress load. The variables sex, school education, and vocational education are not significant and therefore are not further analyzed.

When the general symptom burden increases by one-unit, the pandemic stress burden increases by 0.912 units, holding all other independent variables constant. When risk factors increase by one, pandemic stress increases by 0.193 units. When age increases by one unit (year), pandemic stress increases by 0.29 units, holding all other independent variables constant. The corrected R^2 is = 0.152, meaning that 15.2% of the total variance in pandemic stress burden is explained by general symptom burden, risk factors, and age, which according to Cohen (1992) corresponds to a medium effect.

Descriptive Sample Comparison

The results of the descriptive sample comparison are displayed in **Table 4**. Sample 1 shows a higher amount of pre-pandemic traumatic experiences (Mdn = 8) than sample 2 (Mdn = 6): $Z = -4.74$ and $p < 0.001$. The effect size according to Cohen (1992) is $r = 0.34$ and corresponds to a moderate effect. Small effects become apparent in the overall pre-pandemic stress (Sample 1: Mdn = 6.34, Sample 2: Mdn = 5.67; $Z = -2.24$, $p < 0.05$, $r = 0.13$), as well as in terms of pandemic stress due to isolation experiences (Sample 1: Mdn = 6, Sample 2: Mdn = 5; $Z = -2.08$, $p < 0.05$, $r = 0.12$).

Furthermore, differences in the samples are observed for contextual factors. Sample 1 (Mdn = 0.5) shows a higher number of internal barriers than Sample 2 (Mdn < 0.01), indicating moderate effects with $Z = -5.53$, $p < 0.001$ and $r = 0.31$). In contrast, external facilitators are higher in Sample 2 (Mdn = 2) than in Sample 1 (Mdn = 0.00), showing small effects ($Z = -3.43$, $p < 0.01$, $r = 0.19$).

DISCUSSION

The purpose of this study was to provide an initial review of the application-oriented brief screening for pandemic stress exposure. The findings suggest that the underlying construct of the stress barometer postulating the components pre-pandemic stress, pandemic stress, and contextual factors can be partly confirmed. Instead of assigning item 10 to contextual factors as presumed, the results of the explorative factor analysis indicate a further subdivision of this component into proximal (social and family support) and distal contextual factors (e.g., precautions of the government). The hereby emerging four-factor solution explains 59.5% of the overall variance. Considering preliminary theoretical assumptions as in the bio–psycho–social model, we postulate that proximal and distal facilitators and barriers correspond to the more general term of contextual factors.

The Spearman rho correlation between the components of the brief screening instrument and the *global severity index* serves as a preliminary evaluation of the suitability of the stress barometer to measure subjective stress burden. From the factors of the instrument, the highest correlation is observed between pre-pandemic stress and the GSI. The factor pre-pandemic stress evaluates the existing stress burden in the immediate time before the outbreak of the pandemic, which functions as a risk

TABLE 4 | Descriptive sample comparison for the components of the stress barometer.

Items	*N*	*Mdn*	*Z*	*p*	*r*
Overall pre-pandemic stress			**−2.24**	**<0.05**	**0.13**
Sample 1	109	6.34			
Sample 2	199	5.67			
physical illnesses			−1.35	>0.05	
Sample 1	109	6			
Sample 2	199	7			
Traumatic experiences			**−4.74**	**<0.001**	**0.34**
Sample 1	109	8			
Sample 2	200	6			
Stress due to others, not yet mentioned factors			−0.06	>0.05	
Sample 1	106	6			
Sample 2	193	6			
Overall pandemic stress			−0.331	>0.05	
Sample 1	109	5			
Sample 2	202	5			
fear of being threatened health wise, economically, or socially			−0.72	>0.05	
Sample 1	109	5			
Sample 2	202	6			
Perceived threat due to contact/travel restriction, isolation or quarantine			**−2.08**	**<0.05**	**0.012**
Sample 1	110	6			
Sample 2	202	5			
perceived threat through economic consequences			−0.93	>0.05	
Sample 1	110	5			
Sample 2	202	5			
Perceived lethal threat			−0.82	>0.05	
Sample 1	109	5			
Sample 2	202	5			
Contextual factors					
Proximal facilitators			−0.945	>0.05	
Sample 1	110	2			
Sample 2	202	2			
Proximal barriers			**−5.53**	**<0.001**	**0.31**
Sample 1	110	0.5			
Sample 2	202	<0.01			
Distal facilitator			**−3.43**	**<0.01**	**0.19**
Sample 1	110	<0.01			
Sample 2	202	2			
Distal barrier			**−3.76**	**<0.001**	**0.21**
Sample 1	110	2			
Sample 2	202	<0.01			

Bold values indicate significant results.

factor. The higher the risk factors, the higher seems to be the general symptom burden. Preliminary theoretical assumptions postulate the interaction of contextual factors with stress burden. Functioning as facilitators or barriers, contextual factors are thought to have a moderating or aggravating influence on the impact of the individual. Considering the findings of this analysis, the strongest correlation becomes apparent between facilitators and barriers. The deriving question is, why do contextual factors influence relatively little the symptom burden? Earlier investigations have shown that functional levels serve as a more adequate parameter to indicate long-term effects than the actual symptom burden (Bering et al., 2011). Further analysis will be necessary to examine functional levels, e.g., the global assessment of functioning (GAF) (Aas, 2011).

The multiple regression analysis confirmed that 15.2% of the total variance in pandemic stress burden is explained by general symptom burden, risk factors, and age.

To investigate the consistency of the short screening, a sample comparison is conducted. The analysis shows small to no differences in the factors of the stress barometer between

the samples, indicating similar findings of the short screening in both samples.

LIMITATIONS

The following limitations of the present study must be considered in the interpretation of the results. First, the sample sizes are relatively small with unequal group sizes. Second, the KMO measure indicates that the data are only moderately suitable for the application of the factor analysis. Similarly, the values of internal consistency for the factors of pre-pandemic stress and proximal barriers are low. Therefore, further analysis for a revision of the items of the scale will be necessary.

The descriptive sample comparison indicates similar findings of pandemic stress burden in both samples. The differences noted between the samples can be partly attributed to clinical differences, e.g., the greater number of pre-existing traumatic experiences can be explained due to the psychotraumatologic specialization of the clinic from Sample 1. However, the overall comparability of the samples is limited due to various reasons. On the one hand, the samples differ due to the specialization of the clinics. Sample 1 consists of patients in curative care and rehabilitants in the rehabilitative care, while Clinic 2 focusses on rehabilitative care. More importantly and regarding the dynamic development of the pandemic, data were collected at different times during its course. The survey in Sample 1 was conducted at the beginning of the first lockdown. Sample 2, however, was surveyed at a time between two waves of the pandemic, where at the beginning of the survey the restrictions were eased. The survey ended with the beginning of the second national lockdown. An influence in the form of experiences with the pandemic and knowledge gained about protective measures or the expected course of the pandemic on the pandemic stress burden collected cannot be excluded.

Furthermore, the participants reported pre-pandemic risk factors retrospectively.

CONCLUSION

Further studies will be necessary to approach the limitations in the present study as well as a revision of the items, especially in terms of the components pre-pandemic stress and contextual factors. Yet, the advantage of the short screening is apparent: The stress barometer provides a solution to the previously existing problem of the lack of a specific instrument to assess the psychosocial impact of the COVID-19 pandemic. Contrary to other investigations, instead of applying or revising an existing psychometric instrument, a new instrument was developed. In comparison to other newly developed subjective scales focusing on a bio-medical approach, the stress barometers specifically capture the individual pandemic impact based on the bio–psycho–social model of the ICF. Hereby, the brief screening instrument meets the German obligatory requirement set by the Federal Participation Act and the Ninth Social Code to determine the need for participation based on the ICF (Art. 1, 26 BTHG in accordance with §118 SGB IX).

Instead of offering a large test battery, the brief screening stress barometer can be applied and evaluated by different occupational groups in the health care system within a few minutes and without greater effort. Taking into consideration pre-pandemic stress as well as interactions with facilitators and barriers, the short screening gives first indications of a possible risk profile. Its advantage, therefore, lies in the immediate consideration of the therapeutic curse. Necessary therapeutic interventions (e.g., psychosocial support, conflict counseling, and mediation of government aid) can be derived based on the dominant source of pandemic stress and can be initiated in a timely manner to prevent deterioration (Eckhard et al., 2021b).

So far, the brief screening instrument has been mainly applied to people with pre-existing mental health conditions. Nonetheless, the scale can be suitable for the early detection of people in the general population who may be at risk. A pilot study was conducted in the social environment of students at a German university. At the present, results are not available yet, and further analysis of participants from the general population will be necessary.

All in all, the results indicate the suitability of a bio–psycho–social approach on the measurement of pandemic stress burden. The advantage of this more-dimensional perspective lies in the assessment of pre-existing risk factors, as well as resources and inhibiting factors alongside the pandemic impact itself. By identifying the dominant sources of pandemic stress, immediate therapeutic intervention can be deduced and applied. With further analysis, the stress barometer as a brief screening instrument with an ICF-oriented approach can complement the measurement of the impact of the SARS-CoV-2 pandemic.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because of ethical reasons (patient confidentiality/participant privacy). Requests to access the datasets should be directed to AE, aeckhar2@uni-koeln.de.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RB developed the theoretical model and the questionnaire. AE contributed to the further development of the screening instrument, organized the database of Sample 1, and organized the database of the overall sample and performed the statistical analysis. RB and AE contributed to the conception and design of the study and coordinated the data collection in Sample 1. BM, MS, and MP contributed to the design of the study in Sample 2, coordinated the data collection, and organized the database of Sample 2. All authors contributed to manuscript revision, read, and approved the submitted version.

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COVID-19 and Quitting Jobs

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Despite substantial studies on COVID-19 and the problems employees face, the association between COVID-19 and resigning jobs has not caught the interest of researchers. Millions have already resigned from their employment, and more are expected to resign. This study aims to investigate the relationship between the demographics of employees, the course of COVID-19, perceived effect of COVID-19 on life (PEoC), fear, entrapment feeling, depression, and quitting the job during the COVID-19 pandemic. A cross-sectional study was designed, and a convenient sampling method was adopted. Data were collected *via* an online questionnaire and analyzed by using SPSS version 26. Correlation and regression analyses were performed to reveal the relationship. Coefficients and significance values were used to interpret the results. Independent samples t-test and one-way ANOVA are used to determine the difference across the groups. The correlation between depression and work location is statistically significant. The PEoC increases fear, internal and external entrapment, and depression. Despite the statistically significant correlations between quitting jobs and the education level, internal and external entrapment, PEoC, fear, and depression for employees who have COVID-19 history, quitting the job was found to be affected only by COVID-19 history, internal entrapment feeling, and education level. This study has shown that quitting the job is associated with PEoC, depression, and internal and external entrapments. The correlation between quitting jobs and other conditions differs depending on the COVID-19 history of the employee. Furthermore, quitting the job is being affected by the coronavirus history, the internal entrapment, and education level.

Keywords: COVID-19, quitting job, great resignation, depression, feeling of entrapment

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BACKGROUND OF THE STUDY

A close friend of one of the authors of this article called in and asked his advice about quitting his job. Following a conversation about how he feels, the author started to question his friend's feelings toward some aspects of work and private life. Afterward, the author interviewed over 20 people with COVID-19 history. It turns out that some of them had already quit their jobs, and some were in the process of seriously thinking about quitting. Only a few of the interviewees had never thought about quitting their jobs. Above all, the majority of the interviewees described their feelings with the words, "I feel like I'm being suffocated." Observations led the authors to think that all interviewees showed feelings of

entrapment and depression symptoms. Hence, the authors designed this study to investigate a possible correlation between COVID-19, feeling of entrapment, depression, and the quitting or intention to quit the job.

INTRODUCTION

The COVID-19 pandemic emerged in Wuhan, China, in December 2019. Since its onset, it has caused a worldwide public health crisis and many lives (WHO, 2022) and made countless people go through traumatic experiences. The pandemic made almost everyone fear and suffer from trauma (Üngüren et al., 2022). Extended lockdowns, their negative impact on businesses, often ending up in bankruptcies (Boratyńska, 2021), shortage of food, and, most significantly, inability to access most basic healthcare services, fear of dying, or causing the death of a loved one, has increased the impact of this trauma.

People felt trapped in an unprecedented situation. No matter what precautions were taken, the spread of the coronavirus has left people with feelings of helplessness (Zhang and Ma, 2020) and being defeated (Chaturvedi et al., 2021). Moreover, the long lockdowns provided people with more time to spend on their electronic devices, enabling them to read more about the coronavirus, which increased worry and fear, leading to a downward spiral (Elhai et al., 2020), leaving no room for hope. As a result of the lockdowns and other measures implemented to halt the spread of the coronavirus, people have been restricted from engaging in physical and social activities, which might be regarded as key risk factors for both physical and physiological health (Soheili et al., 2020). To sum up, it has been an unpleasant and stressful scenario everyone tried to avoid but simply felt entrapped (Flett and Hewitt, 2020; Da-Silva-Lopes et al., 2021), which also provides an exact definition of the feeling of entrapment.

The feeling of entrapment is one of the psychological structures that play a major role in the occurrence of depression. Studies on the subject show that there are strong links between the feeling psychologically entrapped and depression (Taylor et al., 2011). The feeling of entrapment, which is a mood disorder, is a sense of being locked up while having a strong desire to escape from an unfavorable situation or a predicament. Being under stress and restricting behaviors are the factors triggering the feeling of entrapment. Meanwhile, the feeling of entrapment may also stem from subjective negative perceptions causing one to experience the sense of having no control over his conditions incessantly and inevitably (Taylor et al., 2011). Numerous variables can contribute to the sensation of entrapment, which plays a significant role in depression (Flett and Hewitt, 2020; Da-Silva-Lopes et al., 2021). There is a growing body of work studying people's experiences of being defeated or stuck in various psychiatric conditions. Depression, anxiety issues, post-traumatic stress disorder (PTSD), and suicidality are the most commonly investigated disorders (Siddaway et al., 2015).

Many researchers have investigated the link between the entrapment feeling during COVID-19 and several other psychological concepts. For instance, in their research, Lee and Park (2021) found the following attributes of the entrapment feelings during the COVID-19: (1) being out of control, (2) having no escape, (3) being trapped, (4) being robbed, and (5) hopelessness. The reasons for these feelings were identified as: (1) the COVID-19 pandemic itself, (2) lockdowns put in place by states, (3) restrictions, (4) uncertainty about the future, (5) economic hardships, and (6) a poor ability to deal with the situation. Meanwhile, the outcomes of the entrapment were found as follows: (1) increased number of suicides, (2) deteriorating mental health, and (3) poorer well-being.

Despite the extensive studies and the problems that employees face, the relationship between the COVID-19 and quitting jobs has not attracted researchers. Millions of people have already resigned from their jobs because of the consequences of the pandemic. Over 24 million Americans resigned between April and September 2021 (Bloomberg Businessweek, 2021), and about 4.5 million in November 2021 (Davidson, 2021), and expected many more to resign (Bloomberg Businessweek, 2021; Davidson, 2021). A 21% of doctors consider leaving National Health Service (Sheather and Slattery, 2021) in the United Kingdom. The severity of the problem may be better understood if we consider the rest of the world. This situation is called Great Resignation (Bloomberg Businessweek, 2021; Davidson, 2021; Sheather and Slattery, 2021).

THE PURPOSE OF THE STUDY

Although many organizations around the globe suffer from the great resignation (Bloomberg Businessweek, 2021; BMA, 2021; Chugh, 2021; Davidson, 2021; Sheather and Slattery, 2021; Sull et al., 2022), there are scarce studies on the issue. The causes of the great resignation and the relationships with other individual and organizational conditions are yet to be investigated. As mentioned in the literature, resignations may be due to burnout syndrome (BMA, 2021; Chugh, 2021; Sheather and Slattery, 2021) or toxic organizational culture (Sull et al., 2022). However, long lockdowns, restrictions, and uncertainty, which cause feelings of being trapped and hopelessness associated with mental health problems (Lee and Park, 2021), may also be associated with resignations.

Therefore, our research questions are as "*does the COVID-19 pandemic have an association with fear, PEoC, depression, entrapment, and ultimately quitting jobs? If it does, then is there any relation with the demographics of the employees?*"

Hence, this study aims to fill the gap mentioned above by investigating the relationship between the demographics of employees, courses of COVID-19, PEoC, fear, entrapment feeling, depression, and quitting the job during the COVID-19 pandemic.

MATERIALS AND METHODS

In this study, 24 people with a history of COVID-19 were interviewed. The interviews were carried out to understand

the feelings of people with COVID-19 history toward their jobs. Some of those who were interviewed had already quit their jobs, and some were in the process of seriously thinking about quitting. Only a few of them had never thought of quitting, and the majority of them described their feelings as: "I feel like I'm being suffocated," and more than half of them reported that their job has "no meaning" for them anymore. The interviewees showed the feeling of entrapment and depression symptoms. Hence, the researchers designed this study according to the findings of those interviews to find the relationship between entrapment feeling, depression, quitting the job, and other contextual conditions, such as the course and the effect of the disease, fear experienced, and the work location.

Data Collection

This cross-sectional online survey was conducted between September and October 2021 in Istanbul, the Republic of Turkey. The survey was designed to obtain the level of fear employees have about the consequences of coronavirus, perceived effect of coronavirus on their life (PEoC), work location, entrapment, and depression levels of the employees with and without coronavirus history.

We reached the participants through social media like LinkedIn and WhatsApp groups and provided the questionary links to those who expressed interest in taking the survey (a total of two links: one for those with coronavirus history and one for those with no history). A total of 321 people requested the links, but only 243 of them filled out the survey (75.7% response rate). The criteria for inclusion are to be an employee or used to be an employee and 18 years old or older.

The data collection process took less than 10 min for each participant.

Measures

The questionary consisted of four parts. The questions in the first part of the questionary were about the demographics of the participants, such as age, gender, and workplace during the pandemic (e.g., working from home, both from home & workplace, and only from the workplace). In the second part, we asked the participants if they had lost any relatives or close friends due to coronavirus. We also asked if they had quit or are thinking to quit their jobs and what they fear most if they get infected with the coronavirus. In the third part, we used two different scales: (1) the 21-item Beck Depression Inventory-II (Beck et al., 1996), (2) the entrapment scale developed by Gilbert and Allan (1998). The scores of Beck Depression Inventory-II were interpreted as suggested by Smarr and Keefer (2011): minimal range = 0–13, mild depression = 14–19, moderate depression = 20–28, and severe depression = 29–63.

Some items of the Beck Depression Inventory-II are as:

i. 0 I do not feel sad.
   1 I feel sad.
   2 I am sad all the time and I cannot snap out of it.
   3 I am so sad and unhappy that I cannot stand it.
ii. 0 I am not particularly discouraged about the future.
   1 I feel discouraged about the future.
   2 I feel I have nothing to look forward to.
   3 I feel the future is hopeless and that things cannot improve.

Some of the items from the entrapment scale are as:

i. Internal Entrapment
   1- I want to get away from myself.
   2- I feel powerless to change myself
ii. External Entrapment
   2-I have a strong desire to escape from things in my life.
   3-I am in a relationship I cannot get out of.

Participants with a COVID-19 history were also asked about the course of the COVID-19.

Fear

We asked respondents to assess the following five items on a scale of 1 to 5 to measure the reason for their fear of contracting coronavirus (1 is the lowest; 5 is the highest level of fear). The five items were related with:

- Afraid of being infected with the coronavirus.
- Afraid of infecting his/her family members or loved ones.
- Afraid of infecting people other than his/her family members and loved ones.
- Afraid of losing someone because of infecting him/her with the disease.
- Afraid of dying.

An exploratory factor analysis (EFA) was performed using the principal components extraction method. Bartlett's test of sphericity was found to be significant [χ^2 (10) = 847.946, $p < 0.001$]. The Kaiser-Meyer-Olkin measure of sampling adequacy was high (KMO = 0.819). Thus, proceeding with the analysis was considered to be acceptable. A varimax rotation method was performed, and only one factor with the Eigenvalue greater than one was extruded. All factor loadings were greater than 0.85 except the first item, which had a factor loading of 0.453. The extracted factor accounted for 68.759% of the variance in the data.

Intention to Quit

The question to assess the intention to quit was the following: "Have you ever thought of quitting your job because of COVID-19?" The options presented to the participants were as: (1) I have never thought of quitting my job because of COVID-19, (2) I have thought of quitting my job because of COVID-19 but not very often, (3) I have thought of quitting my job because of COVID-19 very often, (4) I am seriously thinking of quitting my job because of COVID-19, and (5) I have already quit my job because of COVID-19.

The question "How did the COVID-19 pandemic affect the quality of your life?" was asked to assess the PEoC. They were presented with the following options: 1: not affected at all; 2: minimal adverse effect; 3: moderate adverse effect; and 4: very high adverse effect.

Participants marked 0 if they had not lost any relatives or close friends, 1 for one relative or close friends, and 2 for more than one relative and close friends.

TABLE 1 | Demographics of the participants.

Demographics	Options	Coding	Frequency	Percent
COVID History	No	0	102	43.0
	Yes	1	135	57.0
Age	25 and below	1	22	9.3
	26–30	2	37	15.6
	31–35	3	28	11.8
	36–40	4	39	16.5
	41–45	5	26	11.0
	46–50	6	39	16.5
	51–55	7	25	10.5
	56 and above	8	21	8.9
Gender	Male	1	101	42.6
	Female	2	136	57.4
Decease	None	0	125	52.7
	One	1	53	22.4
	Two or More	2	59	24.9
Education level	High-School and Below	1	34	14.3
	University	2	120	50.6
	MSc Degree	3	51	21.5
	Ph.D.	4	32	13.5
PEoC	Not effected	0	124	52.3
	Minimal Adverse Effect	1	35	14.8
	Moderate Adverse effect	2	51	21.5
	Very High Adverse effect	3	27	11.4
Work location	Home only	1	45	19.0
	Both home & workplace	2	88	37.1
	workplace only	3	104	43.9
	Total		237	100.0

TABLE 2 | Quitting jobs.

	Uninfected		Infected	
	f	%	*f*	%
Never thought	61	59.8%	42	31.1%
Rarely thought	21	20.6%	20	14.8%
Sometimes Thought	7	6.9%	15	11.1%
Seriously Thinking	9	8.8%	30	22.2%
Already quit	4	3.9%	28	20.7%

For the course of the COVID-19, participants were given six options: (1) no symptoms, (2) mild, (3) moderate, (4) severe but stayed at home, (5) severe and hospitalized, and (6) severe and needed intensive care.

Data Analysis

The data were analyzed by using SPSS version 26. We used descriptive statistics to report the frequencies and performed regression and correlation analysis to reveal the relationship between variables. Coefficients and significance levels were used to interpret the results. The statistical significance of the difference across the groups was also analyzed using independent samples *t*-test for constructs consisting of two groups and one-way ANOVA for more than two groups.

Analysis was conducted for total samples and participants with COVID-19 history, respectively.

RESULTS

Out of a total of 243 surveys, 237 were included in the statistical analyses. Six surveys—two of whom belonged to underaged participants and four of them housewives—were excluded because they did not meet the criteria. The average age of respondents was 40.17. **Table 1** shows the demographics of the participants.

Out of 135 infected people: 42 people (%31.1) had never thought of quitting their jobs, while 28 people (%20.7) already had quit. Out of 102 uninfected people: 61 people (%59.8) had never thought of quitting their jobs, while 4 (%3.9) had already quit. All the figures related to quitting jobs are given in **Table 2**; **Figure 1**.

Around 21% of the respondents with COVID-19 history had already quit their jobs. This figure is almost six times higher than uninfected respondents. Moreover, the percentage of people seriously thinking of quitting is nearly three times more than those uninfected. Around 43% of the people with COVID-19 history have either already quit or are seriously thinking of quitting their jobs.

During the interview, we inquired into the reason for quitting the job. The majority of the answers were almost the same: "I feel like I'm being suffocated." A participant said working was no longer bearable for him. Another one, who lost his uncle because of COVID-19, said she transmitted the disease to her uncle after contracting it from her workplace; she was blaming herself for his death. A person who was seriously thinking of quitting said he is dragging his feet when he leaves home for work.

None of the respondents had to go through intensive care due to COVID-19; 14 of them (10.4%) were hospitalized, the conditions of 49 of them (36.3%) were severe but received treatment at home; and 72 of them (53.3%) suffered either from moderate or mild symptoms or had no symptoms at all. The figures related to the course of COVID-19 are given in **Table 3**.

The mean value of fear was measured as 4.0153 out of 5 point scale. The mean and standard deviations of each item in the fear of coronavirus scale are given in **Table 4**.

As per descriptive statistics given in **Table 4**, the highest fear that respondents had was causing the death of someone because of infecting him/her ($M = 4.4153$), while the lowest was dying ($M = 2.7089$).

The results suggest that people do not consider themselves to be in the risk group or believe they would not die of coronavirus. They were simply afraid of causing the death of someone, be it a family member or not. People with a history

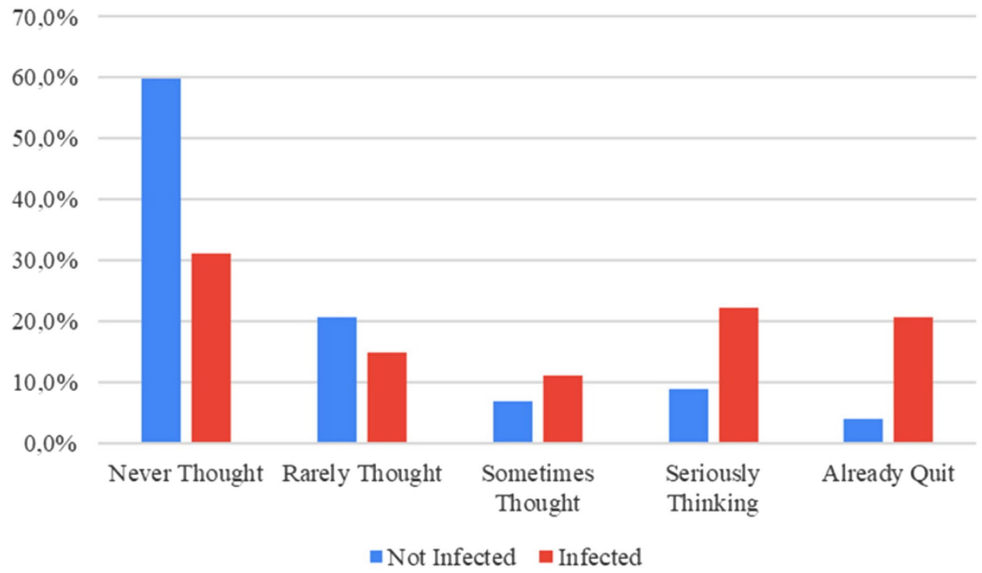

FIGURE 1 | Quitting Jobs.

TABLE 3 | The course of the COVID-19.

	f	%
No symptoms	15	11.1%
Mild	31	23.0%
Moderate	26	19.3%
Severe (at home)	49	36.3%
Severe (hospitalized)	14	10.4%
Intensive care	0	0.0%

of coronavirus, on the other hand, had a higher average in both *Afraid of infecting his/her family members or loved ones* ($\Delta M = 0.30$; $p = 0.044$) and *Afraid of losing someone because of infecting him/her* ($\Delta M = 0.51$; $p = 0.001$). Nonetheless, the mean difference of fear as a variable was not statistically significant ($p = 0.112$) among the coronavirus history groups. The mean differences between work-location groups were also not statistically significant.

Depression scores of the participants were also measured and reported in **Table 5**.

As shown in **Table 5**, only 69% of participants were not in depression. Only 14 participants (6%) suffered from severe depression, while 27 (11%) of them suffered from moderate and 33 (14%) of them from mild depression. Nevertheless, neither the mean difference across age groups [$F(8,126) = 1.496$; $p = 0.165$] nor between infected and uninfected participants ($p = 0.527$) were statistically significant.

Correlation results with Pearson correlation coefficients and significance levels are given in **Table 6**. As per the results given in **Table 6**, depression and age are negatively correlated ($r = -0.182$; $p < 0.01$), which means the depression score elder people have lower depression scores.

Internal ($r = 0.184$; $p < 0.01$) and external ($r = 0.165$; $p < 0.05$) entrapment feelings and depression levels ($r = 0.215$; $p < 0.01$) of females are higher than males.

As per the results given in **Table 6**, there is a correlation between work location and the transmission of coronavirus. Only 14.8% of the infected employees were working from home. A 35.6% of them worked from both home and workplace, while 49.6% of them were working only from the workplace. However, no correlation was found between work location and quitting jobs ($r = -0.027$; $p > 0.05$). As far as concerning the comparison of employees with ($M = 2.8741$; SD = 1.15335) and without ($M = 1.7647$; SD = 1.58081) coronavirus history, the mean differences of Quitting Jobs is found to be statistically significant ($\Delta M = -1{,}10{,}937$; $\Delta SD = 0.18538$; $p = 0.000$), which means that employees with coronavirus history had quit or intention to quit the job compared those without coronavirus history.

The PEoC was found to be correlated with COVID-19 history ($r = 0.515$; $p < 0.01$). The mean difference of the PEoC of employees with COVID-19 history ($M = 1.4074$) and other employees ($M = 0.2745$) is statistically significant (a higher value means a worse effect). The employees with COVID-19 history are the ones who have the worst PEoC. The PEoC is also positively associated with fear ($r = 0.245$; $p < 0.01$), internal ($r = 0.372$; $p < 0.01$) and external ($r = 0.389$; $p < 0.01$) entrapment, depression ($r = 0.245$; $p < 0.01$), and quitting job ($r = 0.342$; $p < 0.01$). The mean difference in quitting jobs across PEoC groups is also statistically significant ($F(3,233) = 10.961$; $p = 0.000$). The means of PEoC of moderate and highly affected groups are significantly higher than the no-effect and mildly affected groups.

Furthermore, the mean differences of those two groups (e.g., moderately and highly affected groups) are statistically higher than the rest for fear [$F(3,332) = 5.662$; $p = 0.001$], internal [$F(3,333) = 15.715$; $p = 0.000$] and external [$F(3,333) = 14.337$; $p = 0.000$] entrapment, and depression [$F(3,333) = 7.529$; $p = 0.000$].

The correlation between education level and quitting jobs is statistically significant [$F(3,233) = 2.975$;$p = 0.032$]. The mean

difference in quitting jobs of employees with Ph.D. degrees ($M = 2.9688$) and MSc degrees ($M = 2.6471$) is significantly higher than university ($M = 2.1917$) and high-school graduates ($M = 2.2059$).

Figure 2 illustrates employees' attitudes toward their jobs; 22% of Ph.D., 18% of MSc, 13% of university, and 9% of high-school graduates had already quit.

Fear is found to be associated with internal ($r = 0.320$; $p < 0.01$) and external ($r = 0.295$; $p < 0.01$) entrapment, and depression ($r = 0.233$; $p < 0.01$). Quitting job was correlated with fear ($r = 0.219$; $p < 0.01$) as well. Quitting job was found to be correlated with internal ($r = 0.284$; $p < 0.01$) and external ($r = 0.307$; $p < 0.01$) entrapment and depression ($r = 0.209$; $p < 0.01$) as well. The highest correlation to quitting job was measured with COVID-19 history ($r = 0.364$; $p < 0.01$), PEoC ($r = 0.342$; $p < 0.01$), and then external entrapment ($r = 0.307$; $p < 0.01$).

TABLE 4 | Fear of respondents.

Item	*N*	Min.	Max.	*M*	SD
Afraid of dying.	237	1.00	5.00	2.7089	1.53064
Afraid of infecting people other than his/her family members and loved ones.	237	1.00	5.00	4.2785	1.11921
Afraid of being infected with the coronavirus.	237	1.00	5.00	4.2827	1.19685
Afraid of infecting his/her family members or loved ones.	237	1.00	5.00	4.4008	1.07931
Afraid of losing someone because of infecting him/her with the disease.	236	1.00	5.00	4.4153	1.08629
FEAR	**236**	**1.00**	**5.00**	**4.0153**	**0.96055**
Valid *N* (listwise)	236				

The bold line is the total score of the fear scale while the lines above that bold line are the values for each item in the scale.

Comparing the Infected and Uninfected Employees

The correlation analysis results for employees infected with coronavirus are reported in **Table 7**. The results of those uninfected are in **Table 8**.

As per the results reported in **Table 7**, there is no correlation between work location and quitting jobs even for infected employees ($r = -0.098$; $p = 0.258 > 0.05$). The correlation between depression and age lost its significance ($r = -0.065$; $p = 0.454 > 0.05$) which was statistically significant ($r = -0.182$; $p < 0.01$) for the whole sample as per **Table 6** and significant for uninfected employees as per **Table 8**. These results suggest that depression levels of uninfected younger employees are higher than others. In fact, the mean depression level of the uninfected employees below the age of 25 falls into the mild depression level range ($M = 15.222$). The means of the rest of the age groups are below 10; even the mean depression level of age group *56 and over* is below 5. The mean depression level of the infected employees changes between 13 (for the age group of 51–55) and 9 (for the age group of 56 and over).

The correlation between the gender and PEoC of the infected employees is significant ($r = 0.204$; $p < 0.05$), which was insignificant ($r = 0.117$; $p > 0.05$) for the whole sample as per **Table 6** and still insignificant for the uninfected employees ($r = -0.016$; $p > 0.05$) as per **Table 8**. This result suggests that, when infected with COVID-19, the PEoC of women is affected worse than men.

The Pearson correlation coefficient and significance levels show that there are correlations between gender and internal entrapment ($r = 0.229$; $p < 0.01$), external entrapment ($r = 0.211$; $p < 0.01$), depression ($r = 0.256$; $p < 0.01$) for employees with coronavirus history (**Table 7**), and no correlation for employees uninfected with coronavirus (**Table 8**).

As per **Tables 7**, **8**, the PEoC is negatively correlated with education level for those employees who are not infected, while there is no correlation for employees with COVID-19 history. There are no statistically significant differences across the education groups. This result suggests that the employees with

TABLE 5 | Depression scores of the respondents.

	Infected		Uninfected		Overall	
	f	%	*f*	%	*f*	%
Minimal range (0–13)	95	70	72	71	163	69
Mild depression (14–19)	16	12	16	16	33	14
Moderate depression (20–28)	16	12	9	9	27	11
Severe depression (29–63)	8	6	5	5	14	6

TABLE 6 | Correlations.

S. No.		1	2	3	4	5	6	7	8	9	10	11	12
1.	COVID History	1											
2.	Age	−0.112	1										
3.	Gender	0.026	−0.322**	1									
4.	Education	0.085	0.100	0.015	1								
5.	Work location	0.152*	0.006	−0.066	−0.083	1							
6.	Loss of life	−0.065	0.242**	−0.124	−0.088	0.097	1						
7.	PEoC	0.515**	0.017	0.117	−0.007	0.117	0.142*	1					
8.	Fear	0.101	−0.013	0.001	0.081	−0.043	0.109	0.245**	1				
9.	Internal Entrapment	−0.068	−0.100	0.184**	−0.044	−0.008	0.152*	0.372**	0.320**	1			
10.	External Entrapment	0.054	−0.102	0.165*	0.012	0.105	0.133*	0.389**	0.295**	0.723**	1		
11.	Depression	−0.065	−0.182**	0.215**	−0.126	−0.091	0.080	0.245**	0.233**	0.711**	0.525**	1	
12.	Quitting Job	0.364**	0.015	0.051	0.177**	−0.027	0.027	0.342**	0.219**	0.284**	0.307**	0.209**	1

*Numbers are Pearson correlations coefficients; N = 237. *p < 0.05; **p < 0.01.*

higher education levels may feel the restrictions the disease puts on their lives more than others.

The statistically significant correlation that exists between education level and quitting jobs ($r = 0.248$; $p < 0.01$) for employees with coronavirus history could not be observed for uninfected employees ($r = 0.086$; $p > 0.05$). No research in the literature supports this finding. This situation may be due to the employees' financial status and savings. The level of income is closely related to the education level. The employees with a higher level of education may have savings upon which they can rely until the end of the pandemic, or it is taken under control, enabling them to consider quitting their jobs.

The correlation between depression and work location is statistically significant ($r = -0.205$; $p < 0.05$) for not infected employees and not significant ($r = 0.036$; $p > 0.05$) for employees with coronavirus history. The mean difference across groups is significant [$F(2,99) = 3.999$; $p = 0.021$], and the mean depression level of the employees working only from home ($M = 14.6400$) is significantly higher than that of those working from both home and workplace ($M = 8.6250$) and only from the workplace ($M = 9.3243$).

The course of the disease is highly correlated with the PEoC ($r = 0.451$; $p < 0.01$), depression ($r = 0.239$; $p < 0.01$), fear ($r = 0.335$; $p < 0.01$), and internal ($r = 0.315$; $p < 0.01$) and external ($r = 0.236$; $p < 0.01$) entrapment. However, it has no correlation with quitting jobs ($r = 0.051$; $p > 0.05$).

The fear (r = 0.319; $p < 0.01$), internal ($r = 0.597$; $p < 0.01$) and external ($r = 0.535$; $p < 0.01$) entrapment, and depression score ($r = 0.558$; $p < 0.01$) are statistically significant for employees with coronavirus history and insignificant for uninfected employees.

Regression Analysis

The above-mentioned independent variables were also entered into a regression analysis in SPSS to determine the predictors of quitting jobs (**Table 9**).

As per the results given in **Table 9**, COVID history significantly predicted quitting jobs ($\beta = 0.511$; $p < 0.01$). In addition to COVID History, Internal Entrapment ($\beta = 0.242$; $p < 0.01$) and Education ($\beta = 0.147$; $p < 0.05$) predicted quitting jobs. These variables also explained a significant proportion of variance in quitting jobs, $R^2 = 0.237$, $F(11, 224) = 7.648$, $p < 0.01$.

DISCUSSION

The results about the fear of coronavirus which are given in **Table 4** suggest that people do not consider themselves to be in the risk group or believe they would not die of coronavirus. They were simply afraid of causing the death of someone, be it a family member or not. The results also show that both internal and external entrapment feelings, and depression levels are correlated with gender. The literature supports statistically significant differences in depression levels and feelings of entrapment between genders. Previous studies also show that females have a higher entrapment level than men (O'Connor et al., 2021), and the occurrence and risk of depressive disorder

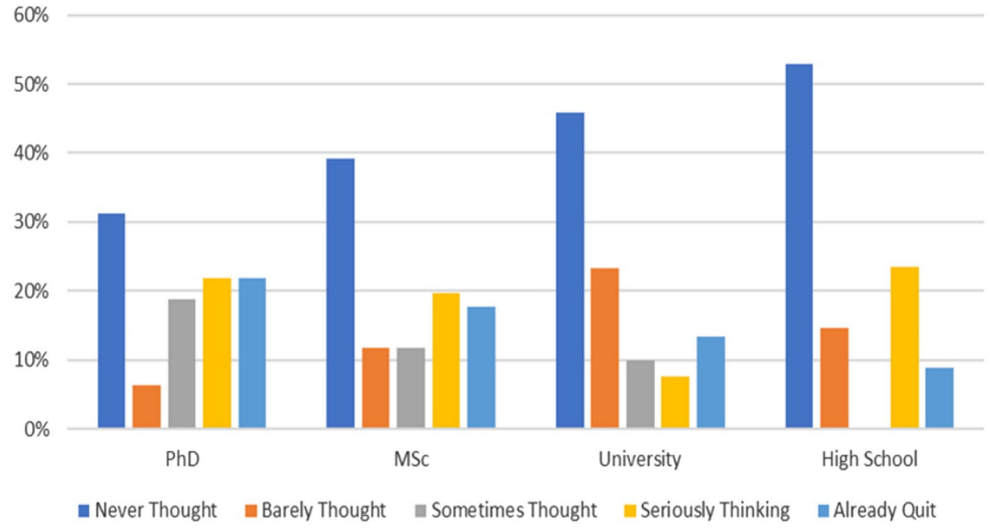

FIGURE 2 | Quitting jobs per education level.

are higher in females than in males (Piccinelli and Wilkinson, 2000; O'Connor et al., 2021).

The PEoC is correlated with COVID-19 history, and the mean difference of PEoC of moderate and highly affected groups is significantly higher than in the no-effect and mildly affected groups, which suggests that quitting jobs is higher among employees whose PEoC is moderate or high.

As far as the education level, both the correlation and regression analyses show that the education level affects quitting jobs. Although no research in the literature supports this finding, higher education levels may cause a greater perception of event strength, resulting in higher levels of emotional exhaustion (Liu et al., 2021) and, hence, quitting the job. Alternatively, it may be due to the employees' financial status and savings. The level of income is closely related to the education level. The employees with a higher level of education may have savings upon which they can rely until the end of the pandemic, or it is taken under control, enabling them to consider quitting their jobs.

The correlation between the gender and PEoC of the infected employees is significant, which suggests that, when infected with COVID-19, the PEoC on women is worse than men, which needs to be verified in line with the values of other cultures. In the Turkish culture, working women also do housework at home, which may cause them to have a worse PEoC compared to men, even after recovery from the coronavirus. This difference, however, may not be attributed to genetics since women are favored in that respect. When compared with men, the genetic difference protects women against severe diseases (Bhatia et al., 2013), even in the case of coronavirus (Sharma et al., 2020). This may be an indication that the psychological recovery of women is taking longer time than that of men for, as shown in previous studies, females have a higher entrapment level than men (O'Connor et al., 2021), and the occurrence and risk of depressive disorder are higher in females than in males (Piccinelli and Wilkinson, 2000; O'Connor et al., 2021).

Although the previous studies report contradictory outcomes of working from home (Oakman et al., 2020), we found an interesting result. The correlation between depression scores and the work location of infected employees turned out to be statistically insignificant, which is significant for employees without coronavirus history. The employees with coronavirus history may have experienced the hardship of being infected and feeling safe when working from home, which is not the case with the employees without coronavirus history. Nevertheless, the depression level of the employees working only from home is significantly higher than the other groups. The literature supports this result since previous studies have shown that working from home causes employees to develop negative feelings and agoraphobia (Ahrentzen, 1989), and the problem *has no name* (Freiden, 1957).

Furthermore, perceiving working from the home situation as an ordinary home-office process may be misleading since all family members have been locked in during the COVID-19 period, and all activities, even education, are carried on online. No visitors, no visitings, no different activities, but work, and all family members tried to maintain work-life balance by using the same technological infrastructure. The fulfillment of work and home life responsibilities and socialization styles have changed or have been limited. These factors may have worsened the situation at home and increased the depression during the COVID-19.

For those who have COVID-19 history, the correlation was found to be significant between quitting jobs and the education level, internal and external entrapment, PEoC, fear, and depression. Interestingly enough, the Pearson correlation coefficients and significance levels of employees with coronavirus history are very low for fear and depression, suggesting that employees start to develop something like a "been there, done

TABLE 7 | Correlation table for employees with COVID-19 history.

S. No.		1	2	3	4	5	6	7	8	9	10	11	12
1.	Age	1											
2.	Gender	−0.326**	1										
3.	Education	0.170*	−0.052	1									
4.	Work Location	−0.061	0.031	−0.134	1								
5.	Loss of death	0.244**	−0.134	−0.089	0.167	1							
6.	PEoC	0.144	0.204*	0.012	0.089	0.213*	1						
7.	Fear	0.083	0.070	0.130	−0.002	0.245**	0.319**	1					
8.	Internal Entrapment	−0.057	0.229**	0.008	0.055	0.131	0.597**	0.249**	1				
9.	External Entrapment	−0.091	0.211*	0.015	0.086	0.137	0.535**	0.207*	0.700**	1			
10.	Depression	−0.065	0.256**	−0.120	0.036	0.126	0.558**	0.213*	0.732**	0.518**	1		
11.	Quitting job	0.138	0.009	0.248**	−0.098	0.037	0.221*	0.191*	0.269**	0.234**	0.185*	1	
12.	Course of disease	0.165	0.163	0.066	−0.042	0.222**	0.451**	0.335**	0.315**	0.236**	0.239**	0.051	1

*Numbers are Pearson correlations coefficients; N = 237. *p < 0.05; **p < 0.01.*

that" mood. This situation may also be related to the employees' assurance that—now that they have recovered from COVID-19—their bodies have enough antibodies to fight against the viruses in case they ever contract it again.

Regression analysis results confirm that the COVID-19 history and internal entrapment effect the resignation. And also, the correlation was found to be significant between quitting jobs and the level of COVID-19 effect on life, internal entrapment, external entrapment, and depression. Although there are no previous studies to compare the results, this may be due to the hardship and psychological state that the coronavirus has caused (Piccinelli and Wilkinson, 2000; Elhai et al., 2020; Soheili et al., 2020; Zhang and Ma, 2020; Kumar, 2021; Liu et al., 2021; O'Connor et al., 2021; Parker and Clark, 2022, p. 34).

Although the correlation was found to be highest between quitting jobs and depression, the effect of depression on quitting the job could not be determined during regression analysis. The uncertainty, news, and rumors related to COVID-19 fuels anxiety (Elhai et al., 2020) and thus depression, which is mainly associated with anxiety.

Theoretical Implications

The scarce research on quitting jobs during COVID-19, or The Great Resign, has given different causes. Some of them are burnout syndrome (BMA, 2021; Chugh, 2021; Sheather and Slattery, 2021), toxic organizational culture (Sull et al., 2022), the comfort of working from home (Chugh, 2021), insufficient salary or benefits (Hirsch, 2021; Parker and Clark, 2022), relocation (Birinci and Amburgey, 2022), reassessing priorities in life, and seeking for an elusive work-life balance (Kumar, 2021, p. 34). Employers and employees having a misaligned picture of factors driving job satisfaction and employee requirements are also counted among the reasons.

Not finding a significant correlation between work location and quitting the job makes us think that the comfort of working from home (Chugh, 2021) may not be the cause. Furthermore, considering the higher depression level of those working only from home eliminates that option as well. Most of the interviewed people did not have problems with the salary or benefits, but most of them had already quit or were seriously thinking of quitting. Therefore, the insufficient salary or benefits (Hirsch, 2021; Parker and Clark, 2022) should not be the cause as well.

This study, however, shows that there should be more to consider. Results show that fear of causing someone's death, feeling entrapped, perceived effect of COVID-19 on worsened quality of life, and depression are highly associated with quitting the job.

Recommendations for Further Research

Although there are several suggestions about the causes of the Great Resign, empirical studies need to be conducted to find the real cause(s). Especially qualitative studies will be able to shed light on the causes and missing variables, if there are any.

Moreover, reassessing life priorities, the changing perception of work and work-life balance, the desire to realize the dreams that are always postponed, and diminishing appetite for worldly

TABLE 8 | Correlation table for employees with NO COVID-19 history.

S. No.		1	2	3	4	5	6	7	8	9	10	11
1.	Age	1										
2.	Gender	−0.321**	1									
3.	Education	0.053	0.109	1								
4.	Work location	0.148	−0.197*	−0.048	1							
5.	Loss of life	0.226*	−0.108	−0.076	0.038	1						
6.	PEoC	0.020	−0.016	−0.197*	−0.020	0.199*	1					
7.	Fear	−0.038	−0.065	−0.192	−0.019	−0.011	0.009	1				
8.	Internal Entrapment	−0.156	−0.029	0.031	−0.093	−0.060	0.025	0.137	1			
9.	External Entrapment	−0.076	−0.053	0.023	−0.101	0.033	0.072	0.088	0.889**	1		
10.	Depression	−0.352**	0.162	−0.141	−0.205*	0.021	0.000	0.114	0.273**	0.156	1	
11.	Quitting job	−0.075	0.050	0.086	−0.021	0.116	0.252*	0.167	0.297**	0.223*	0.430**	1

*Numbers are Pearson Correlations Coefficients; N = 237. *p < 0.05; **p < 0.01.*

TABLE 9 | Predictors of quitting jobs.

Independent variables	Standardized coefficient (*t*-value)
Age	0.094 (1.445)
Gender	0.007 (0.117)
Education	0.147 (2.473)*
Work location	−0.073 (−1.236)
Course	−0.188 (−1.512)
PEoC	0.067 (0.833)
Decease	0.002 (0.036)
Depression	0.067 (0.798)
Fear	0.081 (1.309)
Internal entrapment	0.242 (2.714)**
COVID history	0.511 (4.210)**
External entrapment	0.124 (1.454)

*Dependent variable: Quitting jobs. *p < 0.05; **p < 0.01.*

materials may be considered or evaluated as causes of the great resign.

Along with entrapment and depression, the relation of alexithymia with quitting the job should also be investigated.

Implications for Practice

One of the most critical aspects, which also needs to be carefully investigated and focused on, is increased depression. The mean depression level of the employees whose lives are highly affected by COVID-19 is close to moderate depression level, and this increase in the depression score suggests that psychological support should be provided to the employees whose life is being affected by the coronavirus. As per the results of this study, organizations willing to keep their key employees are urged to employ a psychologist or encourage their employees to visit psychologists to make them overcome the depression and the feeling of entrapment.

Considering the correlation between work location and depression, hybrid working conditions (working both from home and the workplace) or reducing the workload (including work hours) of those working only from home should be considered and assessed by the organizations.

Organizations should find a way to improve the PEoC of employees who have recovered from COVID-19 because the low perceived quality is associated with most mental health problems. Especially female employees, in this sense, require special consideration, for their internal and external entrapment and depression levels are higher than men.

Furthermore, because of the mental health problems their employees have gone through during the pandemic, organizations should be much more flexible with the employees and amend their policies and key performance indicators accordingly.

Limitation

This study has its inherent limitations.

These limitations can be cited as follows: (1) it adopted an online, unadministered survey that could impact the given answers; (2) its sample size; and (3) it was conducted in one

single location (Istanbul, Turkey), which may have limitations on generalizability. (4) It is also a cross-sectional study that adopted a convenient sampling method, which is another limitation. (5) It included only people who are being employed, which causes other limitations on generalizability. (6) This study was conducted during the pandemic.

Due to these limitations, the results should be interpreted carefully and accordingly.

CONCLUSION

This study aims to investigate the factors associated with the resignation of employees during the COVID-19 period. The variables included in this study were selected based on the interviews conducted with the employees with coronavirus history.

This study showed that the correlation between quitting jobs and other conditions differs depending on the COVID-19 history of the employee. However, PEoC, depression, and internal and external entrapments are associated with quitting jobs for both infected and uninfected groups. Meanwhile, the PEoC was found to be worse for female employees with COVID-19 history and quitting jobs associated with higher education levels for the employees with COVID-19 history.

The regression analysis showed that the coronavirus history and the internal entrapment are the best predictors of the resignation. Furthermore, the education level also affects the resignation. Employees with PhD and MSc degrees tend to quit more than those with bachelor's degrees and high-school diplomas.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Kocaeli University Social and Human Sciences Ethics Committee (protocol number: E-10017888-108.99-62960). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

HD, MA, and HG: conceptualization. MA, VD, and DR: methodology and validation. MA: formal analysis. HD, MA, HG, VD, and DR: data curation. HD and MA: writing—original draft preparation. HG, VD, and DR: writing—review and editing. HD: supervision and ethical commission permission. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Individual and Organizational Factors in Coping With COVID-19 in Soldier Students

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The COVID-19 pandemic has posed significant burden across different industrial sectors. Generally, an increase in psychological stress experiences has been reported, while the stress and coping responses of specific, potentially burdened populations have received less attention thus far. Thus, the present study investigated relations between individual (i.e., extraversion, neuroticism, conscientiousness) and organizational (i.e., organizational commitment and study satisfaction) factors, indicators of psychological health (i.e., loneliness, life satisfaction, COVID-19-related stress), and possible mediating effects of four broad coping dimensions (active coping, avoidant coping, social support, positive cognitive restructuring) in a specific sample of soldier students who engage in a double-role being military affiliates and students of non-military subjects. To this end, we assessed data of soldier students at two measurement points ($N = 106$ at t_1 and $N = 63$ at t_2) shortly after the second national lockdown in Germany (20. May 2021 to 11. July 2021) during the COVID-19 pandemic. Personality traits showed expected associations with indicators of psychological health, i.e., positive relations between neuroticism and social loneliness, between extraversion and COVID-19 stress, and negative relations between neuroticism and life satisfaction. Remarkably, organizational variables showed effects above and beyond personality traits on loneliness and life satisfaction. Neither individual, nor organizational factors could predict change in psychological health over time. We found evidence for mediation effects through active coping, avoidant coping, and the use of social support, but not through positive cognitive restructuring. Findings highlight the relative importance of organizational factors besides personality traits for psychological health in a military student sample, holding important implications for designing efficient support systems in the military.

Keywords: military, coping, COVID-19, personality, commitment

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INTRODUCTION

The COVID-19 pandemic has been an unprecedented event in most peoples' lives. The confrontation with an unknown virus was associated with various stressors (e.g., fear of infection, hospitalization, threat of economic losses, isolation or quarantine after government-implemented containment measures and even national lockdown phases; Hale et al., 2020). Affecting individual, family, educational, occupational, and medical systems, the COVID-19 pandemic has been

conceptualized as a multidimensional stressor causing substantial psychological distress (Gruber et al., 2021). Because of this stressful impact and the worldwide spreading of the virus, the COVID-19 pandemic may also be framed as a *critical world event* alluding to the concept of critical life events in stress research (Holmes and Rahe, 1967). Soon, the importance of examining the psychological impact of the COVID-19 pandemic has been highlighted, particularly with regard to understanding human behavior with the ultimate goal of coping efficiently with the virus and containing its spread as well as to tailoring effective interventions for those in need (Kazak, 2020).

Psychological health has been shown to be substantially affected by the COVID-19 pandemic resulting in a set of responses across people, including for instance depression, anxiety, panic attacks, somatization and sleep disorders (Hossain et al., 2020). However, as well established in stress and coping research before the pandemic, individual differences play a decisive role in the face of adversity (Bonanno, 2004; Seery et al., 2010; Masten, 2011; Hamby et al., 2018). There is some evidence of personality traits (e.g., Aschwanden et al., 2020; Zettler et al., 2022), as well as coping strategies (Zacher and Rudolph, 2021b) as predictors of COVID-19-related psychological health outcomes. Yet, these studies focus on samples from the general population. Among others, substantial psychological burden has been reported for college students (e.g., Wang et al., 2020), as well as for certain professional groups including health workers (Giorgi et al., 2020), police (Frenkel et al., 2021), and the military (Gordon et al., 2021), indicating the need to address specific populations and their respective crucial protective and vulnerable factors in examining psychological health outcomes following stress related to the COVID-19 pandemic.

In order to meet this need, the present study examined a population of soldier students (i.e., young officer candidates currently undergoing studies at the University of the Bundeswehr Munich) of the German Federal Armed Forces (*Bundeswehr*)—a sample that comprises both a military affiliation and non-military university studies. Taking account of the German *Bundeswehr* as "special organization" (Richter, 2017), we incorporated the examination of organizational factors above personality traits as potentially crucial predictors of psychological health in this sample. We further assessed different strategies in coping with the COVID-19 pandemic, which we tested as potential mediators between individual and organizational factors and psychological health (i.e., loneliness, life satisfaction, COVID-19 stress). In doing so, we shed some light on resilience and vulnerability in a military student sample during the COVID-19 pandemic.

PSYCHOLOGICAL EFFECTS OF COVID-19

On 11. March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic, massively disrupting daily life of many people ever since. Until the onset of our study in May 2021, Germany had terminated its 6-month, second national lockdown with travel prohibitions, curfews, contact bans and closure of cultural and sports facilities, as well as partial retail sector and school closures (Moradian et al., 2021). During this second lockdown, a high ongoing psychological burden (i.e., COVID-19-related fear, generalized anxiety, depressive symptoms, and psychological distress) was reported in a German sample (Moradian et al., 2021). From May 2021 on, a stepwise cautious relaxation of measures was implemented in accordance with infection rates (e.g., weakened contact bans, only regional curfews, opening of the food service sector or enabling touristic travels under strict conditions). Up until the onset of our study (i.e., 20. May), COVID-19 associated infections [deaths] reached 3,638,504 [87,135], and 32,961,750 people (about 39.29% of the German population) received at least one vaccination (Dong et al., 2020).[1]

This extraordinary situation showed an impact on various psychological health outcomes, including increased loneliness (i.e., painful subjective feelings of isolation and with this an indicator of social well-being; Ellis et al., 2020; Huxhold and Tesch-Römer, 2021; Ernst et al., 2022), decreased life satisfaction (i.e., the cognitive evaluation of one's own subjective well-being; Zacher and Rudolph, 2021b), and increased psychological distress with anxiety and depressive symptoms (Arslan et al., 2021; for an overview see Hossain et al., 2020). While these findings indicate substantial COVID-19-related psychological distress, researchers also reported heterogeneous results (Ernst et al., 2022) or resilience (Luchetti et al., 2020), motivating research on potential vulnerability and protective factors.

PERSONALITY AND COVID-19

Generally speaking, personality consists of all outlasting individual characteristics of a human being in terms of bodily appearance, and patterns of behavior and experiences (Asendorpf, 2019). The personality traits extraversion, neuroticism, and conscientiousness are similarly related to psychological and subjective well-being and therefore considered personality predispositions for general well-being (Grant et al., 2009). Extraversion reflects an individual's tendency for sociability, activity and is often accompanied by experiencing positive emotions (e.g., joy), while neuroticism implicates emotional instability, impulsivity, fear, and anger and can be interpreted as a general predisposition to experiencing psychological distress (Costa and McCrae, 1980, 1992). Finally, conscientiousness describes organization and diligence in task completion (Costa and McCrae, 1992). Research prior to the pandemic indicated that extraversion was positively related to subjective well-being (Guitiérrez et al., 2005; Soto, 2013; Weninger and Holder, 2013), and negatively related to depression and anxiety (Jylhä and Isometsä, 2006). People with higher values in extraversion tended to have larger social networks that offer more social support (Asendorpf and Wilpers, 1998). During the pandemic,

[1]Note that Dong et al. (2020) need to be referenced when using the publicly available dataset that can be accessed through https://github.com/CSSEGISandData/COVID-19. This reference introduces the online dashboard in 2020, yet, the dataset itself is updated continuously and thus also holds data from later time points (e.g., as in our case, data from 2021).

extraverted people tended to perceive government-implemented measures as stricter (Modersitzki et al., 2021) and to engage less in social distancing (Carvalho et al., 2020). Extraversion was positively related to higher average levels of perceived stressfulness of the pandemic (Zacher and Rudolph, 2021a) and seemed to have partially lost its protective role for subjective well-being (Anglim and Horwood, 2021) and against loneliness in times of social/physical distancing (Gubler et al., 2021). Overall, extraversion was negatively related to generalized anxiety and depressive symptoms (Nikčević et al., 2021) and positively with psychological well-being (Shokrkon and Nicoladis, 2021) and life satisfaction (Modersitzki et al., 2021) during the pandemic. When considering phases of the pandemic in a longitudinal study design, extraversion was related with both increases and decreases in perceived stressfulness in accordance with external changes (Zacher and Rudolph, 2021a).

Neuroticism was found to be a factor of vulnerability for life stress and changes (Suls and Martin, 2005) and a risk factor for depression and anxiety (Roelofs et al., 2008) before the pandemic. Neuroticism consistently showed negative relations to subjective well-being and life satisfaction (e.g., Librán, 2006; Gale et al., 2013; Soto, 2013), and relationship satisfaction (Vater and Schröder-Abé, 2015). During the pandemic, negative relations between neuroticism and subjective well-being and life satisfaction were replicated (Modersitzki et al., 2021). Persons scoring higher in neuroticism further tended to display more COVID-19-related concerns (Aschwanden et al., 2020), lower psychological well-being (Shokrkon and Nicoladis, 2021), and more generalized anxiety and depressive symptoms during the pandemic (Nikčević et al., 2021).

Conscientiousness was reported to be a positive predictor of subjective well-being (Grant et al., 2009), and showed positive relations to daily life satisfaction (Smith et al., 2013) before the pandemic. During the pandemic, conscientiousness was related with greater adherence to social distancing measures (Carvalho et al., 2020) and more precautions (Aschwanden et al., 2020). Further, conscientiousness was negatively related to generalized anxiety and depression (Nikčević et al., 2021) and positively related to life satisfaction (Anglim and Horwood, 2021; Modersitzki et al., 2021) during the pandemic.

COPING STRATEGIES, PERSONALITY, AND COVID-19

According to the Transactional Model (Lazarus and Folkman, 1984), coping is defined by thoughts and behaviors that are used with the aim of managing a person-environment transaction that is appraised as stressful (Folkman and Moskowitz, 2004). Different individual coping strategies can be clustered within the four higher-order coping strategies active coping (e.g., planning), avoidant coping (e.g., substance use), use of social support (e.g., emotional support), and positive cognitive restructuring (e.g., acceptance; Nahlen Bose et al., 2015; Baumstarck et al., 2017). The efficiency of these coping strategies for maintaining psychological health in adverse circumstances highly depends on the context, in which they are applied (Folkman and Moskowitz, 2004). In the context of the COVID-19 pandemic, Zacher and Rudolph (2021b) reported positive relations between active coping and positive cognitive restructuring with regard to life satisfaction and negative relations between planning and life satisfaction. The use of social support was related to an increase in life satisfaction (for instrumental support) in addition to higher levels of positive affect and lower levels of negative affect (for emotional support), but also higher levels of negative affect (for instrumental support; Zacher and Rudolph, 2021b), and showed low levels of well-being (Kavčič et al., 2022), supporting the notion of social support as "double-edge sword" (Carver et al., 1989; Revenson et al., 1991). Avoidant coping strategies were positively related with higher negative affect (Zacher and Rudolph, 2021b), depressive symptoms, anxiety, and stress (Agha, 2021; Minahan et al., 2021; Kavčič et al., 2022).

In turn, certain personality traits are related to the use of certain coping strategies. Before the COVID-19 pandemic, a meta-analysis showed extraversion and conscientiousness to be positively related to active coping and positive cognitive restructuring, while extraversion and neuroticism were both positively related to seeking social support (Connor-Smith and Flachsbart, 2007). Neuroticism further showed positive relations to avoidant coping, and negative relations to active coping and positive cognitive restructuring (Connor-Smith and Flachsbart, 2007). There is a lack of studies on relations of personality traits and coping strategies during the pandemic. Agbaria and Mokh (2021) report positive correlations between emotion-focused coping (that comprises avoidant coping and positive cognitive restructuring in their study) and neuroticism, and negative correlations between emotion-focused coping and both extraversion and conscientiousness, while active coping was positively related to extraversion and conscientiousness and negatively related to neuroticism.

SOLDIER STUDENTS IN THE GERMAN *BUNDESWEHR* AND COVID-19

The COVID-19-related studies reported as of yet mostly focus on samples from the general population, whose findings do not seem readily generalizable to other specific samples such as soldier students. For instance, at the individual level, there is evidence for personality differences in people in emergency-service professions (i.e., the "Rescue Personality"; Klee and Renner, 2013, 2016; Mitchell, 1983; Salters-Pedneault et al., 2010). At the organizational level, military organizations are distinct from other organizations in a number of features (e.g., special forms of socialization, a pronounced importance of symbols and rituals, military-specific camaraderie, the principle of order and obedience; Richter, 2017), thus contributing to a military identity (Kümmel, 2018).

The University of the Bundeswehr Munich is one of two universities of the *Bundeswehr* in Germany that are subordinated to the Federal Ministry of Defence on the one hand, but also the Higher Education Act like the regular state universities on the other hand. Students enrolled in the University of the

Bundeswehr Munich are soldiers (i.e., officer candidates or lieutenants) who undergo an academic education and obtain Bachelor and Master degrees in non-military subject areas (e.g., economics, computer science, educational science) that are equivalent to degrees obtained from state universities, thus standing in contrast to military academies (e.g., United States Military Academy in West Point, New York or the Royal Military Academy Sandhurst).

The German *Bundeswehr* played a special role in fighting the pandemic. Since the onset of the pandemic in March 2020, soldiers in Germany were involved in various COVID-19-related tasks including assistance with material and logistics (e.g., providing face masks), tracing infection chains, testing for the virus in care facilities for the elderly, and operating own vaccination centers (Bundeswehr, 2022). The assistance provided by the *Bundeswehr* in the combat against the COVID-19 pandemic was primarily performed by professional military and only in some cases by soldier students of the University, that had the opportunity and were encouraged to engage in various COVID-19-related chores (e.g., providing assistance to local health offices), but were not obligated to do so. However, substantial burden during the pandemic in this sample can still be assumed due to a number of reasons. Soldier students find themselves in a double role being soldiers (i.e., officer candidates or lieutenants) and students at the same time, involving primarily study obligations along with certain military obligations. Considerable psychological burden (i.e., symptoms of depression and anxiety and even suicidal thoughts) has been reported for college students during the pandemic (Wang et al., 2020). In contrast to regular college students, soldier students undergo intensive study programs structured within trimesters that allow for a shorter study duration. They have the order to complete their studies successfully as part of their qualification as an officer, and also receive pay during their 4 years of study. Therefore, the study duties can also be described as work demands rather than regular study demands, potentially suggesting increased study burden as compared to regular student samples. Moreover, soldier students experienced massive changes in their habitual daily life during the pandemic. Usually sharing barracks on an on-site campus, they were freed from the obligation to stay at this campus. Life at campus was subjected to various regulations (e.g., strict restrictions in performing sports activities). Teaching and study obligations were exclusively performed online (with the exception of exams). At the organizational level, such changes have been shown to be associated with a higher risk for psychological health problems before the pandemic (Bamberger et al., 2012).

In addition to organizational changes, organizational commitment as well as job satisfaction are dominantly related to employee well-being and health (e.g., Panaccio and Vandenberghe, 2009; Donaldson and Ko, 2010; Faragher et al., 2013; Rodríguez-Fernández et al., 2021). Organizational commitment is a "bond or linking of the individual to the organization" (Mathieu and Zajac, 1990), whereas its subcomponent affective organizational commitment has been described as a "core essence" (Mercurio, 2015) of organizational commitment and comprises feelings of shared values, pride, affiliation and identification with organizational goals (Felfe and Scherm, 2012).[2] Job satisfaction refers to an individual's positive emotional responses and attitudes toward (aspects of) their job (Faragher et al., 2013). Similarly, study satisfaction refers to an individuals' satisfaction or dissatisfaction with (components of) their studies (Westermann et al., 2018).[3]

Before the pandemic, job satisfaction and organizational commitment reported to be predictors of psychological health, showing significant positive relations to life satisfaction and negative relations to job stress in police officers (Moon and Jonson, 2012; Lambert et al., 2021), a profession related to military personnel. Similarly, job satisfaction and organizational commitment have been shown to be directly affected by work stress levels in military personnel (Dobreva-Martinova, 2002). In a meta-analysis, however, affective organizational commitment turned out to be a crucial factor for lower stress levels and absenteeism, and higher performance and work engagement (Meyer et al., 2002; see also Rivkin et al., 2018). Job satisfaction and loneliness were negatively related before the pandemic (Tabancali, 2016; Bakır and Aslan, 2017). The pandemic implicated massive changes at the work place (e.g., social distancing and loneliness, working from home, the distinction between "essential" (i.e., life-sustaining) and non-essential workers) and typically an increase in work stress (Kniffin et al., 2021). At the same time, individual (e.g., personality) and organizational (e.g., organizational culture) differences were discussed as potential moderators of psychological health outcomes in this crisis (Kniffin et al., 2021), motivating the examination of individual and organization predictors of psychological health in a sample with distinct personal and organizational features (i.e., soldier students).

THE PRESENT STUDY

The present study aims to bridge the gap between research in personality, organization, and coping in a highly extraordinary and dynamic context in a specific military student sample. Personality traits have been associated with psychological stress and satisfaction with new working conditions during the pandemic in a related profession (i.e., the police; Langvik et al., 2021), yet, coping strategies were not considered. In the present study, we examined the effect of three personality traits (i.e., extraversion, neuroticism, and conscientiousness) as individual factors, and organizational commitment and study satisfaction as organizational factors, on psychological health (i.e., loneliness, life satisfaction, and COVID-19 stress) directly and indirectly through coping strategies in soldier students. In doing so, we highlight the special role of specific populations in pandemic situations, and adopt a "resilience perspective"

[2]In the remainder of the article, we refer to affective organizational commitment when using the terms organizational commitment or commitment.

[3]Although we assessed soldier students' study satisfaction, we also refer to job satisfaction within this article as soldier students are in a paid employment status which includes the completion of their studies. Therefore, their studies can also be interpreted as jobs.

(Chen and Bonanno, 2020)—investigating psychological health incorporating factors of both resilience and vulnerability.

While the associations between personality traits and psychological health during the COVID-19 pandemic have been investigated in some studies (e.g., Anglim and Horwood, 2021; Nikčević et al., 2021; Zacher and Rudolph, 2021a), there is considerably less research on the relation between organizational factors (i.e., organizational commitment and study/job satisfaction) and psychological health during the pandemic as well as its incremental validity over and above personality traits. To this end, we derived the first research question:

RQ1. *Cross-sectional direct analyses*: How are individual and organizational soldier student factors related to loneliness, life satisfaction, and COVID-19 stress at the same time point?

Specifically, we anticipated relations in accordance with prior research during the pandemic (for personality traits; see Carvalho et al., 2020; Anglim and Horwood, 2021; Gubler et al., 2021; Modersitzki et al., 2021; Nikčević et al., 2021; Shokrkon and Nicoladis, 2021; Zacher and Rudolph, 2021a) or before the pandemic, respectively (for organizational factors; see Dobreva-Martinova, 2002; Meyer et al., 2002; Moon and Jonson, 2012; Rivkin et al., 2018; Lambert et al., 2021). All expected relations are displayed in **Table 1**.

The pandemic was a highly dynamic situation with various rapidly changing regulations and infection rates. Only few studies examined the predictability of change in psychological health indicators over time during the pandemic (for exceptions see Zacher and Rudolph, 2021a,b). Predictions of change hereby showed (a) little change in subjective well-being across time points that were 1 or 3 month(s) apart (Zacher and Rudolph, 2021b), and (b) predictions of change that depended on the phase of the pandemic (e.g., an association of extraversion with an *increase* in perceived stressfulness in one time frame, and an association of extraversion with a *decrease* in perceived stressfulness in another time frame; Zacher and Rudolph, 2021a). Thus, the predictability of change seems substantially complicated in such dynamic contexts. To examine the predictability of possible change in loneliness, life satisfaction, and COVID-19 stress by personality traits and organizational factors, we posed the second research question:

RQ2. *Longitudinal direct analyses*: Can individual and organizational soldier student factors predict change in loneliness, life satisfaction, and COVID-19 stress across 4 weeks?

Considering the lack of research on the predictability of change and its high context dependency, we examined RQ2 in an explorative manner and did not derive specific expectations.

Finally, to gain insight into the mechanisms of the prediction of psychological health by individual and organizational factors, we examined four broad coping dimensions as potential mediators based on theoretical considerations as described in the Transactional Model (Lazarus and Folkman, 1984) as well as relations between personality traits and coping strategies (e.g., Connor-Smith and Flachsbart, 2007), between coping strategies and psychological health (e.g., Deckx et al., 2018), and evidence for mediated personality-health associations through coping (e.g., Peng et al., 2012). We identified less studies examining the relation between organizational factors, coping, and psychological health, which we implemented in the third research question:

RQ3. *Mediation analyses*: Do coping strategies mediate the relationships between individual and organizational soldier student factors and loneliness, life satisfaction, and COVID-19 stress?

Expected relations between personality and organizational predictors and coping strategies (for personality see Connor-Smith and Flachsbart, 2007; Agbaria and Mokh, 2021; for organizational predictors see Srivastava and Tang, 2015; Portero de la Cruz et al., 2020; Rojas et al., 2022) are presented in **Table 1** along with expected relations between coping strategies and psychological health outcomes (Deckx et al., 2018; Gori et al., 2020; Minahan et al., 2021; Zacher and Rudolph, 2021b; Kavčič et al., 2022). The respective expected indirect effects can be obtained by multiplying the two direct effects (i.e., two positive and two negative direct effects yield a positive indirect effect, one positive and one negative direct effect yield a negative indirect effect, and if at least one direct effect is zero, the indirect effect will be zero).

TABLE 1 | Expected relations between personality traits and organizational predictors, coping dimensions, and psychological health outcomes.

Predictors	Expected relation with cross-sectional psychological health outcomes			
	Social loneliness	Emotional loneliness	Life satisfaction	COVID-19 stress
Extraversion	–	–	+	+
Neuroticism	+	+	–	+
Conscientiousness	+	+	+	–
Commitment	–	–	+	–
Study satisfaction	–	–	+	–
Active coping	–	–	+	–
Avoidant coping	+	+	–	+
Use of social support	–	–	+	0
Positive cognitive restructuring	–	–	+	–
	Expected relation with coping dimensions			
	Active coping	**Avoidant coping**	**Use of social support**	**Positive cognitive restructuring**
Extraversion	+	0	+	+
Neuroticism	–	+	+	–
Conscientiousness	+	–	0	+
Commitment	+	–	0	+
Study satisfaction	0	–	0	0

+, Expected relation is positive; –, expected relation is negative; and 0, expected relation is zero. Note that all indirect effects that suggest a (partial) mediation can be obtained by multiplying the direct effects; i.e., two positive and two negative direct effects yield a positive indirect effect, one positive and one negative direct effect yield a negative indirect effect, and if at least one direct effect is zero, the indirect effect will be zero.

MATERIALS AND METHODS

Procedure and Participants

The present study was administered as a longitudinal online study within two measurement waves, where all variables where

assessed at both measurement points. Using the university-wide e-mail distribution system, the invitation link for the study was shared with all soldier students at the University of the Bundeswehr Munich, such that every student had the opportunity to participate irrespective of subject area or study year. The first measurement wave (t_1) was carried out between 20. May and 8. June 2021 and the second measurement wave (t_2) was conducted between 21. June and 11. July 2021. Study participation at t_1 did not require participation at t_2. If consented to participate at t_2, data collection was administered such that there was a time gap of approximately 4 weeks between individual assessments. We assessed data from $N = 106$ soldier students at t_1 (Sample t_1 with $M_{age} = 23.6$ years, $SD = 3.30$; range = 19–33 years) of whom 52.8% were male. Students studied in various subject areas (e.g., aerospace engineering, psychology, sports sciences, computer science, cyber security, management and media, social sciences and public affairs, economics and management studies) at the University of the Bundeswehr Munich. We assessed data from students across all years of study with 42.3% in their 1st year of study, 22.7% in their second, 15.5% in their third, and 19.6% in their 4th year of study. At t_2, $N = 63$ soldier students participated (sample t_2 with $M_{age} = 23.5$ years, $SD = 2.97$; range = 19–33 years) of whom 52.4% were male. Thus, we obtained data from $N = 63$ at both measurement points (Sample $t_1 + t_2$). Since the students had the opportunity to obtain permission to leave the barracks on campus for specific times during the COVID-19 pandemic, we assessed the number of days that the study participants spent at campus during the month prior to our study (i.e., presence at campus). 17.9% of study participants reported having been completely absent, 31.1% reported having spent 1–6 days at campus, 11.3% reported having spent 7–13 days at campus, 8.5% reported having spent 14–19 days at campus, 18.9% reported to having spent 20–26 days at campus and 12.3% reported having spent more than 26 days at campus.

Students' participation in the study was voluntary and was compensated with course credit for psychology students. Students did not receive any monetary compensation for their participation. The institutional review board of the University of the Bundeswehr Munich approved of all procedures.

Measures

All variables were assessed at both measurement points (t_1 and t_2).

Individual Predictor: Personality

We assessed the three personality traits extraversion, neuroticism, and conscientiousness using the respective subscales from the German version (Danner et al., 2016) of the Big Five Inventory 2 (Soto and John, 2016). The three traits were assessed with 12 items each. Example items and scale reliabilities reported by Danner et al. (2016) include "*I am someone who is outgoing, sociable*" (for extraversion, $\alpha = .86$), "*I am someone who is moody, has up and down mood swings*" (for neuroticism, $\alpha = .88$), and "*I am someone who tends to be disorganized*" (for conscientiousness, negative indicator, $\alpha = .88$). Participants responded on a five-point Likert scale ranging from 1 (*completely disagree*) to 5 (*agree completely*).

Organizational Predictors

Organizational Commitment

To assess the organizational commitment toward the German armed forces (i.e., the German *Bundeswehr*), we used six items of the COMMIT (Felfe and Pundt, 2012) focusing on affective organizational commitment and adapted the item wordings naming the German armed forces as organization. An example item is "*In general, I am proud to be a member of the Bundeswehr.*" Participants responded on a five-point Likert scale ranging from 1 (*does not apply*) to 5 (*completely applies*), such that higher ratings reflected higher affective organizational commitment. Felfe and Pundt (2012) reported an internal consistency of $\alpha = .86$ for the affective organizational commitment subscale.

Study Satisfaction

Study satisfaction was assessed as an approximation to job satisfaction due to the mixture of study and work demands in our sample (see Section Soldier Students in the German *Bundeswehr* and COVID-19 for detailed information). Soldier students' study satisfaction during the COVID-19 pandemic was assessed with the FB-SZ-K questionnaire (Westermann et al., 2018). We explicitly asked participants to refer to the online-teaching conditions during the pandemic when responding to all statements. The questionnaire measures three components of study satisfaction; i.e., satisfaction with study content (e.g., "*I am really happy with what I study,*" $\alpha = .87$), satisfaction with study conditions (e.g., "*I would wish for better study conditions at the university*," negative indicator, $\alpha = .71$) and satisfaction with mastering study loads (e.g., "*Studies are killing me,*" negative indicator, $\alpha = .71$) with three items each (Westermann et al., 2018). We adapted two items of the subscale satisfaction with study conditions to represent COVID-19-related adjustments at the university (i.e., "*I would wish for better study conditions at the university during the COVID-19 pandemic*" and "*The study conditions (online classes) in my subject area are frustrating*"). In our work, we used an overall measure of study satisfaction encompassing all three subscales. Relations to key criteria (e.g., study motivation, conscientiousness) are provided, suggesting convergent validity evidence (Westermann et al., 2018). Participants answered on a 101-point Likert scale ranging from 0% (*not satisfied at all*) to 100% (*completely satisfied*).

Coping

To assess coping with the COVID-19 pandemic, we used a German translation (Kälin, 1994) of the Brief COPE (Carver, 1997) and adapted it slightly. Specifically, we added a time frame and coping target to the item instructions: "*Since last lockdown in December 2020 to cope with the COVID-19 pandemic,* …" The 28-item Brief COPE consists of 14 subscales with two items per scale which we aggregated to four overarching dimensions in accordance with more recent works on its factorial structure (e.g., Folkman and Moskowitz, 2004; Nahlen Bose et al., 2015; Baumstarck et al., 2017).

The first dimension or scale, respectively, was active coping which included the subscales active coping (e.g., "*I've been taking action to try to make the situation better*") and planning (e.g., "*I've thinking hard about what steps to take*"). The second scale was avoidance coping which included the subscales self-distraction (e.g., "*I've been turning to work or other activities to take my mind off things*"), denial (e.g., "*I've been saying to myself 'this is not real'*"), substance use (e.g., "*I've been using alcohol or other drugs to make myself feel better*"), behavioral disengagement (e.g., "*I've been giving up trying to deal with it*"), and self-blame (e.g., "*I've been criticizing myself*"). The third scale was social support and included the subscales seeking emotional support (e.g., "*I've been getting emotional support from others*"), seeking instrumental support (e.g., "*I've been getting help and advice from other people*"), and venting (e.g., "*I've been expressing my negative feelings*"). Finally, the fourth scale was positive cognitive restructuring and included the subscales positive cognitive restructuring (e.g., "*I've been looking for something good in what's happening*"), humor (e.g., "*I've been making jokes about it*"), and acceptance (e.g., "*I've been accepting the reality of the fact that it has happened*"). Participants responded on a five-point Likert scale ranging from 1 (*not at all*) to 5 (*a lot*), such that higher ratings indicated a more frequent use of the respective coping strategies. The subscale religion (e.g., "*I've been praying or meditating*") was omitted due to little variance in our sample. Baumstarck et al. (2017) reported internal consistencies of the four scales ranging between $\alpha = .64$ and $\alpha = .82$ as well as external validity evidence in the form of relations to significant criteria (e.g., quality of life, mental health).

Outcomes

Loneliness

Loneliness was assessed with the German version (Huxhold et al., 2019) of the 6-item De Jong Gierveld Loneliness Scale (De Jong Gierveld and van Tilburg, 2006) that measures the two components social (i.e., missing a social network) and emotional (i.e., missing an intimate relationship) loneliness. Again, we adapted item instructions to refer to the same time frame during the COVID-19 pandemic: "*Please indicate to which extent you agree with the following statements since last lockdown in December 2020.*" Example items are "*I experience a general sense of emptiness*" (for emotional loneliness) and "*There are plenty of people I can rely on when I have problems*" (for social loneliness, negative indicator). In the German-language loneliness scale, a four-point Likert scale is used, ranging from 1 (*not at all*) to 4 (*exactly*), such that higher ratings indicate higher loneliness. Reliability estimates ranged from $\alpha = .67$ to $\alpha = .74$ for the emotional loneliness subscale, and from $\alpha = .69$ to $\alpha = .73$ for the social loneliness subscale (De Jong Gierveld and van Tilburg, 2006). Validity evidence in the form of correlations with loneliness determinants (i.e., partner status and subjective health) were provided (De Jong Gierveld and van Tilburg, 2006).

Life Satisfaction

Life satisfaction was measured as cognitive aspect of subjective well-being using a single-item scale (Beierlein et al., 2015). We adapted the item wording to refer to the same time frame during the COVID-19 pandemic; i.e., "*How satisfied are you since last lockdown in December 2020, all in all, with your life?*." Participants responded on a 10-point Likert scale ranging from 1 (*not satisfied at all*) to 10 (*completely satisfied*) such that higher ratings indicate higher life satisfaction. Beierlein et al. (2015) reported an average test–retest reliability of $\alpha = .67$ across 6 weeks, indicating sufficient reliability for group-level analyses. Moreover, a positive correlation between this single-item scale and the well-known five-item satisfaction with life scale by Diener et al. (1985) of $r = .74$ was reported, suggesting convergent validity (Beierlein et al., 2015).

COVID-19-Related Stress

To assess subjective COVID-19-related stress, we used two self-developed items. We conceptualized COVID-19 stress as an indicator of the perceived psychological burden caused by the COVID-19 pandemic in general as well as the burden by the government-implemented measures to mitigate the spread of the virus: "*How burdened do you feel with the COVID-19 pandemic?*" and "*How burdened do you feel with the measures undertaken to contain the COVID-19 pandemic and their related restrictions?*." Again, participants were asked to refer to the time frame since last lockdown in December 2020. Participants responded on a 10-point Likert scale ranging from 1 to 10 with no verbal anchor points, such that higher ratings represented higher COVID-19-related stress.

Statistical Analyses

For statistical analyses we used the statistical software R (R Core Team, 2021) and specifically the package *lavaan* for mediation models (Rosseel, 2012). Before addressing our research questions, we examined descriptive statistics and psychometric properties of all our measures across both measurement points t_1 and t_2. Due to non-skippable items in the questionnaire, we had 0% of missing data across all items. Since the metrics of our variables varied substantially, we scaled all variables to have a mean of zero and a standard deviation of 1 prior to conducting our analyses.

To estimate the cross-sectional effects of individual and organizational soldier student factors on loneliness, life satisfaction, and COVID-19 stress (RQ1), we computed multiple linear regressions for each outcome variable that were carried out in a stepwise manner. Specifically, we entered gender, age, and days spent in the barracks in the previous month as covariates in step 1, then added the three personality traits (i.e., extraversion, neuroticism, and conscientiousness) as predictors in step 2, and finally added the two organizational factors (i.e., commitment and study satisfaction) as predictors in step 3. We then evaluated individual predictive effects as well as the change in effects by adding new predictors.

To estimate longitudinal effects of individual and organizational soldier student factors on change in loneliness, life satisfaction, and COVID-19 stress over 4 weeks (RQ2), we first examined the change in outcome variables from t_1 to t_2 using *t*-tests for paired samples. For effect size estimations,

we calculated Cohen's *d* and followed the conventional criteria ($|d| \geq .2$ for a small effect, $|d| \geq .5$ for a medium-sized effect, and $|d| \geq .8$ for a large effect; Cohen, 1988). We subsequently performed multiple regression analyses using the three-step procedure described above with the following adjustments: We used predictors at t_1, and created the difference value in each outcome variable (i.e., $t_2 - t_1$) to predict the *change* in loneliness, life satisfaction, and COVID-19 stress over the course of 4 weeks. Again, gender, age, and presence at campus were entered as covariates in step 1, personality traits as individual predictors in step 2, and commitment and study satisfaction as organizational predictors in step 3.

Finally, to address the question of whether different coping strategies mediate the relationships between individual and organizational soldier student factors and loneliness, life satisfaction, and COVID-19 stress (RQ3), we conducted mediation analyses. For the individual factors, we focused on coping dimensions that have been shown to be related to the different personality traits and psychological health in prior work (i.e., active coping and social support as mediators for the association between extraversion and psychological health, avoidant coping and social support for the neuroticism-psychological health link, and active coping and avoidant coping for the conscientiousness-psychological health relation). For the organizational factors, we used all four coping dimensions exploratively for both commitment and study satisfaction due to a lack of prior research in this field. Before conducting mediation analyses, we examined respective relations between predictor and mediator variables, and between mediator and outcome variables. Out of the set of planned mediations, we then only conducted those that showed significant direct relations to and from their potential mediator variable. We then conducted separate mediation analyses for each predictor and each outcome variable. The respective coping strategy was entered as mediator variable (and in the case of multiple mediator variables, these were entered simultaneously and allowed to correlate). In all models, we added gender, age, and presence at campus as covariates. We estimated the size of the indirect effects by calculating the squared standardized indirect path coefficients as an indicator of explained variance (Lachowicz et al., 2018). For cut-off-criteria we used 2% for a small effect, 15% for a medium-sized effect, and 25% for a large effect (Cohen, 1988).[4]

RESULTS

Descriptive Statistics

The descriptive statistics of the implemented measures at both measurement points t_1 and t_2 are displayed in **Table 2** along with the theoretical scale minima and maxima and coefficients of internal consistency and test–retest-reliability. To estimate internal consistencies, we calculated α coefficients that ranged between $\alpha = .62$ and $\alpha = .89$ across all measures and measurement points (see also **Table 2**). At the descriptive level, means and standard deviations were noticeably similar across measurement points for the individual and organizational factors, yet, somewhat lower for the coping strategies and the outcome variables loneliness, life satisfaction, and COVID-19 stress. This was reflected by indicators of test–retest reliability accordingly, where correlation coefficients ranged between $r = .85$ and $r = .91$ across individual and organizational factors, and between $r = .46$ and $r = .72$ across coping and outcome variables (all $ps < .001$).

To gain some first insight into the specifics of our soldier student sample, we compared our mean levels (using t_1 as reference) to the ones reported in other samples before the pandemic descriptively. If scale ranges differed across studies, they were transformed into a common scale of 0 to 100 to be comparable. While extraversion was slightly more pronounced in our sample ($\Delta M = .35$), levels of neuroticism ($\Delta M = -.06$) and conscientiousness ($\Delta M = -.10$ on a scale of 1–5, respectively) were comparable to a representative German sample (Danner et al., 2016). Affective organizational commitment was higher than in a comparable sample of German soldier students from 2011 ($\Delta M = .20$ on a scale of 1–5; Felfe and Scherm, 2012). Study satisfaction during the COVID-19 pandemic in our sample was lower ($\Delta M = -11.70$ on a scale of 0–100) than study satisfaction of a German student sample prior to the pandemic (Bernholt et al., 2018). On a scale of 0–100, the use of active ($\Delta M = 10.90$) and avoidant coping ($\Delta M = 7.10$) were somewhat more frequent in our sample, while seeking support was comparable across samples ($\Delta M = -2.30$), whereas positive cognitive restructuring was reported to be used more frequently compared to the other strategies within our sample and compared to other samples ($\Delta M = 23.30$; Baumstarck et al., 2017). A loneliness value of >2.5 was reported to be indicative of substantial loneliness (Huxhold et al., 2019), which was not the case in our sample, although our sample showed increased emotional loneliness that approximated the cut-off value as compared to social loneliness. Life satisfaction in our sample was higher ($\Delta M = 9.26$ on a scale of 0–100) compared to a German pre-pandemic sample in an online survey (Beierlein et al., 2015). COVID-19 stress values in our sample resembled responses obtained from another German sample with a similar scale during the pandemic ($\Delta M = -.84$ on a scale of 1–100; Brailovskaia et al., 2021). Note that the relations between COVID-19 stress and other measures used in the present study that are described below (e.g., positive relations between COVID-19 stress and neuroticism) can be interpreted as validity evidence of the newly developed measure. Taken together, at the descriptive level, our soldier student sample showed more pronounced extraversion, commitment, active and avoidant coping, positive cognitive restructuring, and life satisfaction scores, while ratings of study satisfaction were lower as compared to other samples before the pandemic. With the exception of commitment, the comparison samples were not soldier students, such that any differences might result from the specific soldier student sample, or the pandemic circumstances (or both).

[4]We additionally tested for mediation effects between the respective predictor at t_1 and the *change* in the respective outcome variable from t_1 to t_2. We could not find any significant indirect effects in these longitudinal mediation models of change.

TABLE 2 | Descriptive statistics and α reliability coefficients.

	Theoretical min, max	t_1			t_2			Test–retest reliability $t_1 - t_2$
		M	*SD*	α	*M*	*SD*	α	*r*
Individual factors (personality)								
Extraversion	1, 5	3.57	.65	.86	3.55	.65	.89	.89***
Neuroticism	1, 5	2.66	.67	.87	2.51	.63	.88	.85***
Conscientiousness	1, 5	3.57	.62	.85	3.54	.67	.88	.91***
Organizational factors								
Commitment	1, 5	3.95	.82	.89	3.91	.78	.87	.88***
Study satisfaction	0, 100	56.47	21.82	.83	57.28	2.65	.81	.87***
Mediators (coping strategies)								
Active coping	1, 5	2.83	.91	.69	2.33	.84	.74	.46***
Avoidant coping	1, 5	1.87	.64	.81	1.70	.58	.82	.63***
Social support	1, 5	2.06	.86	.82	1.78	.72	.83	.56***
Positive cognitive restructuring	1, 5	3.46	.74	.69	3.35	.72	.62	.61***
Outcomes								
Social loneliness	1, 4	1.65	.65	.81	1.56	.59	.80	.58***
Emotional loneliness	1, 4	2.37	.79	.70	2.24	.80	.79	.72***
Life satisfaction	1, 10	6.69	2.00	---	7.13	1.52	---	.64***
COVID-19 stress	1, 10	5.43	2.35	.83	4.25	2.10	.78	.69***

*Min, minimum; Max, maximum; M, mean; and SD, standard deviation. N of sample $t_1 = 106$ and N of Sample $t_2 = 63$. *p < .05; **p < .01; ***p < .001.*

Construct correlations within measurement points (i.e., cross-sectional correlations) can be found in **Table 3**. Correlations among personality traits were as expected, displaying negative relations between neuroticism and both extraversion and conscientiousness (ranges from $r = -.41$ to $r = -.28$, all $ps < .01$), and positive relations between extraversion and conscientiousness ($r = .31$ and $r = .34$ at t_1 and t_2, respectively). Correlations among the different coping strategies showed positive relations between active coping, avoidant coping, and social support (ranges from $r = .31$ to $r = .61$, all $ps < .01$), while positive cognitive restructuring was unrelated to either of the three. Correlations among the loneliness measures were as expected, indicating a positive relation between social and emotional loneliness with $r = .34$ and $r = .49$ ($ps < .001$).

Relations between individual and organizational predictor variables, potentially mediating coping strategies, and outcome variables generally reflected theoretical and empirical expectations. Extraversion was positively related to study satisfaction, active coping at t_1, and life satisfaction (ranges from $r = .26$ to $r = .33$, $ps < .05$), and negatively related to social loneliness at t_1 ($r = -.27$, $p < .01$). Neuroticism showed negative relations to commitment at t_1, study satisfaction, and life satisfaction (ranges from $r = -.49$ to $r = -.25$, $ps < .05$) and positive relations to avoidant coping, social support, social and emotional loneliness and COVID-19 stress (ranges from $r = .25$ to $r = .52$, $ps < .05$), but also to active coping at t_2 ($r = .25$, $p < .05$). Conscientiousness was positively related to study satisfaction ($r = .25$ and $r = .43$, $ps < .01$), and negatively related to avoidant coping and social support at t_2 (ranges from $r = -.32$ to $r = -.53$, $ps < .05$), but also to active coping at t_2 ($r = -.28$, $p < .05$). Commitment showed a negative relation to social loneliness at t_1 ($r = -.37$, $p < .001$) and positive relations to life satisfaction at t_1 ($r = .26$, $p < 01$). Study satisfaction was negatively related to avoidant coping, social support, social (t_1) and emotional loneliness, and COVID-19 stress at t_1 (ranges from $r = -.45$ to $r = -.26$, $ps < .01$), while showing positive relations to positive cognitive restructuring at t_1 and life satisfaction (ranges from $r = .31$ to $r = .55$, $ps < .01$). Active coping showed unexpected positive relations to emotional loneliness and COVID-19 stress (ranges from $r = .26$ to $r = .41$, $ps < .05$). Avoidant coping showed expected positive relations to social (t_1) and emotional loneliness and COVID-19 stress (ranges from $r = .30$ to $r = .58$, $ps < .05$), and negative relations to life satisfaction ($r = -.53$ and $r = -.27$, $ps < .05$). Social support displayed a similar pattern with positive relations to emotional loneliness and COVID-19 stress (ranges from $r = .50$ to $r = .52$, $ps < .001$), and negative relations to life satisfaction at t_1 ($r = -.30$, $p < .01$). Finally, positive cognitive restructuring showed negative relations to emotional loneliness at t_1 and COVID-19 stress at t_2 ($r = -.22$ and $r = -.32$, $ps < .05$), and positive relations to life satisfaction ($r = .20$ and $r = .28$, $ps < .05$).

Correlations across measurement points (i.e., longitudinal correlations) are shown in **Table A1**.

Direct Cross-Sectional Effects of Individual and Organizational Factors (RQ1)

We first addressed direct cross-sectional effects of individual and organizational soldier student factors on loneliness, life satisfaction, and COVID-19 stress (RQ1). Results of the multiple regressions that were carried out in three steps can be found in **Table 4**. The covariates gender, age, and presence at campus showed effects in only two cases across all models (i.e., age

TABLE 3 | Correlations within measurement points.

Variable	E	N	C	Com	StSa	AcCo	AvCo	SeSu	PoTh	SoLo	EmLo	LiSa	CoStr
t_1													
E	---												
N	−.28**	---											
C	.31**	−.32***	---										
Com	.16	−.25*	−.07	---									
StSa	.30**	−.49***	.25**	.01	---								
AcCo	.26**	.06	.07	.05	−.01	---							
AvCo	−.13	.52***	−.37***	−.18	−.42***	.31**	---						
SeSu	.04	.48***	−.08	−.06	−.32***	.44***	.59***	---					
PoTh	.17	−.24*	.02	.12	.31**	.17	−.07	−.17	---				
SoLo	−.27**	.38***	.01	−.37***	−.24*	−.01	.30*	.18	−.17	---			
EmLo	−.09	.37***	−.13	.03	−.45***	.26**	.47***	.50***	−.22*	.34***	---		
LiSa	.25*	−.52***	.19	.26**	.55***	−.06	−.53***	−.30**	.20*	−.46***	−.47***	---	
CoStr	.06	.42***	−.13	−.10	−.26**	.40***	.58***	.52***	−.17	.27**	.58***	−.39***	---
t_2													
E	---												
N	−.33**	---											
C	.34**	−.41***	---										
Com	.19	−.15	−.14	---									
StSa	.26*	−.41***	.43***	−.05	---								
AcCo	.17	.25*	−.28*	.03	−.16	---							
AvCo	−.01	.44***	−.53***	.12	−.43***	.61***	---						
SeSu	.02	.42***	−.32*	.16	−.39**	.59***	.60***	---					
PoTh	.10	−.22	.24	−.02	.16	.04	−.03	−.13	---				
SoLo	−.23	.46***	−.19	−.07	−.21	.20	.23	.22	−.19	---			
EmLo	.03	.35**	−.23	.19	−.46***	.32*	.38*	.52***	−.23	.49***	---		
LiSa	.33**	−.38**	.25	.02	.41***	.04	−.27*	−.24	.28*	−.10	−.22	---	
CoStr	.23	.29*	−.23	.12	−.24	.41***	.41***	.52***	−.32**	.18	.56***	−.13	---

*E, extraversion; N, neuroticism; C, conscientiousness; Com, commitment; StSa, study satisfaction; AcCo, active coping; AvCo, avoidant coping; SeSu, social support; PoTh, positive cognitive restructuring; SoLo, social loneliness; EmLo, emotional loneliness; LiSa, life satisfaction; and CoStr, COVID-19 stress. N of Sample $t_1 = 106$ and N of Sample $t_2 = 63$. *$p < .05$; **$p < .01$; ***$p < .001$.*

TABLE 4 | Standardized path coefficients of direct cross-sectional multiple regression models.

	t_1			t_2		
	Step 1: β (*SE*)	**Step 2: β (*SE*)**	**Step 3: β (*SE*)**	**Step 1: β (*SE*)**	**Step 2: β (*SE*)**	**Step 3: β (*SE*)**
Predictor at t_1 or t_2	Outcome: social loneliness at t_1			Outcome: social loneliness at t_2		
Gender	−.13 (0.10)	.00 (0.10)	.01 (0.10)	.01 (0.13)	.00 (0.13)	.00 (0.14)
Age	.01 (0.10)	−.02 (0.09)	−.06 (0.09)	−.20 (0.15)	−.10 (0.14)	−.10 (0.16)
Presence at campus	.06 (0.10)	.05 (0.09)	.06 (0.09)	−.12 (0.13)	−.08 (0.12)	−.08 (0.13)
Extraversion	---	−.23* (0.10)	−.17 (0.10)	---	−.08 (0.13)	−.08 (0.13)
Neuroticism	---	.37*** (0.10)	.27* (0.11)	---	.41** (0.14)	.39** (0.15)
Conscientiousness	---	.20 (0.10)	.16 (0.10)	---	.00 (0.14)	.00 (0.15)
Commitment	---	---	−.28** (0.09)	---	---	−.02 (0.14)
Study satisfaction	---	---	−.08 (0.11)	---	---	−.03 (0.14)
	Outcome: emotional loneliness at t_1			Outcome: emotional loneliness at t_2		
Gender	−.13 (0.10)	−.05 (0.10)	−.09 (0.10)	−.03 (0.13)	−.08 (0.13)	−.10 (0.13)
Age	−.07 (0.10)	−.08 (0.09)	−.07 (0.09)	−.28* (0.14)	−.20 (0.14)	−.13 (0.14)
Presence at campus	.19 (0.10)	.17 (0.09)	.10 (0.09)	.03 (0.13)	.05 (0.13)	−.01 (0.12)
Extraversion	---	.03 (0.10)	.07 (0.10)	---	.19 (0.13)	.20 (0.12)
Neuroticism	---	.36*** (0.10)	.22 (0.11)	---	.30* (0.14)	.22 (0.14)
Conscientiousness	---	.00 (0.11)	.01 (0.10)	---	−.17 (0.14)	−.04 (0.14)
Commitment	---	---	.06 (0.09)	---	---	.12 (0.13)
Study Satisfaction	---	---	−.35** (0.10)	---	---	−.40** (0.13)
	Outcome: life satisfaction at t_1			Outcome: life satisfaction at t_2		
Gender	.12 (0.10)	.01 (0.09)	.04 (0.08)	.16 (0.14)	.23 (0.13)	.25 (0.13)
Age	.05 (0.10)	.07 (0.09)	.09 (0.08)	.01 (0.15)	−.09 (0.14)	−.14 (0.15)
Presence at campus	−.15 (0.10)	−.12 (0.09)	−.06 (0.08)	−.10 (0.14)	−.13 (0.12)	−.08 (0.12)
Extraversion	---	.11 (0.09)	.02 (0.08)	---	.21 (0.13)	.21 (0.13)
Neuroticism	---	−.50*** (0.09)	−.26** (0.10)	---	−.27 (0.14)	−.21 (0.14)
Conscientiousness	---	−.02 (0.10)	.00 (0.09)	---	.13 (0.14)	.04 (0.15)
Commitment	---	---	.20* (0.08)	---	---	−.08 (0.13)
Study satisfaction	---	---	.40*** (0.09)	---	---	.28* (0.13)
	Outcome: COVID-19 stress at t_1			Outcome: COVID-19 stress at t_2		
Gender	−.23* (0.10)	−.16 (0.10)	−.17 (0.10)	.09 (0.13)	.06 (0.13)	.05 (0.13)
Age	−.08 (0.10)	−.08 (0.09)	−.08 (0.09)	−.23 (0.15)	−.17 (0.14)	−.16 (0.15)
Presence at campus	.08 (0.10)	.07 (0.09)	.04 (0.09)	−.01 (0.13)	−.01 (0.12)	−.03 (0.12)
Extraversion	---	.20* (0.09)	.23* (0.10)	---	.42** (0.12)	.43** (0.13)
Neuroticism	---	.41*** (0.10)	.34** (0.11)	---	.30* (0.13)	.26 (0.14)
Conscientiousness	---	−.09 (0.10)	−.09 (0.10)	---	−.22 (0.14)	−.18 (0.15)
Commitment	---	---	−.05 (0.10)	---	---	−.01 (0.13)
Study satisfaction	---	---	−.13 (0.11)	---	---	−.14 (0.14)

*SE, standard error. N of sample t_1 = 106 and N of sample t_2 = 63. *p < .05; **p < .01; ***p < .001.*

predicted emotional loneliness negatively at t_2, $\beta = -.28$, $p < .05$, and gender predicted COVID-19 stress negatively at t_1, $\beta = -.23$, $p < .05$, indicating higher COVID-19 stress for females. Neither of these effects remained statistically significant when personality traits were entered as predictors in step 2 suggesting a better predictability of relations through personality traits than age and gender).

Within each of the two measurement points, a, respectively, similar result pattern emerged. Neuroticism showed to be the strongest predictor among the personality traits, displaying positive relations to emotional and social loneliness, and COVID-19 stress (ranges from $\beta = .30$ to $\beta = .42$, $ps < .05$), and a negative relation to life satisfaction ($\beta = -.50$, $p < .001$) in step 2. Extraversion predicted social loneliness negatively ($\beta = -.23$, $p < .05$) and COVID-19 stress positively ($\beta = .20$ and $\beta = .42$, $p < .05$) in step 2. However, after the inclusion of commitment and study satisfaction in step 3, most of these effects either shrunk in size, or did not remain statistically significant. Instead, commitment predicted social loneliness at t_1 negatively ($\beta = -.28$, $p < .01$) and life satisfaction at t_1 positively ($\beta = .20$, $p < .05$) over and above the personality traits. Study satisfaction predicted emotional loneliness negatively ($\beta = -.35$ and $\beta = -.40$, $p < .01$), and life satisfaction positively ($\beta = .40$ and $\beta = .28$, $p < .05$). In conclusion, more extraverted people tended to experience more COVID-19 stress. Persons who scored higher on neuroticism tended to show associations with more negatively connotated (i.e., loneliness and COVID-19 stress) and less positively connotated variables (i.e., life satisfaction). The expected relations presented in **Table 1** were partially supported. Contrary to expectations, extraversion and conscientiousness were unrelated to loneliness and life satisfaction, and conscientiousness was unrelated to COVID-19 stress as well. Commitment was negatively related to social but not emotional loneliness, and vice versa for study satisfaction, while both were unrelated to COVID-19 stress. All other relations were in the expected direction. Although neuroticism was the strongest predictor among all three personality traits, the organizational factors commitment

and study satisfaction showed incremental validity in explaining some of these outcome variables above and beyond personality traits (RQ1).

Direct Longitudinal Effects of Individual and Organizational Factors (RQ2)

We then addressed the question of direct longitudinal effects of individual and organizational factors on the change in loneliness, life satisfaction, and COVID-19 stress (RQ2). Means, standard deviations and results of paired samples *t*-tests along with their effect size are displayed in **Table 5**. The only statistically significant changes from t_1 to t_2 were found for emotional loneliness, $t(62) = 2.11$, $p < .05$, $d = .27$, and for COVID-19 stress $t(62) = 5.39$, $p < .001$, $d = .68$, which both decreased over time. The stepwise multiple regression analyses with the difference value in each outcome variable (i.e., the change values) did not reveal any significant relations for individual and organizational factors across all models (see **Table 5**). Gender showed to be a significantly positive predictor of change in COVID-19 stress that remained significant after the inclusion of all individual and organizational predictors ($\beta = .34$, $p < .05$), indicating that females reported a greater decrease in COVID-19 stress than males. An additional *t*-test revealed that at t_1, females had significantly higher COVID-19 stress ($M = 6.00$, $SD = 2.16$) than males ($M = 4.92$, $SD = 2.40$), $t(104) = 2.44$, $p < .05$, while the COVID-19 stress at t_2 did not differ across gender anymore, $t(58) = -.32$, $p > .05$. Taken together, results indicated that participants experienced substantial changes in emotional loneliness and COVID-19 stress between the measurement points. Yet, these changes could not be predicted by individual or organizational soldier student factors, while the change in COVID-19 stress could be predicted by gender.

Mediation Effects Through Coping (RQ3)

Finally, we addressed the question of coping strategies as possible mediators of the relationship between individual and organizational soldier student factors and loneliness, life satisfaction, and COVID-19 stress (RQ3). For the individual factors, we aimed at testing specific relations (see section Statistical Analyses), while we aimed at testing all four coping dimensions exploratively for the organizational factors. As a prerequisite for mediation analyses, we first examined relations of individual and organizational factors to their respective mediators as well as relations of the potential mediators to the outcome variables. Not all postulated direct relations reached statistical significance at either of the measurement points (see **Table 3**). Specifically, relations between extraversion and social support, between commitment and all four coping strategies, between active coping and study satisfaction, social loneliness, and life satisfaction, between social support and social loneliness, and between positive cognitive restructuring and social loneliness were not statistically different from zero (see **Table 3**) which was partially in contrast to previous expectations (**Table 1**). Therefore, mediation analyses building upon either of these relations were not conducted.

TABLE 5 | Descriptive statistics, *t*-tests of change, and standardized path coefficients of direct longitudinal multiple regression models.

	$M_{t2\text{-}t1}$	$SD_{t2\text{-}t1}$	*t* (df)	*d*
Change in social loneliness from t_1 to t_2	−.02	.53	.32 (62)	.04
Change in emotional loneliness from t_1 to t_2	−.15	.58	2.11* (62)	.27
Change in life satisfaction from t_1 to t_2	.22	1.35	−1.31 (62)	−.17
Change in COVID-19 stress from t_1 to t_2	−1.18	1.74	5.39*** (62)	.68
	Step 1: β (SE)	**Step 2: β (SE)**	**Step 3: β (SE)**	
Predictor at t_1	Outcome: change in social loneliness			
Gender	.04 (0.14)	.03 (0.15)	.03 (0.15)	
Age	−.15 (0.15)	−.13 (0.15)	−.06 (0.16)	
Presence at campus	−.14 (0.14)	−.12 (0.14)	−.15 (0.14)	
Extraversion	---	.17 (0.14)	.12 (0.14)	
Neuroticism	---	.16 (0.15)	.20 (0.17)	
Conscientiousness	---	−.05 (0.15)	.01 (0.16)	
Commitment	---	---	.24 (0.16)	
Study satisfaction	---	---	.04 (0.16)	
	Outcome: change in emotional loneliness			
Gender	−.04 (0.14)	−.04 (0.15)	−.05 (0.16)	
Age	−.06 (0.15)	−.06 (0.15)	−.04 (0.16)	
Presence at campus	.08 (0.14)	.09 (0.14)	.08 (0.14)	
Extraversion	---	.19 (0.14)	.19 (0.15)	
Neuroticism	---	.18 (0.15)	.17 (0.17)	
Conscientiousness	---	−.04 (0.15)	−.02 (0.16)	
Commitment	---	---	.04 (0.17)	
Study satisfaction	---	---	−.05 (0.17)	
	Outcome: change in life satisfaction			
Gender	.20 (0.13)	.20 (0.15)	.16 (0.15)	
Age	−.15 (0.15)	−.13 (0.15)	−.16 (0.16)	
Presence at campus	−.06 (0.13)	−.04 (0.14)	−.05 (0.14)	
Extraversion	---	.00 (0.14)	.08 (0.14)	
Neuroticism	---	.16 (0.15)	.05 (0.16)	
Conscientiousness	---	−.03 (0.15)	−.05 (0.16)	
Commitment	---	---	−.19 (0.16)	
Study satisfaction	---	---	−.20 (0.16)	
	Change in COVID-19 stress			
Gender	.29* (0.13)	.34* (0.15)	.34* (0.15)	
Age	−.05 (0.15)	−.07 (0.15)	−.13 (0.16)	
Presence at campus	−.01 (0.13)	−.01 (0.13)	.02 (0.14)	
Extraversion	---	.03 (0.13)	.07 (0.14)	
Neuroticism	---	.04 (0.15)	.02 (0.17)	
Conscientiousness	---	.11 (0.15)	.06 (0.16)	
Commitment	---	---	−.19 (0.16)	
Study satisfaction	---	---	.05 (0.16)	

*SD, standard deviation; d, Cohen's d; and SE, standard error. N of sample $t_1 = 106$; N of sample $t_2 = 63$. *p < .05; **p < .01; ***p < .001.*

Standardized indirect effects for mediation effects between individual (i.e., personality) factors and outcome variables are shown in **Table 6**. In general, more statistically significant paths can be seen at t_1 as opposed to t_2. Avoidant coping was the most frequent mediator at t_1, mediating between neuroticism and life satisfaction ($\beta = -.21$, $p < .01$), neuroticism and COVID-19 stress ($\beta = .23$, $p < .001$), conscientiousness and social loneliness ($\beta = -.13$, $p < .05$), conscientiousness and life satisfaction ($\beta = .20$, $p < .01$), and conscientiousness and COVID-19 stress ($\beta = -.20$, $p < .05$). Active coping mediated the relation between extraversion and COVID-19 stress only ($\beta = .10$, $p < .05$). Social support mediated the relation between neuroticism and emotional loneliness ($\beta = .15$,

TABLE 6 | Standardized indirect path coefficients, standard errors, and effect sizes for the individual factor-mediation models.

	t_1		t_2	
	β_{ind} (*SE*)	β_{ind}^2	β_{ind} (*SE*)	β_{ind}^2
Predictor: extraversion	Outcome: emotional loneliness			
Extraversion ➔ Active coping ➔ Emotional loneliness	.07 (0.04)	.00	.05 (0.04)	.00
	Outcome: COVID-19 stress			
Extraversion ➔ Active coping ➔ COVID-19 stress	.10* (0.04)	.01	.06 (0.05)	.00
Predictor: neuroticism	Outcome: social loneliness			
Neuroticism ➔ Avoidant coping ➔ Social loneliness	.08 (0.06)	.01	.01 (0.05)	.00
	Outcome: emotional loneliness			
Neuroticism ➔ Avoidant coping ➔ Emotional loneliness	.11 (0.06)	.01	.04 (0.06)	.00
Neuroticism ➔ Social support ➔ Emotional loneliness	.15** (0.06)	.03	.16* (0.07)	.03
	Outcome: life satisfaction			
Neuroticism ➔ Avoidant coping ➔ Life satisfaction	−.21** (0.06)	.05	−.10 (0.07)	.01
Neuroticism ➔ Social support ➔ Life satisfaction	.07 (0.05)	.00	.00 (0.06)	.00
	Outcome: COVID-19 stress			
Neuroticism ➔ Avoidant coping ➔ COVID-19 stress	.23*** (0.06)	.05	.05 (0.06)	.00
Neuroticism ➔ Social support ➔ COVID-19 stress	.10* (0.05)	.01	.18* (0.08)	.03
Predictor: conscientiousness	Outcome: social loneliness			
Conscientiousness ➔ Avoidant coping ➔ Social loneliness	−.13** (0.05)	.02	−.08 (0.08)	.01
	Outcome: emotional loneliness			
Conscientiousness ➔ Active coping ➔ Emotional loneliness	.01 (0.01)	.00	−.04 (0.04)	.00
Conscientiousness ➔ Avoidant coping ➔ Emotional loneliness	−.16** (0.05)	.03	−.13 (0.09)	.02
	Outcome: life satisfaction			
Conscientiousness ➔ Avoidant coping ➔ Life satisfaction	.20** (0.06)	.04	.14 (0.08)	.02
	Outcome: COVID-19 stress			
Conscientiousness ➔ Active coping ➔ COVID-19 stress	.01 (0.02)	.00	−.08 (0.05)	.01
Conscientiousness ➔ Avoidant coping ➔ COVID-19 stress	−.20** (0.06)	.04	−.11 (0.09)	.01

*SE, standard error. N of sample t_1 = 106 and N of sample t_2 = 63. *p < .05; **p < .01; ***p < .001.*

$p < .01$) and neuroticism and COVID-19 stress ($\beta = .10$, $p < .05$). At t_2, only social support significantly mediated relations between neuroticism and emotional loneliness, and neuroticism and COVID-19 stress, respectively ($\beta = .16$ and $\beta = .18$, $p < .05$).

Standardized indirect effects for organizational factors and outcome variables are shown in **Table 7**. Mediation models with commitment as predictor were omitted due to the lack of significant relations of commitment to either of the coping strategies. For study satisfaction as predictor, the pattern of results differed between the two measurement points. Again, avoidant coping dominantly mediated relations at t_1, specifically the relation between study satisfaction and social loneliness ($\beta = -.10$, $p < .05$), study satisfaction and life satisfaction ($\beta = .18$, $p < .01$), and study satisfaction and COVID-19 stress ($\beta = -.20$, $p < .01$), while social support mediated the relation between study satisfaction and emotional loneliness ($\beta = -.09$, $p < .05$). At t_2, the pattern changed such that social support was the only coping strategy showing significant indirect effects, mediating the relation between study satisfaction and emotional loneliness ($\beta = -.13$, $p < .05$) and study satisfaction and COVID-19 stress ($\beta = -.16$, $p < .05$). To sum up, we found significant indirect paths indicating mediation effects, i.e., indications of mechanisms underlying the personality-psychological health and study satisfaction-psychological health associations through certain coping strategies. The result pattern largely differed between the two measurement points. Avoidant coping and social support mainly mediated relations between personality traits and study satisfaction on the one hand and loneliness, life satisfaction, and COVID-19 stress on the other hand, with avoidant coping focally mediating relations at t_1, and social support focally mediating relations at t_2.

DISCUSSION

The COVID-19 pandemic has profoundly disrupted daily life and posed a significant multidimensional stressor for many people across the globe. Both students on the one hand and military personnel on the other hand have been reported to react to this extraordinary situation with psychological distress (e.g., Wang et al., 2020; Gordon et al., 2021). However, it is unclear how persons respond to the COVID-19 pandemic that comprise both roles—that of the student and of the soldier—at the same time. Therefore, the present study examined soldier students of the German *Bundeswehr* at two measurement points during the 2nd year of the COVID-19 pandemic in Germany. To consider this special organization, we investigated not only personality trait effects (extraversion, neuroticism, conscientiousness), but also organizational factor effects (organizational commitment and study satisfaction) on psychological health (loneliness, life satisfaction, and COVID-19 stress). We further considered potentially mediating effects of different coping dimensions (active coping, avoidant coping, seeking support, positive cognitive restructuring). In doing so, we aimed to highlight protective and vulnerability factors with regard to psychological health during the COVID-19 pandemic in a military student sample.

TABLE 7 | Standardized indirect path coefficients, standard errors, and effect sizes for the organizational factor-mediation models.

	t_1		t_2	
	β_{ind} (*SE*)	β_{ind}^2	β_{ind} (*SE*)	β_{ind}^2
Predictor: study satisfaction	Outcome: social loneliness			
Study satisfaction ➔ Avoidant coping ➔ Social loneliness	−.10* (0.05)	.01	−.07 (0.06)	.00
	Outcome: emotional loneliness			
Study satisfaction ➔ Avoidant coping ➔ Emotional loneliness	−.07 (0.05)	.00	−.03 (0.06)	.00
Study satisfaction ➔ Social support ➔ Emotional loneliness	−.09* (0.04)	.01	−.13* (0.06)	.02
Study satisfaction ➔ Positive cognitive restructuring ➔ Emotional loneliness	−.02 (0.03)	.00	−.02 (0.02)	.00
	Outcome: life satisfaction			
Study satisfaction ➔ Avoidant coping ➔ Life satisfaction	.18** (0.06)	.03	.10 (0.07)	.01
Study satisfaction ➔ Social support ➔ Life satisfaction	−.04 (0.03)	.00	−.02 (0.05)	.00
Study satisfaction ➔ Positive cognitive restructuring ➔ Life satisfaction	.02 (0.03)	.00	.04 (0.03)	.00
	Outcome: COVID-19 stress			
Study satisfaction ➔ Avoidant coping ➔ COVID-19 Stress	−.20** (0.06)	.04	−.06 (0.06)	.00
Study satisfaction ➔ Social support ➔ COVID-19 Stress	−.07 (0.04)	.00	−.16* (0.07)	.03
Study satisfaction ➔ Positive cognitive restructuring ➔ COVID-19 stress	−.03 (0.03)	.00	−.05 (0.04)	.00

*SE, standard error. N of sample $t_1 = 106$ and N of sample $t_2 = 63$. Significant indirect paths are printed in bold. *p<.05; **p<.01; ***p<.001.*

Personality, Commitment, and Study Satisfaction as Predictors of Psychological Health

Personality traits, commitment, and study satisfaction showed high test–retest reliability coefficients, that exceeded those of social and emotional loneliness, life satisfaction, and COVID-19 stress at the descriptive level. Keeping in mind that all individual and organizational predictors (except for study satisfaction) were assessed in general (i.e., as traits), but all outcome variables were assessed with regard to a specific time frame during the pandemic, these findings might indicate the context-specificity in a dynamic situation. Other studies have already pointed out the need to closely monitor the respective time frame in such dynamic contexts with rapid changes in political measures (Moradian et al., 2021).

Results from the stepwise multiple regressions yielded support for the relevance of both personality traits and organizational factors in predicting psychological health indicators at the same time point (RQ1). Controlling for gender, age, and presence at campus, we observed positive relations between extraversion and COVID-19 stress that replicates previous reports of a weakened positive effect of extraversion on psychological health in times of social distancing (Gubler et al., 2021; Zacher and Rudolph, 2021a). Possibly, this might also be related to military samples that have shown to score higher in extraversion (Klee and Renner, 2016). Extraversion was unrelated to social and emotional loneliness and life satisfaction, when all other predictors were considered, suggesting a higher relevance of other variables. Neuroticism could be confirmed as a vulnerability factor for psychological stress, showing positive relations to social loneliness and negative relations to life satisfaction when all predictors were considered, thus replicating prior research. Conscientiousness was unrelated to either of the criteria. During the pandemic, conscientiousness mainly turned out to predict adherence to implemented containment-measures (Carvalho et al., 2020). The combination of higher conscientiousness scores in military samples (Klee and Renner, 2016) and the finding that adhering to measures has been shown to be related to higher depressive symptoms (Wright et al., 2021) might be the reason why conscientiousness seemed to have lost some of its positive impact on psychological health. Remarkably, the organizational factors commitment and study satisfaction were strong predictors over and above extraversion and neuroticism in social and emotional loneliness and life satisfaction, but not in COVID-19 stress. Commitment showed a negative relation to social loneliness and positive relation to life satisfaction above personality traits, standing in line with prior negative relations between commitment and stress in a military sample (Dobreva-Martinova, 2002). Study satisfaction was the only significant negative predictor of emotional loneliness, when all predictors were considered. Similar relations have been reported for job satisfaction (that we approximated with study satisfaction in our sample) and loneliness at the workplace (Tabancali, 2016; Bakır and Aslan, 2017). Moreover, study satisfaction predicted life satisfaction positively above all other predictors. Such a spillover effect has been shown in the literature already (Heller et al., 2004). Yet, this relation could also be explained by a higher perceived job importance in the military sector during the pandemic that has been identified as moderator of job and life satisfaction in prior work (Rice et al., 1985). Taken together, we identified relations of personality traits to psychological health outcomes, but also relations of organizational factors that showed incremental validity in predicting psychological health outcomes. This indicates a high relevance of organizational factors for psychological health of soldier students who live and study in barracks at campus.

Examining relations between individual and organizational predictors and the change in psychological health outcomes over 4 weeks (RQ2) did not yield any significant results except for a gender effect on the change in COVID-19 stress (i.e., females experiencing a stronger decrease in COVID-19 stress over time than males). Females had reported significantly higher COVID-19 stress than males at the first but not at the second measurement point. Previous research reported higher stress

levels during the pandemic for females (Prowse et al., 2021; Peyer et al., 2022). Our findings thus indicate the advantage of longitudinal measurement that allows for estimating the stability or variability of differences.

Individual and organizational factors were not able to predict change in any of the psychological health outcomes. Considering the large autocorrelations of the outcome variables between the two measurement points, it seems plausible to assume that the variance of change is limited (i.e., the variables were too stable), motivating research on possibilities of initiating change in non-desirable outcomes (e.g., through tailored interventions). Future research could examine intraindividual change on a more fine-grained level (e.g., through daily diary studies) to reveal temporal dynamics and their antecedents and consequences.

The Role of Coping Strategies in Predicting Psychological Health

When considering the role of coping strategies as possible mediators between individual and organizational predictors and psychological health outcomes (RQ3), we first registered some unexpected bivariate relations, including positive relations between active coping and avoidant coping, neuroticism, emotional loneliness, and COVID-19 stress, and negative relations of active coping to conscientiousness. Further, we found zero relations of positive cognitive restructuring to all other coping strategies. The accumulation of unexpected relations centering around the strategy active coping stands in contrast to previous findings that reported beneficial effects of active coping on psychological health during the pandemic (Budimir et al., 2021; Jin et al., 2021; Zacher and Rudolph, 2021b), yet referred to a different time frame. It is possible that in the 2nd year of the pandemic where our study was carried out, the phenomenon pandemic fatigue (Lilleholt et al., 2020) can account for these findings. Possibly, active coping strategies (e.g., planning) are inefficient when circumstances are highly unpredictable and change rapidly. Further, we found the use of social support to be positively related to emotional loneliness and COVID-19 stress, and negatively related to life satisfaction. This supports the notion of social support as "double-edged sword" (Carver et al., 1989; Revenson et al., 1991), that can highly differ in usefulness depending on the (dys-)functionality of social interactions. Contrary to previous findings, extraversion was not related to social support in our study. Further, commitment was unrelated to either of the coping strategies. Although the positive effect of commitment on psychological health is well established, the underlying mechanisms are hardly examined (Rivkin et al., 2018). In our study, we found no evidence for coping strategies as mechanisms of commitment's effect on psychological health.

Evidence for mediation effects could be found for avoidant coping as mediator between neuroticism and both life satisfaction and COVID-19 stress, between conscientiousness and social loneliness, life satisfaction, and COVID-19 stress, between study satisfaction and social loneliness, life satisfaction, and COVID-19 stress. Active coping mediated the relation between extraversion and COVID-19 stress. Social support mediated relations between neuroticism and emotional loneliness and COVID-19 stress, and between study satisfaction and emotional loneliness and COVID-19 stress. We further found differences between the measurement points, such that avoidant coping dominantly mediated relations at the first measurement point while social support dominantly mediated relations at the second measurement point. We can thus conclude that coping strategies play an important role in processing stressful events and later psychological health in a military student sample. Among the coping strategies, avoidant coping and social support were the most pronounced mediators, while we, unexpectedly, did not find any indirect effects through positive cognitive restructuring. Differences between measurement points support the notion of coping as a *process* (Folkman and Moskowitz, 2004). The role of positive cognitive restructuring in our sample remains unclear, yet, it is descriptively reported to be the most frequently used coping strategy of all, and is further positively related to life and study satisfaction and negatively associated with COVID-19 stress. Perhaps, more stress-specific personality characteristics like sense of coherence (Antonovsky, 1993) or hardiness (Kobasa, 1979; Maddi, 2013) would operate as stronger predictors of this influential coping strategy (e.g., Williams et al., 1992; Pallant and Lae, 2002; Fok et al., 2005; Bartone and Bowles, 2020).

LIMITATIONS

We note some important limitations of our study. First, within the cross-sectional analyses, we drew on a correlational design and used the terms of prediction and effect in accordance with theoretical assumptions, but of course not causality. Yet, we conducted a study with two measurement points over 4 weeks, that allows for (a) certain estimations of robustness of results, and (b) estimations of longitudinal effects controlling for previous construct manifestations. Second, our sample size particularly at the second measurement point, is limited, with about 60% of the initial sample partaking in the second measurement point. Consequentially, some regression coefficients at t_2 are similar to coefficients at t_1 in size, yet, do not reach statistical significance, partially accounting for differences in result patterns across the measurement points. Third, we conducted our study in an online format where inherently, a lack of control and insight on the response process and possible biases occurs. However, this was the most feasible way of data collection during the pandemic. Further, the online survey was thoroughly pre-tested to enhance user experience and prevent any systematic response bias. We found no indication for low data quality (e.g., extremely short response times) which was in line with prior research on the adequacy of online studies as compared to traditional methods (Gosling et al., 2004). Fourth, there is considerable incoherence in classifying individual coping strategies into higher-order coping strategies (Folkman and Moskowitz, 2004, see also Solberg et al., 2021 for a recent review). Further coping research could benefit significantly from coherent classifications that are derived from

factorial validation efforts and are then comparable across studies. Fifth, we operationalized commitment and study satisfaction as organizational variables, although there is a confounding of individual and organizational aspects within these variables. We chose this approach as the *Bundeswehr* as military organization has well-known organizational features (Richter, 2017), and we considered individual perceptions of organizational well-being more crucial on psychological health outcomes. Nevertheless, further research could assess both self- and other-rated indicators of organizational features to obtain a more balanced picture.

IMPLICATIONS AND CONCLUSION

We found personality traits, but also organizational factors to be significantly related to psychological health (i.e., loneliness, life satisfaction, and COVID-19 stress), out of which some were mediated by different coping strategies in a sample of soldier students during the 2nd year of the COVID-19 pandemic. In doing so, we shed some light on stress and coping in a specific sample that comprises a professional double-role (i.e., soldier and student) in the German *Bundeswehr* during an extraordinary pandemic situation. These emergency service professions are pivotal in countries' functioning in extreme cases. It is thus crucial to understand critical predictors of coping processes and psychological health in these groups. In the present study, we identified potentially vulnerability (i.e., neuroticism, extraversion, avoidant coping, active coping, social support) and protective factors (i.e., commitment, study satisfaction) in a pandemic setting and a military student sample. The relative importance of organizational variables *over and above* individual variables in this sample is remarkable. The findings of the present study yield important implications for the military in personnel selection and training. For instance, neuroticism showed to be a strong predictor of negative psychological health outcomes, enabling tailored and more efficient interventions even at the personality trait level (e.g., Roberts et al., 2017). Likewise, soldier students can be made aware of different coping strategies and the (mal-)adaptiveness under different circumstances such that they can engage in functional coping strategies that reduce psychological distress efficiently. These insights can be implemented in programs that lay emphasis on building strengths and personal resources to enhance employee well-being and psychological health (e.g., Krick et al., 2018). The predictive strength of affective organizational commitment and study satisfaction on psychological health above and beyond personality traits is particularly of interest to military leaders. In this very distinct organization, organizational variables might be even more decisive for employee health than in other organizations, suggesting a pronounced responsibility on the one hand, but also diverse opportunities to strengthening employee health on the other hand. For instance, study satisfaction was related to psychological health both directly as well as indirectly through coping strategies, and showed to be a strong predictor of emotional loneliness and life satisfaction. This knowledge is crucial at the university level and directly implies opportunities for action for enhancing student well-being (e.g., by improving study conditions). Summing up, the military affiliation should be considered at the individual and organization level when working with these samples with the ultimate goal to supporting those efficiently, who are committed to supporting us.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the data of soldier students is available only under strict restrictions. Requests to access the datasets should be directed to karl-heinz.renner@unibw.de.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethik-Kommission der Universität der Bundeswehr München Universität der Bundeswehr München Werner-Heisenberg-Weg 39 85577 Neubiberg. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AE and K-HR contributed to the conception and design of the study and organized the data collection. IT and AE performed the statistical analyses. IT wrote the manuscript. All authors contributed to the article and approved the submitted version.

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APPENDIX

TABLE A1 | Correlations across both measurement points.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. E $_{t1}$																									
2. E $_{t2}$	.89***	---																							
3. N $_{t1}$	−.28**	−.26*	---																						
4. N $_{t2}$	−.29*	−.33**	.85**	---																					
5. C $_{t1}$	.31**	.34**	−.32***	−.36**	---																				
6. C $_{t2}$	.30*	.34**	−.30*	−.41***	.91***	---																			
7. Com $_{t1}$	.16	.24	−.25*	−.12	−.07	−.16	---																		
8. Com $_{t2}$	.12	.19	−.20	−.15	−.11	−.14	.88***	---																	
9. StSa $_{t1}$	.30**	.26*	−.49***	−.38**	.25**	.36**	.01	−.02	---																
1. StSa $_{t2}$	.29*	.26*	−.41***	−.41***	.39**	.43***	−.08	−.05	.87***	---															
11. AcCo $_{t1}$	.26**	.35**	.06	.04	.07	−.02	.05	.13	−.01	.07	---														
12. AcCo $_{t2}$	.17	.17	.15	.25*	−.35**	−.28*	.04	.03	−.21	−.16	.46***	---													
13. AvCo $_{t1}$	−.13	.05	.52***	.30*	−.37***	−.38**	−.18	.02	−.42***	−.42***	.31**	.45***	---												
14. AvCo $_{t2}$	.01	−.01	.32*	.44***	−.51***	−.53***	.16	.12	−.35**	−.43***	.24	.61***	.63***	---											
15. SeSu $_{t1}$	.04	.10	.48***	.38**	−.08	−.04	−.06	.04	−.32***	−.35**	.44***	.24	.59***	.21	---										
16. SeSu $_{t2}$	.02	.02	.28*	.42***	−.30*	−.32*	.17	.16	−.32*	−.39**	.34**	.59***	.46***	.60***	.56***	---									
17. PoTh $_{t1}$	.17	.11	−.24*	−.14	.02	.17	.12	.03	.31**	.20	.17	.05	−.07	−.01	−.17	−.09	---								
18. PoTh $_{t2}$	.05	.10	−.13	−.22	.14	.24	−.05	−.02	.18	.16	−.12	.04	.07	−.03	−.08	−.13	.62***	---							
19. SoLo $_{t1}$	−.27**	−.28*	.38***	.20	.01	−.03	−.37***	−.22	−.24*	−.03	−.01	.11	.30*	.11	.18	.04	−.17	−.02	---						
2. SoLo $_{t2}$	−.12	−.23	.29*	.46***	−.11	−.19	−.05	−.07	−.16	−.21	.06	.20	.13	.23	.14	.22	.03	−.19	.58***	---					
21. EmLo $_{t1}$	−.09	−.03	.37***	.21	−.13	−.17	.03	.19	−.45***	−.31*	.26**	.26*	.47***	.35*	.50***	.35**	−.22*	−.21	.34***	.39**	---				
22. EmLo $_{t2}$	.04	.03	.26*	.35**	−.18	−.23	.20	.19	−.43***	−.46***	.13	.32*	.25*	.38*	.48***	.52***	−.23	−.23	14	.49***	.72***	---			
23. LiSa $_{t1}$	.25*	.25	−.52***	−.41***	.19	.30*	.26**	.07	.55***	.46***	−.06	−.11	−.53***	−.37**	−.30**	−.21	.20*	.14	−.46***	−.08	−.47***	−.19	---		
24. LiSa $_{t2}$	.34**	.33**	−.34**	−.38**	.22	.25	.04	.02	.37**	.41***	.09	.04	−.31*	−.27*	−.30*	−.24	.41***	.28*	−.29*	−.10	−.35**	−.22	.64***	---	
25. CoStr $_{t1}$	.06	.22	.42***	.22	−.13	−.16	−.10	.25*	−.26**	−.19	.40***	.28*	.58***	.29*	.52***	.40**	−.17	−.34**	.27**	.30*	.58***	.59***	−.39***	−.23	---
26. CoStr $_{t2}$	.17	.23	.26*	.29*	−.18	−.23	.21	.12	−.25	−.24	.26*	.41***	.31*	.41***	.32*	.52***	−.32*	−.32**	.01	.18	.42***	.56***	−.14	−.13	.69***

*E, extraversion; N, neuroticism; C, conscientiousness; Com, commitment; StSa, study satisfaction; AcCo, active coping; AvCo, avoidant coping; SeSu, social support; PoTh, positive cognitive restructuring; SoLo, social loneliness; EmLo, emotional loneliness; LiSa, life satisfaction; and CoStr, COVID-19 stress. N of sample $t_1 = 106$ and N of sample $t_2 = 63$. *p<.05; **p<.01; ***p<.001.*

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Individual-based and interactional resilience mechanisms in social and healthcare service NPOs during the COVID-19 pandemic: Handling a disruptive extreme context in Austria

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While Austrian social and healthcare service nonprofit organizations (NPOs) are key performers in the COVID-19 pandemic, we also notice their vulnerability in terms of struggling with this disruptive extreme context. The particularity of disruptive extreme contexts is that organizations commonly can neither anticipate them, nor prepare specific countermeasures or specialized resources for fighting against them. Thus, we regard organizational resilience based on non-specialized resources as an appropriate approach for dealing with (the struggles of) disruptive extreme contexts. Organizational resilience refers to an organization's ability to resist disruptive extreme contexts while maintaining and adapting functionality and ultimately learning from these extreme contexts by mobilizing and accessing the required resources, behaviors and capabilities. Based on 33 expert interviews with NPO top and middle managers we aim to explore individual-based and interactional resilience mechanisms of NPOs in the pandemic. The qualitative content analysis yielded to following results: Individual personality traits (e.g., pragmatisms, flexibility) and attitudes (serenity and optimism) constitute individual-based resilience mechanisms. Moreover, a shared (crisis) understanding (e.g., common sense of direction), social connectedness (e.g., team cohesion) and managerial staff orientation (e.g., a caring attitude) as interactional resilience mechanisms helped to maintain and adapt NPOs' functioning. Overall, this study reinforces the multilevel nature of resilience in terms of the crucial combination of individual and interactional resilience mechanisms for facing adversity. Moreover, it emphasizes the evolving nature of resilience in terms of the required time for, e.g., building trust.

KEYWORDS

resilience, COVID-19 pandemic, social and healthcare service NPOs, individual mechanisms, interactional antecedents

Introduction

The abrupt outbreak and ongoing threat of the COVID-19 pandemic have made the need of resilience even more clear (Barton et al., 2020; Guistiniano et al., 2020). The pandemic sent a jolt across the globe and resulted not only in a health, but also in a social and economic crisis (Brammer et al., 2020; Hutton et al., 2021; Kuenzi et al., 2021; Sarkar and Clegg, 2021). It caused a worldwide disruption of business models, global institutional alignments, social and political processes as well as organizational disruptions (Lewin et al., 2020; Sarkar and Clegg, 2021). Thus, it has affected citizens, governments, businesses and nonprofit organizations (NPOs). The pandemic hit NPOs hard by creating financial and organizational challenges (Deitrick et al., 2020). Although the crisis highlighted their vulnerability, many NPOs worldwide also were crucial players in mitigating its devastating effects (Shi et al., 2020; Kim et al., 2022), like in Austria, where NPOs have a decisive role in coping with the pandemic since its beginning in March 2020. This is notably the case for social and healthcare service NPOs that offer multiple care and counseling services. A continuous service supply or (sometimes) even an extension of services was necessary (Meyer et al., 2021; Millner et al., 2021).

We refer to the COVID-19 pandemic as an extreme context, which constitutes an intense, risky, and often dangerous environment (Maynard et al., 2018) or is even life-threatening (Mithani, 2020). Extreme contexts involve constraints, such as time pressure or emotional constraints on rationality, such as fear (Hannah et al., 2009). The pandemic represents the specific occurrence of a disruptive extreme context. Such extreme contexts are the "most extreme punctuation of normalcy" due to their core feature of substantial organizational, economic, political or social disruptions (Brammer et al., 2020). Corresponding negative effects—be they physical, psychological, or material—are unavoidable (Hannah et al., 2009). Moreover, these contexts have a surprising, unforeseen nature. Thus, organizations commonly can neither anticipate them, nor prepare specific countermeasures or specialized resources like emergency plans (Hällgren et al., 2018).

Drawing on the work of Dayson et al. (2021) and Hutton et al. (2021), we propose that providing services during a pandemic requires organizational resilience, which refers to the organizational ability to resist adversities while maintaining and adjusting operations, e.g., in terms of service delivery (Sutcliffe and Vogus, 2003; Van der Vegt et al., 2015; Witmer and Mellinger, 2016; McCarthy et al., 2017). This is due to its "emphasis on prompt and autonomous recovery that does not rely on specialized resources" (Mithani, 2020, p. 509). The fact that resilience is based on non-specialized resources makes it also suitable for coping with disruptive extreme contexts. Non-specialized resources are resources not prepared specifically for a certain disruption (i.e., a specific threat), but rather include general individual resources (e.g., emotion efficacy), relational resources (e.g., sound relations) or organizational ones (e.g., general preparedness).

Resilience derives from the Latin term "resilire", which means to "jump back" to a former position (Guistiniano et al., 2020). Bouncing back to an earlier "normal" (original equilibrium) refers to static resilience that corresponds with an internal outlook. Systems only focus on internal repairing and reconstructing, which is almost impossible in complex situations. Dynamic resilience, in contrast, assumes that it is not possible to return to the original. It aims at finding an "adjusted optimality", i.e., a new equilibrium or even new equilibria, as it is the case in the corona pandemic. Thus, dynamic resilience contributes to evolution (Mithani, 2020).

There are different conceptualizations of organizational resilience. Scholars refer to this concept as the ability to withstand adversity or to absorb and recover from shocks, organizational responses to external threats, organizational reliability, the adaptability of business models or design principles for limiting disruptions of supply chains (Linnenluecke, 2017; Duchek, 2020; Hillmann and Guenther, 2021; Jalil et al., 2021). Thus, it can represent a capacity, ability, capability, quality, property or even a process (Hillmann and Guenther, 2021). We follow a (c)apability-based perspective, because it particularly offers insights into the internal workings of resilience and the necessary conditions to further develop it. A capability-based view also has a genuine practical value, as it shows, how practice may attain resilience (Duchek, 2020). In our paper, we understand organizational resilience as an organization's ability to resist disruptive extreme contexts while maintaining and adapting functioning and ultimately learning from these extreme contexts by mobilizing and accessing the required resources, behaviors and capabilities (c.f. Sutcliffe and Vogus, 2003; Van der Vegt et al., 2015; Witmer and Mellinger, 2016; McCarthy et al., 2017; Hillmann and Guenther, 2021).

Organizational resilience has a multilevel nature; it can refer to individuals, teams, organizations, and other systems (like societies). Thus, it reflects individual, team, organizational or societal resilience (Witmer and Mellinger, 2016; Williams et al., 2017; Jalil et al., 2021). The framework by Raetze et al. (2021) integrates individual, team and organizational resilience. They illustrate antecedents, conceptualizations and outcomes of resilience on these three levels and analyze how they are linked. However, there is no consensus regarding the interrelationship of resilience levels. On the one hand, organizational resilience is considered a precursor for, e.g., individual resilience; on the other hand, individual resilience is said to predict organizational resilience. These authors also discuss the antecedents of resilience levels. There are level-specific antecedents (e.g., individual job expertise as an antecedent for individual resilience), but also multilevel antecedents which enable more than one

resilience level (e.g., humor is supposed to enhance all three resilience levels).

In accordance with our understanding of organizational resilience, we define resilience mechanisms as non-specialized resources at the individual, relational and organizational level that antecede organizational resilience and thus enable organizations to resist extreme contexts in terms of adapting and maintaining operations. Individuals' stable attributes (e.g., openness to experience), skills and competences (like reflexivity, sense making, creativity, management skills) as well as emotional resources and attitudes (e.g., optimisms, gratitude) can constitute individual-based resilience mechanisms (Hillmann and Guenther, 2021; Raetze et al., 2021). Interactional resilience mechanisms refer to social resources, such as social connections, support, trust, cohesion or network relationships (Williams et al., 2017; Hillmann and Guenther, 2021; Raetze et al., 2021). In order to systematize interactional mechanisms, we point to social capital as general resources embedded in or generated from relations (Nahapiet and Ghoshal, 1998; Adler and Kwon, 2002; Williams et al., 2017). We focus on relational social capital that is created and leveraged through relations and cognitive social capital "which represents shared understanding, interpretations and systems of meanings between parties" (Nahapiet and Ghoshal, 1997, p. 35). The former relates to network capital (e.g., team cohesion, social support), leadership capital (e.g., employee orientation or fairness) and value/beliefs capital (e.g., common beliefs or trust) (Badura et al., 2013).

There is only limited research that investigates, which mechanisms underpin organizational resilience of NPOs in disruptive extreme contexts (Hutton et al., 2021), and even less discussing in-depth, how individual, relational and organizational mechanisms influence their resilience (Herberg and Torgersen, 2021). Our review of current research shows that studies predominantly focus on organizational-level mechanisms and refer to financial, structural, human and social resources, strategies and practices (Raetze et al., 2021). Hutton et al. (2021), for instance, provide an empirically based framework that illustrates the interconnectedness of nonprofit and community resilience in the context of the combined pandemic-hurricane threat in New Orleans. They suggest that NPO resilience draws on mission orientation, strategic planning, resource management, external communication, board leadership, and operational capacity. Another qualitative study by Searing et al. (2021) analyzed human-service providers in the financial crisis caused by the 2015–2017 Illinois Budget Impasse. They consider NPO resilience to consist of five tactical themes (i.e., financial, human resources, outreach, programs and services, as well as management and leadership) and corresponding subordinate resiliency tactics. Besides, Dayson et al. (2021) explored how local community organizations supporting the elderly handle the pandemic. They conceptualize organizational resilience as absorptive, adaptive and transformative capacity. Their qualitative study shows that at first, NPOs focused on how to continue service delivery (through absorptive capacity) while later on they concentrated on how to adapt it. Adaptation involved ongoing adjustments, innovations and several enabling mechanisms including tangible factors (like sufficient resources) and intangible ones (e.g., guiding values or leadership). Finally, Kim et al. (2022) studied the social welfare sector in Texas (US) in the disruptive context of hurricane Harvey. They propose that "hybrid organizing" in terms of combining formal with informal structures enhances resilience capacity. Formal structures form the basis for informal relations or networking. Besides, disruptions from disasters can impair formal relations and provide space for informal ones.

Moreover, there are scholars who apply a multilevel view and explore how individual-based and interactional (as well as organizational) mechanisms influence organizational resilience. Herberg and Torgersen (2021), for instance, studied organizations in Norway and identified six resilience mechanisms applied in unforeseen and uncertain events (e.g., terrorist attacks). These are general preparedness (e.g., plans, training or equipment), characteristics and competence of individuals (e.g., attitudes, emotional competence or mental abilities), sound relations (e.g., organizational culture), creative behavior and improvisational skills, the ability to reflect and learn, and finally emotion efficacy in terms of the ability to handle one's emotions. A second study by Witmer and Mellinger (2016) investigates two US healthcare NPOs who experienced fundamental funding changes. These authors identified six factors characterizing organizational resilience (incl. individual-based and interactional ones): a commitment to the NPO's mission, the ability to improvise using existing resources, reciprocal relations with the community based on mutual trust, a servant and transformational leadership style, a shared cognitive perspective of hope and optimism, and fiscal transparency. In addition, Förster and Füreder (2021) emphasize resilience mechanisms of leaders and analyze how they contribute to the resilience of hospitals during the pandemic. They identified four key action areas: solving of structural problems, network(ing), anticipation and an open mindset, as well as individual resilience strategies. Concerning the latter, they particularly emphasize individual resilience strategies (that include physical and emotional aspects) for coping with the pandemic. The authors also highlight networking within the hospital as essential and consequently horizontal interactional resilience mechanisms. Finally, the conceptional work by Mithani (2020) provides multilevel insights into resilience in life-threatening events (e.g., natural disasters). He distinguishes five resilience modes: avoidance (in terms of evading the threat), absorption (i.e., absorbing the devastating impact), elasticity (in terms of cognitive and physical flexibility), learning (development of new capabilities, skills etc.) and rejuvenation (i.e., redevelopment after complete desolation). This scholar also

assigns (individual and organizational) resilience mechanisms to these five modes and differentiates between static and dynamic resilience.

In sum, our literature review shows that there is only a small body of research dealing with NPO resilience mechanisms during the pandemic (or in other disruptive extreme contexts) and that the identified (mainly qualitative) papers conceptualize resilience mechanisms heterogeneously. Those are sometimes considered to be a (rather unstructured) combination of capacities (management), processes and resources (see, e.g., Witmer and Mellinger, 2016; Hutton et al., 2021), or themes and tactics (cf., e.g., Searing et al., 2021) as well as characteristics, skills, abilities or competences (see e.g., Herberg and Torgersen, 2021). Besides, research predominately focusses on organizational level resilience mechanisms such as strategic planning, financial management or inter-organizational collaboration (Dayson et al., 2021; Hutton et al., 2021; Searing et al., 2021; Kim et al., 2022). We identified only a few empirical papers focusing on individual and relational resilience mechanisms of NPOs in extreme contexts (Witmer and Mellinger, 2016; Förster and Füreder, 2021; Herberg and Torgersen, 2021). These studies are limited, though, inasmuch as the findings of Herberg and Torgersen (2021) are limited to hierarchical (profit) organizations (e.g., military, private security) and thus need to be transferred to other types of organizations. Only Förster and Füreder's (2021) research focus is comparable to ours. Their findings, though, are limited to resilience of leaders and do not encompass interactional resilience mechanisms in general, while we focus on both individual-based and interactional resilience mechanisms.

Specifically, our paper aims to answer the research question, which individual-based and interactional resilience mechanisms helped Austrian social and healthcare service NPOs to cope with the COVID-19 pandemic as a disruptive extreme context. To answer this question, we conducted an exploratory study based on 33 semi-structured expert interviews with managers of 14 social and healthcare services NPOs in Austria.

Materials and methods

Research approach

As mentioned above, data was collected through semi-structured qualitative interviews. This kind of problem-focused interviews allows gathering detailed information and perceptions about specific circumstances from experts (Gläser and Laudel, 2009). In general, qualitative interviews seemed to be appropriate for our study due to their flexibility and their information-rich illustration of the phenomenon of interest (Patton, 2002). For exploring how social and healthcare service NPOs (can) succeed in coping with the COVID-19 pandemic a qualitative research design was chosen, as this enables in-depth evaluation of information given within the interviews. The qualitative paradigm primarily aims at an understanding-interpretative reconstruction of social phenomena in their respective context (Döring and Bortz, 2016). Data was analyzed using the qualitative content analysis (Mayring, 2015; Mayring and Fenzl, 2019). One of the main advantages of qualitative content analysis is its systematic nature, namely the rule-guided, step-by-step procedure according to a defined flow model.

Recruitment and participants of the study

We decided to study NPOs of the social and healthcare sector as these organizations were crucial for coping with the pandemic, despite being severely affected by the pandemic themselves. In particular, we chose large social and healthcare service NPOs because they were key performers in political processes (e.g., they were consultants of the government) as well as in operative processes (e.g., they were responsible for testing, vaccinating, and caring for vulnerable individuals). We also focused on large NPOs due to our research interest in analyzing their formal crisis management, a "feature" which small NPOs are unlikely to have. In order to get information-rich illustrations and thus maximize the chances of observing our phenomenon of interest (i.e., resilience mechanisms), we relied on a purposeful sampling strategy, which allowed us to select participants that are well-informed about the phenomenon (Patton, 2002). We used a homogenous purposive sampling strategy, which focuses on choosing similar members (Patton, 2002, p. 235). Purposive sampling was based on formalized classification. We used the following two selection criteria:

- Austrian NPOs active in social and healthcare according to the registers of the lobbying or umbrella organizations "Interessenvertretung Sozialverband", "Verband Sozialwirtschaft Österreich" and "Fundraising Verband Austria".
- Large NPOs based on income thresholds: Organizations with revenues higher than three million euro or organizations with donations of more than one million euro (Vereinsgesetz, 2002).

To recruit appropriate participants for our study, we gathered e-mail or phone contact information of NPO managers *via* website research. Subsequently, we screened the potential participants for being either strategically or operatively involved in pandemic management. Moreover, we checked whether they had staff management responsibility. For testing and improving the semi-structured interview guide, two pilot interviews were conducted prior to the start of the interviews.

The selected NPOs cover a wide range of social and welfare services, such as caring and supporting homeless, elderly persons, refugees or children within residential facilities, food delivery, family support, leisure activities, employment opportunities, and education. Their fields of activity also include

healthcare services for physically or mentally disabled persons, people living in difficult psycho-social situations, as well as injured or sick persons, and thus involve the provision of, e.g., (psycho-) therapies, palliative care, ambulance services, mobile care, or blood donations.

We interviewed top managers (i.e., CEOs and members of the board of directors) as well as mid-level managers (e.g., operating managers of a division or unit). We chose top and mid-level managers who were engaged in pandemic management, respectively, had corresponding decision competencies. The final sample includes 33 NPO managers (∼60 % male and 40 % female managers) of 14 Austrian social and healthcare service NPOs. The detailed sample is presented in Figure 1.

We continued sampling and contacting suitable participants until we gained a satisfactory diversity of roles and functions of our interviewees and foremost, until the interviewees' content contributions were not fundamentally new, respectively, there was information redundancy. Consequently, we could not develop further codes based on additional interviews. We achieved thematic saturation (Patton, 2002) with interview 30. Because at that point, three more appointments were scheduled, we also conducted these additional interviews.

Ethics of the research

At the beginning of the interviews, we briefed the interviewees on the aims, procedure, and publication plans of the results; this also included the issue of anonymization. Interviewees could choose to anonymize their name, job title and the name of the organization. Only one participant chose full anonymization (name, title and organization). All other participants only chose to anonymize their names. All participants gave verbal consent to videotaping and publishing the results of the interviews. The consent of using the data and anonymization was given during videotaping. Respondents were asked to let the interviewers know, if they had any questions or felt uneasy. Answering the questions was voluntary, the interviewees were able to skip questions or decline answering specific questions (which was not the case for any interview). The participants had the possibility to end the interview at any time and also to withdraw from the interview (respectively, the data analysis later on). Only the researchers had access to the data. No ethics committee was necessary as this is unusual for studies like ours in Austria.

Quality criteria

We refer to quality criteria defined by Lincoln and Guba (1985) as this is one of the most cited criteria schema (Döring and Bortz, 2016). This includes the quality criteria of credibility, transferability, dependability and confirmability. Credibility means that the results and interpretation of data are trustworthy and, in the end, leads to internal validity of the study. Transferability means that the results and conclusions from the study are transferable to other contexts (in this case other extreme contexts). Transferability should lead to external validity. Dependability means that the research process is comprehensible and reproducible. This leads to reliability of the data and the study. Confirmability means that the study results should not be influenced by prejudices, interests or perspectives of the researchers. Confirmability should lead to objectivity of the study as well as to relevance and ethic rigor. In the study at hand the quality criteria are ensured and achieved by the following techniques (Lincoln and Guba, 1985; Döring and Bortz, 2016):

- comprehensive data collection through a long period of time in the field (see data collection);
- verification of the interpretations on the basis of the raw data;
- triangulation by a stepwise replication of data by the researchers (also intercoder reliability);
- debriefing of the study with outside peers (e.g., discussion on different conferences) and
- description of the studied organizations and contextual conditions in order to make transferability of the results to other organizations and contexts possible.

Data collection

Due to legal COVID regulations, the semi-structured expert interviews were conducted virtually *via* Zoom. The interview team included the four authors. All interviews were done in pairs (meaning two researchers and the NPO manager). Interviews were conducted in the time span of 5 months (from October 2020 to February 2021). The interviews lasted between 20 and 94 min, with an average duration of 49 min.

The overall purpose of the interviews was to gain insights into the perceptions of the experiences, responses, and learnings of the pandemic from its beginning in March 2020 until February 2021. Therefore, a semi-structured interview guideline with a total of eight deductively derived open questions was developed to enable intersubjective comparability (Lamnek, 2010), but also to allow probing (additional) questions to obtain detailed insights and complementing information.

The interview guide was structured as follows: The first question addressed the interviewees' job description in the NPO, encompassing their routine as well as their non-routine job when coping with the pandemic. The second question dealt with the challenges the experts experienced during the crisis in general. This was followed by question three which specified the pandemic challenges by asking, whether and

NPO	Diakoniewerk		volkshilfe.		Caritas	pro mente oö	SOS KINDERDORF
Provided service	Social and welfare services, care for elderly, care for disabled persons, childcare, care for refugees and migrants	Social services, care for disabled persons and their families (e.g. residential facilities, employment opportunities, sports & leisure programs), childcare	Social services, mobile care, care for the elderly, childcare, care for disabled persons, care for homeless people, care for migrants	Social and welfare services, care for elderly, diverse health care services, ambulance services, hospice services	Social and welfare services for families, migrants, care for elderly, care for disabled persons, hospice services	Support for people with mental health issues or people living in difficult psychosocial situations	Social services for children, residential facilities for children that can not live with their family, childcare
No. of interviews	3	2	3	3	3	2	2
NPO	EXIT	lebenshilfe	Persönliche Assistenz	PROGES	Kinder-Krebs-Hilfe		n.a.*
Provided service	Social services for people with mental health and social problems incl. assisted living, consultation, mobile support, etc.	Social services for disabled persons and their families (e.g. residential facilities, employment opportunities consultation)	(Mobile) care for disabled persons	In the field of health, education and social issues, Clinic Clowns community health promotion projects	Support for families with children with cancer	Care for homeless people, eviction prevention, employment, recreation	n.a. due to anonymization
No. of interviews	2	2	2	3	2	2	2

FIGURE 1
Sample of the study.

to what extent managers were confronted with challenges in the task, physical, social and temporal context. Number four referred to the crisis management of the NPO—its nature and decision-making/implementation. Question five raised the question, whether cooperations were useful for coping with the pandemic (and if yes, which collaborations with whom). Question six aimed at identifying the most important aspects the managers learned from the pandemic. This question related to individual, relational and structural/organizational factors facilitating organizational resilience. Question seven explored whether the organizations prepare for similar crises (and if yes, how they prepare). Finally, in question eight, the interviewees were encouraged to declare which resources they would need for better coping with such an exceptional situation. Data was gathered by screening the whole interviews, whereas the most information with respect to the context and to resilience could be generated from questions two and six.

Data analysis

In a first step, we prepared verbatim transcripts of the videotapes for data analysis. We decided to apply qualitative content analysis according to Mayring (2015) due to its flexibility regarding to the material and at the same time its predefined process schema. Following the flow model of Mayring (2015)

we used both a deductive and an inductive approach for defining categories.

The data was coded by two authors. In a first step, each author individually coded the transcripts in order to create an initial coding schema. Team reflexive dialogue and reflexive writing helped us to reflect, critique and assess subjectivity and the context as research influencing factors (Olmos-Vega et al., 2022). To ensure intercoder reliability, two authors met to discuss the codes (refine, adapt, and integrate new ones) at least once a week. Thus, in an iterative process, we added and revised our coding schema and the paraphrases. This also included a recheck of the paraphrases with regard to consistency and meaning. Following the model of Mayring (2007), we paraphrased, generalized and reduced the text passages and created main and subcategories. This guarantees to meet the quality criterion of a systematic, rule-bound procedure (Mayring, 2007).

Data analysis focused in a first step on the challenges for NPOs due to the pandemic. We used inductive category formation to identify the pandemic challenges. For creating corresponding categories based on the interview data, we selected all text passages in which the participants mentioned any difficulties, non-routine tasks or tasks modified due to the pandemic. As a result, main categories are hence defined as business and leadership-related challenges.

In a second step, data was inductively analyzed to explore individual-based resilience mechanisms. Thus, we selected all text passages where participants indicated any individual resources which facilitated organizational resilience. As a result, main categories were defined as attitudes and personality traits. Relying on the understanding of interactional resilience mechanisms as non-specialized social resources, we searched data also for text passages associated with social capital. Based on the social capital classification of Nahapiet and Ghoshal (1997), we developed a deductive coding schema consisting of category definitions, anchor examples and coding rules (see Table 1) (Mayring, 2015). During our text analysis, additional inductive sub-categories complemented the deductive coding schema.

Results

In advance of presenting the individual-based and interactional resilience mechanisms, we start with a brief illustration of the challenges experienced by the NPO managers in the pandemic.

Challenges of social and healthcare service NPOs in the COVID-19 pandemic

Due to far-reaching governmental regulations, there were various decisive business-related challenges to cope with (see Figure 2). Business-related challenges refer to two domains: firstly, how to maintain and adapt the delivery of services and secondly, how to adapt administration and management. The first domain includes the establishment of an emergency operation mode and a new respectively (re-)design of services. In detail, interpreting governmental regulations ("in the beginning there were new regulations every day […]" IP 21) and also *ad-hoc* problem-solving ("there was a strong need for adhoc response but no unnecessary reflexive reactions" IP 5) challenged the NPOs in establishing an emergency operation mode. With respect to services, NPOs struggled with the question which services represented core services and thus had to be provided necessarily and which services were not such ones. NPOs also had to decide which core services should be provided as in-person operations which in turn implied to apply hygienic protective measures. In this context, NPOs sometimes faced a dilemma: "We had to adhere to hygienic protective measures. At the same time, we were asked not to be scared to death and act courageously" (IP 6). Likewise, NPOs had to develop new online services for clients or re-design existing services as online services. This often resulted in a modification of the methodical, therapeutical or didactical approach of the services.

The adaption of administration and management includes, primarily, adjusting human resource management, financing, and procurement. We identified the following corresponding challenges:

- human resource management: developing recruiting, onboarding and training in virtual contexts, coping with dynamic manpower requirements including staff shortages due to illnesses and care, establishing shift work, enacting short-time work and the corresponding payroll accounting;
- financing: finding alternative sources of funding due to losses of revenues, applying for the "NPO fund"[1];
- procurement: providing technical equipment in terms of IT hardware (e.g., laptops, webcams or headsets) as well as personal protection equipment.

In line with the adapted service delivery, administration and management NPOs also had to modify information, communication and coordination processes, as illustrated in the following quote: "So, there was a lot of reorganizing at the organizational level" (IP 15). With regard to information and communication, NPOs struggled with gathering reliable expertise and information. Moreover, it was a challenge to guarantee short, clear and understandable crisis communication for the different target groups (not only staff, but also clients and their families), as one participant stated: "Of course, it was also a great challenge to inform and instruct the employees"

1 The "NPO fund" is a fixed-cost subsidy for NPOs established in 2020 by the Austrian federal government (cf. Bundesministerium für Kunst Kultur, öffentlicher Dienst und Sport, 2021).

TABLE 1 Coding schema for interactional resilience mechanisms (own elaboration).

	Category and title	Definition	Anchor example	Coding rule
Relational social capital	1.a Social connectedness as team (network) capital.	Resources created and leveraged from horizontal relationships between individuals at the same hierarchical level (cf. Badura et al., 2013).	"Colleagues you can rely on each other are very important" (IP 4).	Only categorize, if the text passage is related to resources, which are embedded in or result from colleagues, staff members as "team" (network), respectively, from its corresponding interactions.
	1.b Managerial staff orientation as leadership capital.	Resources created and leveraged from vertical relationships between staff and leaders (cf. Badura et al., 2013).	"You cannot express your gratitude, your respect and appreciation often enough" (IP 17).	Only categorize, if the text passage is related to resources, which are embedded in or result from the relationship between the leader and the staff, respectively, from their corresponding interactions.
	2. Shared crisis understanding as cognitive social capital.	"Resources, which represent shared understanding, interpretations and systems of meanings between parties" (Nahapiet and Ghoshal, 1997, p. 35).	"There is much vigor [. . .] vigor which results from the common past" (IP 11).	Only categorize, if the text passage is related to values, norms, beliefs and meanings which are shared from the organizational members—commonly practiced in everyday life and are considered to be obligatory.

(IP 9). Main challenges referring to coordination were aligning formal crisis management to permanent management as well as implementing various (bilateral) mutual coordination tasks.

In addition to business-related challenges, the second core challenge was to establish and further develop (distance) leadership. This primarily included considerations of how to motivate and integrate remote staff, because after the first weeks of home office, it became evident that there was a need for cultivating teamwork and enhancing informal communication. Moreover, leaders had to think about how to maintain and foster trust *via* distance. Finally, leaders also faced an enhanced spectrum of emotions and mental health issues of staff, clients, and partners, such as uncertainty, panic, frustrations or over-motivation as the following quote illustrates:

> "Employee reactions were split (. . .) between the positions of 'that is all not so bad', 'that is grossly exaggerated', to the point of mortal fear. I had employees in fear of death who were no longer able to work at all; in middle and upper management, too. That was a big problem, because when these people are absent, I can't say, 'stay at home and stay safe', because business has to go on" (IP 12).

Thus, dealing with emotions evolved into a leadership task of increased relevance.

Resilience mechanisms

Based on the interview data, we developed Figure 3, which provides an illustration of the identified resilience mechanisms of NPOs in the COVID-19 pandemic. As mentioned before, we focus on individual-based and interactional resilience mechanisms. Individual-based resilience mechanisms as nucleus of organizational resilience represent the core of the figure. We identified two main categories of individual-based resilience mechanisms. These are personality traits and attitudes. The individual-based mechanisms are surrounded by the triangle shaping interactional resilience mechanisms whereby the triangle is considered to symbolize unity and ascending force. Each side of the triangle refers to a main category of interactional resilience mechanisms. These are a shared (crisis) understanding, social connectedness and managerial staff orientation.

Individual-based resilience mechanisms

Data show that the subcategories serenity and optimism as attitudes and the subcategories (self-)reflection, pragmatism, flexibility and individual stability (both emotional and physical) as personality traits constitute the individual-based resilience mechanisms. These individual-based resilience mechanisms refer to both managers and general staff.

Individual-attitudes-as-resilience-mechanisms

The COVID-19 pandemic highlights that ***serenity*** was an important resilience mechanism, as one interviewee describes: "Stay cool, we will get through it in the end" (IP 8). Serenity prevents narrowed cognitions that are common in panic situations. Staying aware of signals and sensing different alternatives for action certainly contributes to the capacity to act. Two interviewees coined the term "serious serenity" (IP 4, 11), which specifically suggests that serenity corresponds to a well-founded rather than a reckless coping with challenges. This also includes being mindful and attentive toward colleagues, staff, and clients. With regard to the new COVID-19 regulations, this meant to carefully implement the rules without neglecting the specific needs of the clients.

Further, a ***sense of optimism*** was mentioned as resilience mechanism, as the following quote illustrates: "Optimism plays

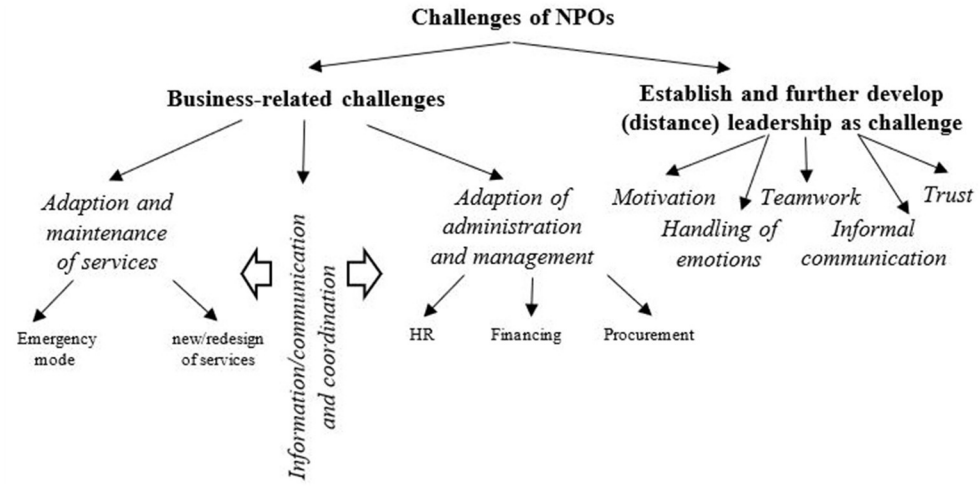

FIGURE 2
Challenges of social and healthcare services NPOs in the COVID-19 pandemic.

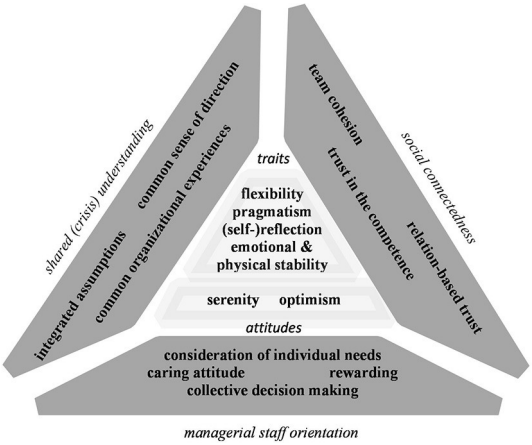

FIGURE 3
Framework of individual-based and interactional resilience mechanisms (own elaboration).

an important role. I think that optimism provides a basis for dealing with changes, which are not positive at first sight" (IP 11). Thus, optimism helps to cope with unpleasant situations or disturbances. When no escape is possible, warming toward the situation facilitates problem-solving. Interviewees also positively associated optimism with self-efficacy. Moreover, interviewees emphasized that optimism strengthened job motivation. In particular, optimism coupled with a sense of humor created "team spirit" and (a sense of) togetherness.

Personality-traits-as-resilience-mechanisms

We also see that a sound ***pragmatism*** in decision-making, in terms of having the courage to leave a gap in decision-making, was crucial for coping with the pandemic, because there often was an incomplete and/or partly inconsistent information base. Moreover, it is essential because extreme situations limit an organization in planning or making forecasts, as the following quote shows: "Coping with a crisis always includes that some questions remain unanswered; it is not possible to clarify everything" (IP 4). Pragmatism in decision-making certainly contributed to an enhanced orientation toward solutions and especially to quick solution finding, which was important due to the dynamics and uncertainty of the disruptive extreme context. Quick solutions in turn represented the basis for *ad-hoc* organizing.

Moreover, individual ***flexibility*** is considered to be an indispensable mechanism in fighting the pandemic. Flexibility refers to cognitive as well as to spatial or temporal flexibility. Cognitive flexibility manifested in an elastic mindset, as the following quote demonstrates: "To be flexible often means to think differently, to integrate the new circumstances in your thinking" (IP 23). Cognitive flexibility also referred to coordination processes, e.g., when to choose which coordination processes, as one interviewee describes: "It often happened this way. [you had to decide] when you need a crisis committee, or when bilateral agreements in the team are adequate" (IP 6). Moreover, physical flexibility in terms of switching between office, home office or different organizational units, and temporal flexibility of individuals in terms of flexible working hours, e.g., in the evening, on weekends, or shift work, supported organizational functioning and adaptation.

A further common aspect across interviews is that ***(self-)reflection*** was crucial for successfully coping with the situation. Self-reflection is particularly important in chaotic situations with a lack of control from outside or of institutionalized norms and rules that individuals usually rely on. Self-reflection referred to aspects of daily-business life, as the next quote exemplifies: "[In online meetings] it is necessary to reflect in advance which information you

need from whom or which information could others require. What is absolutely necessary to clarify?" (IP 24). Self-reflection also included reflecting on how to achieve a new form of work-life balance under these changed circumstances, as one interviewee illustrates:

> "You should not wear a jogging suit all the time because you are in home office. It is necessary to get dressed up sometimes [. . .]. Well, [in sum] it is important to prevent sloppiness" (IP 24).

With regard to leaders, it was necessary to reflect one's role or position as leaders, particularly due to new or altered needs and requirements of staff and peers.

When facing a disruptive extreme context, ***individual stability*** also plays a significant role. Individual stability refers to physical as well as to emotional fitness in terms of being emotionally and physically persevering and durable. Individual stability can be considered crucial, because there was an enormous workload across daily work tasks as well as there were many social and emotional challenges, in particular at the beginning of the pandemic (prevailing the first lockdown in March 2020). Potentially combined with personal dismay (e.g., COVID-19 infections of family members), this mostly represented a heavy burden for leaders and staff members, as one interviewee stated: "The COVID-19 pandemic represents a liminal experience, in particular referring health" (IP 14). Thus, individual stability is the foundation for individual resilience. Interviewees also stressed the importance of conscious breaks and hours to relax, e.g., pets or hobbies, such as jogging or fly fishing, for maintaining individual stability. In particular, with regard to emotional stability, they emphasized the importance of discussing emotional constraints in teams, whilst also considering the self-responsibility of individuals a crucial pillar.

Interactional resilience mechanisms

As illustrated above, a shared (crisis) understanding, social connectedness, and managerial staff orientation represent the main categories of interactional resilience mechanisms. A shared crisis understanding consists of the subcategories creating a common sense of direction regarding the new business normal; developing it into integrated assumptions and, finally, in exploiting common organizational experiences from the past. Social connectedness encompasses the subcategories team cohesion, relation-based trust and trust in the competences. Finally, managerial staff orientation is based on the following subcategories: consideration of the individual characteristics and needs of the staff, a caring attitude, an emphasis on appraisal, and collective decision-making.

Shared-(crisis)-understanding-as-cognitive-social-capital

Having a shared understanding (of the crisis) refers to common beliefs, interpretations and meanings (Nahapiet and Ghoshal, 1997). Subsequently, we describe the identified subdimensions (common sense of direction regarding the new business normal; integrated assumptions, and common organizational experiences).

A ***common sense of direction*** of organizational members represented a crucial resilience mechanism. Particularly at the beginning of the pandemic, there was an overwhelming sense of insecurity and disorientation with regard to the handling of the virus but also, whether and how daily business might run. Thus, achieving a common sense of direction referring to a shared understanding about the new daily business including COVID-19 regulations represented a central asset for being productive, as the following quote exemplifies:

> "No one can answer [how operational processes will be in the next month], that is why, we don't do forecasts, but we would like to convey the impression and I think we succeeded in it. . . that we a prepared for all eventualities" (IP 8).

The sense of security also included that staff was provided with contacts in case of emergency, e.g., COVID-19 infection. The sense of security, in turn, enhanced the mood and motivation of the staff. This common sense of direction represented the most elementary form of mission orientation.

In the course of the pandemic, this first common sense of direction regarding daily business often evolved into corresponding ***integrated assumptions***. Integrated assumptions relate to a shared understanding, how business might be run under conditions of the pandemic at least in the medium term, referring to shared agreements about, e.g., home office rules or human resource policy (e.g., handling of short-time work). Integrated assumptions also refer to how to realistically apply protection rules, as the following quote illustrates: "The legal regulations [...] sometimes were absurd and not implementable. We discussed a lot [. . .] until we found an agreement how to deal with the regulations in the organization" (IP 28). Integrated assumptions represented a crucial prerequisite for the organizations to remain able to act. Additionally, integrated assumptions also referred to a shared understanding of how to cope with failures. This was very important because one cannot prevent failures in crisis. Failure tolerance of staff took pressure away from both leaders and staff. Moreover, it enhanced personal initiatives of staff.

Moreover, ***common organizational experiences*** which relate to experiences that staff have gained in their current organization (Barrett, 2018) represented an often-mentioned resilience mechanism. Common organizational experiences refer to both experience in teamwork and in various cooperation activities within the NPO. With regard to social and healthcare service

NPOs active in crisis management, it also refers to common organizational experience in coping with crises, e.g., natural disasters, psychosocial or financial crises, as illustrated in the following quote: "The focus is now on crisis management but we are familiar with it; we are trained. We will succeed. That is not a problem at all" (IP 10). Moreover, interviewees also mentioned that the common experience about the first lockdown was helpful for the following lockdowns or more general running business under COVID-19 restrictions. One interviewee describes this aspect as follows:

> "I would like to emphasize that the longer the pandemic lasts, the more experienced, cooler and judicious we are [...]. Compared to spring [first lockdown], we have gained experiences regarding online team meetings, crisis communication, online team building" (IP 28).

From the interviewees' perspective, the organizations which are generally active in crisis management were less paralyzed by the status of the pandemic, because crises of different natures are their business. Experiences in teamwork or collaboration facilitated coping with the pandemic, because this was associated with informal knowledge, relation-based trust as well as with the acceptance of top-down decisions and in general with vigor. This is well-exemplified in the following quote: "There is much vigor, much power for dealing with this situation... much vigor results from the common past" (IP 11).

Social-connectedness-as-team-(network)-capital

In addition to a shared crisis understanding, we identified social connectedness as a further important resilience mechanism. Social connectedness relates to a sense of belonging to colleagues (Stavrova and Luhmann, 2016). Social connectedness consists of three pillars. These are team cohesion, relation-based trust as well as trust in the competences.

Team cohesion in terms of "an engagement in and commitment to a group" (Bowers et al., 2017, p. 9) is also considered to be beneficial for coping with an extreme context, as illustrated in the following quote: "What was pleasant was the team cohesion, to pull together, to collaborate, to find common arrangements [...] without rush jobs of anyone, but always in agreement" (IP 17). Team cohesion manifested in a multifaceted engagement of staff, a high commitment to work as well as in taking care of each other. Leaders were even proud of the team cohesion. In turn, the pandemic also enhanced team cohesion, as one interviewee stated: "This catastrophe, this common [experience], coping with this situation has connected us one to another" (IP 11).

Moreover, ***relationship-based trust*** was highlighted as a resilience mechanism—it was even regarded as "indispensable" for coping with the pandemic (IP 4). Relationship-based trust refers to mutual trust in terms of relying on each other. This includes trust between team members, organizational members, leaders, and network partners. Relation-based trust represented the basis for information sharing and communicating, and thus affected "crisis" response seminally. Relationship-based trust also fundamentally improved collaborative effort, because the feeling of relying on each other provided a sense of security: "Relying on each other [...] day and night, on the weekend... I think that is really the right approach" (IP 11). Furthermore, trust helped to substitute formal structures and procedures, as suggested by the following statement: "Having mutual trust is essential for coping with the crisis. Organizational structures won't accomplish what trust accomplishes" (IP 23). Comparable to the positive feeling of team cohesion, leaders were also proud to feel the trust of their staff (IP 22).

In addition to relation-based trust, having ***trust in the competences*** of the staff and of the leader themselves also boosted resilience. Trust in the staff's and leader's competences actually resulted in faster decision-making processes and it represented the base for autonomous action, creativity and improvisation. These effects are well-demonstrated in the next quotes:

> "[I became aware] that there are many good [i.e., competent] employees who you can trust ... [employees] who can handle responsibility" (IP 19).
> "There was much improvisation [done by the employees], they did a lot without my supervision or my commands... I am very impressed. I have always supposed that I can trust my employees, they will make it... but I had never thought that they would make it in such an overwhelming (positive) extent" (IP 12).

It is worth mentioning that the effect between trust in competences and the pandemic was not a one-way relationship. Rather, the pandemic also improved the trust in the competences of the staff, the leaders and the organization.

Managerial-staff-orientation-as-leadership-capital

Whereas social connectedness and its subdimensions emphasize the vigorous resources emanating from teams or collaborations without considering any hierarchies, managerial staff orientation refers to resilience mechanisms created and leveraged from vertical relationships between staff and leaders (cf. Badura et al., 2013). Managerial staff orientation encompasses various subdimensions. Firstly, it refers to a manager's effort to consider the individual characteristics and needs of the staff, secondly to a more caring attitude compared to "daily business", thirdly to an enhanced emphasis on appraisal, and finally to collective decision-making.

Before discussing it in detail, we would like to stress that interviewees highlighted that the physical presence of the managers in office was crucial for dealing with the COVID-19 pandemic. According to the interviewees' experience physical presence was associated with a better (informal) knowledge sharing, an enhanced involvement with challenges, and had a symbolic effect in terms of "fighting side by side". Some staff

members even interpreted a lack of physical presence as loss of trust.

Interviewees stated that the pandemic intensified the manifestation of various positive or negative characteristics in individuals, e.g., the egoists became even more egoistic, and the loyal ones became even more faithful and cooperative. Thus, it was necessary to ***consider*** the corresponding increased ***individualized needs***, e.g., regarding communication, feedback, and supervision, in order to provide the smoothest operations possible. The following quote regarding home office refers to this individualization:

> "I assumed that home office would fit well to everyone, but I experienced that the home office was a heavy burden for some staff members, for others it fit surprisingly well. Both are legitimate" (IP 23).

Moreover, staff orientation manifested in a more ***caring attitude*** compared to "daily business" because the pandemic involved a broad spectrum of (intensified) emotions, such as panic, fear, shock, insecurity, frustration, nervousness, irritations, and loneliness, as mentioned above. Thus, an interviewee stated: "As leaders we were more challenged, in particular regarding [staff] motivations and emotions" (IP 15). Through intense caring in terms of attentively perceiving and regulating emotions, managers were able to enhance motivation and performance. Caring also included looking after staff with regard to overworking and burnout, e.g., by limiting extra working hours or enabling brief timeouts.

There was also evidence for the importance of ***appraisal*** for employees who preserved and performed outstandingly, although many of them were simultaneously challenged in their private lives (e.g., homeschooling, caring for infected persons). Most interviewees stressed that it was essential to reward the loyalty of staff. A correspondingly active rewarding can be of tangible or intangible nature. "One can't say it often enough—either writing 'thank you' in a letter or saying 'thank you' face-to-face, expressing gratitude and valuation" (IP 17).

Finally, managerial staff orientation refers to collective decision-making. Where possible, ***collective decision-making*** seemed useful because it contributed to motivation and reduced resistance. This aspect is well-illustrated in the following quote:

> "It is very important to get the staff on board… I can take the lead, I can swim ahead, but if no one joins me in swimming, I won't accomplish anything" (IP 17).

In summary, the COVID-19 pandemic changed managerial staff orientation, as the following quote exemplifies: "You have to switch your mode; do not believe that you can continue leading as usual. It won't work. A different form of leadership is needed; in particular I have to assist my colleagues more immediately" (IP 5).

Discussion and contributions

Our findings show numerous resilience mechanisms suitable for facing disruptive extreme contexts. Whereas most current research about NPOs dealing with the pandemic or disruptive extreme contexts focuses on resilience mechanisms at organizational level, we researched individual-based and interactional ones.

Our study reveals that interactional resilience mechanisms essentially contributed to generate a basis for facing the adversity. It required the collective competence, the collective spirit—in sum, sound relations to overcome the uncertainty and the diverse obstacles. Thus, Hannah et al. (2009) attributes social resources to attenuate the effects of adversity crucially. It seems that these mechanisms evoked a certain sense of security and enhanced empowerment of staff. This is in line with Williams et al. (2017) who emphasize that relations are the bedrock for activating cognitive, emotional and behavioral abilities. In particular, trust played an important role because it enabled autonomous action. Thus, staff members could suggest their new ideas and solutions to colleagues and implement them. Also, team cohesion as further interactional resilience mechanism certainly had a positive effect. Team members felt "pulled together" and partly also obliged to support each other. This in turn enhanced team effectivity. Adler and Kwon (2002) refer to this effect as social solidarity. Our results also show that the relationship between staff members and leaders has changed in the pandemic—it intensified and became more active. Therefore, we regard managerial staff orientation as a crucial lever for facing an extreme context. The corresponding strengthened consideration of individual characteristics, the enhanced caring attitude, the emphasis on appraisal, and finally the integration of staff in decision-making helped to reduce social, emotional and health hardships. Similarly, Witmer and Mellinger (2016) highlight that an attitude of managers which evokes a feeling of being supported, is essential. Collective decision-making was also essential. On the one hand it enhanced cohesion, on the other hand thus, staff members contributed their knowledge to solve problems, as Hannah et al. (2009) describe. Overall, we would like to emphasize that the collective effort necessary for coping with the disruptive extreme context has a vertical as well as a horizontal perspective. Nonprofit managers contributed vertically *via* managerial staff orientation as well as staff members contributed horizontally *via* social connectedness and common sense of direction. This mix of vertical and horizontal efforts was necessary, because only vertical efforts were not efficient enough for the surprising and hectic situation (Van der Vegt et al., 2015).

Furthermore, it became evident, that individual-based resilience mechanisms fundamentally affected organizational resilience. Individual traits and attitudes were beneficial in various ways. Self-reflection and flexibility facilitated individuals

to get the most out of themselves. In other terms, these mechanisms had a (self)-activating effect and kept individuals going, respectively problem-solving. They made "hidden capabilities" salient, as Hällgren et al. (2018) propose. According to expert statements this resulted in lots of creative and innovative solutions. Thus, similar to existing studies our study also reinforces that individuals enhance the amount, access and quality of resources for deploying and recombing resources in new ways (Sutcliffe and Vogus, 2003). Our results also confirm that in particular, flexibility and pragmatisms supported *ad-hoc* organizing (Williams et al., 2017). They helped to substitute inadequate or missing processes and systems, e.g., decision-making processes and information systems and thus guaranteed acting. Correspondingly (interacting), individuals configured resilience by filling the gaps resulting from the disruptions of the extreme context. This is also stressed by Majchrzak et al. (2007) who point out that acting is essential for facing adversity; from time to time even more than rules.

As mentioned above, extreme contexts raise lots of (positive and negative) emotions. Particularly during the first months of the pandemic, emotions and mental issues were all-pervasive and hence represented an important issue to deal with, in order to restore or maintain the individual mental wellbeing. Due to the fact that emotions shape cognitions and behavior as well as relations, the regulation of emotions also became crucial from an organizational point of view. Several interviewees told us that in particular, negative emotions, such as fear or panic impeded coordination and service delivery. Thus, our findings also provide evidence that coping with emotions is a significant resilience mechanism. This refers to the perception and handling of emotions within an individual as well as between individuals. This is in line with Herberg and Torgersen (2021) who emphasize emotion efficacy as crucial competence for coping with extreme events. In this regard, emotional efficacy refers to the competence, "how effectively a person [. . .] experiences, exploits, and responds to a full range of emotions in a contextually adaption and valued-based manner" (p. 18). Jalil et al. (2021) also emphasize that emotional coping strategies represent a crucial pillar of organizational resilience next to problem-focused coping mechanisms.

This study makes the following theoretical contributions to the field: Foremost, the study contributes to extreme context research. By identifying resilience mechanisms (at individual and interactional level), we illustrate non-specific coping mechanisms. Disruptive extreme contexts require such a non-specificity, because they have a surprising and unforeseen nature and therefore impede specific preparations. Thus, we extend knowledge about mechanisms that are "suitable" for coping with disruptive extreme contexts, for which only rudimentary research exists so far. Accordingly, we provide evidence that a fusion of extreme context research and resilience research essentially contributes to the understanding of how to cope with a disruptive extreme context.

In addition to extreme context research, we also contribute to NPO resilience research. By illuminating a broad range of individual-based and interactional resilience mechanisms, we complement the prevailing organizational-level NPO resilience research; we open the "black box" of resilience at organizational level. Thus, we offer alternative explanations as to what constitutes a resilient social and healthcare service organization. By identifying individual-based and interactional resilience mechanisms we provide deeper insights into NPO resilience. Whereas previous NPO resilience studies mainly refer to interactional resilience mechanisms with "externals", e.g., with the community or partners, we focus on internal interactional resilience mechanisms (see Figure 2). In this context, we would like to stress our findings regarding managerial staff orientation as a particular research contribution. Managerial staff orientation, which includes the managers' efforts to consider the individualized characteristics and needs of the staff, a more caring attitude, an enhanced emphasis on appraisal, and collective decision-making, illustrates leadership capital as one dimension of social capital without focusing on a specific leadership style or competence.

Thirdly, we also nuance previous resilience studies. In this context, we particularly refer to Mithani (2020) and Herberg and Torgersen (2021). With our focus on social and healthcare service NPOs and thus predominantly non-hierarchical organizations, we partly complement the findings of Herberg and Torgersen (2021) who focus in their research on hierarchical organizations, e.g., the military. Concerning individual level mechanisms, scholars highlight trust, integrity and empathy as important attitudes. We particularly highlight the role of serenity and optimism. Moreover, we enrich their individual level competences by adding pragmatism as a crucial mechanism. Concerning interactional mechanisms, we found evidence for an intensified importance of a shared crisis understanding compared to Herberg and Torgersen (2021). This may be rooted in the fact that social and healthcare service providers as non-hierarchical organizations are comparably less familiar with situations assessments as, e.g., the military or police are. Moreover, generating a shared crisis understanding presumably is more important in disruptive extreme contexts than in Herberg and Torgersen's (2021) unforeseen contexts in general, encompassing e.g., also emergency contexts. We also nuance the findings of Mithani (2020). He obviously provides an excellent range of individual and organizational resilience mechanisms. Our findings provide evidence, though, that interactional (relational or group) resilience mechanisms should be defined as an own category or level (see also Witmer and Mellinger, 2016; Williams et al., 2017). On the one hand this underpins the fact that various interactional mechanisms are embedded in and generated from relationships, and on the other hand, this emphasizes the collective effort nature of resilience.

Fourth, it seems reasonable to propose that an identification of resilience mechanisms from a social capital perspective

is appropriate and valuable, because it provides a consistent and clear framework for classifying resilience mechanisms at least at the level of a mid-range theory. This can improve the partly unclear and confusing (synonymous) use of competences, skills, abilities, qualities etc. for conceptualizing resilience mechanisms.

Concerning contributions to practice our findings clearly indicate that NPO managers who are responsible for resilience should concentrate on emotional and physical stability (of staff and themselves) as fountainhead for bearing exhausting periods. This includes preventive health and social care initiatives as well as adequate working conditions in daily business in advance of a "crisis". Moreover, our findings call on organizations to intensively deal with emotions. Because extreme contexts fuel emotions and cognitions as well as behavior are inseparable from emotions, leadership trainings should focus on the handling and regulation of emotions. Finally, dealing with disruptive extreme contexts requires that both managers and employees get more familiar with such contexts. This proposes "crisis simulations" and trainings comparable to high-reliability organizations as well as developing a culture, which nurtures learning, creativity, fault tolerance, and flexibility. In sum, this enables NPOs to an emotion-focused as well as problem-focused coping with adversities (c.f. Jalil et al., 2021).

Conclusion, limitations and further research

We aimed at identifying individual-level based and interactional resilience mechanisms, which fostered social and healthcare service NPOs in maintaining and adapting their functioning during COVID-19 pandemic. Figure 3 provides an overview of the identified resilience mechanisms. Firstly, our findings underscore that there is no "one best way" for coping with a disruptive extreme context in terms of e.g., an emergency plan, but there is a beneficial approach, which consists in continuously focusing on NPO resilience and its mechanisms. Secondly, the evolving nature of resilience became clear. Common organizational experiences, team cohesion, trust etc. do not arise overnight; their development takes time. The evolving character also manifests "during the crisis", where interacting individuals make hidden capabilities salient. Finally, it also includes integrating the learnings for the next adversity in the "post crisis phase". Overall, cultivating "powerful" resilience requires a corresponding continuous consciousness as well as an adequate (financial) resource allocation. We would like to conclude with an analogy of one of our interviewees who compared a resilient organization with a house of cards.

> "A house of cards is vulnerable to break down, when the wind comes sideways; it is stable, when the wind comes from the front. In the pandemic, the wind came from the front and we resisted [the adversities]" (IP 5).

The wind came from the front, because this NPO could rely on the appropriate resilience mechanisms.

Our findings must be viewed in the light of some limitations, though. The focus on large social and healthcare service NPOs may imply a limited transferability to small NPOs or (grassroot) initiatives active in other fields of activity, such as e.g., small environmental NPOs. Secondly, we did the interviews at the beginning period of the pandemic that means our findings are limited to the pandemic's manifestations and the corresponding response in that period. Thirdly, there are further limitations inherent to qualitative interviews (Althubaiti, 2016; Creswell and Creswell, 2018). This includes a potential bias resulting from our point of view, the researchers' perspective. A possible subjectivity of the researchers may negatively influence data analysis and interpretation and thus create researcher bias. Moreover, interviews represent retrospective and self-reported data which may be associated with social desirability bias and recall bias. The interview setting (e.g., time pressure of some leaders) and the interview design (e.g., different intensities of questioning) can also be a source for bias. Fourth, we have neither analyzed the interrelations between the identified resilience mechanisms, nor how they are linked to practices.

Thus, further research might focus on NPOs of different sizes and fields of activity for complementing our findings, particularly for testing our resilience mechanisms. Moreover, there is need for multilevel research in terms of focusing on the relations between the various mechanisms for a better understanding of the nature of resilience. We also regard a deeper exploration of the resilience mechanisms against the background of concrete context factors, e.g., social challenges as useful in order to elaborate resilience mechanisms for different challenges.

Data availability statement

The data that support the findings of this study are available from the corresponding author KAK, upon reasonable request.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work. KAK and SS share first authorship. BG and SM share senior authorship. All authors approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Individual and organizational resilience—Insights from healthcare providers in Germany during the COVID-19 pandemic

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We explored the effects of resilience in the healthcare setting during the COVID-19 pandemic in Germany. Our study sheds light on the cross-level effects of resilience in hospitals and thus responds to calls to research this empirically. In a cross-sectional study design, the perceptions of resilience of employees in hospitals and of transformations at the individual, team, and organizational level were analyzed. An online survey was conducted in summer 2020 in Germany in which 1,710 healthcare workers completed a self-report questionnaire. Results indicate that resilience is both a highly interrelated construct on the individual and organizational level and also positively linked to perceptions of transformation as an indicator for demonstration of resilience. We also found a partial mediation effect of organizational resilience and team efficacy, respectively, on the relationship between individual resilience and perceived transformation on the individual and organizational level as well as a full mediation on the team level. The study highlights the interdependence of individual and organizational resilience (which is mediated by team efficacy) and its impact on perceived transformation in German hospitals during the COVID-19 pandemic. Whereas team efficacy is crucial for performance in regular work operations, during a pandemic the organizational level becomes more relevant. Theoretical and practical implications are discussed.

KEYWORDS

COVID-19, healthcare providers, individual resilience, organizational resilience, team efficacy, transformation, team resilience, healthcare workers

Introduction

Healthcare providers have played a critical role during the COVID-19 pandemic. Hospitals had to adjust their procedures and processes to respond to the pandemic (Sklar et al., 2021) and to function as a place of public safety. Popular press and academic literature reported about healthcare workers experiencing extraordinary challenges, such as feelings of stress and uncertainty (Lai et al., 2020; Shaukat et al., 2020; Vagni

et al., 2020), the risk of testing positive for COVID-19 (Bandyopadhyay et al., 2020; Nguyen et al., 2020; Cohen and Nica, 2021), fear of infection, stigma, guilt, and social isolation (Banerjee et al., 2021), and depressive symptoms, emotional exhaustion, and psychological trauma symptoms (Mitchell and Lăzăroiu, 2021). Thus, the question arises, how employees in hospitals perceived and dealt with endeavors posed by the virus in their day-to-day work.

Resilience research offers a framework with which to understand the unique complexities in healthcare (Jeffcott et al., 2009). In various disciplines (for overviews, Bhamra et al., 2011; Hillmann and Guenther, 2021), resilience generally has been used to describe organizations, groups, or individuals that are able to react to and recover from stress or disturbances with minimal effects on stability and functioning (Sutcliffe and Vogus, 2003; Linnenluecke, 2017) as well as an adaptive capacity to bounce back, recover, and cope effectively with disturbance, stress, and adversity (for a recent overview on resilience definitions, see Raetze et al., 2021). More recently, the multilevel and multistage nature (Williams et al., 2017) of resilience has been highlighted but the concept still lacks clarity, especially regarding the interdependencies between individual, team, and organizational levels (Jeffcott et al., 2009). For example, a team of resilient members may not necessarily demonstrate high resilience at the group level because group interactions may lack clear communication or support (Alliger et al., 2015). Similarly, resilient individuals or teams might not directly build resilient organizations. Collective phenomena such as team or organizational resilience are hence not assumed to be just an additive composite of individual resilience (Lengnick-Hall et al., 2011)—but further processes are at play; on the contrary, highly resilient individuals might even be a barrier to a shared understanding in organizations (Horne and Orr, 1998). Therefore, resilience research needs to integrate findings across levels (Britt et al., 2016; Matheson et al., 2016; Robertson et al., 2016; Duchek, 2020) and to include the interaction between an organization, its stakeholders, and the environment during confrontations with adversity (Williams et al., 2017).

The purpose of this study was to build on and extend past research by empirically testing the interrelations of resilience during an adverse event: the COVID-19 pandemic. Specifically, we aimed to explore the effects of fostering resilience in the healthcare setting during the COVID-19 pandemic in Germany and sought to make four contributions to the literature:

First, empirical studies have addressed either the collective (organizational or team) or the individual level, leaving out the interplay between them. Conceptually, organizational resilience can be achieved through employees and teams. Hereby, individual, team, and organizational resilience are linked and influence each other reciprocally (Riolli and Savicki, 2003). For example, one suggestion has been that organizations can be only as resilient as their individuals are (Horne, 1997; Horne and Orr, 1998; Mallak, 1998; Coutu, 2002; Shin et al., 2012), but more holistic approaches (Lengnick-Hall et al., 2011) have proposed that individual resilience cannot simply be added up to reach organizational resilience. Similarly, one could expect that resilient organizations create an environment enabling individuals to show resilient behavior (Pangallo et al., 2015; Soucek et al., 2016; Wachs et al., 2016). Our empirical study helps clarify how the levels are related to each other. Recent research on the impact of COVID-19 on healthcare workers has addressed the negative effects on these workers (Benfante et al., 2020; Mhango et al., 2020; Couarraze et al., 2021; Riguzzi and Gashi, 2021), the personal resources at the individual level (e.g., Fino et al., 2021), or both (Coulombe et al., 2020; Huffman et al., 2021; Jo et al., 2021) but has barely touched on supportive factors at the collective levels (Labrague and de los Santos, 2020; Tam et al., 2021). We contribute to this literature by providing insights on how organizational- and team-level facets interact with individual facets.

Second, this study addresses resilience in terms of responses and reactions during a specific adverse event, namely, the COVID-19 pandemic. Resilience has been studied in relation to several events (for a review, see Linnenluecke, 2017) that have also assumed that resilience differs according to the nature of the adversity (Martin-Breen and Anderies, 2011). We examined the processes of resilience during the COVID-19 pandemic in hospitals instead of examining resilience before or after an adverse event.

Third, we have followed the advice of Britt et al. (2016) to differentiate between resources for resilience and demonstrations of resilience. We investigated the connections between resources for resilience and perceptions of transformation as demonstration of resilience. Hence, we contribute to the literature by proposing perceptions of transformation as a promising measure for positive adaptation, i.e., an outcome of resilience. We assumed that resilience levels would affect how employees perceived transformations due to the COVID-19 pandemic and we expected that higher levels of individual and collective resilience would lead to more positive perceptions of transformation, which could be interpreted as adaptations that are more positive. By perceptions of transformation we mean specific aspects of life that have been affected by the COVID-19 pandemic at the individual (e.g., work–life balance) and collective (e.g., skills and competencies in the team, communication in the organization across departments) levels. Thus, we have expanded existing research by highlighting individual-, team-, and organizational-level resources for maintaining positive functioning during COVID-19.

Fourth, our study was conducted in the healthcare sector in Germany. Resilience research in this sector has been explored mainly in East-Asian, African, and Arab countries, as these are places associated with higher population density and higher risk of disasters, and many have already faced other epidemic events such as SARS, Ebola, and MERS (Koh et al., 2005; Wong et al., 2008; Khalid et al., 2016; Jalloh et al., 2017). Germany has been a country with less experience in epidemic and pandemic outbreaks or natural disasters. Although recent studies and reviews on the COVID-19 pandemic have investigated resilience in healthcare workers in different countries (see, e.g., Bozdağ and Ergün, 2021; Di Trani et al., 2021; Douillet et al., 2021; Rieckert et al., 2021),

studies in Germany are still lacking. Further, we focused our analysis on hospitals as key players in the healthcare system and integrated various occupation types within a hospital in our survey. Key participants in research in the healthcare sector are medical staff (doctors, nurses), whereas administrative and other service staff members (facility management, cleaning) are often neglected. Understanding hospitals as a system, one can gain deeper knowledge of resilience processes by integrating relevant key stakeholders. This approach broadens the understanding of resilience in a healthcare organization.

Background and hypothesized model

A crisis such as the COVID-19 pandemic disrupts normal operations and creates emergent job demands in a context characterized by urgency, uncertainty, and threat (Sayegh et al., 2004). Therefore, resilience resources should be activated to maintain normal functioning at individual and collective levels within hospitals and over a longer period. The capacity for resilience (resilience resources) addresses the personal and collective factors associated with the ability to show or likelihood of showing positive adaptation in the face of significant adversity, whereas the demonstration of resilience refers to the documentation of positive adaptation (Britt et al., 2016). Thus, resilience at the different levels is expected to influence healthcare workers' perceptions of transformation on the individual, team, and organizational level.

Resilience at the individual level

There is no universally accepted definition of resilience in the empirical literature published this century, however key markers of resilience are: rising above to overcome adversity, adaptation and adjustment, 'ordinary magic', good mental health as a proxy for resilience, and the ability to bounce back (Aburn et al., 2016). Other common characteristics of resilient individuals are their recognition of the need for a firm acceptance of reality, virtue, and the deep belief that life is meaningful, as well as the ability to improvise and adapt to significant change (Coutu, 2002).

Individual resilience is conceptualized as a trait, capacity, or process. The trait perspective understands psychological resilience as the ability to emotionally cope with a crisis, allowing the person to return to the precritical state and thus to promote personal assets and protect the self from the potential negative effects of stressors (Masten, 2001; de Terte and Stephens, 2014). The capacity concept sees resilience as 'psychological capital' that helps a person manage stressors and losses and to engage higher state-like psychological resource capacities by means of humor, hope, self-efficacy, and optimism (e.g., Luthans and Youssef, 2007). The process approach sees resilience as a 'fluid process' rather than a dichotomous construct (Werner and Smith, 1979). In this perspective, resilience is a dynamic process encompassing positive adaptation in the context of significant adversity (Hartmann et al., 2020).

Regarding COVID-19, Banerjee et al. (2021) used a qualitative approach to gain deeper insights into the dynamic processes of resilience and to describe how healthcare workers used their resilience to navigate through adverse situations in Indian hospitals. Healthcare workers formed a 'resilient identity' by harnessing social support, rooted in morality, gratitude, and a sense of purpose. They managed the resilience by applying stress-management strategies (e.g., regular dialogue with themselves, decreasing expectations, promoting self-care, and reducing self-stigma) and working through the socio-occupational distress by self-commitment and care (adequate sleep, diet, hobbies, small celebrations, festivities, etc.). Another review highlighted that coping behaviors, resilience, and social support were associated with positive mental and psychological health outcomes (Labrague, 2021).

In this paper we have conceptualized individual resilience as a capacity that enables healthcare workers to maintain functioning during the COVID-19 pandemic, resulting in positive adaptation and learning. Hence, we have also perceived resilience itself as a dynamic process that includes resilience capacities and respective resilience outcomes in the case of an activation.

Resilience at the organizational level

Resilience at the organizational level is conceptually different from that at the individual level (Lengnick-Hall et al., 2011; Carmeli et al., 2013; Bowers et al., 2017; Morgan et al., 2017). Organizational resilience has also been defined in many ways, for instance, as a capability, capacity, characteristic, outcome, process, behavior, strategy or approach, and type of performance, or as a mix of these (Hillmann and Guenther, 2021). In a comprehensive understanding, resilient organizations promote competence, restore efficacy, and encourage growth through the behavioral processes of mindful organizing enacted by frontline employees (Vogus and Sutcliffe, 2007). There is agreement that organizational resilience develops over time (Vogus and Sutcliffe, 2007; Hillmann and Guenther, 2021), and that every organization has its own way to achieve resilience; thus there is no magic 10-step formula (Horne, 1997). Hillmann and Guenther (2021) concluded that organizational resilience is the ability of an organization to maintain functions and recover fast from adversity by mobilizing and accessing the resources needed. An organization's resilient behavior, resilience resources, and resilience capabilities thus enable and determine organizational resilience. The idea that resilience is commonplace and required across organization types shows up in the organizational literature as well (Williams et al., 2017).

Empirical research on organizational resilience is still sparse in terms of providing a valid measurement scale for organizational resilience (Mallak, 1998; Pal et al., 2014; Richtnér and Löfsten, 2014; e.g., Barasa et al., 2018). For the healthcare sector, Mallak (1998) identified six variables describing resilience: goal-directed solution

seeking; avoidance; critical understanding; role dependence; source reliance; and resource access. Jeffcott et al. (2009), following Wreathall (2006), conceptualized organizational resilience in the healthcare sector as a set of seven factors: top-level commitment, just culture, learning culture, awareness, preparedness, flexibility, and opacity. Resilience as a process further includes multiple stages over time. Anticipating, coping, and adaptation (Duchek, 2020) should be seen as demonstration of resilient behavior.

Similar to individual resilience, organizational resilience as we understand it is both a capacity and a process. If capacities of organizational resilience are activated, they support healthcare providers and their employees in maintaining functioning during the COVID-19 pandemic. Taking a process perspective, this in turn leads to positive perceptions of transformation as an outcome of resilience.

Interconnection of individual and organizational resilience

The literature on the interconnection of individual and organizational resilience is more conceptual and still sparse (see, for reviews, Hartmann et al., 2020; Raetze et al., 2021). In general, organizational resilience can be seen as an important context characteristic that fosters individual resilience. Previous empirical research has focused on one or more facets of organizational resilience in relation to other variables and not on organizational resilience as a holistic construct. Research on programs fostering resilience in organizations have highlighted that organizational resilience affects individual resilience (e.g., Teng-Calleja et al., 2020). Considering time issues, Prayag et al. (2020) found that individual resilience (demonstrated as life satisfaction) increased organizational resilience of entrepreneurs. In the context of COVID-19, in a study among 69 frontline healthcare providers in China, Tam et al. (2021) highlighted the lack of institutional supportive responses to COVID-19 as a direct source of distress for the employees. Moreover, they found support of positive effects of institutional support on individual resilience and lower psychological distress of healthcare workers in face of COVID-19 stressors. Thus, institutions play a critical role in providing support for healthcare providers. In a similar vein, Labrague and de los Santos (2020) investigated the interaction between organizational support, social support, and individual resilience for nurses in the Philippines during the COVID-19 pandemic. Their results indicate that nurses can show higher levels of resilience when organizational and social support exist. In line with these findings, Matheson et al. (2016) put forward the idea that the work environment in the healthcare sector needs to be in alignment with individual resilience. There is some evidence that an institutional variable such as an organizational safety culture leads to better team performance (Heckemann et al., 2019). Gonçalves et al. (2022) emphasized that organizational resilience is an important factor in how healthcare workers perceive stress and adapt to work-related challenges. Given the literature on individual and organizational resilience, we developed our first hypothesis:

> *Hypothesis 1*: Individual and organizational resilience are positively related to each other.

Resilience and efficacy at the team level

The team-stress literature highlights that adverse events cause stress in teams, which has deleterious effects (Driskell and Salas, 1991). For example, in situations of high occupational stressors, most individuals perceive psychological strain, focusing inward and losing focus on the team task as well as on the interdependencies within the team. External threats significantly reduce the communication channels available to and amount of information used by team members (Gladstein and Reilly, 1985). This, in turn, inhibits team satisfaction and increases the potential for conflict because of miscommunication and poor role coordination. Similarly, research on team resilience has assumed that resilient teams can resist the negative impact of adverse events by showing minimal disruption to their performance (Hartwig et al., 2020).

Team resilience as a positive team-level capacity refers to processes of "managing pressure effectively across the team as a whole […] that further strengthen the capacity of the team to deal with future challenges in adversity" (Flint-Taylor and Cooper, 2017). A recent review referred to team resilience as "an emergent state resulting from resilient team processes, which are fostered by team composition and contextual factors" (Gucciardi et al., 2018; Hartwig et al., 2020) and even as a "second-order emergent state that is actually the result of other emergent states in the team" (Bowers et al., 2017). The assumption here is that team resilience mediates other team emergent states and outcomes during times of stress. One of those first-order emergent states is team efficacy. Team efficacy and team resilience are somehow related (Bowers et al., 2017), and some researchers have used the terms team resilience and team efficacy interchangeably (McCray et al., 2016). Both need time to build up through team interactions, and then they relate to important team outcomes (e.g., Chen et al., 2005). Conceptual unclarity also exists when measuring team resilience, for example, by integrating (Sharma and Sharma, 2016) or not integrating (McEwen and Boyd, 2018) team efficacy. However, as theoretical conceptualizations of team resilience often revolve around team efficacy, in this paper we apply team efficacy as a proxy for team resilience.

Team efficacy (also known as collective efficacy) refers to the belief that the team has the ability to perform the job tasks successfully (Lindsley et al., 1995; Bandura, 2000). Team efficacy (as a first-order emergent state) has received far more attention because of increased team-based structures in organizations. Thus, more conceptual clarity and empirical evidence exists regarding team efficacy. Especially in the healthcare context, self-efficacy and team efficacy have been researched in depth. High team efficacy has been associated with decreased burnout of

nurses (Zellars et al., 1999) and higher satisfaction and commitment, as well as buffering the stressor–strain relations (Jex and Bliese, 1999). Furthermore, high team efficacy has been related to increased cooperation and an atmosphere of meaningful interpersonal relationships (Lee and Ko, 2010) and reduced missed care (Duffy et al., 2018; Smith et al., 2018). In contexts of high interdependence, team efficacy has been closely related to performance (Gully et al., 2002) and to change-related issues such as the perception of cohesion (e.g., Morgan et al., 2019). Team efficacy also functions as a mediator between transformational leadership and well-being (Nielsen et al., 2009) as well as between work stressors and burnout (Day et al., 2009). Thus, nurse performance was found to be highly dependent on contextual variables such as collective efficacy, leadership style, or unit culture (Lee and Ko, 2010) but also on resources such as workload, staffing, and implicit rationing (Zhao et al., 2020).

Team efficacy can be seen as a protective factor that increases individual resilience in the workplace. Resilient team members have a comprehensive understanding of team processes, team goals, and objectives, and they discuss team-member roles to guide each other's actions (Mallak and Yildiz, 2016). Especially in a crisis, team efficacy has bearing in the ability and motivation of both the team as a whole and each individual team member. Gichuhi (2021), for instance, emphasized that during a crisis, collaboration is critical to empower and support teams' efforts to confront the day's challenges in a constructive way and to maximize team efficacy. In this line, Traylor et al. (2021) refer to the importance of collective efficacy for frontline healthcare workers because a lack of experience with COVID-19 might reduce team members' believe to be successful in treating patients. First empirical insights during COVID-19 highlight that collective efficacy is a significant predictor of risk perception, which relates to adaptation of preventive health behavior across 10 countries (Dryhurst et al., 2020). In the Italian healthcare sector, physicians' collective efficacy beliefs and sense of belonging to their hospital were positively associated with job satisfaction (Capone et al., 2022).

In summary, we conceptualized team efficacy as a capacity that can be activated during a crisis and in turn leads to a positive resilience outcome. Further, we concluded that team efficacy has positively impacted the resilience of healthcare providers and their workers during COVID-19. Hence,

> *Hypothesis 2*: Team efficacy is positively related to both individual and organizational resilience.

Perceptions of transformation as a demonstration of resilience

Research is still quite inconsistent on defining what is meant by 'positive adaptation' when demonstrating resilience. One main approach is to conceptualize positive adaptation resulting in growth and learning as a potential outcome of resilience. Britt et al. (2016) proposed four categories that demonstrate individual resilience: job performance, low stress symptoms, high well-being, and healthy relationships. Other researchers have endorsed resilience as an adaptive capacity to modify or change to cope better with stressors (Kärner et al., 2021). The underlying assumption is that an employee's attitude toward the process of transformation is determined by the resilience and adaptive capacity of a system. From the perspective of job demands–resources models, resilience as a personal resource acts as a buffer against the negative influence of work demands (Martinez-Corts et al., 2015; e.g., de Clercq and Belausteguigoitia, 2017). From the perspective of conservation of resources theory, resilience can help individuals obtain additional resources from the environment (e.g., Shin et al., 2012). In the COVID-19 context, resources for reducing stress and increasing job satisfaction are for example internal organizational communication, employee reward systems, and skills capitalization (Nemțeanu et al., 2022). Overall, individual resilience has been found to be indirectly related to job performance, organizational citizenship behavior, and career success and directly related to job satisfaction (Larson and Luthans, 2006; Youssef and Luthans, 2007), mental and physical health (e.g., burnout, emotional exhaustion, biopsychological distress; Soucek et al., 2016), healthy relationships, and change-related and work-related attitudes (e.g., psychological contract awareness, happiness; Hartmann et al., 2020). On an organizational level, the result of an organization's response to adversity is positive adaption as well as growth and learning.

In this paper, we consider perceptions of transformation on the individual, team, and organizational level as a demonstration of resilience. In line with Martinez-Corts et al. (2015), we understand resilience as being "related to a more positive appraisal of stressful situations and the use of more active and approach-related coping" (p. 328) and expect that activated resilience is expressed in the fact that one tends to perceive and evaluate transformation more positively because of the opportunities for learning and growth. Thus we emphasize such a connection between resilience and perceptions of transformation for the individual and collective level. Hence,

> *Hypothesis 3*: Resilience, as experienced by hospital employees, leads to positive perceptions of transformation at different levels in healthcare providers during the COVID-19 pandemic.
>
> *Hypothesis 3a*: Individual resilience is positively related to perceptions of transformation at the individual, team, and organizational level.
>
> *Hypothesis 3b*: Team efficacy is positively related to perceptions of transformation at the individual, team, and organizational level.
>
> *Hypothesis 3c*: Organizational resilience is positively related to perceptions of transformation at the individual, team, and organizational level.

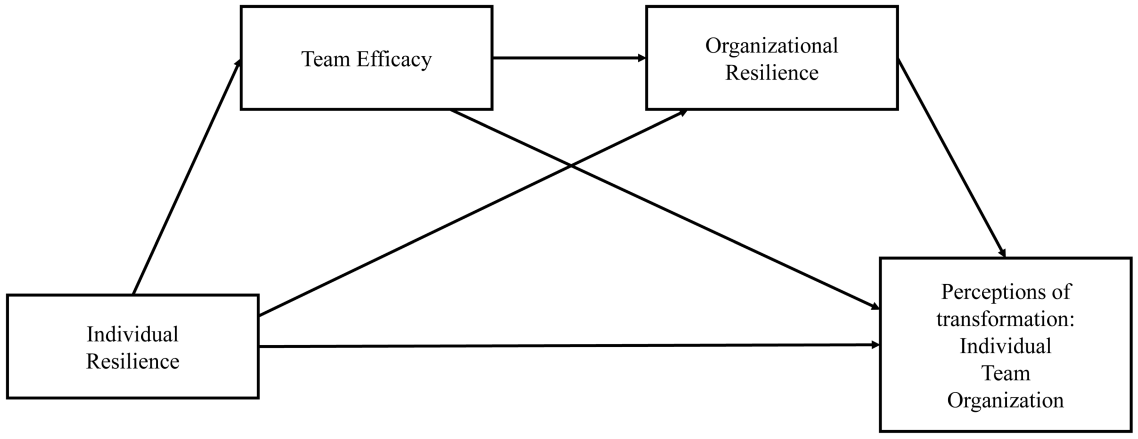

FIGURE 1
Proposed research model: sequential mediation.

Our research model is outlined in Figure 1: Resilient behavior of individuals, teams, and organizations is required to effectively manage and overcome a pandemic event such as COVID-19. These levels are interlinked and of a dynamic nature. As resilient teams and organizations are more than the sum of resilient individuals, resilience of organizations should mediate the positive link between individual resilience and positive outcomes at all levels. Team efficacy as a protective factor for workplace resilience (Sharma and Sharma, 2016) should mediate the relationship between individual and organizational resilience. Avanzi et al. (2015) found a mediating effect of team efficacy relating to lower burnout (for teachers). In other words, organizational resilience provides the context for fostering team efficacy. High team efficacy enables resilient behavior of individuals in hospitals. Thus, we assume that employees are only able to show positive adaptation when organizational resilience processes are in place and high team efficacy is present. In a context supporting team efficacy and individual resilience, transformation will be evaluated more positively. Accordingly, we predict

> *Hypothesis 4*: Organizational resilience mediates the relationship between individual resilience and positive perceptions of transformation at the individual, team, and organizational level.
>
> *Hypothesis 5*: Team efficacy mediates the relationship between individual resilience and positive perceptions of transformation at the individual, team, and organizational level.

Materials and methods

Design

An online survey based on a cross-sectional design was conducted from July 6, 2020, to October 13, 2020, in Germany. To obtain timely insights on the experience and behavior of hospital employees, we recruited a so-called convenience sample, which was assembled according to the snowball principle. Initial contacts were acquired through the research project network as well as through internet research on associations, institutions, and organizations in the hospital context. In addition, the link to the survey was forwarded directly to hospitals *via* a large central German organization. Participants needed 25 min on average to complete the survey.[1] The survey was distributed *via* SoSci Survey and was formulated in German. Response anonymity was ensured.

Participants

In total, 1,730 individuals completed the online questionnaire; after cleaning, 1,710 were included in the analysis (20 participants were excluded from the data analysis owing to inconclusive responses, too many missing values, and response durations being too short). A detailed overview of the sample and descriptive statistics is presented in Table A1 in the Appendix.

The majority (70%, $n = 1{,}192$) were women and nearly 30% ($n = 504$) were men. Our sample covered various ages: 21% ($n = 360$) of participants were between 18 and 32 years old, 36% ($n = 621$) were between 33 and 47 years old, 40% ($n = 675$) were between 48 and 62 years old, and 2% ($n = 34$) were over 62 years old. About a third (34%) of respondents had responsibility for others in their own household. Participants in our sample spanned a broad variety of occupations: 37% worked as nurses, 14% as doctors, 16% as medical support, 28% in administration, and 5% in other areas. The majority of participants (54%, $n = 918$) had already completed pandemic training.

1 The analyzed data set is part of a larger research project. Not all collected variables are reported in this paper.

Measures

We mainly used short versions of scales to fit the busy schedules of healthcare workers during the ongoing pandemic. Most of the scales were developed and pretested in German in a preliminary unpublished study on preparation for an endemic scenario (manuscript currently in preparation). The study focused on individual perceptions (of individual and organizational resilience and team efficacy) and individual outcomes (perceptions of transformation as demonstration of resilience). The measures are described in detail in the following and will be provided by the authors on request.

Individual resilience

We elicited individual resilience by measuring it with the Resilient Behavior at Work short scale adapted from Soucek et al. (2015). The short scale contains eight items (e.g., "When faced with difficult tasks at work, I kept my eyes on my goal and did not allow myself to be diverted from my path"), rated on a 6-point Likert scale ranging from 0 (does not apply at all) to 5 (fully applies). Our data indicated good internal consistency ($\alpha = 0.80$).

Team efficacy

Team efficacy was measured with the respective subscale of the Team Resilience Scale (Sharma and Sharma, 2016). The team efficacy subscale has nine items (e.g., "I trusted that my team could handle such a situation well"), rated on a 6-point Likert scale ranging from 0 (does not apply at all) to 5 (fully applies). The internal consistency of the scale was very high ($\alpha = 0.96$).

Organizational resilience

In a preliminary study, a scale of organizational resilience was developed, based on Mallak (1998), Jeffcott et al. (2009), Toner et al. (2017), and Organizational Resilience Health Check (2019) and tested in two partner hospitals. Out of this scale and based on measurement metrics of the pre-study, seven items were chosen covering opacity, flexibility, learning culture, preparedness, top-level commitment, awareness, and just culture. Participants rated the items (e.g., "Contingency planning included the potential impact on employees and the team") on a 5-point scale ranging from 0 (do not agree at all) to 4 (fully agree). Internal consistency of the Organizational Resilience short scale was high ($\alpha = 0.84$).

Perceptions of transformation

We elicited perceptions of transformation during the COVID-19 pandemic on the individual, team, and organizational level as a dependent variable and as an indicator for the demonstration of resilience (Britt et al., 2016). Participants were asked to indicate on 5-point Likert-type scales to what degree specific aspects on each level, respectively, had been worsened (1), were unchanged (3), or had been improved (5) compared to before the COVID-19 pandemic. Internal consistencies of the three scales were low on the individual level ($\alpha = 0.67$) and good on the team level ($\alpha = 0.79$) and the organizational level ($\alpha = 0.80$).

Control variables

As control variables (see Table A1 in the Appendix), we measured sociodemographic variables as well as some COVID-19-specific variables. As sociodemographic variables, we measured age, sex, occupation type, care responsibilities in participants' own household (e.g., elder care or childcare), and worries about the lack of (child-)care. For COVID-19-specific control variables, we elicited perceived risk of infection and whether participants had completed pandemic training on the transmission routes of highly contagious diseases and how to use personal protection equipment properly.

Results

Reducing common method bias

To reduce common method bias (Podsakoff et al., 2003), we addressed item context effects by randomly assigning the items. Thus, counterbalancing the item order helps control for priming effects. Item characteristic effects were reduced by incorporating different scale formats and scale anchors. Different response formats were chosen for predictor and criterion variables also to control for acquiescence bias.

As a second approach to reduce common method bias, we conducted a Harman's single factor test using principal axis factoring including all 24 items of the constructs individual resilience, team efficacy, and organizational resilience. The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.95 and the Bartlett's test of sphericity was significant ($p < 0.001$). No single factor accounted for more than 50% of the variance, hence the factor loadings are all below the recommended 50% threshold (Podsakoff et al., 2003). An exploratory factor analysis revealed a four-factor solution (team efficacy, organizational resilience, individual resilience 1, individual resilience 2), where the latter two factors were subfactors of one construct (individual resilience). The first factor (team efficacy, nine items) accounted for 37% of the variance, the second factor (organizational resilience, seven items) for 9% of the variance, the third factor (individual resilience 1, five items) for 7% of the variance, and the fourth factor (individual resilience 2, three items) for 2% of the variance.

We further conducted a confirmatory factor analysis using principal axis factoring relating each of the items to their respective theoretical constructs (team efficacy, organizational resilience, individual resilience). Factor 1 (team efficacy) comprised nine items and explained 37% of the overall variance. Factor loadings ranged from 0.597 to 0.880. Factor 2 (organizational resilience) contained seven items and explained 9% of the overall variance with factor loadings from 0.372 to 0.738. Factor 3 (individual resilience) contained eight items and

accounted for 7% of the overall variance with factor loadings from 0.478 to 0.671. The theoretically driven three-factor solution accounted for 53% of the overall variance. We compared the three-factor model to a next-most-likely four-factor model (55% explained variance) and a single-factor model (accounting for 37% of the explained variance). The three-factor solution resulted in the second-highest explanation of variances and was in line with our theoretical assumptions.

Hypotheses testing

All results were calculated with IBM SPSS Statistics 27. To test our mediation hypotheses and research models, we used the SPSS PROCESS macro by Hayes (2017). First, we analyzed the hypotheses regarding the relationships between individual resilience, team efficacy, and organizational resilience (Hypotheses 1 and 2). Second, we focused on their relationships with their respective counterparts of the transformation variables (Hypotheses 3 and 3a–c). Finally, we tested the hypotheses regarding the proposed sequential mediation models (Hypotheses 4 and 5) by applying model 6 from the SPSS PROCESS macro (X = predictor; Y = outcome; M1 and M2 = mediators). We included individual resilience as X, perceived transformations on the individual, team, and organizational level as Ys, team efficacy as M1, and organizational resilience as M2. Table 1 summarizes the correlations among the independent and dependent variables.

Correlations among variables were in line with our expectations. Individual resilience is positively related to organizational resilience ($r = 0.36$, $p < 0.001$) supporting Hypothesis 1. Further, team efficacy is positively related to individual resilience ($r = 0.39$, $p < 0.001$) and organizational resilience ($r = 0.52$, $p < 0.001$), supporting Hypothesis 2. Finally, in line with our Hypothesis 3, there are positive relationships between individual resilience, team efficacy, and organizational resilience, respectively, and perceptions of transformation. The correlation analysis indicated a positive relationship for the individual level ($r = 0.30$, $p < 0.001$), the team level ($r = 0.41$, $p < 0.001$), and the organizational level ($r = 0.59$, $p < 0.001$). Interestingly, participants perceived variables concerning the organizational level more strongly associated than variables on the team level. During the COVID-19 pandemic, organizational resilience of hospitals thus seems to have been a crucial factor in successfully responding to the pandemic as an adverse event. The results from the correlation analysis were further confirmed by multiple linear regressions. Table 2 provides the estimated regression results. Individual resilience, team efficacy, and organizational resilience were added as explanatory variables. The dependent variable varied in the three models. Individual transformation was the dependent variable in Model 1, and team transformation was the

TABLE 1 Descriptive statistics and correlations of the measures.

Variable	Cronbach's α	M (SD)	1	2	3	4	5	6
1. Individual resilience	0.800 (8 items)	3.63 (0.83)	–					
2. Team efficacy	0.957 (9 items)	3.83 (1.00)	0.39***	–				
3. Organizational resilience	0.837 (7 items)	2.63 (0.82)	0.36***	0.52***	–			
4. Individual transformation	0.669 (3 items)	2.75 (0.63)	0.30***	0.27***	0.34***	–		
5. Team transformation	0.785 (4 items)	3.23 (0.56)	0.24***	0.41***	0.38***	0.33***	–	
6. Organizational transformation	0.796 (5 items)	3.07 (0.64)	0.27***	0.32***	0.59***	0.46***	0.54***	–

Scales ranged from 0 to 5 for individual resilience and team efficacy, from 0 to 4 for organizational resilience, and from 1 to 5 for individual transformation, team transformation, and organizational transformation. M, mean; SD, standard deviation.
Significant at level ***$p < 0.001$.

TABLE 2 Individual resilience, team efficacy, and organizational resilience as determinants of perceptions of transformation.

Variable	Model 1 (DV = Individual transformation)	Model 2 (DV = Team transformation)	Model 3 (DV = Organizational transformation)
Individual resilience	0.18***	0.05*	0.06*
Team efficacy	0.09**	0.27***	0.001
Organizational resilience	0.23***	0.23***	0.58***
Observations	1,682	1,681	1,682
R^2	0.16	0.21	0.36
Adjusted R^2	0.15	0.21	0.36

Regression results (standardized beta coefficients) from multiple linear regression models. Individual transformation was the dependent variable in Model 1, team transformation in Model 2, and organizational transformation in Model 3. DV, dependent variable.
Significant at level *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

dependent variable in Model 2. Model 3 included organizational transformation as dependent variable.

In all specifications, we found positive and significant main effects of individual resilience and organizational resilience on perceptions of individual, team, and organizational transformation. That is, perceptions of transformation were perceived as more positive the higher the levels of individual resilience, team efficacy, and organizational resilience were perceived by the study participants. In Model 1, we find that perceptions of transformations on the individual level were significantly predicted by individual resilience [$\beta = 0.18$, $t(1679) = 7.34$, $p < 0.001$], team efficacy [$\beta = 0.09$, $t(1679) = 3.16$, $p = 0.002$], and organizational resilience [$\beta = 0.23$, $t(1679) = 8.51$, $p < 0.001$]. In Model 2, we find that perceptions of transformations on the team level were significantly predicted by individual resilience [$\beta = 0.05$, $t(1678) = 2.07$, $p = 0.039$], team efficacy [$\beta = 0.27$, $t(1678) = 10.47$, $p < 0.001$], and organizational resilience [$\beta = 0.23$, $t(1678) = 8.84$, $p < 0.001$]. In Model 3, we find that perceptions of transformations on the organizational level were significantly predicted by individual resilience [$\beta = 0.06$, $t(1679) = 2.54$, $p = 0.011$] and organizational resilience [$\beta = 0.58$, $t(1679) = 24.60$, $p < 0.001$] but not by team efficacy [$\beta = 0.001$, $t(1679) = 0.05$, $p = 0.959$]. Organizational resilience had the largest impact on individual and organizational transformation perceptions and the second largest impact on team transformation processes. Team efficacy was a significant predictor of perceptions of transformation on the individual and team level but not on the organizational level. This result underscores the relevance of organizational resilience in perceptions of transformation during a crisis: Team efficacy and organizational resilience predicted perceptions of transformation beyond individual resilience. Analyses for multicollinearity reveal variance inflation factors (VIF) below 2, indicating no multicollinearity among the variables. Model 3 explained the largest amount of variance [$R^2 = 0.36$, adjusted $R^2 = 0.36$, $F(3,1,679) = 311.76$, $p < 0.001$), followed by Model 2 ($R^2 = 0.21$, adjusted $R^2 = 0.21$, $F(3,1,678) = 151.31$, $p < 0.001$), and last, Model 1 ($R^2 = 0.16$, adjusted $R^2 = 0.15$, $F(3,1,679) = 102.85$, $p < 0.001$). The regression results remained similar when control variables were included. The regression results with control variables are reported in Table A2 in the Appendix. This result provides further evidence for the importance of organizational resilience during a crisis. Hence, Hypotheses 3a, 3b, and 3c were supported.

Hypotheses 4 and 5 predicted a sequential mediation of team efficacy and organizational resilience between individual resilience and perceptions of transformation on the individual, team, and organizational level. Three sequential mediation models for each level were run, respectively, to test these hypotheses. The results of the path models are illustrated in Figure 2 for the individual level, in Figure 3 for the team level, and in Figure 4 for the organizational level. Detailed results of the mediation analyses are reported in Tables A3-A5 in the Appendix.

We first aimed to test whether team efficacy and organizational resilience mediates the relationship between individual resilience and perceptions of individual transformation. In a first step, the results reveal a significant total effect (c) of the predictor (individual resilience) on the outcome (perceptions of individual transformation); $\beta = 0.23$, $t = 12.05$, $p < 0.001$. Also, the total direct effect (c') without the effect of the two mediators was significant ($\beta = 0.14$, $t = 7.01$, $p < 0.001$). In a second step, data analysis reveals that individual resilience significantly predicts team efficacy ($\beta = 0.47$, $t = 14.59$, $p < 0.001$) and organizational resilience ($\beta = 0.20$, $t = 8.11$, $p < 0.001$). Further, team efficacy significantly predicts organizational resilience ($\beta = 0.36$, $t = 17.90$, $p < 0.001$). In

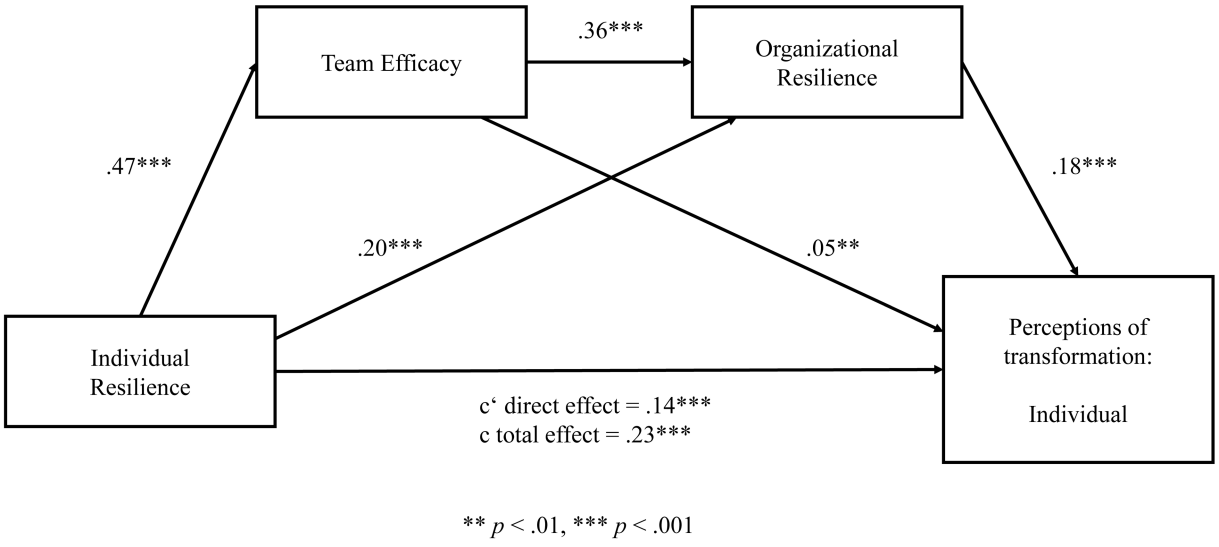

FIGURE 2
Sequential mediation model for perceptions of transformation on the individual level. Significant at level **p<0.01, ***p<0.001.

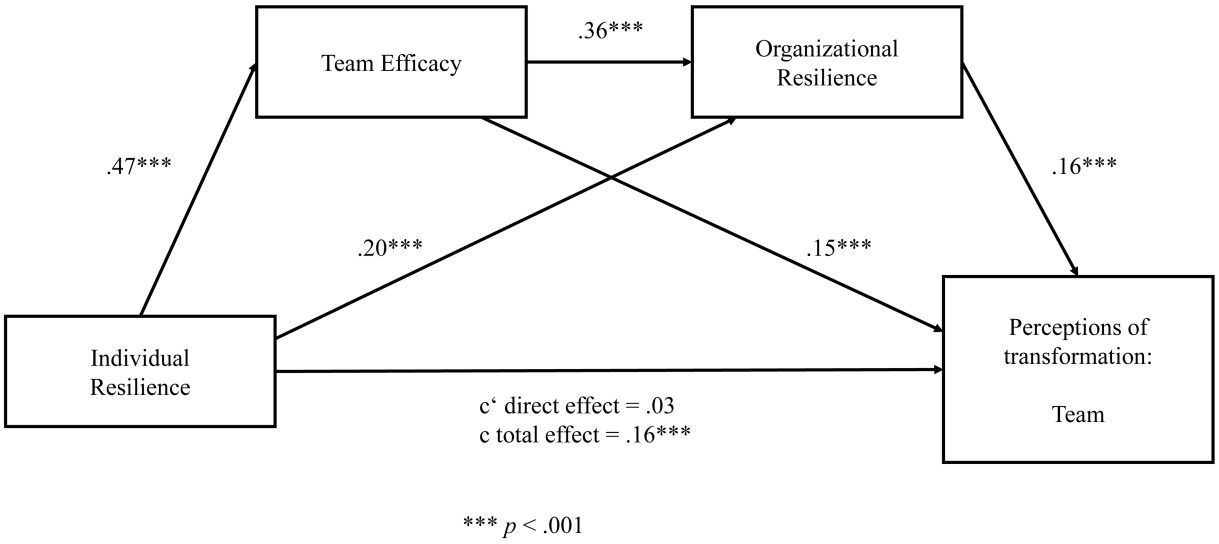

FIGURE 3
Sequential mediation model for perceptions of transformation on the team level. Significant at level ***p<0.001.

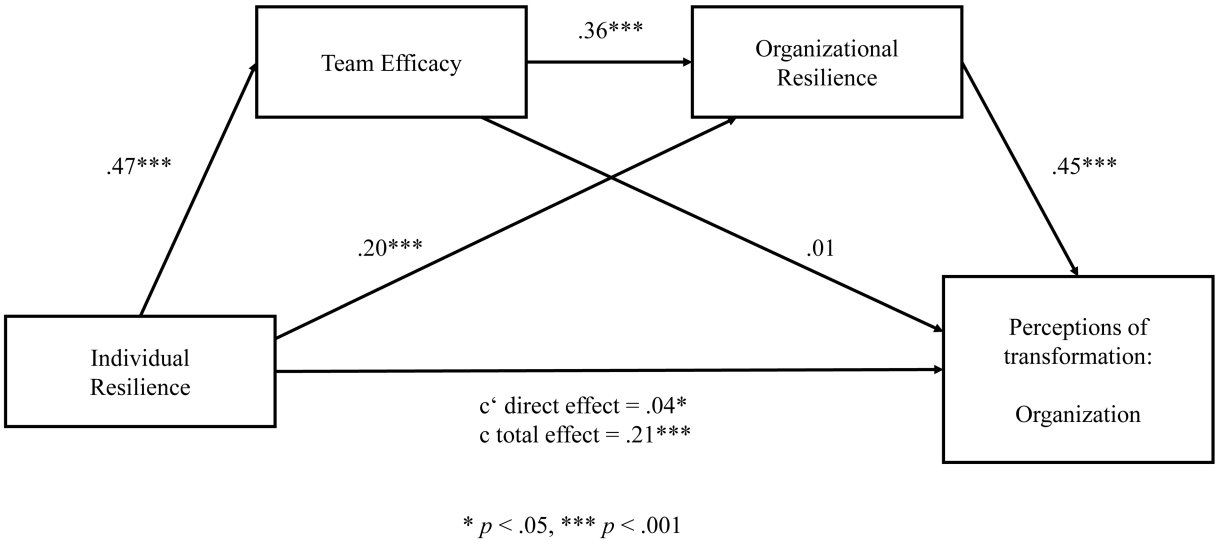

FIGURE 4
Sequential mediation model for perceptions of transformation on the organizational level. Significant at level *p<0.05, ***p<0.001.

a third step, the results reveal that team efficacy ($\beta = 0.05$, $t = 2.80$, $p = 0.005$) and organizational resilience significantly predict perceptions on individual transformation ($\beta = 0.18$, $t = 7.81$, $p < 0.001$). In order to estimate the significance of the total indirect effect, we calculated 95% confidence intervals using 10.000 bootstrap resamples. The value "0″ was not contained in the interval, thus we can conclude that the indirect effect is significant; 95% CI (0.02, 0.04).

We ran an identical mediation analysis for perceptions of team transformation. In a first step, the results reveal a significant total effect (c) of the predictor (individual resilience) on the outcome (perceptions of team transformation; $\beta = 0.16$, $t = 9.46$, $p < 0.001$). The total direct effect (c') without the effect of the two mediators was not significant ($\beta = 0.03$, $t = 1.95$, $p = 0.051$). In a second step, data analysis reveals that individual resilience significantly predicts team efficacy ($\beta = 0.47$, $t = 14.59$, $p < 0.001$) and organizational resilience ($\beta = 0.20$, $t = 8.10$, $p < 0.001$). Further, team efficacy significantly predicts organizational resilience ($\beta = 0.36$, $t = 17.90$, $p < 0.001$). In a third step, the results show that team efficacy ($\beta = 0.15$, $t = 9.11$, $p < 0.001$) and organizational resilience significantly predict perceptions on team transformation ($\beta = 0.16$, $t = 7.64$, $p < 0.001$). In order to estimate the significance

of the total indirect effect, we calculated 95% confidence intervals using 10.000 bootstrap resamples. As the value "0" was not contained in the interval, we can conclude that the indirect effect is significant; 95% CI (0.02, 0.04).

Lastly, we ran a mediation analysis for perceptions of organizational transformation. In a first step, the results reveal a significant total effect (c) of the predictor (individual resilience) on the outcome (perceptions of organizational transformation; $\beta = 0.21$, $t = 10.84$, $p < 0.001$). Also, the total direct effect (c') without the effect of the two mediators was significant ($\beta = 0.04$, $t = 2.52$, $p = 0.012$). In a second step, data analysis reveals that individual resilience significantly predicts team efficacy ($\beta = 0.47$, $t = 14.58$, $p < 0.001$) and organizational resilience ($\beta = 0.20$, $t = 8.10$, $p < 0.001$). Further, team efficacy significantly predicts organizational resilience ($\beta = 0.36$, $t = 17.93$, $p < 0.001$). In a third step, the results show that organizational resilience ($\beta = 0.45$, $t = 22.63$, $p < 0.001$) but not team efficacy ($\beta = 0.01$, $t = 0.05$, $p = 0.961$) significantly predicts perceptions on organizational transformation. In order to estimate the significance of the total indirect effect, we calculated 95% confidence intervals using 10.000 bootstrap resamples. The value "0" was not contained in the interval, thus we can conclude that the indirect effect is significant; 95% CI (0.06, 0.09).

On the individual and organizational level, a partial sequential mediation effect of organizational resilience was found. There was a significant indirect effect of individual resilience on perceptions of individual and organizational transformation through organizational resilience, a significant direct effect of individual resilience on perceptions of individual and organizational transformation, and a significant total effect. For the team level, we find a full mediation. While the indirect effect and the total effect are significant, the direct effect of individual resilience on organizational transformation remains insignificant. Hence our results indicate empirical evidence in support of Hypothesis 4.

Team efficacy partially mediated the relationship between individual resilience and individual transformation and fully mediated the relationship between individual resilience and team transformation but not organizational transformation. Hence, Hypothesis 5 can be only partly confirmed.

Overall, individual resilience relates to more positive perceptions of transformation at different levels in hospitals through consecutive mediating steps—*via* enhanced team efficacy and higher organizational resilience.

Discussion

Key findings

This study aimed to shed light on the cross-level effects of resilience in hospitals and has thus responded to calls to research this topic empirically (Jeffcott et al., 2009; Hartmann et al., 2020; Zhang et al., 2022). First, individual and organizational resilience as well as team efficacy are important and interrelated determinants for employees in hospitals to adapt better with the COVID-19 pandemic. Organizational resilience seems to be a critical antecedent variable for individual resilience and team efficacy during the COVID-19 pandemic. Hereby, organizational resilience is not the sum of resilient employees, nor does it function independently of employees; rather, it relies on the interdependence of capacities at each level. In other words, resilient employees perceive their organization to be more resilient, and it seems to be easier for employees to be resilient in organizations with high organizational resilience. This is in line with research on promoting organizational resilience (in preparation for an adverse event), which in turn results in higher individual resilience (Teng-Calleja et al., 2020) and approaches to resilience that understand resilience as a reciprocal process involving employees and their organization (Kuntz et al., 2016).

Second, our study took a first step towards the empirically underexplored relationship between individual resilience and the demonstration of resilience by revealing the mediating roles of team efficacy and organizational resilience in this relationship. On the individual and organizational level of transformation, we found a partial mediation effect of organizational resilience on the relationship between individual resilience and perceived transformation. Team efficacy partially mediated the relationship between individual resilience and individual transformation as well as team transformation but not on its own for organizational transformation. In this case, organizational resilience was necessary in addition to team efficacy to partially mediate the relationship. Furthermore, people with high individual resilience are particularly likely to experience higher team efficacy and to perceive higher organizational resilience. Team efficacy relates positively to a sense of organizational resilience, which subsequentially will relate to positive perceptions of transformations. As there is no direct link between individual resilience and factors that demonstrate resilience at the team level, organizational resilience and team efficacy fully mediated the relationship between individual resilience and perceptions of team transformation. These results emphasize the need to consider the construct of resilience holistically and as a cross level construct (Zhang et al., 2022). Our results support the logical premise that organizational resilience enhances the capability to cope and learn within organizations at both the individual and the team level. This pattern of results points to benefits for healthcare workers and hospitals to boost resilience capacities.

Third, our conceptualization of resilience outcomes as positive perceptions of transformation is in line with the proposition that "resilient behaviors among employees will be related to positive outcomes, even when circumstances are challenging or highly stressful, but only to the extent that the organization fosters a resilience-building context" (Kuntz et al., 2016, p. 460). Our research extends this understanding by showing that resilience across levels is positively related to perceptions of transformation. Moreover, organizational resilience had the largest impact on perceptions of individual and organizational transformation. Hospitals with highly committed leaders, organizational awareness, good preparation, and

flexibility as well as a just and learning culture were better able to adapt to the pandemic situation as a whole organization and for their members. This supports the importance of resources that allow for proactive coping strategies (job demands–resources theory, conservation of resources theory) and underlines that frontline workers experience positive changes such as posttraumatic growth during COVID-19 (Chen et al., 2021).

Fourth, our study reveals deeper insights into emergent phenomena at the collective level during a pandemic (response and adaptation phase; Ponomarov and Holcomb, 2009). Organizations have been described in resilience research as complex systems with interconnected agents forming a network of nonlinear interactions (Bhamra et al., 2011). These interactions inhibit or facilitate emergent phenomena such as organizational resilience and team efficacy. In general, efficacy beliefs at the individual and team level are important predictors of behavior (e.g., Sonnentag and Volmer, 2009). In times of crisis, they are still critical, but resilience mechanisms/capacities expand the resources needed to adapt and learn. Our data show that healthcare workers report high team efficacy, but organizational resilience must have emerged and must be facilitated to enable resilient behavior at the individual level. This indicates restrictions of social-cognitive approaches to resilience. Social-cognitive theory assumes that people have the power to control, transform, and develop their increasingly complex environments (Bandura, 2002). People therefore have the ability to adapt flexibly to the most diverse environments and to act proactively. In a pandemic, external forces (e.g., social distance, quarantine) restricted this proactive agency, making individual choices and behavior more dependent on higher level guidelines.

Our results are in line with research on the importance of organizational resilience and organizational support during the COVID-19 pandemicand supports the notion put forth by Rodríguez-Sánchez et al. (2021) regarding the human side of building organizational resilience and the need to integrate organizational factors to understand the complexities of team resilience. Hence it seems to be the case that the relevance of team and organizational levels changes in a crisis situation such as the COVID-19 pandemic. In crises, the organizational framework conditions become of utmost importance (Kreh et al., 2021; Zhang et al., 2022). Organizational practices (e.g., limiting change in task setting and team-related work) minimize the burnout of frontline workers (Sklar et al., 2021). Organizational justice (Kreh et al., 2021) and resilient focused leadership behavior (Giordano et al., 2022) increase the well-being of hospital staff. Building resilient healthcare systems is crucial to maintain high-quality healthcare even during a crisis (Haldane et al., 2021; Orru et al., 2021).

Finally, our results reveal the resilience of healthcare workers in hospitals in Germany (at least that of the healthcare workers in our sample; for limitations see below). We have summarized empirical results on how German healthcare providers and their employees have dealt with the crisis, closing a gap in the literature. Our results indicate that resilience indeed has been a highly relevant phenomenon for healthcare organizations to maintain their workforce during the pandemic. We have further extended the work on resilience in hospitals by following a holistic approach and by taking various occupation types into account.

Limitations and avenues for future research

This study does not come without some limitations. Given the highly demanding nature of the situation in hospitals as well as in private lives during the pandemic, a convenience sample was used. Generalizations to healthcare providers and their employees can therefore not be derived. The statements and interpretations made here can therefore only be applied to the demographic groups that participated in the survey. As this is not a representative survey, we might have missed some stakeholders with specific backgrounds, for example, a migration background. In the health sector in Germany it is estimated that between 11 and 18% of the employees have a migration background/experience (Habermann and Stagge, 2015). We had pretested our questionnaire in hospitals (also before the pandemic) and did not account for language fluency. We speculate that people with migration experience (as a marginalized group) might face additional stressors during the pandemic. This also links to highly stressed groups that were not accessible to us because of their limited (time) capacities for answering an online survey. Participation in the online survey was optional; no benefits were offered. Therefore, we encourage future research to consider more nuanced approaches to meet the diversity of stakeholders.

Although our results support a strong interrelation between the individual, team, and organizational level, the use of cross-sectional data necessitated a correlational structure. Hence, this precludes making inferences of causality and does not allow us to investigate causal effects. Thus, we cannot disentangle whether organizational resilience is necessary as a framework for building individual resilience and team efficacy or whether individual and team efficacy are the "microfoundation of organisation-level resilience" (Hartmann et al., 2020). Future research is needed to investigate causal relationships between individual, team, and organizational resilience, for instance, by applying experimental research designs. Further, we only were able to collect data of individuals on their perceptions at different levels (individual resilience, team efficacy, organizational resilience) across different hospitals. Thus, we are not able to present team or organizational level differences in the concepts. Future research should consider collecting nested data on different levels of resilience to allow for multi-level analysis.

The cross-sectional design further does not allow for any assumptions regarding the development of resilience over time. The study was conducted in the third and fourth quarter of 2020, just after the first COVID-19 wave in Germany but long before the current state of the COVID-19 pandemic (nearly 2 years on, at this writing). Our results thus provide no insights into the subsequent waves of the COVID-19 pandemic. Many healthcare workers have

resigned their jobs although our data showed (surprisingly) proactive and positive attitudes and perceptions. What role does time or duration of an adverse event play? What roles do preparation before and reflection after a crisis play? A deeper understanding of enhancing but also disempowering resilience processes across time is needed. Both longitudinal data and in-depth case studies are needed to be able to describe the processes of empowering and disempowering (e.g., *via* follow-up data collection after the pandemic) and to identify factors that foster persistence for resilient behavior at work.

Furthermore, comparative studies are needed to capture and embrace the dynamic character of resilience and its multiple potential pathways when dealing with a crisis within one hospital. Cross-sectional designs can reveal something as a 'good practice' but might miss the unique character of each hospital in dealing with a pandemic situation. In addition, we focused on one type of adverse event in one industry in one country (COVID-19 pandemic in healthcare providers in Germany). Hence, we cannot assume that our results are generalizable to other industries, other countries, other types of adverse events, or other phases of a crisis. Future research might investigate whether our findings can be replicated in other industries and other countries. To ensure comparability of results, it is recommended to use similar measures across studies. In cross-country comparisons, national characteristics of the healthcare systems might be another potential aspect that needs to be addressed.

To ensure reliability of the collected data, resilience at collective levels needs further clarification and translation in validated measures. Team resilience is conceptualized as a second-order emergent concept, whereas organizational resilience also follows emergent collective states but addresses more institutional processes. We decided to stick with a first-order concept such as team efficacy, while remaining aware of disregarding aspects of team resilience. Further research is needed to clarify the nature of the concepts and appropriate measurement approaches. One promising path would be to validate the short measures of organizational resilience we used in further studies. Such validated short scales could benefit research on occupations under high time pressure, as, for instance, the healthcare sector. Also, the development and validation of a reliable short scale measure for team resilience seems fruitful for future research.

Another limitation of our study is the use of self-report data. Although the use of self-reported data was appropriate for many of the variables we studied, a non-self-report measure of the outcomes in the hospital context would have been more ideal. We encourage future research to integrate organizational, team or individual performance measures to address this limitation. This also applies to our measure of perceptions of transformation, which can be interpreted as a cognitive measure. Future research on combinations of cognitive and behavioral measures would improve our picture of resilience and its demonstration.

Future research should also address the 'dark side' of resilience (Williams et al., 2017). Resilience might come at a cost (e.g., self-enhancing bias, positive illusions), which also could bias the (positive) answers in our sample. Enabling people to be energetic and happy might also inhibit learning and slow down responses to emerging threats (in Williams et al., 2017). Future research designs on resilience should integrate or be aware of this perspective.

Implications

The results from a large online survey of German healthcare workers during the COVID-19 pandemic have some important theoretical and practical implications. The present study looked at the interplay of individual resilience characteristics and collective resilience in hospitals and their effects on transformation during the pandemic. Results indicate indeed that resilience is a highly interrelated construct on the individual, team, and organizational level. Both research and practical recommendations should thus conceptualize and derive measures to foster resilience on all three levels. Both practitioners and researchers can benefit from a more holistic approach because such frameworks account for interactions and complexities between variables at different levels and in doing so direct attention to important areas where interventions can build resilience within healthcare providers.

This study highlights further that during a crisis, organizational capabilities are of utmost importance. Whereas team efficacy is crucial for performance in regular work operations, this shifts to the organizational level during a pandemic. Organizational processes must be created to maintain and promote resilient behavior of employees and teams. Organizations that are flexible in adjusting work processes should consider aspects of team efficacy and support resilient behavior in teams. For example, monitoring aspects of resilience might prevent physician burnout and reduced workforce capacities (Darrow and Eseonu, 2017). Also, continuous assessment within organizations on the multiple levels of resilience is recommended to detect potential needs within an organization. As such, evaluations conducted during normal operations (i.e., noncrisis times) can also serve as a benchmark tool to examine developments within an organization over time or after specific companywide trainings.

Individual resilience can be strengthened by long-term-oriented resilience training programs, which, for example, positively affect job satisfaction (Liossis et al., 2009; Vanhove et al., 2016). Vanhove et al. (2016) showed in their meta-analysis that resilience-building programs (as well as other prevention programs) in organizations have a modest effect across health and performance criteria, but those effects diminish over time. Their explanation was that learned skills were not being used. Consequently, fostering resilience is a continuous process that should be aligned across levels by human resources departments, as proposed by Branicki et al. (2019). Nevertheless, there is a lack of studies on holistic resilience-building programs. It hence seems fruitful to develop programs at different levels in hospitals to

foster resilience holistically across levels and in addition to evaluate their effectiveness.

Conclusion

In this study we shed light on the subjective experiences of employees in hospitals (healthcare workers, physicians, administrative staff) during the first wave of the COVID-19 pandemic in Germany. Our goal was to gain deeper insights into the interrelations of different levels of resilience in hospitals. In order to better understand the determinants, underlying mechanisms and consequences of resilience, we were especially interested in the interconnections of organizational and individual resilience and their relation to team efficacy as well as in the questions, how the change caused by COVID-19 is perceived at different levels in hospitals.

Our results reveal that organizational resilience becomes of utmost importance in a pandemic, and, when in place, enables both resilient behavior of employees and team-efficacy. Thus, organizational resilience enhances the capability to cope and learn within organizations at both the individual and the team level in hospitals during the pandemic. Moreover, resilience leads to positive perceptions of transformation (caused by COVID-19 pandemic) at different levels in hospitals, when employees experienced support by their organization and when they are able to believe in the competencies of their teams.

Our results indicate that resilience indeed has been a highly relevant phenomenon for healthcare organizations to maintain their workforce during the pandemic. Collective phenomena such as team efficacy and even more organizational resilience function as a catalyst during a pandemic. Thus, healthcare providers should conceptualize and derive measures to foster resilience especially on the organizational level, but also of their employees and teams.

Further research is needed to gain deeper insights into the multi-level structure of resilience and to integrate a multimodal and interdisciplinary perspective (e.g., socioecological) to foster resilience for healthcare providers during and after COVID-19. Further considerations should be taken regarding the 'dark side' of resilience.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

DG, NM, and JW contributed to the conception and design of the study. NM and EH organized the database and performed the statistical analysis. DG and EH wrote the first draft of the manuscript. All authors contributed to the manuscript revision and read and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.965380/full#supplementary-material

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Vulnerability of South African women workers in the COVID-19 pandemic

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On March 5th, 2020, the first SARS-CoV-2 (COVID-19) case was diagnosed in South Africa. Shortly after, President Cyril Ramaphosa, declared a National State of Disaster placing the country under "lockdown". Two years later the National State of Disaster was terminated on 15 March 2022 with more than 3.9 million cases of COVID-19 and more than 100,000 fatalities recorded. In the context of this pandemic the vulnerability of working women in South Africa increased considerably. In South Africa most women workers find themselves in vulnerable employment as domestic help in private households, traders in the informal economy, and small-scale agriculture with no employment contracts or health insurance cover. During the pandemic, women workers had to further deal with the socioeconomic vulnerability of their employment, dual domestic and working responsibilities and those infected with COVID-19, with the clinical sequelae of the disease. The government implemented several policies to assist workers and reduce the risk faced by vulnerable workers, including women. Despite these initiatives, long-term policies aimed at socioeconomic protection and employment creation that focus on women workers are required to address the negative impact of the COVD-19 pandemic as experienced by women workers in South Africa.

KEYWORDS

COVID, working women, vulnerability, socio-economic, South Africa

Introduction

The SARS-CoV-2 pandemic is in its third year with more than 600 million infections and in excess of 6 million deaths globally (1) and far-reaching socio-economic consequences for people in all countries. On March 5th, 2020, the first SARS-CoV-2 (COVID-19) case was diagnosed in South Africa. Shortly after, the President declared a National State of Disaster placing the country under "lockdown", limiting movement to purchase of essential items and access of emergency care (2). Two years later, with declining daily death rates, the National State of Disaster was terminated on 15 March 2022. More than 3.9 million cases of COVID-19 and more than 100,000 fatalities have been recorded in a population of ~60 million (3). The country has experienced five waves of COVID-19 infections with the Delta and Omicron variants of COVID-19 driving the severe second and fourth waves in the country (4, 5). Owing to the recurrent peaks in the burden of COVID-19 infections, the country has returned to different Alert Levels

and lockdown at various points in the pandemic. During Alert Level 5, drastic measures were taken, with closure of all sectors except for those providing essential services such as health, food production and sales. Confined to their homes, people were only permitted to go out to purchase food and access essential services. Between Alert Levels 4 and 2 there was an easing of the restrictions but several remained in place. Alert Level 1 allowed for ease of movement and opening of all sectors in the country, with limits on gatherings and continuation of the public health principles of physical distancing, hand sanitizing and the legislated use of facemasks in public spaces (6).

All of these restrictions have had implications for the population at large and workers in particular, whose vulnerability has increased in this pandemic. In this paper, we explore the impact the COVID-19 pandemic has had on women workers in South Africa and provide a perspective on addressing this impact in women workers in the country.

Employment and economic vulnerability of women workers

South Africa, like most low and middle income countries globally, has formal and informal employment sectors, with 63.8% of employed South African's working in the formal sector in 2021. Unemployment levels during the pandemic increased from 32.6 to 34.4% in 2021. In the 2nd quarter of 2021, ∼32.4% of women were employed in the country. Of those women who were employed ∼68% were in formal sector employment while 14.6, 13.5, and 3.9% worked in the informal sector, private households and agriculture. Most women working in the formal sector in 2021 worked in jobs in community and social services (including healthcare) (32.7%), trade (21.5%) and finance (13.7%), respectively (7).

The informal sector in South Africa comprises employees working in establishments employing less than five employees or employers, own account holders or persons helping in their own household business who are not registered for income tax or value-added tax. This sector consists of a vast array of enterprises including but not confined to street vendors and hawkers, "spaza" shops (township shops), hairdressers and barbers, food outlets, garment manufacture, mechanics and panel beaters (8). Fractionally more women (50.8%) work as "own account holders" in the informal sector as compared to men (49.2%) in South Africa and more women aged 35 years and above tend to find themselves working in the informal economy (9).

Women workers in South Africa are far more economically vulnerable when compared to their male counterparts. Most women in South Africa, whether employed in the formal or informal sector find themselves in low skilled and poorly paying jobs. Often these jobs are contractual in nature with no basic benefits such as pensions and medical insurance (10). As a result, when the economy faces a crisis as has been case with the COVID-19 pandemic, they are more likely to lose their jobs and experience financial insecurity. Not surprisingly, unemployment amongst women in South Africa saw a steady increase from 31.3% in the 2nd quarter of 2019 to 36.8% in the 2nd quarter of 2021 (7, 11). The South African National Income Dynamics Study Coronavirus Rapid Mobile Survey conducted between May and June 2020 found that women in the informal economy experienced a decrease in their working hours by as much as 49% and those women in informal self-employment reported a decrease in income by as much as 70% (12). These decreases in income increased the already vulnerable position of working women in South African society.

Burden of COVID-19 infection in women workers

Globally the number of COVID-19 cases in women (52%) exceeds that of men (48%) despite mortality being worse in men (1). This pattern is replicated in South Africa with current infections in women accounting for more than 55% of the total burden of COVID-19 infections in South Africa (3). Owing to the COVID pandemic a national occupational health surveillance system monitored by the South African National Institute of Occupational Health has been implemented requiring employers to register on the system and report workers diagnosed with COVID-19. The May 2020 COVID-19 transmission by Occupation report from this surveillance, found that women [median age of 40 years, interquartile range (IQR), 19–86 years] accounted for 56% of COVID-19 infections in the workplace for these cases with available occupational information (13). The industries mainly reporting information were from services and sales, health care and management. Undoubtedly, women in the healthcare sector in South Africa have been at the coalface of the pandemic. As of November 2021 of the more than thirty-nine thousand COVID-19 hospital admissions, 2.4% were health care workers. Female health care workers accounted for 67% of all admissions amongst health care workers (14). Increased infections amongst women workers and slow recovery amongst those with severe morbidity delayed return to work and increased the vulnerability amongst these working women.

Psychosocial impact of COVID-19 on women workers

There is no doubt that working women globally experienced a significant psychosocial burden during the pandemic. The sources of stress felt by women workers were multiple. These included loss of employment and decreases in income, the risk of COVID-19 infection, working longer hours and gender based violence (15).

In South Africa the risk of contracting COVID-19 or transmitting the disease posed a stress to several workers. Those who worked in jobs interacting with the public such as in health and services worried about taking infection home to family (16). An online survey of South African health care workers experiences of COVID-19 conducted between April and May 2020 in the country found that amongst female health care workers more than 20% (95% CI 19.7–23.8) were severely distressed (17).

Working longer hours increased stress in women workers. Those women who continued to go to work had to work longer hours when colleagues contracted COVID-19. Health care workers in particular started to experience burnout owing to stressful conditions, the longer hours and reduced time-off they faced during the pandemic (18). The experiences of healthcare workers during the pandemic in South Africa are similar to that of healthcare workers the globally (19–21).

South Africa is a patriarchal society in which, the vulnerability of women workers is further increased by virtue of the additional responsibilities they face on the home front in the form of domestic work, caring for children and the elderly. During lockdown most women found that in addition to working from home, they had the added burden of caring for family members who were ill, monitoring children who were having online schooling and general household chores. This resulted in blurring of the lines between work and home responsibilities. There were also those women who had to go to their workplaces and then return to the added responsibilities, worsening the psychosocial stress they experienced. A survey amongst 185 informal sector workers in Durban, South Africa found that women reported far greater increases, of between 37 and 59%, in cooking, cleaning and child care responsibilities when compared to their male counter-parts (21–27%) (22).

Women who were the sole financial support in their homes experienced increased stress owing to loss of earnings. In 2019, 41.8% of South African households were female-headed (23). The UNDP report on the socio-economic impact of COVID-19 on South Africa indicated that female-headed households were more likely to fall into poverty and persist in this state during the pandemic as compared to male- headed households (24).

Reported cases of gender-based violence increased considerably in South Africa during lockdown. Women either working from home or being unemployed found themselves with increased exposure to their violent partners (25). Based on the 2022 report from the South African Police there was a 10% increase in sexual offenses when comparing the financial period April to June 2017 /2018 ($n = 11,526$) to the same period in 2021/2022 ($n = 12,702$) (26). The increase in gender-based violence added to psychosocial stress experienced by women during the pandemic in South Africa.

Interventions

The government implemented several policies to assist workers and reduce the risk faced by vulnerable workers, including women. Regulations and workplace guides were implemented to reduce the risk of COVID-19 transmission in the workplace and identify vulnerable workers, for intervention (26–31).

The workplace guides while initially focused on the healthcare setting expanded to include all sectors such as manufacturing, mining and transport. These guides focused on identifying COVID-19 risk in the workplace, reducing exposure through improved ventilation and infection prevention and control practices and managing the COVID-19 positive worker (29–31). COVID-19 infections acquired in the workplace were declared compensable, requiring employers to report cases to the Compensation Commissioner (27). Unfortunately all of these interventions applied to the formal sector and could realistically only be implemented in the formal work sector. Practices of infection prevention control for COVID-19 were difficult to implement in the informal sector where basic access to water and sanitation remain a major limitation. However, there were non-governmental organizations such as Asiye eTafulani in the eThekwini municipality who in collaboration with WIEGO and public health experts produced health and safety guidelines and handwashing stations to help street traders. Importantly though in the main traders were responsible for purchasing their own personal protective equipment which increased the financial burden they were already experiencing (22).

The South African government announced several financial interventions aimed at providing social protection for South Africans in the midst of the pandemic. The COVID-19 Temporary Employee/ Employer Relief Scheme ("TERS") was announced in March 2020. This scheme allowed for the provision of supplementation income for employees who had a reduction in their salaries due to reduced working hours (32). Unfortunately, this scheme only covered employers and employees in the formal sector. Women working in the informal sector did not qualify for the benefits of this scheme.

The child support grant was increased for a month and then converted to a Caregiver allowance paid to the primary caregiver of children who received the child support grant from June to October 2020. Often in South Africa, children are left to the care of grandmothers in rural communities while women travel to urban areas for work and so this incentive while benefitting the household in which the child resided, would not benefit an unemployed woman unless she was the primary caregiver for her child.

A COVID-19 Social Relief Distress Grant was paid for a period of 9 months to individuals who were unemployed and ineligible for other grants or unemployment benefits (12).

This grant continues in 2022. For a period prior to the Social Relief Distress Grant, food aid from the South African Social Security Administration was distributed through municipal structures (12). Women who received child support grants were excluded from this incentive. As a result, several women in the informal sector who received child care grants were excluded (12). Further the applicants details were cross-checked through seven databases including, Home Affairs, the South African Revenue Services and government salary prior to awarding of the grant. This delayed the process for recipients considerably (12). In addition women who were migrants or asylum seekers were excluded as they were not considered for financial support through the COVID-19 Social Relief Grant (33).

While some informal sector workers were able to access the social relief initiatives there were challenges for others. An absence of identification documents, no access to digital services and a lack of bank accounts were amongst the challenges experienced by the workers. All applications for social relief had to be made digitally and in the absence of data or WiFi connectivity, this could not be done. Further, ∼20% of South Africans do not have bank accounts (34) and the grants were paid into bank accounts to avoid large queues at pay-points, which would have been a contravention of lockdown rules and a challenge for infection prevention and control. Hence those who did not have bank accounts were disadvantaged (Figure 1).

Discussion

While there were both workplace and social interventions implemented aimed at assisting workers, the complicated processes required to achieve the benefits of these interventions proved frustrating for workers and often excluded those most in need such as women workers increasing their vulnerability. The existing vulnerability of working women in South Africa worsened during the COVID-19 pandemic through job losses, increased risk at work and domestic pressures. The current measures aimed at assisting working women are only interim measures and long-term policies aimed at socioeconomic protection and employment creation that focus on women workers are required to address the negative impact of the COVD-19 pandemic as experienced by women workers in South Africa.

The national occupational health surveillance system that was implemented needs to be supported and extended to other aspects of worker health and to ensure that women workers are included. Further working with local authorities and non-governmental organization surveillance has to be extended to include the informal sector where most women workers find themselves in South Africa. This will require investment in systems and human resources.

The International Labor Organization in 2015 issued Recommendation 204 concerning the "Transition from the Informal to the Formal Economy". This recommendation

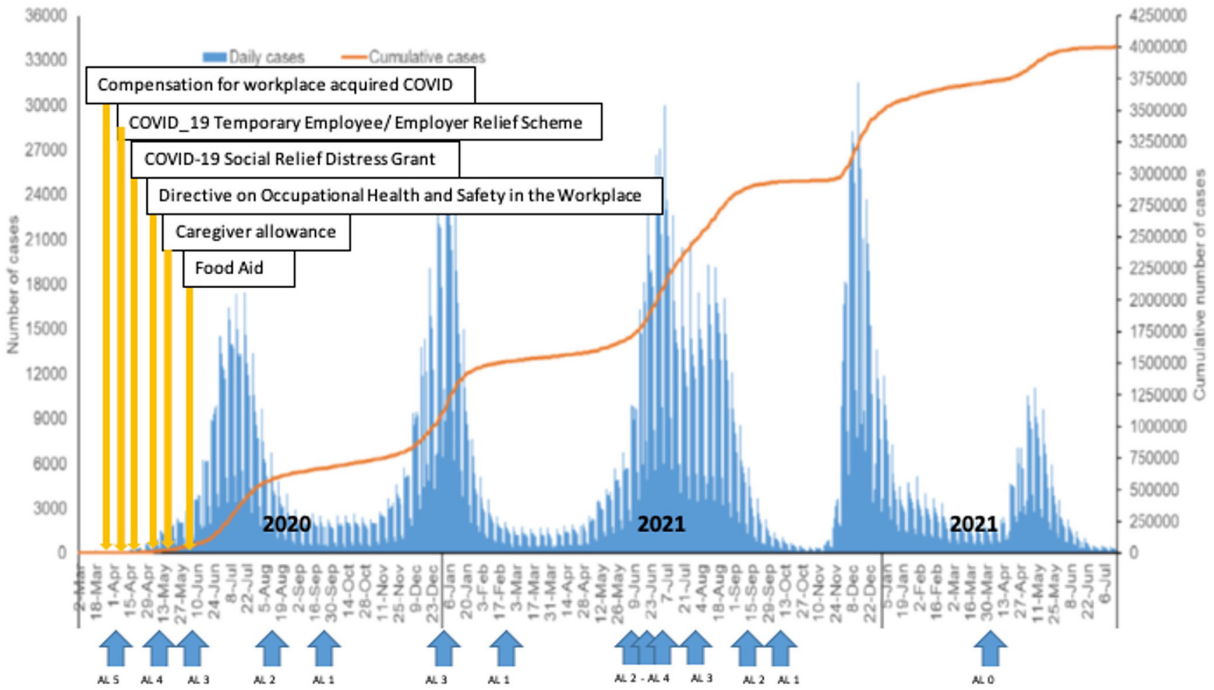

FIGURE 1
South African COVID-19 Alert levels (35) and dates of specific interventions. AL = Alert Level.

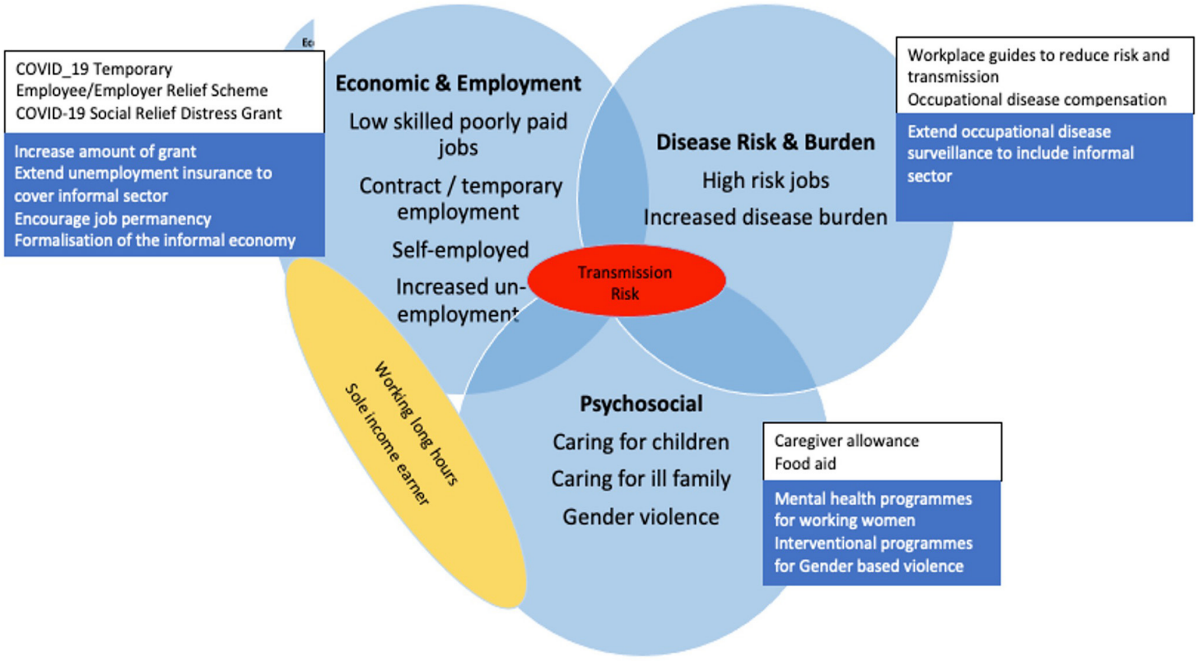

FIGURE 2
Vulnerabilities, Government interventions and proposed recommendations for addressing the COVID-19 impact on South African women workers. Blue circles: vulnerability factor, red oval: transmission risk, yellow oval: overlay of economic and psychosocial vulnerabilities, white box: government intervention, blue box: recommendations.

provides the guiding principles for countries to embrace when designing strategies to formalize the informal economy. This requires necessary policy frameworks be implemented (36). In South Africa amongst the policies extending unemployment insurance to women in the informal sector and those employed in temporary contracts will aid in filling the gap that currently exists with respect to this system. Women in the informal sector are organized in informal groups (such as domestic workers) and linked to non-governmental organizations, which can be used to link them to the unemployment insurance fund. Identifying easier ways for women to access financial support, be it grants or funding for small businesses, is crucial to ensuring the money and support reaches those most in need of it. Due consideration should be given to increasing the child support grants and converting the COVID-19 relief grant into a permanent basic income support grant available to all South African earning below. Further, the current amount of R350 should also be increased to a livable amount.

Greater attention is needed to encourage job security for women workers in South Africa, with concerted efforts to move away from contractual jobs to greater job permanency. Supportive work environments which encourage skills development and up-skilling giving women the opportunity to compete with their male counterparts for permanent positions are required. These environments need to take cognizance of the dual roles women play in the workplace. Further, the impact that COVID has had on women's health both physically and mentally has to be dealt with in the workplace through worker health programs. Programs to support women's health in the informal sector can be implemented with support from NGOs and ward based outreach teams at a primary health care level.

In South Africa, gender-based violence had been recognized as a human right violation which is a first step in addressing this problem in society. However, uplifting women' socioeconomic status empowers them to make their own choices. This is a very important step in addressing gender-based violence and due attention should be given to it (Figure 2).

In summary a comprehensive program addressing the short-term and long-term impacts of COVID-19 on women workers in needed in the current South African context. Such a program will have to be flexible and resilient in the changing South African work context.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Author contributions

NS conceptualized and wrote the paper including revisions. NN reviewed and commented on all drafts of the paper.

All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Psychological distress and post-traumatic growth in France during the COVID-19 pandemic: A mediation model of psychosocial safety climate as a determinant of work performance

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The psychosocial safety climate (PSC) reflects workers' perceptions of senior management's concern for mental health. Because the COVID-19 pandemic has exacerbated organizational issues, PSC could be a target for interventions attempting to preserve both the psychological health of employees and the economic health of companies. This study examines the direct and indirect relationships between PSC and work performance through two indicators of psychological health, psychological distress and post-traumatic growth, during a health crisis, i.e., prior to the second confinement in France. To this end, 2,004 participants from the French workforce completed a survey in October 2020. The results of mediation analyses indicate that PSC has a direct and positive influence on post-traumatic growth (PTG) and performance, as well as a direct negative influence on psychological distress. PSC also has an indirect positive influence on performance via psychological distress. Organizations that wish to jointly address mental health and performance at work would benefit from optimizing PSC.

KEYWORDS

psychosocial safety climate (PSC), psychological distress, post traumatic growth (PTG), performance, pandemic crisis

Introduction

On March 11, 2020, the World Health Organization (WHO) officially declared the COVID-19 a pandemic (World Health Organization [WHO], 2020), and as we have all seen, the disease rapidly spread across the globe (Bontempi, 2022). The global population has experienced many health restrictions, e.g., lockdowns, curfews, and

social distancing, which have required people to adopt new behaviors in all areas of their lives (Raile et al., 2020). In the workplace, the health crisis has led to new organizational practices, such as teleworking (Feng and Savani, 2020), which have greatly transformed employees' work experiences, e.g., work and home overload while telecommuting (Burk et al., 2021). Some authors underline the pressing need to act to preserve employees' psychological health during the pandemic (Chen et al., 2021). Long before the pandemic, the WHO already stressed the urgency of increasing investment in mental health because depression was already one of the leading causes of disability in the world (World Health Organization [WHO], 2017). Dzau et al. (2020) discuss the risks of a parallel pandemic specific to mental health if organizations do not react quickly to protect their staff.

Longitudinal studies are consistent in showing that the COVID-19 pandemic exacerbated mental health problems (Daly et al., 2020; Pierce et al., 2020) and that these effects may even have been underestimated (Czeisler et al., 2021). This crisis context illustrates the extent to which organizations must strike a balance between productivity on the one hand and the health and wellbeing of their employees on the other hand. Psychosocial safety climate (PSC) theory highlights the implications of attaining a balance between productivity and mental health for organizations and their staff. Specifically, PSC refers to "shared perceptions regarding policies, practices, and procedures for the protection of worker psychological health and safety," and PSC represents "the causes of the causes of work stress" (Dollard and Bakker, 2010, p. 579).

Many studies have demonstrated the precursor role of PSC for work design and employee health, e.g., the reduction of emotional exhaustion (Idris et al., 2011, Idris et al., 2014; Mansour and Tremblay, 2019), but few researchers have used this theory to understand the role of PSC in work performance. Idris et al. (2011) showed that PSC was directly and positively related to perceived performance. In addition, these authors highlighted that PSC positively influences job resources, e.g., managerial support, thus increasing engagement at work, which, in turn, enhances performance. Conversely, a better PSC was associated with reduced work demands, which, in turn, reduced the risk of burnout. In their study, both burnout and engagement were predictors of job performance.

As Ipsen et al. (2020) argue that "good health is good for business" (p. 1) and that there is a need to address mental health and performance at work simultaneously in research and organizations because these two issues are intrinsically interrelated (Nowrouzi-Kia et al., 2021). Moments of crisis, such as those triggered by the COVID-19 pandemic, cause an upsurge in mental health problems but also create transformational opportunities for individuals and organizations. One such opportunity is the phenomenon of post-traumatic growth (PTG), which is the set of positive changes following a traumatic event (Tedeschi and Calhoun, 1996, 2004b). Although little studied in the context of a crisis (Gori et al., 2021), this form of growth may have been experienced by some employees. The experience of contracting COVID-19 can be traumatic for some individuals, leading them to experience increased anxiety, distress, and depression (Masiero et al., 2020; Cohen and Nica, 2021). For others, however, the experience can also lead to lasting changes in the way they view the world, e.g., appreciating life more, changing their relationship to work, or altering their spiritual life (Nearchou and Douglas, 2021). These opportunities for PTG during a health crisis may, on the one hand, depend on individual characteristics such as resilience, hope, or beliefs (Nearchou and Douglas, 2021; Vazquez et al., 2021). On the other hand, they may also depend on organizational context because some studies suggest that PTG is more likely in a context in which mental health issues are prioritized and supported by top management (Wood et al., 2020).

The present study examines the mediating role of psychological distress and PTG in the relationship between PSC and job performance. More precisely, this research raises the following questions: (1) by putting in place the appropriate practices, policies, and procedures related to psychological health, especially during a health crisis, can organizations limit their employees' psychological distress while helping them achieve PTG? (2) To what extent does PSC influence employees' performance during a health crisis? (3) To what extent are psychological health indicators such as psychological distress and PTG explanatory mechanisms for the relationship between PSC and performance? To answer these questions, this study analyzes PSC, psychological distress, PTG, and perceived performance.

Psychosocial safety climate

A good PSC is characterized by freedom from psychological and social risk or harm at the highest levels of the organization (Dollard and Bakker, 2010). Specifically, PSC includes four dimensions: (1) top management commitment, namely their support in the prevention of work-related ill-being through the implementation of useful and decisive actions; (2) priority given to PSC by senior management, which is reflected in the importance placed on the psychological health and safety of employees vs. production; (3) communication, which refers to the organization's ability to listen, dialog, and take into account its members' contributions to psychological health and safety; and (4) organizational participation, which entails the consultation of employees and unions on issues related to psychological health and safety (Dollard and Bakker, 2010).

As an organizational resource likely to influence the constraints (i.e., by requiring compensatory physical and/or psychological efforts in order to cope with the situation while achieving the objectives set) and resources (i.e., by reducing

the intensity of the constraints and their deleterious effects on health while stimulating personal growth and development) of a job (Hakanen et al., 2006), PSC can be considered an extension of the Job Demands-Resources model (JD-R: Demerouti et al., 2001; Schaufeli and Bakker, 2004; Bakker and Demerouti, 2007). The JD-R model is based on two distinct psychological processes: the health impairment process, which assumes that constraints lead to various health problems, e.g., depression (Hakanen et al., 2008), and the motivational process, which argues that resources have motivational potential because they promote employee learning and development (Bakker and Demerouti, 2007). Dollard et al. (2019) assert that PSC mitigates health problems indirectly by reducing constraints and their effects and increases work commitment indirectly through resources. More concretely, in a weak PSC context, employees and their managers may have no internal mechanism, e.g., reporting procedures or a counseling unit, enabling them to report individual (e.g., chronic fatigue, stress, and risk of burnout) or collective (e.g., work overload and interpersonal conflicts) difficulties to management. A good PSC implies that the organization gives a high priority to the mental health of staff and managers and puts in place the necessary mechanisms to ensure managers have the resources needed to support their staff. A good PSC has been associated with better managerial practices because it promotes better mental health for managers (Biron et al., 2018; Parent-Lamarche and Biron, 2022). In the same vein, a multi-level study of healthcare workers during the pandemic showed that PSC promotes resilience through hope, as well as increasing the impact of supportive leadership on employee hope (Siami et al., 2022). In contrast, when PSC is low, the means available to employees to report their difficulties may be inadequate or non-existent. As a result, the work-related constraints to which they are exposed are more likely to persist over the long term, affecting their health and performance (Liu et al., 2020; Biron et al., 2021). Similar findings (Idris et al., 2015; Lee and Idris, 2017) confirmed that PSC acts as an antecedent to job demands and resources. By strengthening employees' job resources, e.g., learning opportunities, PSC increases their interest in and enthusiasm for their work, i.e., work engagement, as well as their performance.

Despite its theoretical soundness, few studies have considered the mechanisms through which PSC influences work performance during a health crisis. Therefore, this study analyzes the effects of PSC on the psychological health (psychological distress and posttraumatic growth) and performance of employees during a health crisis.

Psychological distress

Psychological distress is generally used as an early indicator of mental disorder (Kessler et al., 2003b). It is associated with various symptoms, such as cognitive impairments, irritability, depression, and anxiety (Ching et al., 2021). Previous studies indicate that high psychological demands, low work support, and low recognition for work efforts are strong predictors of psychological distress (Duchaine et al., 2017). Regarding the consequences of psychological distress, these include decreases in work productivity due to absenteeism (Duchaine et al., 2020) and presenteeism (Biron et al., 2021). For example, a study by Mirza et al. (2019) conducted in a sample of the oil and gas workers in Malaysia has shown that psychological distress mediates the relationship between PSC and safety behaviors in such a way that PSC reduced psychological distress, which, in turn, improved safety behaviors. Like Mirza et al. (2019), in this study, we suggest that a psychologically safe climate will help reduce distress, which, in turn, will improve work performance.

> **Hypothesis 1**. Psychosocial safety climate is negatively related to psychological distress.

Post-traumatic growth

The COVID-19 pandemic has engendered or reinforced work-related constraints, e.g., job uncertainty, such that the work environment may now pose new risks to workers' psychological health (Zahiriharsini et al., 2022). It has consequently become essential to identify the organizational variables, e.g., PSC, related to both positive and negative outcomes for employees, specifically in times of a health crisis.

Introduced by Tedeschi and Calhoun, 1996, 2004a,b, the concept of PTG corresponds to the set of positive changes following a traumatic event. More precisely, it describes the process of individuals experiencing these changes in certain areas of their lives through the reevaluation of their worldview (Gori et al., 2021). Although PTG is considered a salutogenic concept (Hamama-Raz et al., 2020), Tedeschi and Calhoun (2004a) clarify that, while PTG occurs more frequently in the context of suffering and inner struggle, it can also emerge in the lives of individuals who have not experienced specific trauma (Tedeschi and Calhoun, 1996), particularly in occupational settings (Sattler et al., 2014). For example, Stanton et al. (2006), in their review of the literature on the subject, suggest that cancer patients can experience PTG by, among other things, seeking more social support or using positive and adapted coping strategies. Accordingly, the constraints associated with the pandemic situation, e.g., successive lockdowns, may have both traumatic and constructive consequences (for a narrative review on PTG in the workplace during COVID-19, see Finstad et al., 2021; Vazquez et al., 2021).

Tedeschi and Calhoun (1996, 2004b) identified five areas that are central to the concept of PTG: personal strength, new possibilities in life, relationships with others, appreciation

of life, and spiritual change. First, people who experience an increase in personal strength feel that they can better handle everyday tasks and events that had been perceived as insurmountable, e.g., hard-to-achieve goals or internal conflicts. Second, PTG involves the identification of new possibilities for oneself and one's life, such as taking a different path than one had planned, e.g., career reorientation or a change in career development) (Tedeschi and Calhoun, 2004b). Third, PTG is characterized by potentially more intimate interpersonal relationships. Individuals thus become more aware of the importance of their relationships and cherish them more. This change also results in increased compassion for others, e.g., during a restructuring or job loss (Tedeschi and Calhoun, 2004b). Fourth, greater appreciation of life can also qualify as a PTG experience. For example, many aspects of daily life, however, small, are associated with small joys that can take on special meaning. The sense of priorities is profoundly altered such that "little things" are more valued, e.g., time spent with loved ones (Tedeschi and Calhoun, 2004b). Finally, the PTG experience can include positive changes in spirituality. People who experience PTG, be they religious or not, often engage in spiritual and existential reflection, which helps them cope with painful emotions or loss (Tedeschi and Calhoun, 2004b). To summarize, the PTG experience allows individuals to engage in a cognitive process, e.g., positive reinterpretation, positive reframing, interpretive control, and the reconstruction of events, that imparts meaning to their experiences and future perspectives. It allows them to develop resources with which to cope with new and undesirable situations (Hobfoll, 2002; Sattler et al., 2014).

Post-traumatic growth is increasingly being investigated in work settings (e.g., physicians, Taku, 2014; firefighters, Yang and Ha, 2019; paramedics, Ragger et al., 2019), but occupational factors are rarely considered. The literature has focused on the benefits of individual (e.g., emotional intelligence, Li et al., 2015; optimism, Yang and Ha, 2019; sense of coherence, Ragger et al., 2019) or personal (e.g., family support, Taku, 2014) characteristics in terms of PTG; scant research has explored organizational avenues of action. However, a few studies have noted the positive influence of the meaning of work (Hamama-Raz et al., 2020), recognition at work (Idås et al., 2019), and perceived social support in the workplace (Sattler et al., 2014) on PTG. Maitlis (2020) endorses various organizational practices that promote the development of PTG in employees, such as establishing a supportive organizational culture for employees coping with trauma, paying special attention to teams that are suffering, and creating organizational conditions that promote interpersonal trust and psychological safety.

> **Hypothesis 2**. Psychosocial safety climate is positively related to post-traumatic growth.

Relationships between psychosocial safety climate, distress, growth, and performance

Organizational performance reflects a firm's results, ranging from productivity to profitability, while remaining dependent on employees' perceived performance (Ipsen et al., 2020). Depending on their efficiency levels, personnel may or may not achieve the objectives set by the employer. This is why many authors emphasize the fact that psychological health and performance are intrinsically linked (Peccei and Van De Voorde, 2019) so that employees with good psychological health report better performance than those with poor psychological health. Despite organizational and governmental policies that assume a lack of connection between health and performance (Hasle et al., 2019), Ipsen et al. (2020) argue that these variables should be examined and integrated jointly into central managerial concerns and practices. The present study attempts to respond to this call by focusing on workers' psychological health and performance simultaneously.

Performance indicators vary widely between studies and can include subjective, e.g., perceived performance (Shimazu et al., 2010), or objective measures, e.g., total sales volume (Shannahan et al., 2013). It can be self-reported or not, e.g., completed by the supervisor (Alessandri et al., 2017), and can also be protean with respect to the profession studied, e.g., safe behavior among oil and gas workers (Mirza et al., 2019).

Kessler et al. (2003a) recommend examining performance as a subjective and global construct whereby employees evaluate their overall performance according to their own criteria. Although this operationalization does not allow one to distinguish among employees' skills, behaviors, and results, it does allow one to put these factors into perspective and determine whether employees have met the organization's requirements (Shimazu and Schaufeli, 2009; Shimazu et al., 2010). Moreover, this approach seems particularly well suited to a representative sample of a national population, as may be the case in our study, i.e., the French population.

One of the main objectives of examining performance is to identify the variables that best predict it, particularly during a health crisis in which labor shortages are acute. Thus, employees' health is construed as a key determinant of performance (Ipsen et al., 2020), such that wellbeing and ill-being will have differentiated effects. For example, several studies have shown that sleep disorders (Giorgi et al., 2018), psychological ill-being (Huang and Simha, 2018), and perceived stress (Lindegård et al., 2014) lead to performance deterioration. In addition, a few studies find that psychological distress is negatively related to performance (Lim and Tai, 2014) because distress leads to decreased attention, motivation, and effort. Conversely, several studies demonstrate that engagement at work (Shimazu and Schaufeli, 2009) and subjective wellbeing (Salgado et al., 2019)

increase performance. Similar results were also found during the COVID-19 pandemic. Nemteanu et al. (2021) showed that job satisfaction positively influenced performance, while negatively affecting counterproductive behaviors. Similarly, Prodanova and Kocarev (2021) highlighted the negative indirect influence of information and communications technologies (ICT) anxiety on work-from-home performance via job efficacy.

Although no research to date has examined the influence of PTG on performance, it is likely that, as a salutogenic indicator, the resources with which PTG is associated, e.g., improved self-image and higher quality of interpersonal relationships, allow employees to experience more positive effects and events perceived as stimulating and, thus, to adopt the appropriate behaviors so as to achieve high levels of performance. Thus, we offer the following hypotheses (**Figure 1**).

> **Hypothesis 3**. Psychological distress is negatively related to perceived performance, whereas PTG is positively related to perceived performance.

> **Hypothesis 4**. The positive relationship between PSC and perceived performance is mediated by psychological distress and post-traumatic growth.

Materials and methods

Participants and procedure

All participants in this study were recruited through a French opinion polling institute, OpinionWay, with which we collaborated in this work. The participants completed an online questionnaire between October 19 and 28, 2020. In an invitation was sent by email, in which they were told how to access the questionnaire. The targeted sample was representative of the characteristics of the working population in France, e.g., the ratio of men to women, and aged 18 years or more. The representativeness of the sample was based on quota methods for gender, age, and profession, which was performed after stratification by region and town size. In addition, the participants were told that this research was anonymous and confidential, that there were no right or wrong answers, and that it was important to answer sincerely. The survey was completed in no more than 20 min. The socio-demographic and socio-professional characteristics of the participants are presented in **Table 1**.

Measures

Psychosocial safety climate

Participants reported their perceptions of their organization's PSC based on four items ($\alpha = 0.90$ for this study; i.e., "Senior management shows support for stress prevention through involvement and commitment," "Senior management considers employee psychological health to be as important as productivity," "There is good communication here about psychological safety issues which affect me," "In my organization, the prevention of stress involves all levels of the organization" (Dollard, 2019). The instructions they were given took into account the COVID-19 pandemic context (i.e., "*The following statements relate to psychological health and safety within your organization. Considering your current employment status during this pandemic, please select the answer that best fits your situation*"). Responses ranged from 1 (Strongly Disagree) to 5 (Strongly Agree).

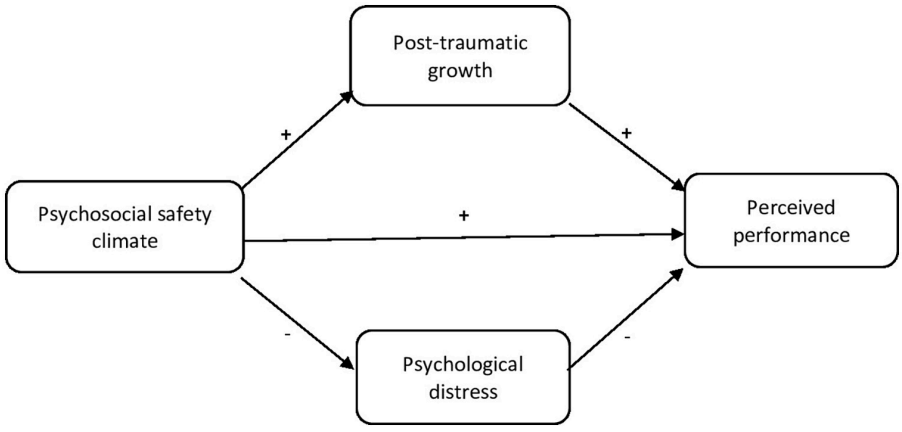

FIGURE 1
Theoretical model.

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TABLE 1 Characteristics of study participants.

	Participants ($N = 2,004$)	Percentage
Gender		
Men	1,042	52.0
Women	962	48.0
Age		
18–29 years	183	9.1
30–39 years	581	29.0
40–49 years	625	31.2
50–59 years	493	24.6
60 years and older	122	6.1
Seniority in the organization		
Less than 1 year	142	7.1
1–3 years	373	18.6
3–5 years	332	16.5
5–9 years	262	13.1
10 years or more	895	44.7
Job categories		
Executives and professionals	583	29.1
Middle managers	476	23.8
Employees	682	34.0
Laborers	263	13.1
Company size		
Less than 10 employees	263	13.1
10–249 employees	746	37.2
250–4,999 employees	601	30.0
5,000 employees or more	394	19.7
Supervision		
Managers	685	34.2
Managers of managers	217	10.8
Work status during the pandemic		
Full time	1,743	87.0
Partial technical unemployment	171	8.5
Total technical unemployment	53	2.6
Leave/special leave of absence	37	1.9
Days teleworked/week ($n = 1,914$)		
No teleworking	1,236	64.6
1 day a week	107	5.6
2 days a week	224	11.7
3 days a week	170	8.9
4 days a week	60	3.1
5 days a week	110	5.7
6 days a week	4	0.2
7 days a week	3	0.2

Psychological distress

The six items of the Kessler Psychological Distress Scale (K6; Kessler et al., 2002, 2003b) were used to measure the frequency with which participants exhibited symptoms of non-specific psychological distress the week prior, e.g., feeling nervous, depressed, agitated, or irritable ($\alpha = 0.90$ for this study). The response choices ranged from 1 (Never) to 5 (All the time). This measure was used because it reflects the diagnostic criteria for psychological unhappiness, specifically major depression and generalized anxiety disorder (Kessler et al., 2002). The K6 has been validated with adults in several studies; its psychometric properties are as good as those of the K10 (Kessler et al., 2002, 2003b; Furukawa et al., 2003). The scale can also be used with established threshold to discriminate cases of serious mental problems from non-cases (Kessler et al., 2003b, 2010).

Post-traumatic growth

The post-traumatic growth inventory (PTGI), developed by Tedeschi and Calhoun (1996), measures perceived benefits following a traumatic event. Participants responded to a total of 21 items. Specifically, they were asked to report the extent to which events related to the health context, i.e., the declaration of the COVID-19 pandemic, confinement, and re-opening, caused lasting changes ($\alpha = 0.95$ for this study; "I have new interests," "I feel closer to others," "I have a greater appreciation of the value of my life"). The responses ranged from 1 (Not at all) to 5 (Totally).

Perceived performance

Performance was measured by responses to the following question: "Over the past week, how would you rate your performance at work on a scale of 0–100%?" (Kessler et al., 2003a). The responses ranged from 0% (the worst performance an employee could deliver) to 100% (the best performance an employee could achieve) in 5% increments. The main reason for the choice of this scale is that the nature of the performance indicators varies significantly from one study to another. This makes it all the more difficult to examine work performance when it is studied in a population-based sample, such as the one used in this study. In this respect, some authors propose to measure performance through a one-item subjective scale (Shimazu and Schaufeli, 2009; Shimazu et al., 2010), which allows us to take into account disparate professional backgrounds.

Analyses

The data were analyzed using the Statistical Package for Social Sciences (SPSS 23) software. To test the set of hypotheses, several steps were followed. First, descriptive and correlation analyses were conducted to explore the relationships between the variables, i.e., PSC, psychological distress, PTG,

and perceived performance. Second, analyses were conducted to test the mediating effects of psychological distress and PTG on the relationship between PSC and perceived performance. To this end, the procedure defined by Hayes and Preacher (2014) was used. It involves estimating four parameters (i.e., alpha, which corresponds to the regression weight of PSC on each mediator, namely psychological distress and PTG; beta, which corresponds to the regression weight of the mediators of perceived performance; c, which corresponds to the total effect (i.e., direct and indirect) of PSC on perceived performance; and c′, which corresponds to the direct effect of PSC on perceived performance (indirect effect = c − c′). We can thus differentiate the direct and indirect effects of an independent variable on a dependent variable. Finally, the indirect effect is calculated as the product of the alpha × beta relationships for each mediator. Its 95% confidence interval is estimated from a resampling procedure that is repeated 5,000 times. This commonly used procedure produces a more reliable estimate of the confidence interval because it is robust to a non-normal distribution on the part of the indirect effect (Preacher and Hayes, 2008). These mediation analyses were conducted using the freely available macro PROCESS v3.5 (model 4) developed by Hayes (2022).

Results

First, correlation analyses were performed to test for preliminary support for our hypotheses (see **Table 2**). Our results showed that PSC is positively correlated with PTG and perceived performance [$r(2{,}003) = 0.24$ and $r = 0.21$, respectively; $p < 0.001$] but negatively correlated with psychological distress [$r(2{,}003) = -0.223$; $p < 0.001$]. In addition, psychological distress and PTG are, respectively, negatively [$r(2{,}003) = -0.21$; $p < 0.001$] and non-significantly [$r(2{,}003) = 0.033$; $p > 0.05$] related to perceived performance.

Next, simple mediation analyses were performed to identify potential mechanisms, i.e., psychological distress and PTG, via which PSC influences perceived performance. The results are presented in **Table 3**.

Psychosocial safety climate is negatively associated with psychological distress ($b = -0.19$; CI = [−0.23; −0.16]; $p < 0.001$) but positively associated with PTG ($b = 0.24$; CI = [0.20; 0.29]; $p < 0.001$). Furthermore, results showed that psychological distress negatively predicted perceived performance ($b = -8.33$; CI = [−9.32; −7.33]; $p < 0.001$), whereas PTG was not significantly associated with perceived performance ($b = -0.12$; CI = [−1.00; 0.76]; $p = 0.78$). Consistent with these results, we found that PSC has an indirect and positive influence on perceived performance by reducing psychological distress ($b = 1.64$; CI = [1.26; 2.06]). Conversely, PTG did not make a significant indirect contribution to the relationship between PSC and perceived performance ($b = -0.03$; CI = [−0.25; 0.19]).

Discussion

This study examined the effects of PSC on psychological distress, PTG, and perceived performance among French employees during the COVID-19 pandemic, specifically prior to the second confinement in France (October 30 to December 15, 2020). First, as hypothesized, our results indicate that PSC is positively related to PTG but negatively related to psychological distress. These results support H1 and H2. Our results partially supported H3, showing that distress was negatively associated with performance but the association with PTG was not significant. As for H4, the association between PSC and performance was partially mediated by psychological distress. PSC indirectly fostered work performance by reducing psychological distress. The mediating effect of PTG was not significant.

Theoretical contributions

Our results are consistent with previous work that found that PSC was associated with positive consequences for both psychological health and performance (Idris et al., 2015). More tangibly, PSC is an organizational resource that tends to mitigate constraints such as work overload, whilst promoting resources such as social support, autonomy, and skills development (Dollard and Bakker, 2010; Yulita et al., 2022). PSC implies that key stakeholders are enabled to respond promptly and proactively to the psychological health issues exacerbated by the pandemic. PSC has been associated in previous studies with many mental health outcomes such as psychological distress (Platania et al., 2022; Yulita et al., 2022), and with the core components of the JD-R model such as burnout and engagement (Dollard and Bakker, 2010; Idris et al., 2011). However, to the best of our knowledge, it has never been used in the context of crisis as an antecedent to PTG, thus responding to the recent call to use PSC with a broader range of outcomes (Dollard et al., 2019). This implies that employees who evolve in a work climate in which they perceive that their wellbeing is considered and preserved by their organization report less psychological distress and tend to experience the COVID-19 crisis more positively. The PSC thus helps maintain healthy working conditions, allowing employees to thrive professionally through good health and strong performance.

Second, consistent with previous research (Shimazu et al., 2010; Lim and Tai, 2014), our results showed that psychological distress was negatively associated with perceived performance. Furthermore, we demonstrate that PSC positively influences perceived performance via psychological distress. In other words, psychological distress is an explanatory mechanism for the relationship between climate and performance such that, when the PSC is perceived to be high, performance levels

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TABLE 2 Means, standard deviations, and correlations.

Variables	*M*	SD	Correlations			
			1	2	3	4
(1) Psychosocial safety climate	2.96	1.01	–			
(2) Psychological distress	2.26	0.90	−0.223**	–		
(3) Post-traumatic growth	3.31	1.02	0.246**	−0.012	–	
(4) Perceived performance	78.55	21.84	0.219**	−0.377**	0.033	–

**$p \leq 0.01$.

TABLE 3 Results of direct and indirect effects of mediation.

Direct effects

	Mediators	*B*	ES	*t*	*p*
PSC-performance (total relationship)	–	4.68	0.46	10.02	<0.001
PSC-performance (direct relationship)	–	3.06	0.46	6.59	<0.001
PSC-mediators (alpha relationships)	PD	−0.19	0.02	−10.24	<0.001
	PTG	0.24	0.02	11.33	<0.001
Mediators-performance (beta relationships)	PD	−8.33	0.50	−16.40	<0.001
	PTG	−0.12	0.45	−0.27	0.78

Indirect effects

	Effects	Effects (%)	BootSE	BootLLCI	BootULCI
PSC-PD-performance	1.65	35	0.20	1.26	2.06
PSC-PTG-performance	−0.03	0.6	0.11	−0.25	0.19

PSC, psychosocial safety climate; PD, psychological distress; PTG, post-traumatic growth.

increase via a decrease in distress levels. These results are coherent with the Conservation of Resources theory (Hobfoll, 1989, 2002). Hobfoll and Shirom (2000) postulate that, when individuals have the necessary resources, e.g., a strong PSC, to cope with the constraints of their environment, they are also able to conserve and renew individual resources to preserve their wellbeing. Employees with sufficient resource reservoirs can undertake various projects at the workplace, intellectual challenges, or new career or training opportunities because they have the energy and motivation to achieve these goals. Conversely, if employees lack the necessary resources, e.g., weak psychosocial security climate, to perform their work despite certain constraints, e.g., a lack of autonomy or recognition, they risk developing higher levels of ill-being, e.g., psychological distress, and being unable to achieve their performance objectives. For employees, high levels of psychological distress are often associated with lower levels of concentration (Lim and Tai, 2014) and work engagement (Inoue et al., 2010). They thus become inattentive and put forth less effort when carrying out their tasks.

Third, contrary to our expectations, our results suggest that PTG is not significantly correlated with perceived performance and that it does not mediate the relationship between climate and performance. Accordingly, although PSC promotes the development of PTG, which is beneficial to employees' psychological health, it does not enhance workers' performance. This can be explained mainly via conceptual reasons linked to the very definition of PTG and its components. Tedeschi and Calhoun (1996, 2004b) identified five factors that are central to the concept of PTG: personal strength, new possibilities in life, relationships with others, appreciation of life, and spiritual change. While it is true that this growth allows individuals to develop new resources through pleasurable emotional, interpersonal, or spiritual experiences, it is also possible that the benefits of these experiences remain highly personal. In other words, the benefits experienced through PTG do not induce changes or improvements in performance but, rather, in individual wellbeing. For example, although PTG does not influence employee performance directly, it remains associated with significant reservoirs of resources that employees can draw on. Since PSC was found to be a positive determinant of PTG, future research could investigate the explanatory mechanisms behind this association. For example, PTG may depend not only on contextual factors such as PCS, but also on leadership behaviors specific to PTG, as suggested by Wood et al. (2020) in their study of a military sample. Lastly, as pointed out by

Maitlis (2020), it is likely that certain aspects of growth are not enacted behaviorally.

Limitations and future research directions

Although this study deepens our understanding of the relationship between PSC and perceived performance during a health crisis through two indicators of psychological health (psychological distress and PTG), it has limitations that deserve mention. First, this work is based on a transverse study protocol, which does not allow us to demonstrate causal relationships between our constructs, e.g., PSC and PTG. Therefore, longitudinal and experimental studies should be conducted to confirm and generalize these results, both within a representative sample of the French population and with more specific professionals, e.g., teachers, or hierarchical levels, e.g., local managers.

Second, we examined the extent to which specific indicators of psychological health, i.e., psychological distress and PTG influence perceived employee performance. However, we did not consider any objective performance indicators that could limit social desirability bias, i.e., the tendency to distort self-descriptions in a positive sense (McCrae and Costa, 1983), nor did we consider multisource measures, e.g., co-workers and supervisors, that could minimize common variance bias, i.e., variance in the dimensions studied attributable to the measurement method rather than to the constructs that the measures are assumed to represent (Podsakoff et al., 2003). Although we used only tools whose psychometric qualities had been confirmed repeatedly, future research could draw on multi-source data, e.g., peer-perceived organizational citizenship behaviors, and other indicators of organizational health, e.g., absenteeism and turnover. Multi-item and multi-dimensional scales would also be welcome because, while this tool has advantages, e.g., the ability to survey a sample with a variety of jobs, it does not allow for the examination of specific behaviors associated with performance, e.g., organizational citizenship behavior, nor the achievement of more concrete organizational objectives, e.g., the quality of brand and product presentation, including those relating to the COVID-19 pandemic, such as performance while teleworking.

The present study was conducted in the context of a health crisis, but it would be relevant to contrast these results with data collected in a less turbulent context. For example, Dollard and Bailey (2021) showed that, in times of crisis, as well as in non-crisis times, PSC can be developed and sustained with leaders and teams through appropriate interventions. Placing mental health as a priority for top management is even more relevant given that the pandemic has generated and even exacerbated emerging risks, such as unethical culture, technological pressure, and the management of organizational change (Zahiriharsini et al., 2022). As suggested by Dollard and Bailey (2021), the pandemic has put mental health on the radar of policy makers. This has led to a multitude of interventions that are not always grounded in theory or empirical evidence. Our study corroborates previous ones highlighting the fact that the PSC is a key target for both mental health and organizational performance (Idris et al., 2015; Biron et al., 2021; Dollard and Bailey, 2021; Parent-Lamarche and Biron, 2022).

Practical implications

Our results underline the benefits of PSC for employees' psychological health and performance in the context of a health crisis, particularly during periods of confinement. Therefore, it is essential for organizations to put in place policies, practices, and procedures explicitly intended to preserve workers' psychological health and safety (Dollard and Bakker, 2010; Dollard et al., 2019). These measures could include developing an internal process to encourage employees to share their problems during a health crisis, e.g., individual or group interviews on health and psychological safety, and proposing internal solutions to address them. For example, the health context has disrupted many work practices, e.g., the deployment of telecommuting, and compartmentalized departments and colleagues, leading to feelings of isolation. In cases in which difficulties regarding teleworking, e.g., work overload and an imbalance between life areas, reach top managers, it could be interesting to train all the staff in good practices related to telework in order to avoid an increase in working hours, i.e., starting earlier and finishing later, and mental overload related to household tasks, e.g., looking after the children while attending a meeting via videoconference. Concurrently, drawing on Dollard and Bailey (2021), managers could be trained in practices that take such difficulties into account, on the one hand, by equipping them to recognize the signals of ill-being in their teams and, on the other hand, by enabling them to address the associated emotional load.

Conclusion

Overall, this research sheds light on the role of PSC in perceived performance via two distinct mental health pathways, namely psychological distress and PTG. This expands the scope of studies that have primarily considered the effects of PSC on mental health, thus attempting to answer the call of Ipsen et al. (2020) to consider mental health and performance simultaneously rather than separately, as is most often the case in research and practice. Given the deterioration of mental health in many workplaces as a result of the pandemic and critical and pervasive labor shortages in several work sectors, it is crucial that leaders develop better practices, policies, and

procedures to ensure that workers can work in psychologically safe environments.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

ÉS, J-PB, and CN contributed to conception and design of the study. ÉS and CN organized the database. ÉS and HI performed the statistical analysis. ÉS and J-PB wrote the first draft of the manuscript. CB and HI wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

Conflict of interest

ÉS, J-PB, and CN were employed by Empreinte Humaine.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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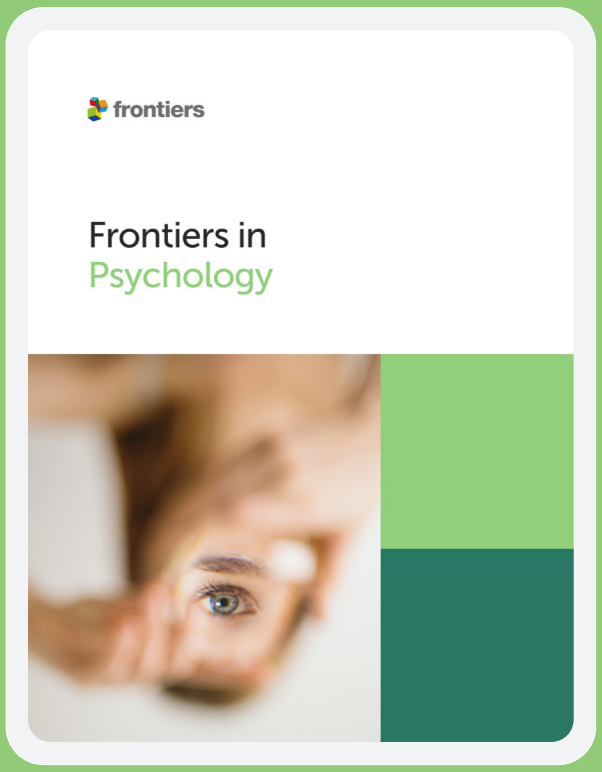

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