Drilling under the COVID-19 pandemic: A diary study of professional football players' mental health and workout performance

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Abstract
There is little research examining how individuals' daily experience during a pandemic affects their daily mental health status and work performance. To address this knowledge gap, we invoke conservation of resources theory to propose a resource-based framework explaining how individuals' daily COVID-19 intrusive experience affects their daily mental health status (depression and anxiety) and work performance via its effect on daily psychosocial resource loss and gain; We further examine whether their supervisors' daily visionary leadership behaviour alleviates the adverse impacts of daily COVID-19 intrusive experience. Results, based on daily diary data from 139 football players (or soccer players) at 15 professional football clubs over 5 days during the COVID-19 pandemic, provided support for our predictions. Our study extends the literature by providing previously undocumented evidence on daily within-person variations in mental health status and work performance during a pandemic and by offering theory-driven insights into the mediating and moderating mechanisms involved in within-person variations.

KEYWORDS
conservation of resources theory, diary design, mental health, visionary leadership behaviour, work performance

The COVID-19 pandemic has wrought havoc across the globe, with pervasive psychological and social impacts (Hagger et al., 2020; Holmes et al., 2020; Schinke et al., 2020; Zhang, Wang, et al., 2020). However, little research has developed a fine-grained understanding of how individuals' daily COVID-19 intrusive experience affects their daily mental health (depression and anxiety) and work performance. Following research on the intrusive experience of traumatic events (Horowitz et al., 1979), we define COVID-19 intrusive experience as the extent to which an individual experiences unbidden thoughts, images, and strong feelings associated with the ongoing COVID-19 pandemic. A nuanced understanding of the daily impacts of the COVID-19 intrusive experience is extremely important from both theoretical and practical perspectives: studying the phenomenon day-to-day under the COVID-19 pandemic can generate knowledge regarding psychological processes under mass traumatic events and provide useful information to guide intervention efforts on daily mental health and job functioning during the pandemic.

To advance the understanding of how individuals' daily COVID-19 intrusive experience affects their daily mental health status (depression and anxiety) and work performance, we conducted a daily diary study. Our study is driven by the conservation of resources (COR) theory (Hobfoll, 1989, 1998). COR theory was initially...
developed to understand the impact of major traumatic events (Hobfoll, 1991, 1998; Hobfoll et al., 2018), making it a particularly useful theoretical lens to understand the impact of the COVID-19 pandemic.

Drawing on COR theory, we propose and test a conceptual model (Figure 1) explaining how individuals’ daily COVID-19 intrusive experience affects their daily mental health status (depression and anxiety) and work performance by affecting daily psychosocial resource loss and gain in the process. We choose psychosocial resource loss and gain as the core explanatory mechanisms because COR theory places central roles on psychosocial resource loss and gain in understanding the adverse impacts of traumatic events on mental health status (Hobfoll, 1998; Schumm et al., 2012; Smith & Freedy, 2000). According to COR theory, psychosocial resource loss ‘includes losses of routine, sense of control, sense of optimism, accomplishing goals, and time with loved ones’ (Hobfoll, Tracy, et al., 2006; Smith & Freedy, 2000, p. 349), the loss of which is one key mechanism leading to mental health problems (Hobfoll, 1998; Hobfoll, Canetti-Nisim et al., 2006). COR theory further suggests that individuals can also develop and gain psychosocial resources during traumatic events (Hobfoll et al., 2016; Schabram & Heng, 2021). Importantly, COR theory proposes that it is the joint effects of psychosocial resource loss and resource gain that determine an individual’s mental health status and performance outcomes (Halbesleben et al., 2014; Hobfoll, 1998). Consequently, we examine psychosocial resource loss and gain as the central mechanisms in linking individuals’ daily COVID-19 intrusive experience and their daily mental health and work performance outcomes.

Further, we identify supervisors’ daily visionary leadership behaviour during the pandemic as an important moderator that affects the extent to which individuals experience psychosocial resource losses versus psychosocial resource gains in response to COVID-19 intrusive experience. We identify visionary leadership behaviour during the pandemic as a moderator because of the following reasons. Theoretically, visionary leadership behaviour is an energizing and inspiring resource during crises (Conger, 1999; Fuller et al., 1996; Hunt et al., 1999). Visionary leadership behaviour, or ‘the expression of an idealized picture of the future’ (Rafferty & Griffin, 2004, p. 332), is particularly critical during mass traumatic events such as the COVID-19 pandemic because ‘mass trauma is often accompanied by a “shattered worldview,” the vision of a shortened future, and catastrophizing’ (Hobfoll et al., 2007, p. 298). Practically, although there is a proliferation of leadership constructs, from visionary leadership that articulates a compelling vision to inspire followers and reduce their uncertainties (Conger, 1999; Rafferty & Griffin, 2004) to more concrete instrumental leadership behaviours that provide direct help (Gerpott et al., 2020; Nahum-Shani et al., 2014), leaders have limited opportunities to provide direct instrumental support to followers given the stay-at-home order during the COVID-19 pandemic. During the extreme and uncertain context of the COVID-19 pandemic, followers experience greater uncertainty about the future, which calls for leadership vision that can give them a direction, reduce their uncertainties, and inspire and motivate them to take agentic actions themselves that potentially generate and replenish psychosocial resources (Hobfoll et al., 2007; Rafferty & Griffin, 2004; Schabram & Heng, 2021). Thus, for these theoretical and practical reasons, we investigate the potential role of daily visionary leadership behaviours in affecting how followers’ daily COVID-19 intrusive experience affects their daily mental health status (depression and anxiety) and work performance.

We conducted a daily diary study to test the model, tracking 139 footballers (or soccer players) from 15 professional football clubs daily over 5 working days starting in the first week of May 2020 during the COVID-19 pandemic lockdown. Although the pandemic

![FIGURE 1](conceptual_model.png)

**FIGURE 1** Conceptual model
shuttered global sports, professional athletes were still under contract and were obliged to perform a series of daily workouts at home to maintain their physical fitness (Garfin, 2020; Hammami et al., 2020; Hull et al., 2020). Through this study, we hope to uncover individuals’ day-to-day experience, and mental and job functioning during the COVID-19 pandemic and to make the following contributions.

First, our diary design and within-person analyses significantly extend the limited empirical literature on the impact of the COVID-19 pandemic that has been largely between-person focused, helping develop a fuller picture of the impact of the COVID-19 pandemic. Second, our study makes theoretical contributions by translating COR theory and its core mechanisms into the study of individuals’ daily mental health status and performance. More importantly, we conducted more nuanced investigations of COR theory’s largely unexamined principles regarding the complex roles of psychosocial resource loss and gain in affecting mental health status. Specifically, COR theory posits that the impacts of psychosocial resource loss and gain are not functionally equivalent in an equal and opposite way, but the beneficial impact of psychosocial resource gain is greater when individuals experience greater psychosocial resource loss is greater when individuals experience greater psychosocial resource loss (Doane et al., 2012; Hobfoll, 1989, 1998, 2001). Therefore, we contribute to COR theory by evaluating the joint effects of daily psychosocial resource loss and gain on daily mental health status. Finally, our study has significant practical implications by suggesting interventions on the mechanisms uncovered in this study. Visionary leadership behaviours can be trained (Frese et al., 2003), and psychosocial resource loss and gain can be directly changed through individual treatment and counselling (Hobfoll, Tracy et al., 2006).

1 | THEORETICAL DEVELOPMENT AND HYPOTHESES

1.1 | Daily COVID-19 intrusive experience, psychosocial resource loss and gain, mental health status, and subsequent day performance

Much of the existing research on the impact of the COVID-19 pandemic on mental health status tends to be atheoretical and descriptive, seeking to demonstrate its effects on mental health status as indicated by the level of depression and anxiety (for reviews, see Rajkumar, 2020; Torales et al., 2020). While these studies are important and have informed us of the pervasive psychological impact of the COVID-19 pandemic, they have rarely explicated the underlying mechanisms linking the COVID-19 pandemic and mental health status. To address this theoretical gap, we invoke COR theory to posit that psychosocial resource loss and gain mediate the impact of COVID-19 intrusive experience on mental health status (depression and anxiety).

A fundamental proposition of COR theory is that resource loss and resource gain are the key mechanisms to explain the impact of stressful events on mental health status and performance (Hobfoll, 1989, 1998; Sun & Chen, 2017). COR theory defines resources broadly as those objects, personal characteristics, conditions, or energies that are valued or that serve as a means for the attainment of these ends (Hobfoll, 1998). Resources can be material resources such as food or psychosocial resources such as a sense of control and meaning (Hobfoll, Canetti-Nisim, et al., 2006). Psychosocial resources were found to play unique roles in mental health during traumatic events such as war (Hobfoll, Tracy, et al., 2006) and natural disasters (Smith & Freedy, 2000). Further, psychosocial resources are more dynamic and can change daily (Ten Brummelhuis & Bakker, 2012). Therefore, we focus on psychosocial resource loss and gain as the mediators in our daily diary study.

According to COR theory, psychosocial resource loss (loss vs. no loss) and gain (gain vs. no gain) are not polar opposites but represent distinct and independent processes (Hobfoll, 1998; Tversky & Kahneman, 1979). For example, an individual can gain a sense of control at one moment and lose a sense of control in the next moment, and these are separate processes (Hobfoll, 1998). Individuals can lose psychosocial resources directly due to their ongoing daily COVID-19 intrusive experience, for example, when they feel they lose control over their work and lives as they observe the daily surging COVID-19 cases and mortality. Psychosocial resource losses can also occur when the initial resource loss cascades to affect other areas of their life (Hobfoll, 1998; Hobfoll, Canetti-Nisim, et al., 2006). In parallel, psychosocial resource gains such as a sense of control and growth can occur in dealing with stressful events (Tedeschi & Calhoun, 1995). However, individuals’ ability to gain psychosocial resources will significantly decrease as stressful events get worse (Hobfoll, 1998; Hobfoll, Canetti-Nisim, et al., 2006). Consequently, people’s mental health status will deteriorate as they experience increased psychosocial resource loss and have little or no psychosocial resource gain as their daily COVID-10 intrusive experience intensifies.

**Hypothesis 1** Daily COVID-19 intrusive experience positively relates to daily mental health status (depression and anxiety).

**Hypothesis 2** Daily psychosocial resource loss (2a) and gain (2b) mediate the positive effect of daily COVID-19 intrusive experience and daily mental health status (depression and anxiety).

As mental health status (depression and anxiety) indicates individuals’ mental functioning and can affect subsequent performance (Wright & Cropanzano, 2000; Wright & Hobfoll, 2004), it is reasonable to expect that COVID-19 experience can affect individuals’ performance by influencing their mental health status. Indeed, from a COR theory perspective, optimal mental health is a resource that can directly affect subsequent performance (Wright & Hobfoll, 2004). As individuals’ performance can fluctuate across time (Dalal et al., 2020; McCormick et al., 2020), we expect that daily COVID-19 intrusive experience may explain the within-person changes in daily performance via its effect on daily mental health status.
Hypothesis 3 Daily COVID-19 intrusive experience has a negative effect on subsequent daily work performance via its effect on daily mental health status (depression and anxiety).

Further, integrating the reasoning for Hypothesis 2 and 3, we infer that:

Hypothesis 4 Daily psychosocial resource loss (4a) and gain (4b) mediate the daily COVID-19 intrusive experience to daily mental health status (depression and anxiety) to subsequent daily work performance relationship.

1.2 The moderating role of visionary leadership behaviours

Given the central roles of psychosocial resource loss and gain in explaining individuals’ functioning under stressful events, COR theory elucidates when psychosocial resource loss and gain are more likely to occur in the face of stressors. Specifically, COR theory posits that people who lack access to resources are more vulnerable to psychosocial resource loss in response to stressors and are less capable of deriving psychosocial resource gain from them; conversely, people who have access to resources are less vulnerable to psychosocial resource loss in the face of stressors and more capable of orchestrating psychosocial resource gain from them (Hobfoll, 1989, 1998). Hence, COR theory suggests that daily access to resources during the COVID-19 pandemic will likely buffer the adverse impacts of the daily COVID-19 intrusive experience.

Because the COVID-19 pandemic presents an unprecedented experience with enormous uncertainties (Holmes et al., 2020), we highlight supervisors’ visionary leadership behaviours during the COVID-19 pandemic as an important source of resources for team members. In the face of great uncertainties, individuals need energizing visions and clear directions from their leaders. A vision is a positive and emotionally laden image of the future (Emrich et al., 2001; Frese et al., 2003). It helps people with an interpretive scheme to understand current challenges and opportunities and to enable actions (Hunt et al., 1999). Indeed, communicating a vision, such as an exciting and attractive image of where the team is going, can generate enthusiasm and inspire hope and hence instill an energizing resource in people (Emrich et al., 2001; Griffin et al., 2010; van Knippenberg & Stam, 2014). Invoking COR theory, we propose that supervisors’ visionary leadership behaviour will dampen or buffer the adverse effects of individuals’ daily COVID-19 intrusive experience on their psychosocial resource loss and gain and in turn their mental health status because it provides them with a positive and inspiring resource during the pandemic.

Hypothesis 5 Daily visionary leadership behaviours buffer the adverse effects of daily COVID-19 intrusive experience on daily psychosocial resource loss (5a), daily psychosocial resource gain (5b), and daily mental health status (5c).

1.3 The Complex Joint Roles of Psychosocial Resource Loss and Gain

COR theory not only identifies psychosocial resource loss and gain as pivotal in explaining stressful experiences but also provides a more novel theoretical insight on how the two interact to affect mental health status. First, like other stress theories in general, COR theory suggests that the adverse effects of psychosocial resource loss on mental health outcomes can be offset or forestalled by psychosocial resource gain (Hobfoll, 1989, 1998), which is generally termed as the buffering effect of psychosocial resource gain in the relationship between psychosocial resource loss and mental health (Hobfoll & Schumm, 2009; Sonnentag & Frese, 2003).

Second, a more novel and largely unexplored principle from COR theory is that the impact of psychosocial resource gain increases in the context of psychosocial resource loss (Hobfoll, 1998; Schumm et al., 2012). That is, instead of viewing resource loss as a predictor of mental health status and resource gain as a moderator of such a relationship, COR theory also considers the effect of resource gain on mental health status in the context of resource loss, that is, to view resource gain as a predictor of mental health status and resource loss as a moderator of such a relationship (Wells et al., 1999, p. 1174):

Resource gain should have greater influence on psychological well-being in the context of loss than in the context of gain alone. That is, the influence of resource gain should be most apparent when resource loss has occurred. This hypothesis follows from COR theory, is counterintuitive, and would not be predicted by other stress theories.

COR theorists termed this prediction as the third principle of COR—‘the paradox of the power of gain in the face of loss’ (Doane et al., 2012, p. 304). The key element of this principle is that when people experience psychosocial resource loss, the impact of psychosocial resource gain, which is otherwise small, increases substantially (Doane et al., 2012; Hobfoll et al., 2018). According to COR theory, psychosocial resource gain becomes more salient and important in the face of psychosocial resource loss because of the increasing need to maintain a resource pool to combat stresses under the psychosocial resource loss (Hobfoll, 1998; Schumm et al., 2012; Wells et al., 1999). Hence, the effect of psychosocial resource gain on mental health status is also contingent on the level of psychosocial resource loss. By testing these two unique predictions from COR theory, we not only contribute to the theory testing of COR theory but also develop a deeper understanding of the role of psychosocial resource loss and gain in mental health status. We shall note that the two predictions reflect the same interaction effect between resource loss and resource gain on mental health status in an analytic sense. Their differences lie in that the traditional buffering hypothesis views resource gain as a moderator, whereas the more unique hypothesis regarding ‘the paradox of the power of gain in the face of loss’ views
resource loss a moderator (for methodological discussions on moderation effects, see Baron & Kenny, 1986). Following COR theory, we thus propose:

Hypothesis 6 (the buffering effect of resource gain): Daily psychosocial resource gain moderates the effect of daily psychosocial resource loss on daily mental health status such that the adverse effect of psychosocial resource loss is weakened when psychosocial resource gain is higher rather than lower.

Hypothesis 7 (the paradox of the power of gain in the face of loss): Daily psychosocial resource loss moderates the effect of daily psychosocial resource gain on daily mental health status (depression and anxiety) such that the negative effect of psychosocial resource gain is stronger when psychosocial resource loss is higher rather than lower.

2 METHODS

2.1 Sample and procedures

We collected data during the COVID-19 pandemic lockdown (1–5 May 2020) from 139 football players at 15 professional football clubs in Iran. Despite the lockdown and postponed sporting events, professional footballers were still under contract and were obliged to work out daily at home to maintain their physical fitness. To understand how the pandemic affects their daily mental health and daily performance, one of the authors, a former professional footballer, called the football club coaches and managers to help recruit players for the study. With their help and permission, we sent a total of 207 footballers from the 15 professional clubs an invitation to participate in a study on the impact of the COVID-19 pandemic.

Iran represents one of the countries most affected by COVID-19 (Jahanshahi et al., 2020; Zhang, Liu, et al., 2020; Zhang, Sun, et al., 2020). When we started our survey on 1 May 2020, Iran already had high national counts of COVID-19, with confirmed total cases of 94,640 and total deaths of 6091. At the end of data collection (May 10), Iran had confirmed a total number of cases of 107,603 and total deaths of 6640. During the middle of our data collection (on 6 May 2020), the first Iranian football players passed away because of COVID-19 infections. On 20 May 2020, the second Iranian football player has died from a coronavirus infection. The COVID-19 outbreak in Iran has been compounded by the ongoing decade-long US-led sanctions on Iran. A Lancet correspondence noted that ‘all aspects of prevention, diagnosis, and treatment are directly and indirectly hampered, and the country (Iran) is falling short in combating the crisis. Lack of medical, pharmaceutical and laboratory equipment such as protective gowns and necessary medication has been scaling up the burden of the epidemic and the number of casualties’ (Takian et al., 2020). Hence, Iran offers a suitable context to study how individuals cope with the stress from COVID-19. Further, there is frequent communication between athletes and their coaches including both videoconferencing with all athletes and individual contacts between individual athletes and coaches via phone calls and videoconferencing during the pandemic.

The footballers were told that their participation is voluntary, and if they agree to participate, they will need to complete a short baseline survey and five short daily surveys. They were also told that university researchers were conducting this study for research purposes and that their responses would be confidential. After consenting to participate in the study, the players were briefed on the procedures of the diary study online via their cellphones or computers. Immediately following the briefing, the participants reported their demographic information in a baseline survey. A total of 139 players completed the surveys, representing a response rate of 67%. The footballers all played professionally, and 26 of our sampled footballers had the experience of playing for the national team. The diary data collection yielded 569 daily responses out of a maximum of 695 possible daily responses (139 participants × 5 days), generating a response rate of 82%. The majority of the footballers were male (75.54%), and they averaged 21.33 years of age (SD = 4.75). Given the extreme context of the COVID-19 pandemic, we faced practical constraints to track the athletes for a longer period of time. Nonetheless, we note that five-day diaries have been frequently used in the existing literature (e.g., Cangiano et al., 2019; Sonnentag, 2003; Uy et al., 2015). Further, we have implemented a one-day time lag between each wave of diary surveys to capture greater variance in the study constructs across measurement waves.

2.2 Measures

All measures originally in English were translated into Persian using a translation and back-translation procedure (Brislin, 1986). We pilot tested the questionnaire for readability with the coaches from the 15 clubs and 10 football players, who were not part of our main sample. All the diary measures began with ‘In the past 24 hours…’

COVID-19 intrusive experience was measured daily with Horowitz et al.’s. (1979) event-specific intrusive experience scale (α = 0.93). The original scale has seven items, but two of them asked participants to recall past events and are thus not applicable to this study on the intrusive experience of the ongoing COVID-19 situation. It is also common for intensive daily diary studies to use shortened scales to lower participant burden to increase data quality (Ilies et al., 2006; Uy et al., 2010). Sample items include ‘I thought about the COVID-19 pandemic when I didn’t mean to’ and ‘Images related to the COVID-19 pandemic popped into my mind.’ A five-point scale from 1 (very little) to 5 (a great deal) was used. The Cronbach’s alpha in this study is 0.93, which is larger than the Cronbach’s alpha of 0.78 in the original study (Horowitz et al., 1979).

Psychosocial resource loss and gain were measured daily with Hobfoll, Tracy et al.’s. (2006) scale of psychosocial resource loss and gain, which the National Institute of Mental Health recommended for research on psychosocial resource loss and gain (Hobfoll, Tracy et al., 2006). The original scale has 11 items for psychosocial resource
loss and 11 items for psychosocial resource gain. To reduce participants’ fatigue due to our intensive daily surveys especially during the pandemic, we retained seven items for each. Sample items include ‘feeling valuable to others’ and ‘feeling that you are accomplishing your goals.’ Following Hobfoll, Tracey et al. (2006), for psychosocial resource loss (α = 0.83), participants were instructed to report whether each of the items ‘had no decrease’, ‘decreased a little’, or ‘decreased a lot’; for psychosocial resource gain (α = 0.77), participants were instructed to report whether each of the items ‘had no increase’, ‘increased a little’, or ‘increased a lot’. It is important to note that a cornerstone position of COR theory is that psychosocial resource loss and gain are not the opposite ends of the same scale but represent distinct processes. For example, when individuals experience an increased sense of self-efficacy at one moment and a decreased sense of self-efficacy next moment, it does not mean they experience zero overall change in self-efficacy. Thus, it is inappropriate to average loss and gain to calculate an overall score. The Cronbach’s alpha for psychosocial resource loss in this study is 0.83, which is larger than the Cronbach’s alpha of 0.78 in the original study; The Cronbach’s alpha for psychosocial resource gain in this study is 0.77, which is similar to Cronbach’s alpha of 0.78 in the original study (Hobfoll, Tracy, et al., 2006).

**Visionary leadership behaviours** were measured daily using the three-item measure (α = 0.93) that Griffin et al. (2010) adapted from House (1998). During the lockdown, there are frequent communication between athletes and their coaches including both videoconferencing with all athletes and individual contacts between individual athletes and coaches via phone calls and videoconferencing. The items include ‘My coach creates an exciting and attractive image of where the team is going’ and ‘My coach expresses a clear direction for the future of the team’ from 1 (completely disagree) to 7 (completely agree). The Cronbach’s alpha in this study is 0.93, which is larger than the Cronbach’s alpha of 0.89 in the original study (Griffin et al., 2010).

**Mental health status** was measured daily using patient health questionnaire (PHQ-4), the four-item Patient Health Questionnaire (Kroenke et al. 2009). The measure (α = 0.86) taps into depression and anxiety. Sample items include ‘I am feeling nervous, anxious, or on edge’ and ‘I am feeling down, depressed or hopeless.’ A five-point scale from 1 (very little) to 5 (a great deal) was used. The Cronbach’s alpha in this study is 0.86, which is similar to the Cronbach’s alpha of 0.85 in the original study (Kroenke et al., 2009).

**Work performance** was measured daily with a list of 10 routine workouts that the football coaches instructed their players to perform daily during the COVID-19 lockdown (α = 0.81). Sample items include ‘Number of minutes doing stretching exercises (e.g. forward lunge, side lunge, standing quad (thigh) stretch, seat straddle lotus, side seat straddle, seat stretch, knees to chest) in the last 24 hours’ and ‘Number of minutes doing bodybuilding in the last 24 hours.’ As the workout performance measures were count variables on the number of different exercise activities, they needed to be log-transformed to ensure normal distributions and then standardized to be comparable on the same scale to create a single daily performance measure (Hox, 2010). We confirm with all the coaches that this measure of workout performance was the only performance measure that they used during the lockdown period. Performance measure was lagged in the data analyses to examine the predictive validities of the studied psychological variables.

**Control variables.** We controlled for age and education as they reflect levels of experience and knowledge and represent a form of resources (Wright & Hobfoll, 2004). We controlled for gender (0: Male; 1: Female) which can influence how people experience stress (Nelson & Burke, 2002). Further, we measured and controlled for daily exposure to people with COVID-19 (0: No; 1: Yes). Finally, we controlled for the order of daily diaries (days 1 to 5) to remove confounding due to potential trend effects (Singer & Willett, 2003). The inclusion of control variables did not change the significance patterns of the study findings.

### 2.3 Analyses

All analyses were conducted using Stata 16 (StataCorp, 2017). Given the hierarchical data structure (i.e., daily data were hierarchically nested within individual players who were nested within clubs), we tested our hypothesis using three-level hierarchical linear modelling (Bliese & Hanges, 2004). Following the established suggestions on centring for hierarchical linear modelling (Raudenbush & Bryk, 2002; Z. Zhang et al., 2009), we centred all level 1 variables around their respective individual means to gain unconfounded within-person level estimates and the correct reparameterization of the interaction terms in moderation analyses (Gabriel et al., 2019; Raudenbush & Bryk, 2002). To test the mediation effects, we adopted the product-of-coefficients approach and Monte Carlo simulation procedures to obtain the 95% confidence interval of indirect effects (Morgan-Lopez & MacKinnon, 2006).

**Missing Data.** We did not impute any missing data. Missing data are common in diary studies (Gabriel et al., 2019; Ployhart & Vandenberg, 2010; Willet & Singer, 2003) and also occurred in our diary study. Methodologists (Enders, 2010, p. 16; Schafer & Graham, 2002, p. 152) explained that missing data can be relatively well-handled using our data analytic procedure of hierarchical linear modelling coupled with maximum-likelihood estimation under the less stringent assumption of missing at random (MAR).

### 3 RESULTS

Table 1 presents descriptive statistics, ICC1, and within-person bivariate correlations of the studied variables. The ICC1 values indicate that the diary measures had considerable within-person variations across days: the proportion of within-person variance was 69% for COVID-19 intrusive experience, 63% for visionary leadership behaviour, 78% for psychosocial resource loss, 79% for psychosocial resource gain, 77% for mental health status as indicated by depression and anxiety scores, and 71% for work performance.
Before hypothesis testing, we performed a series of multilevel confirmatory factor analyses to assess the discriminant validity of our study measures and found that the hypothesized six-factor model ($\chi^2(285) = 679.04$, CFI = 0.94, TLI = 0.93, RMSEA = 0.04) had significantly better fit than all alternative models (Table 2).

Hypothesis 1 posits that COVID-19 intrusive experience positively relates to mental health status (depression and anxiety). As shown in Table 3, COVID-19 intrusive experience was significantly and positively related to mental health status as indicated by depression and anxiety scores ($\gamma = 0.46$, $p < 0.01$, Model 1). Thus, Hypothesis 1 was supported.

Hypothesis 2a states that psychosocial resource loss mediates the effect of COVID-19 intrusive experience on mental health status (depression and anxiety). As shown in Table 3, COVID-19 intrusive experience significantly related to psychosocial resource loss ($\gamma = 0.27$, $p < 0.01$, Model 2), which significantly related to mental health status score ($\gamma = 0.43$, $p < 0.01$, Model 4). The indirect effect was significant: $\gamma = 0.12$, Monte Carlo 95% CI = [0.08, 0.16], supporting Hypothesis 2a.

Hypothesis 2b states that psychosocial resource gain mediates the effect of COVID-19 intrusive experience and mental health status (depression and anxiety). As shown in Table 3, COVID-19 intrusive experience significantly related to psychosocial resource gain ($\gamma = -0.19$, $p < 0.01$, Model 3) which significantly related to mental health status score ($\gamma = -0.25$, $p < 0.01$, Model 4). The indirect effect was significant: $\gamma = -0.02$, 95% CI = [−0.04, −0.01], supporting Hypothesis 2b.

Hypothesis 3 states that COVID-19 intrusive experience affects latter work performance via its effect on mental health status, as shown in Figure 1. As shown in Table 3, COVID-19 intrusive experience ($\gamma = 0.46$, $p < 0.01$, Model 1) significantly related to mental health status score, which in turn significantly related to performance ($\gamma = -0.16$, $p < 0.05$, Model 5). The indirect effect was significant: $\gamma = -0.08$, Monte Carlo 95% CI = [−0.01, −0.14], supporting Hypothesis 3.

Hypothesis 4a posits a serial mediation effect from COVID-19 intrusive experience to psychosocial resource loss to mental health status to later work performance. As shown in Table 3, COVID-19 intrusive

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**TABLE 1** Descriptive statistics and within-person correlations of the study variables

| Variables                        | Mean | SD  | ICC1 | 1   | 2   | 3   | 4   | 5   | 6   | 7   |
|----------------------------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|
| 1 Exposure to people with COVID-19 | 0.02 | 0.14| 0.00 | --- |     |     |     |     |     |     |
| 2 COVID-19 intrusive experience  | 1.77 | 1.04| 0.31 | 0.21** | 0.93 |     |     |     |     |     |
| 3 Visionary leadership behaviour | 5.02 | 1.71| 0.37 | -0.09* | -0.47** | 0.93 |     |     |     |     |
| 4 Psychosocial resource loss     | 0.48 | 0.48| 0.22 | 0.10** | 0.55** | -0.39** | 0.83 |     |     |     |
| 5 Psychosocial resource gain     | 0.85 | 0.49| 0.21 | -0.08 | -0.38** | 0.38** | -0.37** | 0.77 |     |     |
| 6 Mental health status (PHQ-4)   | 1.71 | 0.74| 0.23 | 0.13** | 0.63** | -0.48** | 0.57** | -0.43** | 0.86 |     |
| 7 Work performance              | -0.09| 0.76| 0.39 | -0.04 | -0.27** | 0.41** | -0.28** | 0.33** | -0.36** | 0.81 |

Note: $N$ of observations = 569, $N$ of participants = 139. All measures were repeatedly assessed daily. The bold values in the diagonal refer to reliability coefficients.

**TABLE 2** Comparison of measurement models of key study variables with multilevel confirmatory factor analysis

| Model Description                                      | $\chi^2$  | df  | CFI  | TLI  | RMSEA | $\Delta \chi^2 (\Delta df)$ |
|--------------------------------------------------------|-----------|-----|------|------|-------|-----------------------------|
| 1 Hypothesized six-factor model                        | 679.04    | 285 | 0.94 | 0.93 | 0.04  | Baseline                    |
| 2 Five-factor model (psychosocial resource loss and gain were combined) | 951.63    | 290 | 0.90 | 0.89 | 0.06  | 272.59 (5)                 |
| 3 Four-factor model (psychosocial resource loss and gain were combined; COVID-19 intrusive experience and mental health status were combined) | 1203.72   | 294 | 0.87 | 0.84 | 0.07  | 524.68 (9)                 |
| 4 Three-factor model (psychosocial resource loss, gain, COVID-19 intrusive experience, and mental health status were combined) | 1373.94   | 297 | 0.84 | 0.82 | 0.08  | 694.9 (12)                |
| 5 Two-factor model (work performance vs. the rest)     | 2038.12   | 299 | 0.73 | 0.71 | 0.10  | 1359.08 (14)               |
| 6 One-factor model                                     | 2200.84   | 300 | 0.72 | 0.68 | 0.11  | 1521.8 (15)                |

Note: The hypothesized six-factor model served as the baseline model. All alternative models were compared to it. All $\Delta \chi^2$ are significant at $p < 0.01$. We constructed parcels as composite indicators of the factors to achieve an optimal ratio of sample size to the number of estimated indicators (Little et al., 2013). Specifically, we created three parcels for scales with five items or more including psychosocial resource loss, and psychosocial resource gain, COVID-19 intrusive experience, and work performance by randomly combining items. A value greater than 0.90 is needed for CFI and TLI and a value smaller than 0.07 to generally indicate an acceptable fit of the model (Hooper et al., 2008; Kline, 2005).

Abbreviations: CFI, comparative fit index; RMSEA = root mean squared error of approximation; TLI, Tucker-Lewis index.
intrusive experience significantly related to psychosocial resource loss (γ = 0.27, p < 0.01, Model 2), which significantly related to mental health status score (γ = 0.43, p < 0.01, Model 4) and, in turn, latter performance (γ = −0.19, p < 0.01, Model 6). The serial mediation effect was significant: γ = 0.05, Monte Carlo 95% CI = [0.03, 0.07], supporting Hypothesis 4a.

Hypothesis 4b proposes a serial mediation effect from COVID-19 intrusive experience to psychosocial resource gain to mental health status to later performance. As shown in Table 3, COVID-19 intrusive experience significantly related to psychosocial resource gain (γ = −0.19, p < 0.01, Model 3), which significantly related to mental health status score (γ = −0.25, p < 0.01, Model 4) and, in turn, latter performance (γ = −0.19, p < 0.01, Model 6). The serial mediation effect was significant: γ = −0.01, Monte Carlo 95% CI = [−0.02, −0.002], supporting Hypothesis 4b.

Hypothesis 5a states that visionary leadership behaviours buffer the adverse effect of COVID-19 intrusive experience on psychosocial resource loss. As shown in Table 4, there was a significant interaction between COVID-19 intrusive experience and visionary leadership on psychosocial resource loss (γ = −0.04, p < 0.01, Model 7). In conducting the moderation test, we centred the predictor and moderator variables around their respective individual means to gain unbiased within-person relationship estimates and the correct reparameterization of the interaction term (Gabriel et al., 2019; Raudenbush & Bryk, 2002; Z. Zhang et al., 2009). We conducted simple slope tests and illustrated the interaction effect in Figure 2. When visionary leadership was low (1 SD below the mean), daily COVID-19 intrusive experience significantly related to daily psychosocial resource loss (γ = 0.27, p < 0.01); when visionary leadership was high (1 SD above the mean), the relationship became weaker (γ = 0.17, p < 0.01), supporting Hypothesis 5a.

Hypothesis 5b states that visionary leadership behaviours buffer the adverse effects of COVID-19 intrusive experience on psychosocial resource gain. As shown in Table 4, there was a significant interaction effect between COVID-19 intrusive experience and visionary leadership on psychosocial resource gain (γ = 0.04, p < 0.01, Model 8). Figure 3 demonstrates the interaction pattern. When visionary leadership was low, COVID-19 intrusive experience significantly related to psychosocial resource gain (γ = −0.17, p < 0.01); when visionary leadership was high, the negative relationship became weaker (γ = −0.08, p < 0.05), supporting Hypothesis 5b.
### Table 4: Hierarchical linear modeling for testing Hypotheses 5–7

| Variables                  | Model 7: Psychosocial resource loss | Model 8: Psychosocial resource gain | Model 9: Mental health status (PHQ-4) | Model 10: Mental health status (PHQ-4) |
|----------------------------|-------------------------------------|------------------------------------|--------------------------------------|---------------------------------------|
|                            | γ        | SE     | γ        | SE     | γ        | SE     | γ        | SE     |
| Intercept                  | 0.52**   | 0.07   | 0.86**   | 0.07   | 1.79**   | 0.11   | 1.79**   | 0.11   |
| Control                    |          |        |          |        |          |        |          |        |
| Exposure to people with COVID-19 | 0.02    | 0.11   | 0.01    | 0.13   | 0.11    | 0.16   | 0.40**   | 0.16   |
| Day                       | -0.01*   | 0.01   | 0.00    | 0.01   | -0.03*   | 0.01   | -0.03*   | 0.02   |
| Age                       | 0.01     | 0.01   | 0.00    | 0.01   | 0.00    | 0.01   | 0.00     | 0.01   |
| Gender                    | -0.06    | 0.08   | 0.13    | 0.11   | -0.11   | 0.15   | -0.10    | 0.15   |
| Education                 | -0.01    | 0.02   | -0.01   | 0.02   | 0.01    | 0.03   | 0.00     | 0.03   |
| Main variables            |          |        |          |        |          |        |          |        |
| COVID-19 intrusive experience (IE) | 0.22** | 0.02  | -0.12** | 0.03  | 0.36**   | 0.03  |          |        |
| Visionary leadership behaviour (VL) | -0.05** | 0.01 | 0.08**   | 0.02 | -0.11**   | 0.02 |          |        |
| IE × VL                   | -0.04**  | 0.02  | 0.04*   | 0.02  | -0.06**  | 0.02  |          |        |
| Psychosocial resource loss (RL) |          |        |          |        | 0.68**  | 0.06 |          |        |
| Psychosocial resource gain (RG) |          |        |          |        | -0.35** | 0.06 |          |        |
| RL × RG                   |          |        |          |        | -0.41** | 0.15 |          |        |
| Mental health status (PHQ-4) |          |        |          |        |          |        |          |        |
| Variance (level 3 intercept) | 0.01    | 0.01  | 0.02    | 0.02  | 0.02    | 0.02  |          |        |
| Variance (level 2 intercept) | 0.05    | 0.04  | 0.04    | 0.13  | 0.13    | 0.12  |          |        |
| Variance (level 1 residual) | 0.12    | 0.16  | 0.24    | 0.24  | 0.24    | 0.26  |          |        |
| Deviance                  | 552.58   | 660.77 | 970.16  | 1007.31| 0.04    | 0.06  | 0.08    | 0.23   |
| Pseudo R²                 |          |        |          |        |          |        |          |        |

Note: N = 569. *p < 0.05; **p < 0.01. We centred the predictor and moderator variables around their respective individual means to gain unbiased within-person relationship estimates and the correct reparameterization of the interaction term (Gabriel et al., 2019; Raudenbush & Bryk, 2002; Zhang et al., 2009).

Abbreviations: PHQ, patient health questionnaire.

![Figure 2](https://example.com/figure2.png)

**Figure 2** Visionary leadership behaviour as a moderator of the relationship between COVID-19 intrusive experience and psychosocial resource loss.
Hypothesis 5c states that visionary leadership behaviours buffer the adverse effects of COVID-19 intrusive experience on mental health status. As shown in Table 4, there was a significant interaction effect between COVID-19 intrusive experience and visionary leadership on mental health status as indicated by depression and anxiety scores ($\gamma = -0.06, p < 0.01$, Model 9). The interaction effect is illustrated in Figure 4. When visionary leadership was low, COVID-19 intrusive experience significantly related to mental health status ($\gamma = 0.44, p < 0.01$); when visionary leadership was high, the relationship became weaker ($\gamma = 0.30, p < 0.01$). Thus, Hypothesis 5c was supported.

Hypothesis 6 states that psychosocial resource gain moderates the effects of psychosocial resource loss on mental health status. As shown in Table 4, there was a significant interaction effect between psychosocial resource gain and loss on mental health status as indicated by depression and anxiety scores ($\gamma = -0.41, p < 0.01$, Model 10). Figure 5 illustrates the interaction pattern: the relationship between psychosocial resource loss and mental health status was weaker when psychosocial resource gain was high ($\gamma = 0.52, p < 0.01$) than when it was low ($\gamma = 0.84, p < 0.01$), supporting Hypothesis 6.

Hypothesis 7 states that psychosocial resource loss moderates the effects of psychosocial resource gain on mental health status such that the effect of psychosocial resource gain on mental health is stronger when psychosocial resource loss is higher rather than lower. As shown in Figure 6, the impact of psychosocial resource gain and mental health status as indicated by depression and anxiety scores was stronger when psychosocial resource loss was high ($\gamma = -0.51, p < 0.01$) than when it was low ($\gamma = -0.20, p < 0.05$). Thus, Hypothesis 7 was supported.

4 | DISCUSSION

The day-to-day impact of the COVID-19 pandemic on individuals’ daily mental health status and work performance is a virtually untapped area of research. Our study addresses this knowledge gap by drawing from COR theory and using a repeated-measure diary design, tracking 139 professional footballers using daily diary surveys during the COVID-19 pandemic. We found that the footballers’ daily
COVID-19 intrusive experience related to their daily mental health status and subsequent performance by affecting their daily psychosocial resource loss and gain. We further found that their coaches’ daily visionary leadership behaviours buffered the adverse impacts of their daily COVID-19 intrusive experience. Our study also revealed a theoretically novel finding that the beneficial effect of daily psychosocial resource gain on daily mental health status is greater when individuals experience greater psychosocial resource loss. Our study provides valuable insights into the daily impact of this unprecedented pandemic and offers significant research and practical contributions.

4.1 Research contributions

First, our study shows that 63% to 79% of the variance in our study constructs resided at the within-person level, indicating that individuals’ COVID-19 experience, mental health, and work performance fluctuated a great deal across days during this unpredictable pandemic. Indeed, the amount of within-person variation in our study is on the higher end of the within-person variation spectrum (typically from 26% to 79%) found in the within-person literature (for a meta-analysis, see McCormick et al., 2020). The finding of large within-person variations in our study constructs is theoretically and empirically important as it (1) provides previously undocumented information on daily within-person fluctuations in mental health status and work performance during the COVID-19 pandemic, (2) provides theory-driven insights into the mediating and moderating mechanisms involved in within-person variations, and (3) provide evidence to suggest that future research on the impact of the COVID-19 pandemic should extend beyond a static, between-person focus to a focus on within-person vacillations across time using longitudinal and diary designs (e.g., Kim & James, 2019; Sato et al., 2015).

Second, an important and instructive aspect of our study is the significant moderating effects of daily visionary leadership behaviours on the relationship from daily COVID-19 intrusive experience to daily psychosocial resource loss, psychosocial resource gain, and mental health status. Prior theorizing on visionary leadership posited that visionary leadership behaviours are particularly significant in crises and catastrophes (Conger, 1999; Fuller et al., 1996; Hunt et al., 1999), yet research seldom examines the role of visionary leadership in crisis situations. Our findings thus extend the literature...
on visionary leadership literature by highlighting it as a critical resource to individuals during the COVID-19 pandemic in buffering the adverse effects of their COVID-19 intrusive experience on them. In doing so, our findings also contribute to recent conversations on potential effective leadership behaviours during the COVID-19 pandemic (Duarte, 2020; Knight, 2020; Petriglieri, 2020).

Third, our study makes a significant theoretical contribution to COR theory by delineating and evaluating the specific interactions between psychosocial resource loss and gain on mental health status. Although COR theory has emerged as a major theoretical lens for studying stress and mental health (Halbesleben et al., 2014; Hobfoll et al., 2018; Westman et al., 2005), existing research has rarely evaluated this major prediction of COR theory regarding how resource loss and gain interact to affect mental health outcomes (Hobfoll, 1998). Our study addresses this critical theory-testing gap by examining and reporting that (1) psychosocial resource gain mitigated the adverse effect of psychosocial resource loss on mental health status and (2) the effect of psychosocial resource gain on mental health status increases at the time of psychosocial resource loss. Our findings thus help develop more nuanced and hence more accurate theoretical accounts of the roles of psychosocial resource loss and gain in mental health status. Importantly, our finding that the effect of psychosocial resource gain on mental health status increases at the time of psychosocial resource loss significantly contribute to COR theory. It demonstrates that during the periods of psychosocial resource loss, even a small amount of psychosocial resource gain could play a large role in elevating people’s mental health.

4.2 | Practical implications

Our study advances our understanding of footballers’ daily mental health status and job functioning during the pandemic and thus provides timely and significant practical implications. First, our findings suggest that clubs and leagues should monitor their players’ daily COVID-19 intrusive experience, as it was found to affect their daily mental health status and subsequently their performance. Second, coaches can engage in more visionary leadership during the COVID-19 pandemic, given that it was found to mitigate the adverse effects of COVID-19 intrusive experience on psychosocial resource loss, psychosocial resource gain, and mental health status. Clubs and leagues may design action-based training programs to train coaches’ capability to communicate vision during a crisis, as action-based training programs were shown to be effective in enhancing coaches’ capability to inspirational communication of a vision (Frese et al., 2003). Finally, our findings suggest that mental health services targeted at enhancing individuals’ daily psychosocial resource gain can be useful, as we found that psychosocial resource gain mitigated the adverse effect of psychosocial resource loss on mental health status and that its beneficial effect on mental health status was especially salient when individuals experienced high levels of psychosocial resource loss. Psychosocial resource gain or traumatic growth can be enhanced through individual counselling and group intervention efforts (Hobfoll et al., 2007).

4.3 | Limitations and future research directions

Our study has several limitations calling for future research. For example, the correlational nature of our diary study prevents us from drawing causal conclusions, and our repeated diary measures based on self-reports are also susceptible to common-method variances. Future research is thus needed to replicate our findings via experimental designs and alternative measurement sources to address this potential concern. Nonetheless, there are reasons to believe that common method variance is not a serious problem in our study. First, because significant interaction effects cannot be an artifact of common-method biases (Evans, 1985; Siemsen et al., 2010), common method variances cannot explain our key findings regarding the moderating effects of visionary leadership behaviours or the interaction effect between psychosocial resource loss and gain on mental health status. As Siemsen et al. (2010, p. 456) noted in their methodological study: ‘This research analyzes the effects of common method variance (CMV) on parameter estimates in bivariate linear, multivariate linear, quadratic, and interaction regression models.… They demonstrate that quadratic and interaction effects cannot be artifacts of CMV’ (Siemsen et al., 2010, p. 456). Second, our analyses were on the within-person level. At the within-person level of analysis, all predictors are person-mean centred (which eliminates all between-individual variance in the focal variable), so stable personal response biases should also be removed (Butts et al., 2015; Gabriel et al., 2019; Ilies et al., 2007). As Butts et al. (2015, p. 783) noted, common method bias ‘may be minimized because before hypothesis testing we removed between-person variance through individual-mean centring, essentially controlling for common source effects such as recall bias, social desirability, response tendencies, and trait affectivity.’ For these reasons, Ng and Feldman (2012, p. 1040) noted that ‘longitudinal studies, which utilize self-ratings, do not entail a significantly larger amount of common method variance than cross-sectional studies’ (also see Gabriel et al., 2019). Future research, however, should replicate our findings via alternative measurement sources to address this potential concern.

Another limitation is that we test our model using a sample of football players from professional football clubs. We chose professional football players as our participants because they, like other professionals athletes, need to work even during the pandemic lockdown, allowing us to test our model of daily mental health and work performance of athletes during the pandemic. Although our theorizing based on COR is not occupation-bounded, our data were collected from a group of professional football athletes in a sportive context. Therefore, the generalizability of our findings across occupational contexts remains an empirical question. Future research directly replicating and extending our study findings to different occupational contexts will help test the robustness of our findings. Nonetheless, it is worthy of note that sports organizations also face
challenges to maintain their professional athletes’ daily mental health and work performance during the pandemic. In fact, we found that a considerable proportion of athletes in our sample had mental disorders during this pandemic. Indeed, based on the cutoff point for PHQ-4, 23.3% of participants in our study experienced mental disorders during this pandemic. In fact, we found that a considerable proportion of athletes in our sample had mental disorders during the pandemic.

Yet, there is no prior empirical research on the mental health status of professional athletes during the COVID-19 pandemic, even though commentators observed that professional athletes were experiencing significant grief, anxiety, frustration, and distress during this unprecedented pandemic (Toresdahl & Asif, 2020).

We also note that to minimize potential biases, we followed the standard survey approaches (Armstrong & Overton, 1977), including the respondents being assured of anonymity and confidentiality of their responses. All the respondents consented to the survey online before proceeding to answer the questionnaire. Our response rate of 67% is higher than most diary studies in the work context (For review, see Gabriel et al., 2019), suggesting biases not to be a significant issue in this study. From 207 initially contacted participants for the study, 68 participants did not proceed with the diary surveys. We compared the participating football players and non-participating players (68 players who didn’t complete the diary studies) with respect to their age (respondent vs. non-respondent players: $F = 0.612$, n.s.), their gender (respondent vs. non-respondent players: $F = 0.581$, n.s.) and their education (respondent vs. non-respondent players: $F = 0.379$, n.s.). These comparisons showed that there was no significant difference between players that participate fully in our study and those that did not ($p < 0.05$).

Finally, future research should extend our study by incorporating other psychological and leadership resources such as psychological resilience (Fletcher & Sarkar, 2013), hardness (Funk, 1992), self-talk (Tod et al., 2011), leader’s social support and undermining (Duffy et al., 2002) that may also affect how individuals deal with the impact of a pandemic upon their mental health status and work performance during the COVID-19 pandemic. Focussing on these psychological and leadership behaviours is also consistent with our guiding theory given COR theory suggests that some people can remain resilient and hopeful despite facing mass trauma (Doane et al., 2012; Hobfoll, 1998) and that leadership represents a critical source of support as well as a source of draining experience (Duffy et al., 2002; Gerpott et al., 2020; Sun et al., 2021). Nonetheless, we highlight that we focus on visionary leadership in the current study for both theoretical and practical reasons. Theoretically, visionary leadership is particularly critical during mass traumatic events such as the COVID-19 pandemic because ‘mass trauma is often accompanied by a “shattered worldview”, the vision of a shortened future, and catastrophizing’ (Hobfoll et al., 2007, p. 298). Practically, our study was conducted during the early outbreak of the COVID-19 pandemic when a stay-at-home order has been issued. During this period of time, there were fewer opportunities for the coaches to provide concrete, other-oriented support behaviours, yet there is huge uncertainty about the future among the professional footballers. As such, a clear vision from coaches will be important and helpful, as Rafferty and Griffin (2004) and Hobfoll et al. (2007) pointed out.

5 CONCLUSION

Pandemics such as the COVID-19 often pose significant challenges to organizations and their employees on a daily basis. We invoke COR theory to propose a resource-based framework to understand how daily pandemic experience affects daily mental health status and work performance and how visionary leadership could help alleviate the adverse impact of daily COVID-19 intrusive experience. Our study enhanced our understanding of individuals’ daily mental health and performance during the COVID-19 pandemic and generated research findings that organizations and mental health service practitioners may use to guide their daily practices with organizational members during the unprecedented pandemic.

CONFLICT INTEREST STATEMENT

The authors have declared that no competing interests exist.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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