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Protecting oneself while supporting the organisation: A longitudinal exploratory study of healthcare workers' coping strategies and organisational resilience processes in the first year of the COVID-19 pandemic

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ABSTRACT

The COVID-19 pandemic has been a major source of stress for health professionals and health institutions. In response, healthcare workers adapted their behaviours to protect their health and the organisational resilience of their institutions. The study aimed to explore these individual coping and organisational resilience strategies and their evolution during the first year of the pandemic. Based on a mixed and longitudinal protocol, the study included staff from several French-speaking Swiss healthcare institutions. Participants completed an online questionnaire three times during the first year of the pandemic. They described daily problematic work situations, coping styles, and organisational resilience strategies. 'Problem solving' was the most frequently reported coping style, followed by 'positive thinking', and in a lesser extent 'seeking social support' and 'avoidance'. A high level of 'problem solving' and 'positive thinking' was associated with well-managed situations, learning and development of new work practices and higher team performance. A higher level of 'seeking social support' and 'avoidance' tended to be associated with high-risk problematic situations that hindered organisation resilience. Coping strategies differed depending on profession, job tenure and hierarchical status. The article concludes with recommendations for improving both organisational resilience and individual workers' well-being in healthcare institutions.

1. Introduction

From early 2020, the COVID-19 pandemic became a major challenge for healthcare institutions worldwide. Indeed, shortages of personal protective equipment (Slotkin et al., 2020), isolation measures (Borasio et al., 2020; Fallon et al., 2020; Pahuja & Wojcikewych, 2020; Stall et al., 2020), reduced staff availability (Sarma et al., 2020), lack of clear existing protocols (Fang et al., 2020; Sarma et al., 2020; Slotkin et al., 2020), high volumes of severely ill patients and fears of being infected (Amin, 2020; Greenberg et al., 2020), among other issues, forced healthcare workers to reinvent their practices extremely quickly (Juvet et al., 2021). These factors have had practical effects on staff motivation and well-being. Accordingly, since the onset of the COVID-19 pandemic, many cross-sectional studies about the negative effects of the crisis on healthcare workers' mental health have been published (Baker et al., 2020; Carmassi et al., 2020; Lamb et al., 2021; Lorente et al., 2021;

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Roberts et al., 2021a; Roberts et al., 2021b; Santabárbara et al., 2021). The deterioration of team mental health may jeopardize institutions' organisational resilience. The concept of organisational resilience refers to the process and capacity that enable an organisation to anticipate, adapt to, resist, transform itself amidst and recover from a crisis (Barasa et al., 2018; Hollnagel, 2017; Ishak & Williams, 2018; Madni & Jackson, 2011). Organisational resilience is an understudied topic in the healthcare field, and little is known about how it occurred in the circumstances particular to the COVID-19 pandemic. Previous research showed that individual coping and collective adaptive strategies enabled health professionals to mitigate the effects of a crisis on their mental health (Chang, 2018; Edrees et al., 2016; Funk et al., 2017; Lane and McGrady, 2018; Legido-Quigley et al., 2020; Lowe et al., 2016; Mariano & Carreira, 2016; Mast & Gillum, 2018; Vandrevala et al., 2017), but such strategies' relationship to organisational resilience has not been researched. Although some authors found coping to have a mediator effect on individual resilience (Lorente et al., 2021; Ziarko et al., 2020), the relationship between individual coping and collective resilience has not been reported in the literature. Most of all, resilience is rarely considered as an effect of a team's dynamic or at an organisational level and is mostly studied at the individual one. Many descriptive and interventional studies have focussed on identifying individual capacities and characteristics of poor adaptation to crises (Afshari et al., 2021; Roberts et al., 2021a; Sánchez-Zaballos & Mosteiro-Díaz, 2020). Less emphasis is put on the promotion of team resilience in organisations (Koh et al., 2020; Rangachari and Woods, 2020). Finally, there are only a few longitudinal studies that examine these effects across time and the pandemic's waves (Agorastos & Tsamakis, 2021; Dufour et al., 2021; López Steinmetz et al., 2022; Sasaki et al., 2021), especially in Europe (van Steenkiste et al., 2021). Based on these considerations, the purpose of this study is to explore the relationship between the individual coping strategies and collective resilience strategies applied by the healthcare workers in the context of the COVID-19 pandemic. The study's longitudinal design facilitates a view of the evolution of these strategies across the pandemic waves. Better understanding the relationship between coping and organisational resilience would allow the managers of healthcare facilities to develop collective (team and institutional) resources to ensure that organisational resilience is not achieved at the expense of individual workers' health. Since evidence of such a relationship is still lacking, this study aims to develop knowledge on the associations between employees' well-being, individual coping strategies and organisational resilience processes.

2. Conceptual framework

Coping is defined as an array of reactions and strategies that allow an individual to manage a stressful situation (Brough et al., 2005; Vranjes et al., 2021). The seminal work of Lazarus and Folkman (1984) distinguished two families of coping styles: problem-centred coping and emotion-centred coping. Problem-centred coping includes practical, action-based strategies that allow to manage the situation or alter the stress-causing problem, such as making an action plan. Emotion-centred coping involves both constructive strategies, such as emotion sharing, making sense of events, positive reframing, meditation and religion, and more negative strategies, such as avoidance and denial. Over the following years, more than 400 ways of coping were described, but none of them reached an absolute taxonomical consensus (Skinner et al., 2003). The most common groupings are adaptive versus maladaptive strategies, approach versus avoidance, cognitive versus behavioural (Carmassi et al., 2020; van der Merwe et al., 2020; Ye et al., 2020). Baumstarck et al. (2017) developed a four-factor structure with strong psychometric properties from the Coping Orientation to Problems Experienced Inventory (brief COPE questionnaire; Carver, 1997): seeking social support, problem-solving, avoidance and positive thinking. Seeking social support is characterised by venting, emotional support, instrumental support and religion; problem-solving, by active coping and planning; avoidance, by behavioural disengagement, self-distraction, substance use, denial, and self-blame; and positive thinking, by humour, positive reframing, and acceptance. These dimensions belong to the higher order coping categories identified by Skinner et al. (2003).

Research outside the COVID-19 period found that caregivers used adaptation strategies to cope with professional stress (Chew et al., 2020; Khalid et al., 2016; Smith et al., 2020; Wang et al., 2020), and that peer support was the most-used strategy (Zheng et al., 2018). However, the unique conditions of the COVID-19 pandemic strained healthcare workers to an unprecedented level and many caregivers experienced deterioration of their mental health, especially women, younger staff and nurses (Lamb et al., 2021). This suggests that long-established coping strategies, which might have been effective in more typical situations, may no longer be sufficient to ensure resilience in such a critical context. Resilience is a dynamic process of negotiating, managing and adapting, and sustains positive attitudes and strategies against stress (Koh et al., 2020). This process enables a system (an individual, a team, an institution, etc.) to overcome a catastrophic event that could threaten its well-being. The resilience concept has been studied in several disciplines, including psychology, organisational design and management, nursing sciences, engineering and geography (Anaut, 2015). Recent research showed that adaptive coping strategies, stress reduction and individual resilience were associated with each other (Kang et al., 2020; Ye et al., 2020). But the category of adaptive strategies is large, and we do not know which strategies are most effectively used. Moreover, it was proposed that individual resilience and coping strategies influence each other in the process of an individual's selection of the most appropriate adaptive response for the demands of a particular situation (Gloria & Steinhardt, 2016; Ziarko et al., 2020).

The present paper focuses on team and institutional resilience, expressed through the notion of organisational resilience (Corbaz-Kurth et al., 2022). In a time of crisis, the organisational resilience of an institution is partly influenced by self-regulation strategies, applied by front-line professionals confronted with disturbances in their usual activities (Cuvelier & Falzon, 2010; Kruk et al., 2015; Lane and McGrady, 2018). Teamwork seems to have a crucial role in these processes, allowing workers to maintain their health and reduce their stress levels while performing their jobs (Bourgeois et al., 2000; Caroly, 2010). In a recent qualitative study, healthcare workers valued collective resilience as more important and effective than individual resilience (Koh et al., 2020). Discussions between colleagues contribute to the anticipation and detection of problems before those problems' negative consequences become apparent. In addition, they foster the dissemination of knowledge and skills, the development of a shared situational awareness, and the redefinition of work rules to accommodate the unexpected (Caroly & Barcellini, 2015; Couix, 2010; Cuvelier & Falzon, 2010; Lane and McGrady, 2018; Weick & Sutcliffe, 2001). In a similar vein, research on the notion of 'job crafting' has shown that employees are not passive recipients of work tasks (van den Heuvel et al., 2015; Wrzesniewski & Dutton, 2001). To some extent – and often in ways invisible to their hierarchy – employees exert an influence on their work, even in the most restricted and routine jobs. For instance, they can decide on the form or number of activities they engage in, the way they see their jobs, and the people they interact with. The notion of job crafting includes every action undertaken by individuals to increase their available resources (e.g., seeking learning opportunities, asking for advice), to seek challenging and motivating demands (e.g., pursuing new responsibilities), or to reduce their burden of job demands, so that the job becomes physically or mentally less demanding.

Collective adaptations implemented daily by healthcare workers are currently scarcely researched in the COVID-19 pandemic context. Factors influencing the development of organisational resilience in healthcare institutions have yet to be explored. Furthermore, the link between individual coping and organisational resilience deserves to be illuminated (Carmassi et al., 2020; Lorente et al., 2021; Ye et al., 2020).

Currently, we do not know whether one coping style is more strongly associated with organisational resilience than another is, or whether organisational resilience is associated with individual workers' health. The present study explores the relationship between individual coping strategies and collective resilience strategies applied by healthcare workers amidst the problematic situations experienced during the first year of the COVID-19 pandemic. Our research questions are the following:

Q1. What type of individual coping strategies (seeking social support, problem-solving, avoidance and positive thinking) did Swiss healthcare workers deploy when confronted with problematic situations?
Q2. To what extent did these coping strategies vary according to the nature of the problematic situations?
Q3. How did these strategies evolve during the first year of the pandemic?
Q4. How did individual coping strategies correlate with organisational resilience processes measured at the team level?

The investigation of these questions relied on a longitudinal design, which followed and completed a previous cross-sectional study (Juvet et al., 2021). The methods are described in the next section.

3. Method

3.1. Sampling and data collection

As described in detail in two companion papers (Corbaz-Kurth et al., 2022; Juvet et al., 2021), the convenience sample consisted mainly of the healthcare, logistical, technical, maintenance, catering and administrative staff of a university hospital in French-speaking Switzerland. The sample was supplemented with employees from other institutions: nursing and educational staff of an institution for disabled persons, caregivers from a regional hospital, nursing staff and students in the nursing sciences from two universities of applied sciences, in-house nursing care instructors working in healthcare institutions in several Swiss cantons and nurses participating in continuing education courses. Individuals who fell into one of the above categories were eligible for inclusion in the sample. In all, 15,272 potential participants were contacted between April and May 2020 (the first wave of the pandemic in Switzerland). They received an email explaining the project and inviting them to participate. Respondents participated by voluntarily clicking on the link in the email, and they were allowed to complete the questionnaire during their working hours. Participants who completed the first survey were contacted a second and a third time, between June and October 2020 (between the first two waves of the pandemic) and between December 2020 and February 2021 (during the second wave), respectively. In each survey wave, a reminder email was sent two weeks after the initial contact.

To get as close as possible to the nature of their actual work activities, an open-ended question inspired by the validated Working Conditions and Control Questionnaire (Hansez, 2008) asked participants to describe a concrete problematic situation related to the pandemic that they had encountered in their working activities. The French version of the 28-item brief COPE questionnaire (Baumstarck et al., 2017; Carver, 1997; Muller & Spitz, 2003) was used to assess the individual strategies the participants had used to cope with this situation. The respondents also answered several sets of four-point Likert-type questions to assess how their team had reacted to this situation. The French version of the Team Emergency Assessment Measure questionnaire (Cooper et al., 2016) was used to evaluate the quality of leadership and teamwork experienced by respondents. Specific items were created to measure organisational resilience processes (anticipation of, detection of and adaptation to the situation), described in a previous publication (Corbaz-Kurth et al., 2022). The impacts of the problematic situation and of the resilience processes were assessed with a series of eight scales graduated from zero to 100. The scales addressed the severity of the situation, the quality of its management, its effects on the patient, its impacts on other organisational units, the degree of the individual's and team's exposure to risk while handling the situation, and individual and team satisfaction with the management of the situation. Finally, the questionnaire requested demographic data (sex, institution size, profession, job tenure and hierarchical status). Study data were collected and managed using Research Electronic Data Capture (REDCap), a secure, web-based software platform designed to support data capture for research studies (Harris et al., 2019).

3.2. Data processing

Answers to the open-ended question on the problematic situations were categorised, to quantify their frequency and study their association with the other variables. The coding process was described in a previous publication (Juvet et al., 2021). For the close-ended questions, following existing guidelines (Sterne et al., 2009), we verified the characteristics of participants with missing data. In the first survey, three quarters of the questionnaire items had less than 20 % missing values and one quarter had between 20 and 30 % missing values. In the second survey, three quarters of the questionnaire items had less than 10 % missing values. In the third survey, 90 % of the questionnaire items had between 10 and 20 % missing values and 10 % of the items had between 20 and 30 % missing values. We performed a multiple imputation procedure for participants who completed the questionnaire but missed some questions; five imputed datasets were created.

Coping scores were computed using the validated four-factor structure by Baumstarck et al. (2017): seeking social support, problem solving, avoidance and positive thinking. Score values ranged from 1 to 4 and their consistency was assessed with Cronbach's alpha coefficient. Differences in coping styles across diverse sociodemographic characteristics and the three surveys were assessed using Mood's median test for several independent samples, a robust and non-parametric equivalent to the one-way Anova. To compare coping scores over time, we considered using Friedman's test for several related samples. However, only 47 of the original 1,290 participants completed the questionnaire three times. Using Mood's median test allowed us to have larger sample sizes for the analyses. Both tests gave the same results. To compare the coping scores according to the different types of problematic situations, we used the Mann-Whitney *U* test. Exploratory factor analyses of the organisational resilience variables resulted in a two-dimensional model described in a companion paper (Corbaz-Kurth et al., 2022). One dimension was named 'anticipation and performance' and the other 'adaptation and change'. Factorial scores were computed for each dimension. Pearson correlations between the coping styles and these two dimensions were computed for the entire 3-survey dataset. The evolutions of the relationships between coping styles and organisational resilience dimensions over the three surveys were graphically represented by placing each coping style on a two-dimensional graphical representation of organisational resilience. For this purpose, each coping style was first recoded into a three-level categorical variable: a value of 1.00 to 2.00 was coded as 'low', 2.01 to 3.00 as 'medium', and 3.01 to 4.00 as 'high'. The higher the score, the more pronounced the use of that coping style. The mean factorial scores on the two resilience dimensions were used as coordinates to graphically position each coping level. Additionally, exploratory factor analyses were used to build scales measuring the impact of each problematic situation and resilience process. The suitability of the data for factor analyses was measured with the Kaiser-Meyer-Olkin (KMO) value. All analyses were conducted using IBM SPSS Statistics (version 26) and the R Core Team software.

4. Results

4.1. Sample

The sample size was 1,290 in the survey's first iteration, 363 in the second, and 372 in the third (in the third survey, the questionnaire was sent to all 1,290 people who had responded to the first survey, in order to avoid finishing with a too-small sample). The sample's composition was 54.9 % nurses, healthcare assistants and auxiliary nurses; 14.4 % medical-technical, medical-therapeutic or medical-social staff; 12.5 % administrative staff; 9.8 % medical doctors; and 3.1 % logistical, technical, maintenance or catering staff. A quarter (28.3 %) of the respondents had managerial roles. Thirty-three per cent were less than 40 years old, 32 % were 40 to 50 years old and 35 % were more than 50 years old. Nearly 80 % of the participants worked in a university hospital, 5 % in an institution for people with disabilities, and the others in various health institutions in French-speaking Switzerland.

4.2. Types of coping strategies (Q1)

The internal consistency of three of the four coping scales was satisfactory: Cronbach's alpha for the 'seeking social support' scale was 0.79, for 'problem solving' 0.76 and for 'positive thinking' 0.74. Only the 'avoidance' scale showed a lower consistency than expected ($\alpha = 0.64$). The predominant coping style, on average, was the 'problem solving' style, followed by 'positive thinking'. The 'social support' and 'avoidance' styles had lower levels (Table 1).

4.3. Relationship between coping strategies and types of problematic situations (Q2)

Coping strategies were associated with specific problematic situations encountered during the COVID-19 pandemic. Among situations described as problematic by participants, 'positive thinking' coping was particularly associated with 'organisational changes' and 'teleworking problems'. This coping style was less pronounced among people who mentioned problems of 'emotional burden' or 'concerns about the quality of care'. The 'seeking social support' coping strategy was associated with 'information-communication-training' problems, 'emotional burden', 'concerns about quality of care' and 'conflicting relationships'. Conversely, it was less used in connection with 'organisational changes'. 'Problem solving' coping was not associated with any particular type of problematic situation, with the exception of 'organisational changes'. 'Avoidance' coping was weakly associated with 'workload', 'information-communication-training', 'emotional burden' and 'conflictual relationships'. Conversely, 'avoidance' coping scores were slightly lower for those who reported 'organisational changes' than for the others.

To explain these variations in coping styles, we evaluated whether the problematic situations described by participants differed in their impacts. Depending on the type of problematic situation, the level of 'severity and risk exposure' and the level of 'quality of management of the situation' were assessed differently by the respondents. These two scores were constructed from an exploratory factor analysis. The first factor of 'severity and risk exposure' ($\alpha = 0.77$) consisted of three items: 'severity', 'individual exposure to risks' and 'team exposure to risks'. The second factor of 'quality of management of the situation' ($\alpha = 0.85$) grouped five items: 'effect on the patient's condition', 'effect on other units or institutions', 'quality of the handling of the situation', 'individual satisfaction with the handling of the situation' and 'team's satisfaction with the handling of the situation'. These two components explained 64.6 % of the variance and the KMO index (0.715) was sufficient.

'Positive thinking' and 'problem solving' coping strategies were positively associated with the 'quality of management of the situation' score ($r = 0.289$, $p < 0.001$ and $r = 0.254$, $p < 0.001$, respectively), but not with the 'severity and risk exposure' score. 'Seeking social support' and 'avoidance' strategies were negatively associated with the 'quality of management of the situation' score ($r = -0.106$, $p < 0.001$ and $r = -0.253$, $p < 0.001$, respectively), but were positively associated with the 'severity and risk exposure' score ($r = 0.121$, $p < 0.001$ and $r = 0.163$, $p < 0.001$, respectively).

The situation considered the least serious and risk-exposing was 'teleworking', followed by concerns about 'organisational changes', 'workload', 'patient care practice and quality of care' and 'conflictual relationships'. The most serious and risk-exposing situation was 'lack of equipment', followed by 'lack of information, communication and training', 'difficulties with COVID-19 guidelines and measures', and finally 'emotional burden' (Fig. 1). 'Organisational changes' and teleworking issues were the types of situations considered best managed. 'Patient care practice and quality of care' issues were considered to be well managed as well. 'Conflictual relationships' was the type of situation considered to be the least well managed, followed by 'lack of information, communication and training' (Fig. 2).

Table 1
Relationships between coping styles and problematic situations.

			Positive thinking	Seeking social support	Problem solving	Avoidance
Problematic situation		**Sample %**	**Median (IQR)**	**Median (IQR)**	**Median (IQR)**	**Median (IQR)**
Organisational Change	Present	37.4	2.50 (0.83)*	1.88 (0.75)*	3.00 (1.25)*	1.50 (0.40)*
	Absent	62.6	2.33 (0.83)	2.00 (0.87)	2.75 (1.00)	1.50 (0.50)
Workloads and work schedules (overloads and under-utilisation)	Present	28.3	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.50)*
	Absent	71.7	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.40)
Lack of information, communication or training	Present	14.9	2.33 (0.83)	2.13 (0.75)*	2.75 (1.00)	1.60 (0.50)*
	Absent	85.1	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.40)
Complexity of working from home (setting and technical issues)	Present	5.9	2.67 (0.67)*	1.88 (0.75)	3.00 (1.25)	1.50 (0.40)
	Absent	94.1	2.50 (0.83)	2.00 (0.87)	2.75 (1.00)	1.50 (0.50)
Access to COVID-19 PPE and equipment for patient care	Present	9.0	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.50)
	Absent	91.0	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.50)
Difficulties with COVID-19 guidelines and protection measures	Present	11.6	2.50 (0.83)	2.00 (0.63)	2.75 (1.00)	1.50 (0.40)
	Absent	88.4	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.50)
Emotional burden: fear, distress, loneliness, etc.	Present	18.4	2.33 (0.67)*	2.13 (0.75)*	2.75 (1.00)	1.60 (0.50)*
	Absent	81.6	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.40)
Patient care practices and quality of care perceptions	Present	20.0	2.33 (0.67)*	2.13 (0.75)*	2.75 (1.00)	1.50 (0.40)
	Absent	80.0	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.50)
Conflictual relationships	Present	22.2	2.50 (0.83)	2.13 (0.75)*	2.75 (1.00)	1.60 (0.60)*
	Absent	77.8	2.50 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.40)
All situations included (n = 2.025)			*2.50 (0.83)*	*2.00 (0.75)*	*2.75 (1.00)*	*1.50 (0.50)*

IQR: interquartile range. *Difference between medians ('present' vs 'absent') was significant at $p < 0.05$ based on Mann-Whitney *U* test.

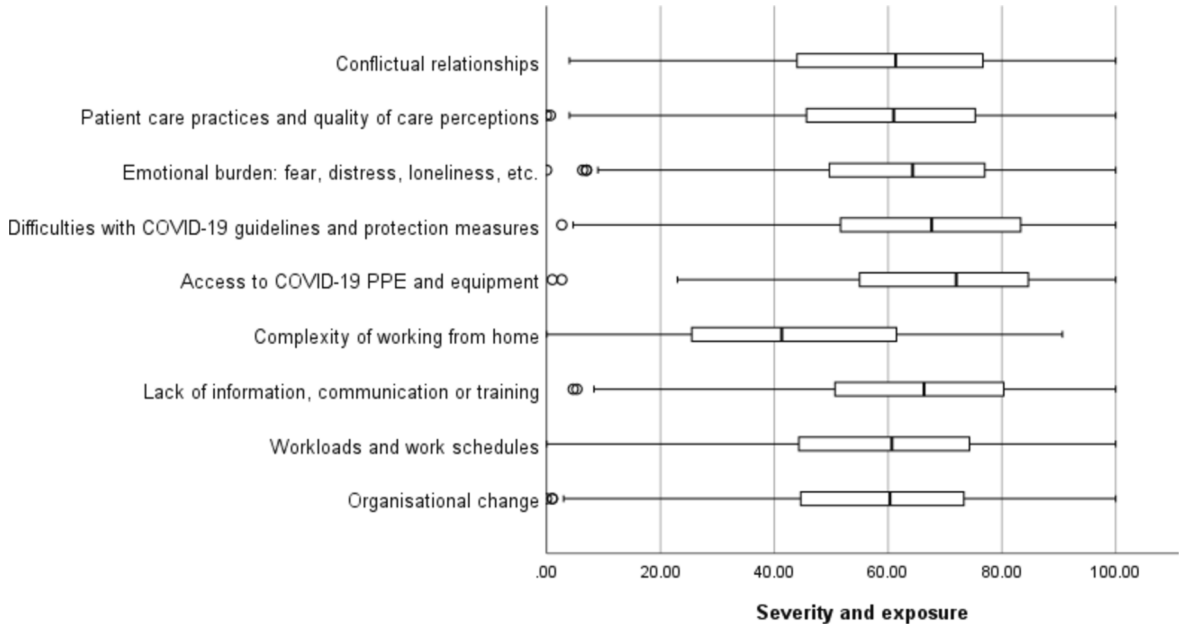

Fig. 1. Boxplot of the 'severity and risk exposure' scores for the various types of problematic situations.

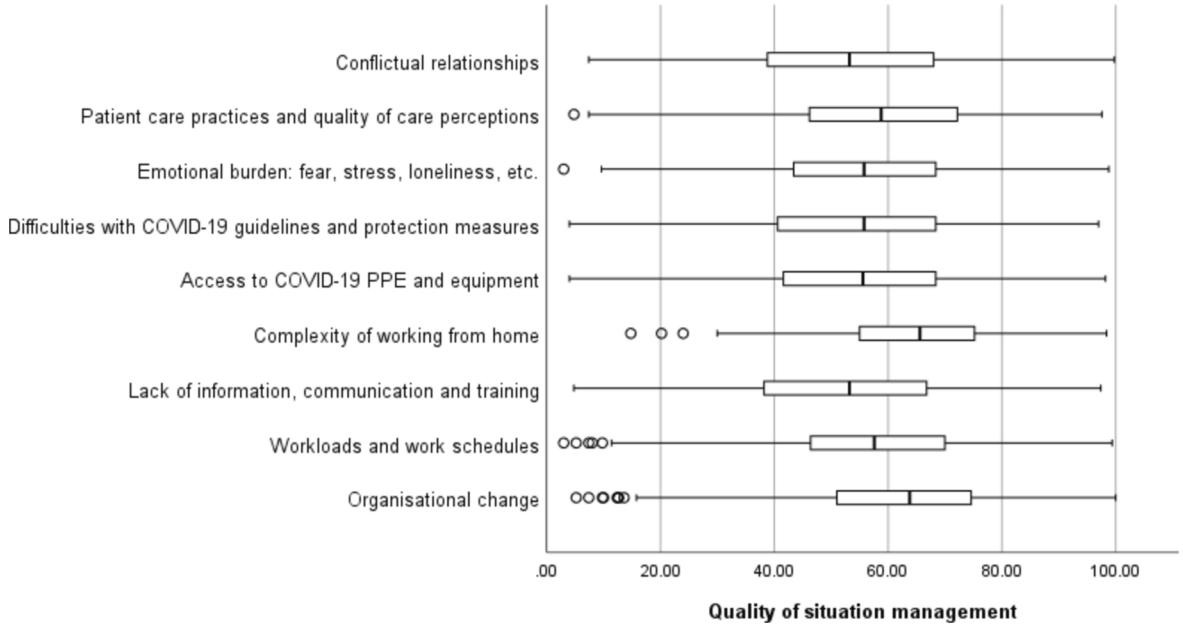

Fig. 2. Boxplot of the 'quality of situation management' scores for the various types of problematic situations.

4.4. Variations of the coping strategies over time (Q3) and across professions, hierarchical statuses and job tenure

All coping styles remained stable over the period studied, except 'positive thinking', which decreased over time (Table 2). Medical and paramedical professions were characterised by a higher level of 'seeking social support' coping than non-caregiving professions were. The 'positive thinking' and 'problem solving' styles were more present among managers than they were among non-managerial staff, unlike the 'avoidance' style. Participants with '15 years or more' job tenure had higher 'positive thinking' and 'problem solving' scores than did those with less than 15 years. The socio-demographic structure of the sample was the same in the 3 surveys.

4.5. Relationships between coping strategies and organisational resilience processes (Q4)

Exploratory factor analysis of the resilience scales produced two *meta*-dimensions of organisational resilience. The 'anticipation and performance' axis related to team performance, pre-existing resources, team cohesiveness, team leader performance, and anticipation. The 'adaptation and change' axis related to development of new resources, changes in operating procedures, and changes in work activities. By graphically crossing these two axes of organisational resilience, four resilience configurations were highlighted, each reflecting a different kind of organisational and collective response (Table 3).

Individual coping styles were linked with teamwork functionality. The Pearson correlation matrix indicated a weak but positive

Table 2
Relationships between coping styles, professions, hierarchical statuses, time periods and job tenure.

		Positive thinking	Seeking social support	Problem solving	Avoidance
	Sample %	**Median (IQR)**	**Median (IQR)**	**Median (IQR)**	**Median (IQR)**
Profession					
Doctors (A)	11.0	2.50 (0.83)	2.00 (0.87)	3.00 (1.00)	1.40 (0.50)
Nurses, healthcare assistants and auxiliary nurses (B)	54.9	2.50 (0.83)	2.13 (0.75)	2.75 (1.00)	1.50 (0.50)
Medical-technical, medical-therapeutic and social staff (C)	16.2	2.50 (0.66)	2.00 (0.75)	2.75 (1.25)	1.50 (0.50)
Logistical, technical, maintenance and catering staff (D)	3.4	2.50 (1.00)	1.75 (0.88) BC*	2.75 (1.00)	1.40 (0.70)
Administrative staff (E)	14.0	2.50 (0.83)	1.75 (0.75) ABC*	3.00 (1.00)	1.50 (0.50)
Hierarchical status					
Upper management (A)	11.2	2.67 (0.67)	1.88 (0.75)	3.25 (1.00)	1.40 (0.40)
Lower management (B)	19.0	2.67 (0.83)	2.00 (0.75)	3.00 (1.00)	1.40 (0.40)
Employee (C)	69.8	2.33 (0.83) AB*	2.00 (0.87)	2.75 (1.00) AB*	1.40 (0.50) AB*
Period					
Time 1 (before 31.05.2020) (A)	70.4	2.50 (0.66) C*	2.00 (0.75)	2.75 (1.00)	1.50 (0.50)
Time 2 (from 01.06 to 30.09.2020) (B)	13.6	2.33 (1.00)	2.00 (0.75)	2.75 (1.00)	1.50 (0.60)
Time 3 (from 01.10.2020 to 15.02.2021) (C)	16.0	2.33 (0.84)	2.00 (0.87)	2.75 (1.13)	1.50 (0.40)
Job tenure					
<15 years (A)	40.4	2.33 (0.83)	2.00 (0.75)	2.75 (1.00)	1.50 (0.40)
15 years or more (B)	59.6	2.50 (0.66) A*	2.00 (0.75)	3.00 (1.00) A*	1.50 (0.50)

IQR: interquartile range. Capital letters signal significant differences with the corresponding categories on Mood's median test (Bonferroni-adjusted p-value < 0.05).

Table 3
Factorial axes of organisational resilience and associated configurations (Corbaz-Kurth et al., 2022).

	Anticipation and performance < average	Anticipation and performance > average
Adaptation and change > average	*Learning through mistakes* Teams are not very effective yet but able to innovate and learn.	*Effective development* Teams are in a phase where they can fully develop their potential.
Adaptation and change < average	*Hindered resilience* Teams are less effective and innovative. Their potential for adaptation is exhausted and remains insufficient.	*New standards* Teams put in place new ways of working effectively.

relationship between 'positive thinking' and both the anticipation-performance axis ($r = 0.222$, $p < 0.01$) and the adaptation-change axis ($r = 0.184$, $p < 0.001$). The coping style 'problem solving' was weakly but positively correlated with both the anticipation-performance axis ($r = 0.199$, $p < 0.001$) and the adaptation-change axis ($r = 0.113$, $p < 0.001$). These coping styles were then associated with the 'effective development' configuration. In contrast, the relationship between the 'avoidance' style and the anticipation-performance axis was negative ($r = -0.306$, $p < 0.001$), while the relationship with the adaptation-change axis was close to zero ($r = 0.080$, $p < 0.001$). The 'seeking social support' style was also negatively related to the anticipation-performance axis ($r = -0.146$, $p < 0.001$) and almost unrelated to the adaptation-change axis ($r = 0.082$, $p < 0.001$).

Fig. 3 shows how each coping style was related to the two dimensions of organisational resilience: anticipation and performance on the x-axis, adaptation and change on the y-axis. For each coping style, a low level is represented by a square, a medium level by a diamond, and a high level by a triangle. The mean factorial scores on the two dimensions were used as coordinates to locate each level on the graph. Curved arrows illustrate the evolution of each level over time in the space defined by the two axes. There is one graph for each coping style. In each graph, the quadrants are named after the resilience configurations from Table 3.

High levels of 'positive thinking' and 'problem solving' were located in the 'effective development' and 'new standards' configurations, whereas low values were positioned in the 'hindered resilience' configuration (Fig. 3). This pattern was repeated in all three surveys, shifting progressively to the right. This means that a high level of these coping styles tended to be associated with the learning and development of new and more effective work practices and with strong team performance.

High levels of 'seeking social support' and 'avoidance' style evolved from the 'learning through mistakes' quadrant at time 1 to the 'hindered resilience' quadrant at time 3. This reflects poor performance and decreasing adaptation to change, suggesting difficulties in the way teams coped with the situations they encountered.

5. Discussion

This study highlighted differences in coping styles associated with different types of problematic situations experienced during the pandemic. We also showed that coping styles were associated with different patterns of organisational resilience. This suggests that individual coping styles and organisational resilience processes are linked, and that they depend in particular on the type of problematic situation experienced. These results are discussed below.

5.1. Coping styles and their association with organisational resilience processes

The predominant coping style used by this population was the 'problem solving' style, followed by 'positive thinking'. This suggests that participants were quite able to adeptly manage crises during the study period. Results showed an association between these coping styles and the confrontation with problematic situations considered as well managed and less severe. Results also highlighted an association between teamwork functioning and these coping styles, as they had a positive relationship with the team's anticipation and performance processes. This means that a high level of these coping styles was associated with efficient development, learning phenomena and high team performance.

These results are consistent with previous literature's indication of a positive linear association between individual resilience, learning processes and problem-centred coping strategies among psychology students (de la Fuente et al., 2017). Moreover, adaptive or positive coping strategies have been linked to individual resilience (van der Merwe et al., 2020; Ye et al., 2020; Zhao et al., 2021). Literature also showed

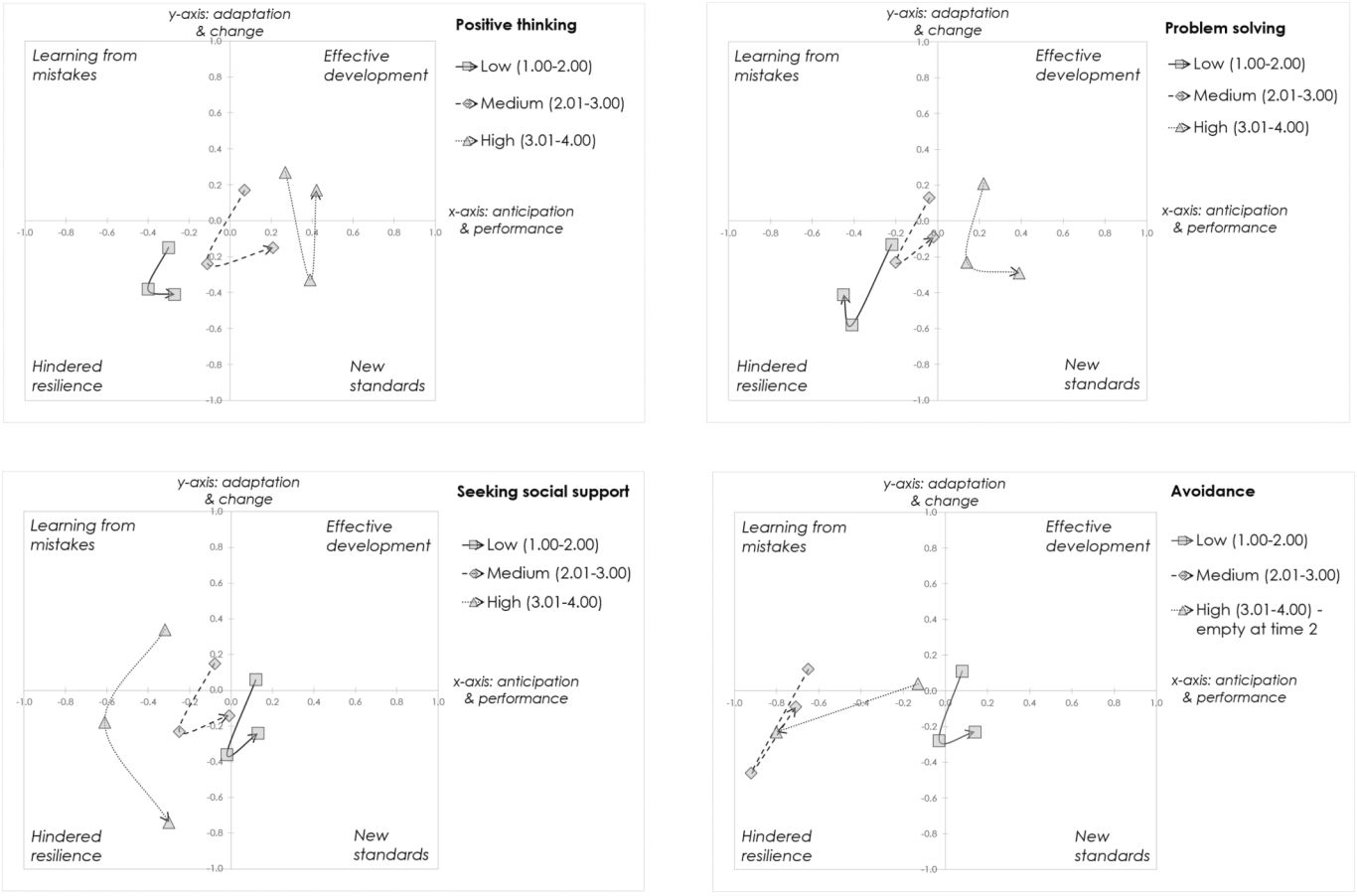

Fig. 3. Evolution of the position of the coping categories on the factorial axes.

that positive emotions or attitudes are protective factors associated with greater resilience, and moderate the influence of a stressful situation on anxiety and depression (Babore et al., 2020; Gloria & Steinhardt, 2016; van der Merwe et al., 2020). In our study, use of the 'positive thinking' coping strategy decreased over time. This suggests either an exhaustion of participants' psychological resources or a habituation effect, resulting in the reduction of the need to adapt.

The 'seeking social support' and the 'avoidance' coping strategies were the least used. They were associated with problematic situations that were considered to be serious and poorly managed. These coping styles were also negatively associated with anticipation and team performance. They seem to be related to participants' difficulties managing situations or to contexts that prevented concrete resolution of problematic situations. The fact that these strategies were little used was in accordance with previous results. Indeed, according to Massicotte (2015), negative strategies, such as avoidance, are less used, since individuals instinctively employ the most beneficial strategies for their psychological adjustment. However, previous research found divergent results for these two coping styles. 'Avoidance' was shown to be associated with post-traumatic syndrome, lack of resilience and depression, and was considered a risk factor (al Barmawi et al., 2019; Babore et al., 2020; Zhao et al., 2021). 'Seeking social support' is either associated with resilience and lower stress (Ye et al., 2020), considered as a risk factor (Babore et al., 2020), or has neither positive nor negative effects (al Barmawi et al., 2019). Methodological and population differences could explain these disparities and future studies are needed to better clarify this coping style.

Coping and collective resilience could be considered parts of the same adaptive effort to manage a disruptive event. They belong to a multilevel dynamic process, including bottom-up and top-down influences, personal and environmental characteristics, and temporal dimensions (Chapman et al., 2020; Pooley & Cohen, 2010). Our longitudinal analysis reinforced the plausibility of the links between individual coping strategies and organisational resilience processes. Indeed, people with high 'problem solving' scores not only performed better than others did at the beginning, but also improved over time. Conversely, those with low 'problem solving' scores had lower performance levels at the start, which decreased further over time. People with high 'positive thinking' scores performed better than others did at the beginning, but did not improve more than others did afterwards. People with high scores in 'seeking social support' performed worse than others did at the beginning and did not improve. In addition, they were much less adaptable over time (hindered resilience). People with high 'avoidance' scores experienced a drop in performance, which confirms the negative relationship between avoidance and organisational resilience.

5.2. *Profession, hierarchical status and job tenure*

Results showed that medical, paramedical and caregiver professions were characterised by a higher level of the 'seeking social support' coping style than administrative and technical staff were. As suggested above, maladaptive coping was demonstrated by individuals with low resilience and high stress (Massicotte, 2015; Ye et al., 2020). To our knowledge, no other study has examined such differences between these professions. Some researchers focussing on differences between nurses and physicians (Shechter et al., 2020) found that nurses more often used the 'avoiding' coping style and positive reappraisal than doctors did (Salopek-Ziha et al., 2020).

Managers used more 'positive thinking' and 'problem solving' coping

strategies and less 'avoidance' coping than did employees. This is consistent with previous results that suggested that resilience is significantly associated with higher graduate degrees (Riehm et al., 2021). A hypothesis could be that managers have more leeway to act in a given situation and can autonomously choose to mobilise their resources. Indeed, Parent-Lamarche et al. (2021) found an association between decision authority and lower levels of psychological distress. Other previous studies found a link between work autonomy in day-to-day management, independence at work and flexibility in organisation, and resilience and collective coping in healthcare workers (Eley et al., 2013; McKnight et al., 2020). It could be postulated that the relationship between individual coping and collective resilience is not only causal, but that both are determined by the margin of action available to employees.

Participants with '15 years or more' job tenure had higher 'positive thinking' and 'problem solving' scores than those 'under 15′ job tenure. This is consistent with previous findings that showed that age and professional experience are performance and protection factors (Afshari et al., 2021; Carmassi et al., 2020; Roberts et al., 2021a; Sánchez-Zaballos & Mosteiro-Díaz, 2020). This association suggests that mid-career professionals develop adaptability to uncertainty when they possess full physical and intellectual capacity. However, younger workers are still developing their skills, enduring mental wear and discrepancies while adjusting their expectations of ideal care to the reality demanded by unexpected challenges (Albott et al., 2020).

5.3. *Strengths, limitations, and future avenues of research*

The present study is one of few to rely on a mixed-methods approach in the analysis of resilience in healthcare (Ellis et al., 2019). The use of an open-ended question, whose answers were coded in a systematic way, was a real strength. Indeed, such a measure allowed both an exploratory approach, which was most useful given the disruptive nature of the pandemic – especially its first months – and a quantification of the relationships between problematic situations, coping styles, organisational resilience processes and sociodemographic characteristics, based on a large dataset. The study's longitudinal design is another strength, since it allowed the observation of changes in organisational resilience processes and coping styles over time.

This exploratory study had several limitations. Firstly, only 47 people completed the three surveys. Because of this small number, we treated the samples of the three surveys as independent samples rather than using Friedman's test for related samples. As the results of both Mood's and Friedman's tests were the same, we believe our choice can be supported. Second, we only measured associations between problematic situations, individual coping styles and organisational resilience processes. Future hypothesis-driven studies could strive to identify cause-and-effect relationships. Third, 'resilience process' implies both adversity and success (Chapman et al., 2020). The nature of adversity is obvious in the COVID-19 context, but we did not actually assess the success. Future studies could measure objective indicators of success and relate them to organisational resilience processes and coping styles.

6. Conclusion

This study showed that a high level of 'positive thinking' and 'problem solving' coping is associated with the development of more efficient work practices, learning phenomena and stronger team performance. In the context of the study, organisational resilience did not seem to come at the cost of individual health, but seemed to be closely related to it. Indeed, organisational resilience was shown to be related to individual resilience, via the influence of job resources (Taylor et al., 2019). Numerous recommendations were made to promote efficient coping strategies and organisational resilience among healthcare workers (Wozniak et al., 2022). Fulfilling basic physiological and self-care needs – such as sufficient and quality sleep, regular meals and adequate hydration – is a first step (Albott et al., 2020). Organisations could ensure that these needs are met through arranging physiologically appropriate schedules, maintaining healthy eating areas, and providing water fountains and relief breaks. The development of strong team relationships and social connectedness is a second pillar. Leaders should exemplify and foster feelings of self-efficacy, hope and optimism (Gillman et al., 2015; Hobfoll et al., 2007; Koh et al., 2020). Third, institutions should offer stress management training, coaching in processing emotion and learning from experiences, mentoring programs for young colleagues and an open communication culture (Gillman et al., 2015; Koh et al., 2020). However, if it is undeniable that each individual has partial responsibility for developing his or her own coping strategies, resilience remains a dynamic process, less dependent on individual characteristics than on contextual ones. It is essential to create an appropriate context to empower teams to address professional challenges (Gillman et al., 2015; Taylor et al., 2019). Thus, organisational support is likely the most important field of action, able to simultaneously protect workers' health and support the achievement of the institutional mission in a time of trouble.

CRediT authorship contribution statement

Pauline Roos: Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization. **Typhaine M. Juvet:** Writing – original draft, Data curation. **Sandrine Corbaz-Kurth:** Writing – review & editing, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Lamyae Benzakour:** Writing – review & editing, Methodology. **Sara Cereghetti:** Writing – review & editing, Methodology. **Claude-Alexandre Fournier:** Writing – review & editing, Funding acquisition. **Gregory Moullec:** Writing – review & editing, Formal analysis. **Alice Nguyen:** Formal analysis, Data curation. **Jean-Claude Suard:** Software, Methodology. **Laure Vieux:** Software, Resources. **Hannah Wozniak:** Writing – review & editing, Methodology. **Jacques A. Pralong:** Writing – review & editing, Resources, Conceptualization. **Rafaël Weissbrodt:** Writing – review & editing, Supervision, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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Declaration of competing interest

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

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