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Longitudinal association of stress with mental health in the context of COVID-19: The mediating role of psychological flexibility and emotional schemas

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Abstract

Stress is a known contributor to psychosocial pathological conditions and reduction of well-being. The literature has highlighted the role of emotional schemas and psychological flexibility as psychological processes underlying this relationship in the short term. This two-wave longitudinal study analyses the mediating role of psychological flexibility and emotional schemas in the relationship between stress responses to COVID-19-related events and mental health 6 months later. Two hundred and seventy-six individuals were included in this study, completing measures of stress responses, emotional schemas, psychological flexibility and positive and negative mental health. Negative evaluation of emotions was a significant mediator in the longitudinal relationship between stress responses and negative mental health. Valued action and openness to experience mediate the longitudinal relationship between stress responses and positive mental health. This study underscores the importance of the different dimensions of psychological processes, suggesting that over time, more maladaptive psychological processes play a significant role in elucidating the relationship between stress responses and

negative mental health. Similarly, it suggests that more adaptive processes may help explain the relationship between stress responses and positive mental health. This contributes to a better understanding of the stability of these processes, which is important for determining which intervention targets should be prioritised.

KEYWORDS

emotional schemas, negative mental health, positive mental health, psychological flexibility, stress

INTRODUCTION

A complete state model of mental health comprises both positive and negative mental health (Keyes, 2013). This complete state can be affected by negative experiences such as stress. Stress is a known contributor to psychosocial pathological conditions in humans and the disruption of well-being (Brooks et al., 2020; Chrousos, 2009; Musazzi et al., 2017). In response to exposure to a stressor, individuals could generate physiological, cognitive, emotional or behavioural responses, known as stress, to re-establish the threatened or perceived threatened homeostasis (Chrousos, 2009). Depending on the type, timing and severity of exposure to a stressor, the stress response could be acute or chronic, with short- and long-term consequences on mental health (Musazzi et al., 2017).

Research has shown that stress response is a reaction to environmental changes that can be adaptive or maladaptive. Certain individuals are more vulnerable to the adverse impact of stress and demonstrate negative outcomes (Cohen et al., 2016; Monroe & Cummins, 2015). Understanding what makes individuals more resistant to the negative effects of stress over time could suggest new paths for the development of interventions for stress-related disorders. These paths must be malleable and responsive to psychological interventions to ensure their functional utility (Holmes et al., 2020). Among the different factors, transdiagnostic modifiable psychological processes may help to mitigate the impact of stress on mental health. According to a process-based approach (Hayes et al., 2020; Hofmann & Hayes, 2019), it is important to examine both adaptive and maladaptive processes as mental health encompasses both well-being and adverse mental health aspects (Keyes, 2013; Westerhof & Keyes, 2010).

Psychological flexibility has been pointed out as an important process to mitigate the deleterious effects of stress on mental health (Fonseca et al., 2020; Gloster et al., 2017). According to Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 2011), psychological flexibility represents the ability to stay in the present moment and respond to situations based on context and personal values (Hayes, Villatte, et al., 2011), despite unpleasant internal experiences (Hayes, Strosahl, & Wilson, 2011), encompassing behavioural repertoires (Silberstein et al., 2012).

Emotional schemas, which involve cognitive perspectives and strategies to deal with emotional experiences (Leahy, 2002, 2022), have been related to a wide range of mental health issues, such as depression, anxiety and post-traumatic stress symptoms (Barlow et al., 2017; da Silva et al., 2022; Leahy et al., 2018; Sebastião, Neto, & da Silva, 2023; Tirch et al., 2012). Additionally, the emotional schema model proposes that individuals may appraise their stress along

various dimensions, such as duration, comprehensibility and control. This evaluation may impact the stress response (Leahy, 2015), which can be reflected in mental health.

Integrating these two transdiagnostic psychological processes that focus on different levels – cognitive, emotional and behavioural – allows a fuller picture of the phenomena, contributing to understanding the different paths related to positive and negative mental health. Psychological flexibility can be considered a more experiential approach, emphasising the willingness to embrace thoughts and emotions while living according to personal values (Fonseca et al., 2020; Gloster et al., 2017). On the other hand, emotional schemas can be integrated under a more meta-experiential approach, emphasising the role of thoughts and feelings about emotions (Leahy, 2016). Additionally, psychological flexibility is usually implicated in adaptive and flexible psychological functioning, while emotional schemas are more associated with emotional distress and psychopathology (Leahy, 2016; Silberstein et al., 2012).

Although stress is prevalent in everyday life, people's stress responses vary across individuals and contexts. A specific context, common to all the population around the globe has been the COVID-19 pandemic. Even though COVID-19 is no longer considered a "global health emergency", it was a source of shared stress, composed of different kinds of stressors, impacting the lives of all people at various levels. This allowed the study of stress responses along a continuum, ranging from adaptive to pathological over time. Tracking the pandemic's progression, the stress and mental health levels and the psychological processes, provided an opportunity to examine these dynamics.

Studies published regarding the pandemic have effectively shown (e.g., Bridgland et al., 2021; Ikizer et al., 2021; Montano & Acebes, 2020; Neto & da Silva, 2023; Ribeiro et al., 2023; Sebastião, Neto, & Costa, 2023; Wu et al., 2020; Yang et al., 2021) that stress is an important factor in (positive and negative) mental health. Additionally, the literature has demonstrated that psychological inflexibility is a mediator in the relationship between COVID-19 stress and negative (e.g., Arslan et al., 2022; Huang et al., 2021), and positive mental health (e.g., Arslan & Allen, 2022; Wasowicz et al., 2021). There has been limited research into emotional schemas within stressful contexts, such as the COVID-19 pandemic. However, a cross-sectional study (Sebastião & Neto, 2024) found that negative evaluation of emotions and difficulties in reappraisal (emotional schemas dimensions) significantly mediated the relationship between stress responses and mental health. Concerning psychological flexibility, only behavioural awareness was a significant mediator in the relationship between stress responses and negative mental health, and valued action was a significant mediator between stress responses and positive mental health.

Nevertheless, coping with stress is a dynamic process. Folkman and Lazarus (1985) postulated that "The essence of stress, coping, and adaptation is change (...) Therefore, unless we focus on change we cannot learn how people come to manage stressful events and conditions" (p. 150). Based on this idea, studying individual adaptation requires longitudinal analyses, since both the processes that foster resilience and the individual's context evolve dynamically over time. To our knowledge, no study has evaluated these two psychological processes longitudinally in an integrated manner. Extending the findings of the previous cross-sectional study (Sebastião & Neto, 2024) on the role of psychological flexibility and emotional schemas in the relationship between stress responses and mental health, enhances our understanding of the stable nature of these psychological processes in this relationship over time. This insight is critical for determining which intervention targets should be prioritised. Differentiating between transient and enduring processes will contribute to implementing effective programs to decrease the negative impact of stress on mental health through transdiagnostic modifiable psychological processes in the short- and long term.

Thus, the present study aims to analyse the role of psychological flexibility and emotional schemas in the longitudinal association between stress responses to COVID-19-related events and mental health after 6 months, controlling mental health at the baseline. Specifically, it aims to analyse the mediating roles of psychological flexibility and emotional schemas dimensions in the relationship between stress responses to COVID-19-related events and positive and negative mental health.

METHOD

Participants

The Time 1 (T1) sample included 666 individuals. 583 completed all the questionnaires of interest. Participants aged 16–93 (M = 44.8, SD = 19.60), were mostly female (375, 64.3%). The majority of participants were in a marital or civil union (265, 45.5%) and were full-time employees (266, 45.6%). Most with a typical education level for Portugal - high school (168, 28.8%) or BA (236, 40.5%). Right before the pandemic, 10.7% (62) had been diagnosed with a mental health disorder. In Time 2 (T2), 303 participants completed the survey. However, 27 participants were excluded from the analysis because they did not answer all the questionnaires of interest. The final longitudinal sample was 276 individuals from the Portuguese population. Participants ranged from 16 to 86 years (M = 47.2, SD = 18.24), were mostly female (193, 69.9%) and were married or in a civil union (138, 50%). The majority were full-time employees (133, 48.2%) and had a typical education level for Portugal - high school (75, 27.2%) or BA (110, 39.9%). Right before the pandemic, 10.5% (29) had been diagnosed with a mental health disorder.

Measures

Stress responses

The Impact of Event Scale-Revised (IES-R, Weiss & Marmar, 1997; Portuguese version by Vieira et al., 2020) is a 22-item questionnaire used to evaluate stress responses to a specific event (in this case, it was considered the most stressful event related to the pandemic selected by the participants). Participants rate each item on a five-point Likert scale (1 = never to 5 = always). The current study focuses on the total score. This measure presents good internal consistency (ω = .94).

Emotional schemas

The Leahy Emotional Schema Scale (LESS, Leahy, 2002; Portuguese version by da Silva et al., 2022) is a 42-item scale assessing how individuals cope with their beliefs and emotions about their own emotions. Participants rate each item on a six-point Likert scale (1 = very untrue of me to 6 = very true of me). Items were grouped into five components: 1) negative evaluation of emotions, reflecting control, incomprehension, non-acceptance dimensions, and a secondary emotion towards the emotion felt; 2) difficulties in reappraisal, referring to cognitive emotion regulation, suggesting a reappraisal dimension; 3) difficulties in naturalising emotion, capturing a non-acceptance of what the individual is feeling and that they do not feel the same

as other human beings; 4) need to be rational, reflects a devaluing of emotions and a need to be rational; 5) simplistic view of emotion, related to a simplistic view of emotion and rumination dimension. This self-report measure has demonstrated internal consistency ranging from acceptable to very good in the present sample (negative evaluation of emotions $\omega = .94$; difficulties in reappraisal $\omega = .59$; difficulties in naturalising emotion $\omega = .60$; need to be rational $\omega = .74$; simplistic view of emotion $\omega = .72$).

Psychological flexibility

The Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT, Francis et al., 2016; Portuguese version by Trindade et al., 2021) is an 18-item self-report measure that assesses psychological flexibility. This scale comprises three subscales: 1) openness to experience, assessing one's willingness to experience internal events without controlling or avoiding them; 2) behavioural awareness, evaluating one's mindful attention to the present moment; and 3) valued action, assessing one's engagement in valued actions. Participants are asked to rate the degree to which they agree with the statement using a 7-point Likert scale (0 = strongly disagree to 6 = strongly agree). In the present sample, this measure exhibited good internal consistency (openness to experience $\omega = .74$; behavioural awareness $\omega = .89$; valued action $\omega = .83$).

Negative mental health

The Brief Symptom Inventory 18 (BSI-18, Derogatis, 2001; Portuguese version by Canavarro et al., 2017) evaluates negative mental health and includes 18 items with a five-point Likert scale (0 = not at all to 4 = extremely). Scores on the 18 items correspond to a measure of overall psychological distress level, with higher scores reflecting more significant psychopathological symptoms (Canavarro et al., 2017; Nazaré et al., 2017). The present study focuses on the global score. The internal consistency was good for both baseline ($\omega = .93$) and 6-month follow-up ($\omega = .93$).

Positive mental health

The Mental Health Continuum-Short Form (MHC-SF, Keyes, 2002; Portuguese version by Fonte et al., 2020) consists of 14 items and evaluates positive mental health. Participants rate each item on a 6-point scale (1 = never to 6 = every day). The MHC-SF produces a total score with higher scores indicating higher levels of well-being. This self-report measure has demonstrated good internal consistency in the present sample for baseline ($\omega = .92$) and 6-month follow-up ($\omega = .92$).

Procedure

This longitudinal study was approved by the ethical committee of the ISPA—Instituto Universitário and the other organisations in which data were collected. Data collection was

conducted both online and at hospitals, senior universities and patient organisations. Before completing the survey, informed consent was obtained from all participants. The online survey was implemented on Qualtrics and was disseminated via social networks. Data collection followed these two approaches (paper- and web-based questionnaires) to include people who might not otherwise have access to the questionnaire, ensuring a diverse sample regarding stress levels and sociodemographic backgrounds.

Data was collected from the following time points: January to July 2022 (T1) and July 2022 to March 2023 (T2). The T2 occurred approximately 6 months after T1. The first period was characterised by the removal of most COVID-19 restrictions (e.g., wearing face masks was no longer mandatory during this time) in Portugal (Portuguese Government, n.d.). During the second, the alert state ceased, and COVID-19 restrictions were completely lifted (Portuguese Government, 2022).

Data analysis

Descriptive statistics, t-tests and Pearson's correlations were conducted using SPSS (IBM Corp, 2017). The significance level considered was .05. To examine the mediating role of emotional schemas and psychological flexibility in the longitudinal relationship between stress responses and positive and negative mental health, mediation analysis was conducted. In the mediation model, stress responses at T1 was the predictor variable. Emotional schemas and psychological flexibility subscales were the mediators at T2. Positive and negative mental health were both outcome variables at T2. In the mediation analysis, positive and negative mental health at baseline (T1) have been controlled, as well as relevant sociodemographic variables (sex, age, previous mental health issues). To test the hypothesised model, a mediation analysis was conducted using JASP, based on the lavaan package (Rosseel, 2012). The estimation was carried out with maximum likelihood. The significance of indirect effects was determined using the bias-corrected percentile method bootstrapping, as suggested by Biesanz et al. (2010) with 10,000 resamples. If the 95% bias-corrected bootstrapped confidence interval for an indirect effect does not include zero within its upper and lower limits, it indicates the presence of mediation.

RESULTS

Table 1 lists the means and standard deviations of stress responses, emotional schemas dimensions, psychological flexibility dimensions, positive and negative mental health at baseline (T1) and 6-month follow-up (T2) and the Pearson correlation coefficients between these variables. Stress responses significantly correlated with most variables ($p < .05$) in the expected direction. Emotional schemas' dimensions were significantly associated with positive and negative mental health ($p < .05$) in the expected direction. Finally, regarding psychological flexibility, all dimensions were significantly correlated with positive and negative mental health ($p < .01$) in the expected direction.

We also examined the associations between demographic variables and positive and negative mental health. We found that women ($t(274) = -2.07$, $p = .039$, $d = -0.27$, 95% CI [−0.53,-0.01]) and those who reported mental health issues right before the pandemic ($t(31.19) = -2.60$, $p = .014$, $d = -0.68$, 95% CI [−1.07,-0.30]) reported more psychopathological

TABLE 1 Bivariate correlations and descriptive statistics.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Stress responses (T1)													
2 Negative evaluation of emotions[a] (T2)	.38**												
3 Difficulties in reappraisal[a] (T2)	.02	.19**											
4 Difficulties in naturalising emotion[a] (T2)	.23**	.47**	.01										
5 need to be rational[a] (T2)	.23**	.49**	.00	.25**									
6 Simplistic view of emotion[a] (T2)	.12*	.14*	−.27**	.18**	.06								
7 Openness to experience[b] (T2)	−.39**	−.49**	.30**	−.40**	−.28**	−.24**							
8 Behavioural awareness[b] (T2)	−.28**	−.56**	−.16**	−.14*	−.29**	.02	.43**						
9 Valued action[b] (T2)	−.28**	−.48**	−.39**	−.16**	−.15*	.17**	.09	.33**					
10 Positive mental health (T2)	−.30**	−.50**	−.41**	−.24**	−.25**	.12	.24**	.37**	.56**				
11 Negative mental health (T2)	.45**	.66**	.21**	.32**	.21**	.12	−.40**	−.54**	−.43**	−.57**			
12 Positive mental health (T1)	−.25**	−.43**	−.35**	−.19**	−.17**	.05	.17**	.34**	.48**	.73**	−.45**		
13 Negative mental health (T1)	.53**	.56**	.14*	.31**	.13*	.17**	−.40**	−.45**	−.36**	−.48**	.78**	−.51**	
M	52.1	2.76	2.77	3.16	3.33	4.53	10.48	16.29	38.63	57.96	17.45	58.09	18.22
SD	16.93	1.05	0.85	1.06	0.73	1.05	6.15	7.97	6.49	14.15	14.58	13.87	14.70
Min.	22	1	1	1	1.71	1.33	0	0	11	23.00	0	14.00	0
Max.	103	5.71	5.50	5.80	6.00	6.00	30.00	30.00	48.00	83.00	71.00	83.00	69.00

Note: $n = 276$.

*$p < .05$.

**$p < .01$.

[a]Emotional schemas dimension.

[b]Psychological flexibility dimension.

symptoms. Age was negatively correlated with psychopathological symptoms ($r = -.19$, $p = .001$). These sociodemographic variables will be controlled in the following analysis.

The model assessing the mediation role of emotional schemas and psychological flexibility dimensions in the longitudinal relationship between stress responses and positive and negative mental health was tested, controlling sociodemographic factors and baseline outcomes. The proposed model (Figure 1) explained 35.8% of the negative evaluation of emotions, 15.5% of the difficulties in reappraisal, 16.6% of the difficulties in naturalising emotion, 9.1% of the need to be rational, 6.8% of the simplistic view of emotion, 21.9% of the openness to experience, 24.8% of the behavioural awareness, 27.8% of the valued action, 65.6% of the positive mental health and 69.9% of the negative mental health.

No direct effects of stress responses on positive mental health ($\beta = -.03$; 95% CI [−.115,.068]) or negative mental health ($\beta = .03$; 95% CI [−.052,.108]) were observed.

Only negative evaluation of emotions was a significant mediator in the relationship between stress responses to COVID-19-related events and negative mental health ($\beta = .03$; 95% CI [.005,.081]). Regarding positive mental health, valued action ($\beta = -.03$; 95% CI [−.061,-.004]) and openness to experience ($\beta = -.04$; 95% CI [−.076,-.008]) were significant mediators.

DISCUSSION

The present study aimed to understand the transdiagnostic psychological processes through which stress becomes a psychopathological reaction, impacting not only negative mental health but also positive mental health over time. Focusing on the potential mediating effects of emotional schemas and psychological flexibility dimensions, the results suggest that individuals who reported more stress responses presented more (maladaptive) emotional schemas and less psychological flexibility, reporting more psychopathological symptoms and less well-being over time.

The results showed that only the negative evaluation of emotions (an emotional schema dimension) was a significant mediator in the longitudinal relationship between stress responses and negative mental health. However, regarding the longitudinal relationship between stress responses and positive mental health, valued action and openness to experience (psychological flexibility dimensions) were significant mediators. This supports the idea that it is the fear of losing control over emotions, the tendency to reject experiencing emotions and the difficulties understanding emotions and meanings that can explain the relationship between stress responses and negative mental health over time. Moreover, the results suggest that being less able to behave according to personal values and to accept events (i.e., without controlling or avoiding them) seems to explain the longitudinal relationship between stress responses and positive mental health.

Consistent with our results, Sebastião and Neto (2024) found that negative evaluation of emotions was a mediator in the relationship between stress responses and negative mental health, and valued action was a mediator in the relationship between stress responses and positive mental health. This contributes to the idea that negative evaluation of emotions and valued action are stable psychological processes in the relationship between stress responses related to COVID-19 events and negative and positive mental health, respectively. However, this cross-sectional study found that other dimensions from emotional schemas and psychological flexibility were significant mediators in the short-term adaptation. Based on the idea that coping with stress is a dynamic process (Lazarus & Folkman, 1984), the present results suggest that, over time, more maladaptive psychological processes contribute to explaining the relationship

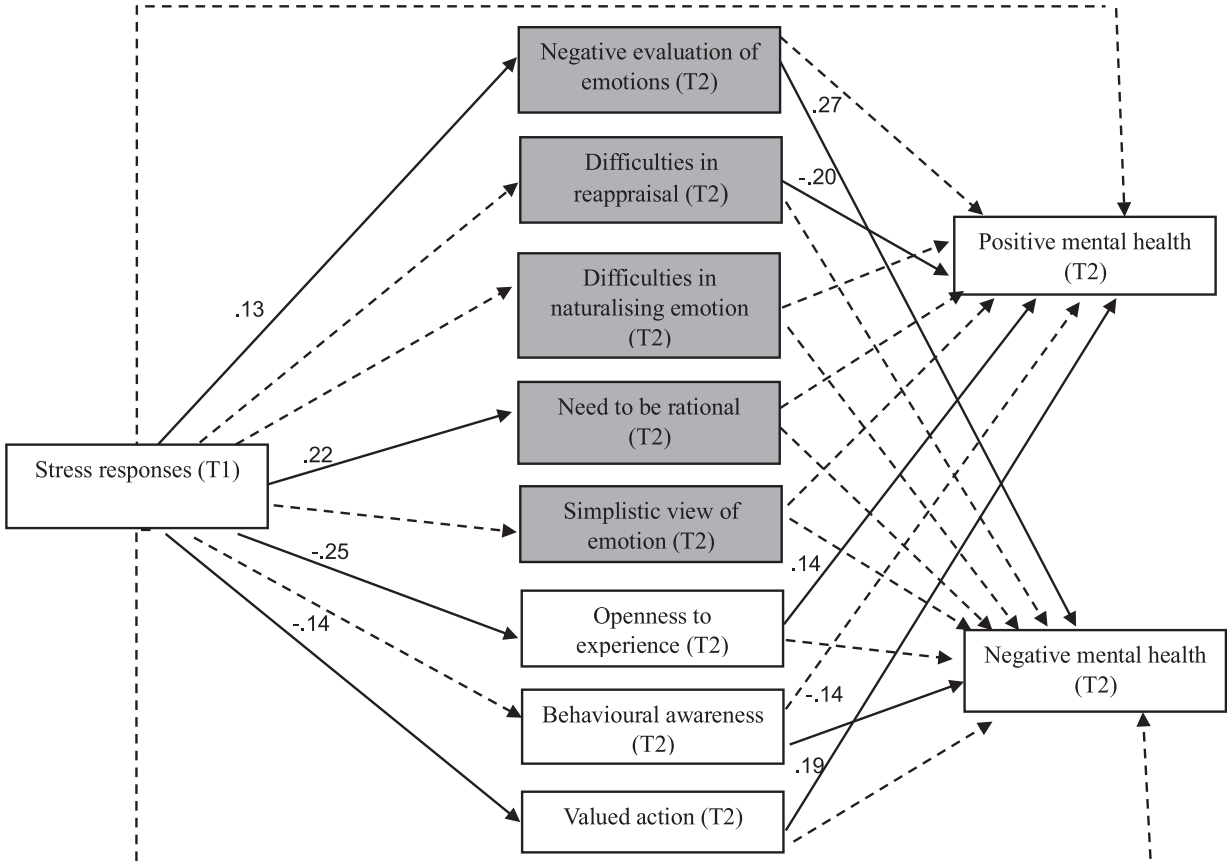

FIGURE 1 Mediation model combining emotional schemas and psychological flexibility. *Note*: Solid lines indicate significant paths, and dashed lines indicate non-significant paths. Standardised path coefficients are presented. Positive and negative mental health at T1 and age, sex and previous mental health issues have been controlled. Emotional schemas' dimensions are presented in grey. Psychological flexibility' dimensions are represented in white.

between stress responses and negative mental health, and more adaptive psychological processes may contribute to explaining the relationship between stress responses and positive mental health. This is consistent with the idea that psychological flexibility is usually implicated in adaptive and flexible psychological functioning, while emotional schemas are more associated with emotional distress and psychopathology (Leahy, 2016; Silberstein et al., 2012). Nonetheless, the present study occurred in a specific context – the COVID-19 pandemic – and the role of these psychological processes can vary according to the context. Future studies could explore the relative weight of these psychological processes in other situations.

The results of our study, in combination with existing literature, can inform the development of individualised intervention programs that incorporate approaches spanning multiple levels of processing. These interventions should effectively use experiential and meta-experiential processes related to flexible behavioural repertoires and emotional responses. On the one hand, following Relational Frame Theory and Acceptance and Commitment Therapy, the aim is to foster the development of more flexible and less defensive responses to difficult thoughts, feelings, or sensations. This involves promoting a willingness to experience internal events without attempting to control or avoid them, while simultaneously engaging in valued actions, thereby reducing the harmful regulatory effects of maladaptive behaviour (Hayes, 2016). On the other hand, from the perspective of Emotional Schema Therapy, the focus is not only on the acceptance of emotions but also on clarifying the individual's specific emotional theories, modifying these theories and encouraging more adaptive emotion regulation strategies (Leahy, 2019). This includes emphasising the validation of emotions, making sense of emotional experiences, linking emotions to meanings, expanding and differentiating emotions and challenging beliefs about the uncontrollability of emotions. These approaches contribute to long-term mental health, particularly in stressful contexts such as the COVID-19 pandemic.

Our study has several limitations. The research was conducted with a convenience sample despite the effort to collect data from different contexts (e.g., hospitals, senior universities, online). The generalisation of these findings to other groups with different sociodemographic backgrounds should be made cautiously. Additionally, although the included constructs are typically assessed using self-report questionnaires, this approach still presents a limitation. The reliability of two of the LESS components (difficulties in reappraisal and difficulties in naturalising emotion) was slightly under the recommended cutoff value, which can explain why we did not find significant results regarding these dimensions. However, the significant mediators were not affected by this limitation. Furthermore, within the IES-R instructions, participants were invited to think about the most stressful event related to the pandemic. This could have caused variations in the choice of the stressor, with consequent differences in responses and perceived stress. Nevertheless, Bridgland et al. (2021) found that the worst event reported concerning the pandemic was the strongest predictor of post-traumatic symptoms, suggesting that the most important reaction would be linked to the most stressful event. Additionally, Sebastião, Neto, and Costa (2023) did not find a moderating effect of the stressor type, suggesting that stress responses play a more critical role in determining mental health outcomes. Finally, this longitudinal study did not reach strong causal relationships, and thus, intervention studies should explore these relationships.

Even considering these limitations, the present study adds empirical support for the role of transdiagnostic modifiable psychological processes, which may help to reduce the mental health impact of stress in a crisis context over time. Psychological flexibility and emotional schemas may function as resilience resources and help in individual adaptation when stressful events, such as the ones experienced during the COVID-19 pandemic, arise. By examining both

adaptive and maladaptive processes that contribute to complete mental health, it is possible to advance the current understanding of a process-based approach (Hayes et al., 2020; Hofmann & Hayes, 2019) and the two-continua model (Keyes, 2013; Westerhof & Keyes, 2010). This exploration can deepen knowledge regarding individual adaptation over time in a specific context (Lazarus & Folkman, 1984), and provide insights into Relational Frame Theory and Acceptance and Commitment Therapy, particularly in terms of interactions with the world within a specific context (Hayes, 2016). Additionally, it can inform the application of the Emotional Schemas Model and Therapy in stressful contexts (Leahy, 2019).

CONCLUSION

This study investigated whether two psychological processes that focus on different psychological levels – cognitive, emotional and behavioural – could mediate the effect of stress responses on (positive and negative) mental health over time in the context of a health crisis. Over time, negative evaluation of emotions seems to be a crucial psychological process in the relationship between stress responses and negative mental health. Openness to experience and valued action seem to be key dimensions regarding positive mental health. Understanding the transdiagnostic psychological processes involved in adaptation over time enables the development of interventions, that address not only the COVID-19 crisis but also prepare individuals for future challenges.

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CONFLICT OF INTEREST STATEMENT

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.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

The study was conducted following the Declaration of Helsinki and approved by the Ethics Committees of ISPA—Instituto Universitário (protocol code D-049-2-22, date of approval: January 2022), of Centro Hospitalar de Lisboa Norte (protocol code 51/22, date of approval: May 2022) and of Centro Hospitalar de Lisboa Central (protocol code 1239/22, date of approval: May 2022).

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REFERENCES

Arslan, G., & Allen, K. A. (2022). Exploring the association between coronavirus stress, meaning in life, psychological flexibility, and subjective well-being. *Psychology, Health and Medicine*, *27*(4), 803–814. https://doi.org/10.1080/13548506.2021.1876892

Arslan, G., Yıldırım, M., Karataş, Z., Kabasakal, Z., & Kılınç, M. (2022). Meaningful living to promote complete mental health among university students in the context of the COVID-19 pandemic. *International Journal of Mental Health and Addiction*, *20*(2), 930–942. https://doi.org/10.1007/s11469-020-00416-8

Barlow, M. R., Goldsmith Turow, R. E., & Gerhart, J. (2017). Trauma appraisals, emotion regulation difficulties, and self-compassion predict posttraumatic stress symptoms following childhood abuse. *Child Abuse and Neglect*, *65*, 37–47. https://doi.org/10.1016/j.chiabu.2017.01.006

Biesanz, J. C., Falk, C. F., & Savalei, V. (2010). Assessing mediational models: Testing and interval estimation for indirect effects. *Multivariate Behavioral Research*, *45*(4), 661–701. https://doi.org/10.1080/00273171.2010.498292

Bridgland, V. M. E., Moeck, E. K., Green, D. M., Swain, T. L., Nayda, D. M., Matson, L. A., Hutchison, N. P., & Takarangi, M. K. T. (2021). Why the COVID-19 pandemic is a traumatic stressor. *PLoS ONE*, *16*(1), e0240146. https://doi.org/10.1371/journal.pone.0240146

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, *395*, 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8

Canavarro, M. C., Nazaré, B., & Pereira, M. (2017). Inventário de sintomas psicopatológicos 18 (BSI-18). In M. M. Gonçalves, M. R. Simões, & L. Almeida (Eds.), *Psicologia clínica e da saúde: Instrumentos de avaliação* (pp. 115–130). Editora Pactor.

Chrousos, G. (2009). Stress and disorders of the stress system. *Nature Reviews Endocrinology*, *5*, 374–381. https://doi.org/10.1038/nrendo.2009.106

Cohen, S., Gianaros, P. J., & Manuck, S. B. (2016). A stage model of stress and disease. *Perspectives on Psychological Science*, *11*(4), 456–463. https://doi.org/10.1177/1745691616646305

da Silva, A. N., Matos, M., Faustino, B., Neto, D. D., & Roberto, M. S. (2022). Rethinking Leahy's emotional schema scale (LESS): Results from the Portuguese adaptation of the LESS. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *1–20*, 95–114. https://doi.org/10.1007/s10942-022-00453-3

Derogatis, L. R. (2001). BSI 18 – Brief Symptom Inventory 18: Administration, scoring, and procedures manual. Pearson.

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*, *48*(1), 150–170. https://doi.org/10.1037/0022-3514.48.1.150

Fonseca, S., Trindade, I. A., Mendes, A. L., & Ferreira, C. (2020). The buffer role of psychological flexibility against the impact of major life events on depression symptoms. *Clinical Psychologist*, *24*(1), 82–90. https://doi.org/10.1111/cp.12194

Fonte, C., Silva, I., Vilhena, E., & Keyes, C. (2020). The Portuguese adaptation of the mental health continuum-short form for adult population. *Community Mental Health Journal*, *56*(2), 368–375. https://doi.org/10.1007/s10597-019-00484-8

Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). The development and validation of the comprehensive assessment of acceptance and commitment therapy processes (CompACT). *Journal of Contextual Behavioral Science*, *5*(3), 134–145. https://doi.org/10.1016/j.jcbs.2016.05.003

Gloster, A. T., Klotsche, J., Ciarrochi, J., Eifert, G., Sonntag, R., Wittchen, H.-U., & Hoyer, J. (2017). Increasing valued behaviors precedes reduction in suffering: Findings from a randomized controlled trial using ACT. *Behaviour Research and Therapy*, *91*, 64–71. https://doi.org/10.1016/j.brat.2017.01.013

Hayes, S. C. (2016). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies – Republished article. *Behavior Therapy*, *47*, 869–885. https://doi.org/10.1016/S0005-7894(04)

Hayes, S. C., Hofmann, S. G., & Ciarrochi, J. (2020). A process-based approach to psychological diagnosis and treatment: The conceptual and treatment utility of an extended evolutionary meta model. *Clinical Psychology Review*, *82*, 101908. https://doi.org/10.1016/j.cpr.2020.101908

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2011). *Acceptance and commitment therapy: The process and practice of mindful change*. Guilford Press.

Hayes, S. C., Villatte, M., Levin, M., & Hildebrandt, M. (2011). Open, aware, and active: Contextual approaches as an emerging trend in the behavioral and cognitive therapies. *Annual Review of Clinical Psychology*, *7*, 141–168. https://doi.org/10.1146/annurev-clinpsy-032210-104449

Hofmann, S. G., & Hayes, S. C. (2019). The future of intervention science: Process-based therapy. *Clinical Psychological Science*, *7*(1), 37–50. https://doi.org/10.1177/2167702618772296

Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A. K., Shafran, R., Sweeney, A., ... Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, *7*(6), 547–560. https://doi.org/10.1016/S2215-0366(20)30168-1

Huang, C., Xie, J., Owusua, T., Chen, Z., Wang, J., Qin, C., & He, Q. (2021). Is psychological flexibility a mediator between perceived stress and general anxiety or depression among suspected patients of the 2019 coronavirus disease (COVID-19)? *Personality and Individual Differences*, *183*, 111132. https://doi.org/10.1016/j.paid.2021.111132

IBM Corp. (2017). IBM SPSS Statistics for Windows, Version 25.0. (Version 25.0) [Computer Software]. IBM Corp. https://www.ibm.com/analytics/spss-statistics-software

Ikizer, G., Karanci, A. N., Gul, E., & Dilekler, I. (2021). Post-traumatic stress, growth, and depreciation during the COVID-19 pandemic: Evidence from Turkey. *European Journal of Psychotraumatology*, *12*(1), 1872966. https://doi.org/10.1080/20008198.2021.1872966

Keyes, C. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Research*, *43*, 207–222. https://doi.org/10.2307/3090197

Keyes, C. (2013). Mental health as a complete state: How the salutogenic perspective completes the picture. In *Bridging occupational, organizational and public health* (pp. 179–192). Springer. https://doi.org/10.1007/978-94-007-5640-3_11

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

Leahy, R. L. (2002). A model of emotional schemas. *Cognitive and Behavioral Practice*, *9*(3), 177–190. https://doi.org/10.1016/S1077-7229(02)80048-7

Leahy, R. L. (2015). *Emotional schema therapy*. Guilford Press.

Leahy, R. L. (2016). Emotional schema therapy: A meta-experiential model. *Australian Psychologist*, *51*(2), 82–88. https://doi.org/10.1111/ap.12142

Leahy, R. L. (2019). Introduction: Emotional schemas and emotional schema therapy. *International Journal of Cognitive Therapy*, *12*(1). https://doi.org/10.1007/s41811-018-0038-5

Leahy, R. L. (2022). Emotional schemas. *Cognitive and Behavioral Practice*, *29*, 575–580. https://doi.org/10.1016/j.cbpra.2022.02.004

Leahy, R. L., Wupperman, P., Edwards, E., & Shivaji, S. (2018). Metacognition and emotional schemas: Effects on depression and anxiety. *International Journal of Cognitive Therapy*, *12*(1), 25–37. https://doi.org/10.1007/s41811-018-0035-8

Monroe, S. M., & Cummins, L. F. (2015). Diathesis-stress models. In R. L. Cautin & S. O. Lilienfeld (Eds.), *The encyclopedia of clinical psychology* (pp. 3–6). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118625392.wbecp466

Montano, R. L. T., & Acebes, K. M. L. (2020). Covid stress predicts depression, anxiety and stress symptoms of Filipino respondents. *International Journal of Research in Business and Social Science*, *9*(4), 78–103. https://doi.org/10.20525/ijrbs.v9i4.773

Musazzi, L., Tornese, P., Sala, N., & Popoli, M. (2017). Acute or chronic? A stressful question. *Trends in Neurosciences*, *40*(9), 525–535. https://doi.org/10.1016/j.tins.2017.07.002

Nazaré, B., Pereira, M., & Canavarro, M. C. (2017). Avaliação breve da psicossintomatologia: Análise fatorial confirmatória da versão portuguesa do Brief Symptom Inventory 18 (BSI 18). *Análise Psicológica*, *35*(2), 213–230. https://doi.org/10.14417/ap.1287

Neto, D. D., & da Silva, A. N. (2023). The mental health impacts of a pandemic: A multiaxial conceptual model for COVID-19. *Behavioral Sciences*, *13*(11), 1–9. https://doi.org/10.3390/bs13110912

Portuguese Government. (2022). Fim do estado de alerta. https://www.portugal.gov.pt/pt/gc23/comunicacao/noticia?i=fim-do-estado-de-alerta

Portuguese Government. (n.d.). Não paramos - Estamos ON - A resposta de Portugal à COVID19. Retrieved December 2, 2022, from https://covid19estamoson.gov.pt/

Ribeiro, S., Nunes da Silva, A., Dias Neto, D., Gloster, A., Kassianos, A., & Karekla, M. (2023). Psychological impact COVID-19: Moderated-mediation effect of social support and of psychological flexibility. *Psicologia, Saúde & Doença*, *24*(2), 632–643. https://doi.org/10.15309/23psd240217

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*, 1–36. https://doi.org/10.18637/jss.v048.i02

Sebastião, R., & Neto, D. D. (2024). Stress and mental health: The role of emotional schemas and psychological flexibility in the context of COVID-19. *Journal of Contextual Behavioral Science*, *32*, 100736. https://doi.org/10.1016/j.jcbs.2024.100736

Sebastião, R., Neto, D. D., & Costa, V. (2023). Understanding differential stress and mental health reactions to COVID-19-related events. *International Journal of Environmental Research and Public Health*, *20*(10), 1–14. https://doi.org/10.3390/ijerph20105819

Sebastião, R., Neto, D. D., & da Silva, A. N. (2023). Recalled parental emotion socialisation and psychological distress: The role of emotional schemas. *Psychological Reports*, 332941231204304. https://doi.org/10.1177/00332941231204304

Silberstein, L. R., Tirch, D., Leahy, R. L., & McGinn, L. (2012). Mindfulness, psychological flexibility and emotional schemas. *International Journal of Cognitive Therapy*, *5*(4), 406–419. https://doi.org/10.1521/ijct.2012.5.4.406

Tirch, D. D., Leahy, R. L., Silberstein, L. R., & Melwani, P. S. (2012). Emotional schemas, psychological flexibility, and anxiety: The role of flexible response patterns to anxious arousal. *International Journal of Cognitive Therapy*, *5*(4), 308–391. https://doi.org/10.1521/ijct.2012.5.4.380

Trindade, I. A., Ferreira, N. B., Mendes, A. L., Ferreira, C., Dawson, D., & Golijani-Moghaddam, N. (2021). Comprehensive assessment of acceptance and commitment therapy processes (CompACT): Measure refinement and study of measurement invariance across Portuguese and UK samples. *Journal of Contextual Behavioral Science*, *21*, 30–36. https://doi.org/10.1016/j.jcbs.2021.05.002

Vieira, C., Paixão, R., Silva, J. T. da, & Vicente, H. T. (2020). Versão Portuguesa da impact of event scale – Revised (IES-R). *Psique*, *16*, 24–43. https://doi.org/10.26619/2183-4806.xvi.1.2

Wasowicz, G., Mizak, S., Krawiec, J., & Białaszek, W. (2021). Mental health, well-being, and psychological flexibility in the stressful times of the COVID-19 pandemic. *Frontiers in Psychology*, *12*, 647975. https://doi.org/10.3389/fpsyg.2021.647975

Weiss, D., & Marmar, C. (1997). The Impact of Event Scale-Revised. In J. Wilson & M. Keane (Eds.), *Assessing psychological trauma and PTSD*. Guilford Press.

Westerhof, G. J., & Keyes, C. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development*, *17*(2), 110–119. https://doi.org/10.1007/s10804-009-9082-y

Wu, D., Yu, L., Yang, T., Cottrell, R., Peng, S., Guo, W., & Jiang, S. (2020). The impacts of uncertainty stress on mental disorders of Chinese college students: Evidence from a nationwide study. *Frontiers in Psychology*, *11*, 243. https://doi.org/10.3389/fpsyg.2020.00243

Yang, C., Chen, A., & Chen, Y. (2021). College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion. *PLoS ONE*, *16*(2), e0246676. https://doi.org/10.1371/journal.pone.0246676

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