Received: 19 January 2023 | Accepted: 3 May 2023

DOI: 10.1002/jclp.23536

RESEARCH ARTICLE

WILEY

Identification of psychological flexibility and inflexibility profiles during the COVID-19 pandemic

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Abstract

Background: The first coronavirus disease 2019 (COVID-19) wave and lockdown adversely affected the lives of people in diverse ways.

Aims: This study used a person-centered approach to identify patterns of engagement in the 12 psychological flexibility (PF) and inflexibility (PI) processes to manage the first COVID-19 wave and lockdown hardships.

Materials & Methods: A total of 1035 Italian adults completed an online survey.

Results: Latent profile analyses conducted on the 12 PI/PF processes measured by the Multidimensional Psychological Flexibility Inventory identified five profiles; three reflected gradations of high to low PF with corresponding inverse levels of PI, while two represented more complex relationships between PI and PF. After controlling for relevant socio-demographic and COVID-19/lockdown factors, the five profiles differed in mental health (depression, anxiety, and COVID-19 distress). Essentially a gradient of progressive decreases in all PI processes (except experiential avoidance) corresponded with increments in mental health across all profiles. Two profiles, which evidenced the highest levels of mental health (highly

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flexible and moderately flexible profiles), also had the greatest proportion of the sample 56.42% ($n = 584$), and the highest levels of PF and experiential avoidance.

Discussion: Findings from this and similar studies suggest intersecting complex relationships among the PI/PF processes that are likely to shift in response to changing contexts. We suggest this network of relationships is better represented by a three-dimensional PF/PI hexaflex than a simplistic two-dimensional depiction of the model.

Conclusion: Distinguishing different PF/PI profiles identified groups most at risk for the adverse mental health impacts of the pandemic and exposed variations in the mental health protective and risk roles of PF and PI processes, respectively, that can inform ACT-based mental health promotion interventions.

KEYWORDS

COVID-19 pandemic, hexaflex, latent profile analysis, mental health, psychological flexibility, psychological inflexibility

1 | INTRODUCTION

According to the Hexaflex model of psychological flexibility/inflexibility (Hayes et al., 1999, 2012) that underpins acceptance and commitment therapy (ACT), psychological flexibility (PF) involves being open to inner experiencing in the present, and adjusting behaviors in response to changing situational demands that are also aligned with personal values (Hayes et al., 2006). As such, PF enables an individual to shift behavioral repertoires when they compromise pursuit of personal values and related goals, while also adapting to changing circumstances, such as those imposed by the COVID-19 pandemic (Kashdan & Rottenberg, 2010). The hexaflex model proposes six PF dimensions that cultivate mental health: acceptance, defusion, present moment awareness, self-as-context, values, and committed action (Hayes et al., 2012). The inverse of these PF processes fosters psychological inflexibility (PI), which involves rigid and reactionary behavioral responses to unwanted stimuli. The corresponding six PI processes are: experiential avoidance, lack of present-moment awareness, self-as-content, fusion, lack of contact with values, and inaction and impulsiveness (Hayes et al., 2012). Consistent with the hexaflex model, higher PF, and higher PI are related to better and poorer mental health outcomes, respectively, across a wide range of contexts and populations (Gloster et al., 2017; Hayes et al., 2006; Kashdan & Rottenberg, 2010; Marshall & Brockman, 2016; Stabbe et al., 2019). Moreover, ACT is an effective treatment for numerous mental health problems (Gloster et al., 2020), and evidence suggests that ACT produces therapeutic change through PF, the mechanism of action proposed by the hexaflex model (Stockton et al., 2019).

1.1 | Research on the 12 PF and PI processes

Most of the research that has investigated the PF/PI hexaflex model has focused on PI using unidimensional scales that produce a global PI score. The most commonly used scales are the Acceptance and Action Questionnaire

(AAQ-I and AAQ-II) (Bond et al., 2011; Hayes et al., 2004) and the Brief Experiential Avoidance Questionnaire (BEAQ) (Gámez et al., 2014). In addition to only measuring global PI, these scales are confounded with distress (Kashdan et al., 2020). A recently developed measure, the Multidimensional Psychological Flexibility Inventory (MPFI) (Rolffs et al., 2018), separately assesses the six PF dimensions and their corresponding six PI dimensions as well as producing composite global PF and PI scores. The MPFI is a widely used instrument with evidence from several studies demonstrating its sound psychometric properties (Cherry et al., 2021), including factorial validity (Azadfar et al., 2022; Grégoire et al., 2020; Landi, Pakenham, Giovannetti, et al., 2021; Lin et al., 2020; Seidler et al., 2020; Sundström et al., 2022), responsiveness to change over time (Rolffs et al., 2018), identification of individuals currently in counseling (Stabbe et al., 2019), and the prediction of mental health outcomes (Rolffs et al., 2018; Stabbe et al., 2019).

The MPFI has enabled more in-depth investigations into the roles of the 12 dimensions of the hexaflex model in addition to the roles of global PF and PI in shaping mental health. For example, a US community longitudinal survey study conducted person-centered analyses on the 12 hexaflex processes measured by the MPFI to identify groups of individuals based on distinct PF and PI profiles (Stabbe et al., 2019). Latent profile analyses (LPAs) revealed six PF profiles. Four profiles reflected a gradient with PI decreasing as PF increased in each group. These groups also highlighted how PI responses and PF skills can be reciprocally linked. In contrast, the PI/PF profiles of two additional groups (22% of the sample) represented more complex relationships between PI and PF than both being polar ends of a single dimension, indicating that PF and PI could also be meaningfully distinct from one another. Specifically, the fifth group had relatively high levels of both PF and PI, indicating that PF and PI could vary across situations or contexts as well as varying across days or weeks. As such the same individuals might approach some situations (e.g., work or personal relationships) with above-average levels of acceptance, present moment awareness, self-as-context, contact with values, and committed action but also react to other situations or in other contexts with above-average inflexible responses (e.g., engaging in high levels of fusion, self-as-content, and inaction) (Stabbe et al., 2019). Finally, a sixth group had a more complicated pattern of engaging in PF and PI. In particular, people in this group reported average levels of all PF processes with the exception of acceptance and present moment awareness, which were displayed at below-average levels—indicating they were generally less tolerant, accepting, and aware of unwanted thoughts and feelings—but unexpectedly also displaying some of the lowest levels of four PI processes (i.e., experiential avoidance, self-as-content, fusion, and inaction) and below average levels in the remaining PI processes. The six flexibility groups differed in background traits and mental health indicators and showed shifts in functioning across time. Although groups with higher flexibility evidenced links to well-being, the presence of inflexibility within groups was associated with poorer individual functioning.

To our knowledge, the Stabbe et al. (2019) study is the only published research that has conducted LPAs on the 12 hexaflex processes to identify groups of individuals based on PF/PI profiles. However, given that PF is likely to be most important in difficult situations that disrupt valued living and provoke distress (Doorley et al., 2020), different patterns of engagement in the 12 hexaflex processes to those identified by Stabbe et al. (2019) are likely to emerge in the context of significant hardship, such as a life-threatening pandemic. In addition, given that PF involves choosing appropriate strategies for the pursuit of values in a given context, the dynamic interplay between PF and PI processes is likely to change markedly in a situation that can thwart a person's selection and pursuit of values-based goals. For example, the lockdowns and social distancing measures that occurred during the first COVID-19 wave had the potential to hinder engagement in some values-based goals, such as those related to family, career, socializing, and leisure activities. Hence, the main objective of this study is to further our understanding of how the 12 hexaflex processes cluster together in characteristic ways to form identifiable groups of individuals based on how they engage in the 12 PF/PI processes by conducting person-centered analyses in the context of significant adversity. To this end, we examine data collected from the general community in Italy during the first wave of COVID-19. Given the contextual sensitivity of the PF/PI processes, we sought to identify groups most at risk of the adverse mental health impacts of the pandemic and further explore the mental health protective and risk roles of PF and PI processes, respectively, in the context of significant wide-reaching adversity.

1.2 | COVID-19 and lockdown context

Italy was one of the European countries most adversely affected by the first wave of the COVID-19 pandemic. Italy was also the first country to enact a nationwide mandatory COVID-19 lockdown that lasted almost 2 months (Remuzzi & Remuzzi, 2020). This restrictive lockdown confined over 60 million people to their homes and was the most radical containment measure implemented as a first response since the onset of the COVID-19 pandemic outside of the lockdowns in China (Lowen, 2020). During the lockdown, Italy registered over 28,884 deaths due to COVID-19 (Italian Ministry of Health, 2020) and recorded one of the highest case fatality rates (Sudharsanan et al., 2020).

Published reports on the adverse mental health impacts of the initial phase of the COVID-19 pandemic suggested an emerging global mental health crisis. The first COVID-19 wave evoked fears of contagion, concerns about disease and death, and anxiety about economic uncertainties (Asmundson & Taylor, 2020). Exacerbating this distress was the conflicting information about the virus, the absence of a medical cure, and media saturation about the deaths, infection rates, overcrowded hospitals, and other negative information about the pandemic (Garfin et al., 2020; Ren et al., 2020). Lockdowns were a further source of distress due to confinement, social isolation, loss of income, and activity restrictions (Brooks et al., 2020). The significant negative mental health impacts of the first COVID-19 wave in Italy have been widely documented (Amerio et al., 2021; Landi, Boccolini, et al., 2022; Landi, Duzen, et al., 2022; Landi, Pakenham, Grandi, et al., 2022; Mazza et al., 2020; Pakenham et al., 2020). For example, a study of 6003 Italian adults found the prevalence of depressive symptoms increased from 14.3% before the first lockdown to 33.2% during the lockdown, anxiety symptoms rose from 18.1% to 41.5%, and unsatisfactory quality of life increased from 13.1% to 42.1% (Amerio et al., 2021).

1.3 | PF and PI during the COVID-19 pandemic

Although research has examined the roles of PF and PI as mental health protective and risk factors, respectively, during the COVID-19 pandemic, most have focused on global PI, even though ACT interventions are based on fostering the six PF processes. A meta-analytic review of the associations between PI and mental health problems during the pandemic across 22 studies found PI was a mental health risk factor during the pandemic. Specifically, the meta-analysis found large and significant associations between higher PI and higher depressive, anxiety, and stress symptoms (Yao et al., 2023). The relatively fewer studies that have examined PF during COVID-19, have found that higher PF is associated with better mental health (Dawson & Golijani-Moghaddam, 2020; Kroska et al., 2020; McCracken et al., 2022). In addition, PF has been found to moderate the adverse effects of COVID-19 and lockdown risk factors on mental health (Pakenham et al., 2020), mediate decreases in the adverse effects of trait health anxiety on mental health (Landi et al., 2020), and mediate the protective effects of psychological resources on depression (Pellerin et al., 2022). However, studies that have examined both PF and PI have found stronger associations between higher PI and poorer mental health than between higher PF and better mental health (McCracken et al., 2022).

We located seven published studies that collected data on the six PI and or the six PF hexaflex processes and mental health outcomes during the COVID-19 pandemic. All studies measured the PI/PF processes with the MPFI. The main findings regarding the relationships between the PI and PF processes and mental health outcomes are summarized in Table 1. Four studies collected data on all 12 hexaflex processes (Crasta et al., 2020; Landi, Pakenham, Giovanneti, et al., 2021; McCracken et al., 2022; Pakenham et al., 2020), three studies only measured the six PF processes (Landi et al., 2020; Landi, Pakenham, Crocetti, et al., 2021; Landi, Pakenham, Mattioli, et al., 2022), while another study reported data on only the six PI processes and global PF and PI but not on the six PF processes (Crasta et al., 2020). Five of the seven studies were conducted by one research team which recruited samples from Italy using snowballing (Landi et al., 2020; Pakenham et al., 2020; Landi, Pakenham, Mattioli, et al., 2022; Landi, Pakenham, Giovannetti, et al., 2021; Landi, Pakenham, Crocetti, et al., 2021). Of these five

TABLE 1 Studies that examined the 12 PF and PI hexaflex processes with the MPFI in relation to mental health outcomes during the COVID-19 pandemic.

	Crasta et al. (2020)	Pakenham et al. (2020)	Landi et al. (2020)	Landi, Pakenham, Mattioli, et al. (2022)	Landi, Pakenham, Giovannetti, et al. (2021)	Landi, Pakenham, Crocetti et al. (2021)	McCracken et al. (2022)
Mental health outcomes	Suicidal ideation	Anxiety depression COVID-19 distress	Anxiety depression COVID-19 distress	Posttraumatic growth	Anxiety depression well-being	Anxiety depression	Depression anxiety insomnia
COVID-19 phase and lockdown severity	First wave, social distancing measures no lockdowns (27 March–April 2020)	First wave, strictest lockdown (9–19 April 2020)	First wave, strictest lockdown (9–19 April 2020)	First and second waves, less strict lockdowns (9–19 July and 9–19 October 2020)	End of first wave, less strict restriction (8 May–15 September 2020)	End of first wave, less strict restriction (8 May–15 September 2020)	Third wave, less strict restrictions (29 June–23 August 2021)
1. Global psychological flexibility	**ns†**	✓	✓	✓	✓	✓	✓
1a. Acceptance	n/a	**ns**	✗	**ns**	**ns**	✗	**ns**
1b. Present moment awareness	n/a	**ns**	**ns**	✓	✗	✗	**ns**
1c. Self-as-context	n/a	✓	**ns**	**ns**	✓	**ns**	**ns**
1d. Defusion	n/a	✓	✓	✓	✓	**ns**	✓
1e. Values	n/a	✓	**ns**	✓	✓	**ns**	
1f. Committed action	n/a	✓	✓	✓	✓	**ns**	✓
2. Global psychological inflexibility	✓	✓	n/a	n/a	✓	n/a	✓

(Continues)

TABLE 1 (Continued)

	Crasta et al. (2020)	Pakenham et al. (2020)	Landi et al. (2020)	Landi, Pakenham, Mattioli, et al. (2022)	Landi, Pakenham, Giovannetti, et al. (2021)	Landi, Pakenham, Crocetti et al. (2021)	McCracken et al. (2022)
2a. Experiential avoidance	✓	✗	n/a	n/a	✓	n/a	ns
2b. Lack of contact with present moment	✓	ns	n/a	n/a	✓	n/a	ns
2c. Self-as-content	✓	✓	n/a	n/a	✓	n/a	ns
2d. Fusion	✓	✓	n/a	n/a	✓	n/a	✓
2e. Lack of contact with values	✓	✓	n/a	n/a	ns	n/a	ns
2f. Inaction	✓	ns	n/a	n/a	ns	n/a	✓

Abbreviations: COVID-19, coronavirus disease 2019; MPFI, Multidimensional Psychological Flexibility Inventory; PF, psychological flexibility; PI, psychological inflexibility.

Note. ✓ = hexaflex process related to one or more measured mental health outcomes in the expected direction (i.e., PF processes related to better mental health and PI processes related to poorer mental health); ✗ = hexaflex process NOT related to one or more mental health outcomes in the expected direction; ns = hexaflex process not significantly related to all mental health outcomes; n/a = not assessed. † Only data on global PF was presented.

studies, three analyzed data from the same sample (Landi et al., 2020; Pakenham et al., 2020; Landi, Pakenham, Mattioli, et al., 2022), while the other two studies used data from a second different and independent sample (Landi, Pakenham, Giovannetti, et al., 2021; Landi, Pakenham, Crocetti, et al., 2021). Hence, across the seven studies four independent samples were recruited. Five of the seven studies were cross-sectional. One study was conducted in the United States (Crasta et al., 2020), one in Sweden (McCracken et al., 2022), and the remaining five were undertaken in Italy. Data were collected at different phases of the pandemic. Consistent with the hexaflex model, across the four independent samples that measured the six PF processes, defusion, values and committed action were associated with better mental health in one or more studies. In contrast and unexpectedly, in one or more studies, acceptance and present moment awareness were related to poorer mental health, were unrelated to mental health, and exhibited positive cross-loadings with a latent distress factor in an exploratory structural equation modeling (ESEM) analysis in three independent samples (Landi, Pakenham, Giovannetti, et al., 2021; McCracken et al., 2022; Pakenham et al., 2020). Despite these variations in relations between the six PF processes and mental health, global PF was related to better mental health across three of the four independent samples.

Consistent with the hexaflex model, across the four studies, each with an independent sample, that measured the six PI processes, fusion and self-as-content were associated with poorer mental health (Crasta et al., 2020; Landi, Pakenham, Giovannetti, et al., 2021; McCracken et al., 2022; Pakenham et al., 2020), and lack of contact with values, inaction, lack of contact with present moment, and experiential avoidance were related to poorer mental health in two studies (Crasta et al., 2020; Landi, Pakenham, Giovannetti, et al., 2021). In contrast and unexpectedly, experiential avoidance was not significantly associated with mental health in one study (McCracken et al., 2022), and was related to better mental health in another study (Pakenham et al., 2020). Although there were variations in the relations between experiential avoidance and mental health, global PI was significantly related to poorer mental health in all four studies.

1.4 | The present study

There are numerous potential explanations for the variations and model deviations in relations between some of the hexaflex processes and mental health outcomes during the pandemic. One such explanation is that only investigating the mean levels of engagement in these processes obscures multiple distinct patterns of variations in the use of these processes to manage significant pandemic-related challenges. Most studies have taken a variable-centered approach (Lanza & Cooper, 2016) and focused on average levels of engagement in the 12 hexaflex processes during the pandemic. In contrast, a person-centered approach would examine possible individual differences and identify different patterns of engagement in the 12 PI/PF processes. In addition, this approach is likely to reveal sub-groups that are more at risk of the adverse mental health impacts of the pandemic and those that are better protected from these harmful effects. Hence, in the present study, we took a person-centered approach using LPA to distinguish empirically distinct patterns of engagement in the 12 hexaflex processes by reanalyzing a data set that had been used in our prior (Landi et al., 2020; Landi, Pakenham, Mattioli, et al., 2022; Pakenham et al., 2020). In this investigation we were particularly interested in exploring the idiosyncrasies of experiential avoidance and acceptance that had emerged in these studies, which could have been due to the limitations of a variable-based approach used in this prior research. To this end, the present study had four aims.

Aim 1: To examine the MPFI factor structure on an independent sample in the context of extreme hardship related to the first COVID-19 wave and the associated strict lockdown in Italy. Given the proposed contextual sensitivity of the 12 hexaflex processes, we investigated whether the MPFI factor structure holds in a nationwide significant adversity.

Aim 2: To identify specific patterns of engagement in the 12 PF/PI processes to manage the hardships related to the first COVID-19 wave and the associated lockdown in Italy by conducting LPA on the 12 PF/PI processes. We had no specific hypotheses as to the number or nature of these profiles for the following reasons: the sensitivity of the PF and PI processes to changing situations, this is the first published study to explore profiles of PF/PI during a pandemic, and LPA is by nature exploratory.

Aim 3: To explore associations between membership of the identified PF/PI profiles and socio-demographic variables and COVID-19/Lockdown mental health risk factors.

Aim 4: To investigate differences across the PF/PI profiles on three mental health outcomes (anxiety, depression, and COVID-19 distress) controlling for relevant demographics and COVID-19/lockdown mental health risk factors.

2 | METHODS

2.1 | Participants and procedures

This study involved reanalysis of the same 12 MPFI sub-dimensions and three mental health outcomes used in our prior studies (Landi et al., 2020; Landi, Pakenham, Mattioli, et al., 2022; Pakenham et al., 2020). Please refer to Pakenham et al. (2020) for details on recruitment, study procedures, and measures. The sample was collected April 9–19, 2020 during the first national lockdown in Italy through social media and a snowballing approach, whereby participants invited friends and acquaintances to participate in the study. After signing the informed consent, a total of 1035 participants completed an online questionnaire, which took 15–20 min to complete. Inclusion criteria were ≥18 years old and being resident in Italy. This study was approved by the Ethics Committee of the University of Bologna.

2.2 | Measures

2.2.1 | Demographics

Participants reported their gender, age, education, marital status, occupation, socioeconomic status, and nationality.

2.2.2 | COVID-19/Lockdown Index

We used the 12-item COVID-19/Lockdown Index (Pakenham et al., 2020) to assess COVID-19 (e.g., COVID-19 infected) and lockdown (e.g., lost work during lockdown) mental health risk factors. Higher index scores reflect greater pandemic-related mental health risk (range 1–14).

2.2.3 | PF and PI

The Italian version (Landi, Pakenham, Giovannetti, et al., 2021) of the MPFI (Rolffs et al., 2018) was utilized to assess global PF and PI and their sub-processes. Higher scores on the respective global and sub-processes indicate greater PF and PI. McDonald's omegas for global PF and PI were 0.95 and 0.93, respectively (observed range for the sub-processes = 0.86–0.94).

2.2.4 | Anxiety

Anxiety symptoms were evaluated with the Italian-validated version (Kroenke & Spitzer, 2010) of the standardized General Anxiety Disorder Scale (GAD-7) (Löwe et al., 2008). Higher scores reflect higher anxiety. The Observed McDonald's omega was 0.88.

2.2.5 | Depression

Depressive symptoms were measured with Italian validated version (Mazzotti et al., 2003) of the standardized Patient Health Questionnaire (PHQ-9) (Spitzer & the Patient Health Questionnaire Primary Care Study Group, 1999). The Observed McDonald's omega was 0.85.

2.2.6 | COVID-19 distress

We used the Italian version (Costantini & Mazzotti, 2020) of the 18-item COVID-19 Peritraumatic Distress Index (CPDI) (Qiu et al., 2020) to measure COVID-19 distress. Higher scores indicate higher COVID-19 distress. The observed McDonald's omega was 0.89.

2.3 | Data analysis approach

Confirmatory factor analyses (CFAs), ESEM, and LPAs were performed with *Mplus* 8.3 with the robust maximum likelihood estimator (Muthén & Muthén, 2018), while all other analyses were performed with SPSS version 24. Only 1.92% of data were missing across all research items. Little's (Little, 1988) Missing Completely at Random index—employed to correct for sensitivity of the χ^2 in large samples (χ^2/df)—was low indicating that data were missing completely at random. For this reason, we used the Full Information Maximum Likelihood estimator in *Mplus* to address missing data. In descriptive statistics, we considered the magnitude correlations considering Pearson's *r* around: 0.5 as large, 0.30 as moderate, and 0.10 as small (Ellis, 2010).

To address the first aim, we investigated the factor structure of the MPFI in the context of the first Italian COVID-19 wave and lockdown. We conducted a first-order CFA composed of a 12-factor model of all PF and PI processes. We also ran a CFA examining a two-factor solution with all PF processes as observed variables loading on a PF factor and all PI processes as observed variables forming a PI factor. For CFAs that resulted in poor fit indices, we further conducted ESEMs with a target rotation (Marsh et al., 2014). Like EFA, ESEM permits items with cross-loadings to load on other factors and, as with CFA, ESEM makes it possible to model data in a theory-driven way (Marsh et al., 2014; van Zyl & ten Klooster, 2022). Model fit was assessed by inspecting goodness-of-fit indices and the significance and magnitude of factor loadings. Loadings on the main factor had to be >0.32 with a p value > 0.05, and cross-loadings were considered meaningful at or above 0.10 with a p value > 0.05 (Hair et al., 2021). Model fit was evaluated by examining the Chi-Square, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), Root Mean Square Error of Approximation Confidence Interval at 90% (RMSEA CI), and the Standardized Root Mean Square Residual (SRMR). CFI and TLI values > 0.90, RMSEA values ≤ 0.08, SRMR values ≤ 0.09 are representative of good model fit (Brown, 2015).

To address the second aim, LPAs (Berlin et al., 2014) were conducted on the observed values of the 12 PF/PI processes. LPA is a mixed modeling approach intended to probabilistically assign each participant to a profile that shares strong similarities on a set of variables, with the purpose of selecting the smallest number of profiles that capture most of the variance among participants. A parsimonious number of profiles is detected by examining the: (1) Sample Size Adjusted Bayesian Information Criterium (SSA-BIC), with the optimal model represented by the lowest SSA-BIC; (2) entropy, which is an index of classification accuracy to assign a participant to a profile, with values > 0.75 representing clarity of classification (Reinecke, 2006); (3) adjusted Lo–Mendell–Rubin Likelihood Ration Test, with a nonsignificant result indicating that adding an extra profile does not significantly improve the model; (4) content, interpretability and theoretical meaningfulness of each profile in the solutions, preferring the most parsimonious solution; (5) presence in every profile of a meaningful number of participants (i.e., >5% of the sample) for interpretation and further analysis.

To investigate the third aim, a multinomial logistic regression was conducted to examine associations between membership in the identified PF/PI profiles and socio-demographics and COVID-19/Lockdown Index.

Finally, to examine the fourth aim, we conducted a series of univariate ANCOVAs to examine significant differences among the identified PF/PI profiles in mental health outcomes (anxiety, depression, and COVID-19 distress) controlling for demographics and or the COVID-19/Lockdown Index where they significantly differed among the profiles in the multinomial logistic regression. Cohen's *d* effect sizes between the two group means showing the greatest difference were also reported for each variable examined, considering Cohen's *d* around 0.80 as large, 0.50 as a medium, and 0.20 as small (Ellis, 2010). All significant ANOVAs were followed up with post hoc pairwise comparisons using Tukey HSD to account for unequal sample size.

3 | RESULTS

3.1 | Sample characteristics

The total sample consisted of 1,035 participants (79.13% female; M_{age} = 37.51, SD_{age} = 12.32). Approximately half the sample (48.41%) reported having a bachelor's degree, 27.25% high school, 3.86% primary school, and 20.29% postgraduate education levels. Almost half (49.18%) of the sample were single, 45.41% married or living with a partner, and the remainder (5.41%) were widowed or divorced. Most (65.60%) participants were employed, 13.24% were students, and 6.67% were unemployed. Regarding socioeconomic status, the majority (82.51%) endorsed being in the middle socioeconomic class, while 10.43% and 7.05% reported a mean income below or above average, respectively. Almost all of the sample (98.36%) was of Italian nationality.

3.2 | Factor structure of the MPFI during the first Italian COVID-19 wave

Results of a first-order CFA composed of a 12-factor model of the PF and PI processes yielded a very good model fit: χ^2 (1644) = 4049.774, $p < 0.001$; CFI = 0.940; TLI = 0.935; RMSEA = 0.038; RMSEA CI = [0.036, 0.039]; SRMR = 0.047 (standardized factor loadings of each of the 12 factors are reported in Table SA1).

To examine the factor structure of the overall hexaflex model, consisting of two factors, another CFA was conducted with all six PF processes as observed variables loading on a PF factor and all six PI processes as observed variables forming a PI factor. Fit indices were poor: χ^2 (53) = 924.926, $p < 0.001$; CFI = 0.804; TLI = 0.758; RMSEA = 0.126; RMSEA CI = [0.119, 0.133]; SRMR = 0.083. Standardized factor loadings reported in Table SB1 indicate that experiential avoidance has a problematic factor loading of 0.096, $p < 0.5$ and is likely responsible for the inadequate model fit. We conducted another CFA and based on the modification indices, we inserted a correlation between acceptance and experiential avoidance, however, a satisfactory model fit was not achieved.

We, therefore, conducted an ESEM analysis with a target rotation examining a two-factor solution with all PF and PI processes as observed variables. Initial model fit was not satisfactory: χ^2 (41) = 408.218, $p < 0.001$; CFI = 0.918; TLI = 0.869; RMSEA = 0.093; RMSEA CI = [0.085, 0.101]; SRMR = 0.045. By inserting a correlation between experiential avoidance and acceptance, findings indicated a two-factor model with good model fit: χ^2 (40) = 277.959, $p < 0.001$; CFI = 0.947; TLI = 0.907; RMSEA = 0.078; RMSEA CI = [0.070, 0.087]; SRMR = 0.036 (standardized factor loadings for the two-factor solution are reported in Table SB1). Inspection of the final factor allocation results indicated that all PF and PI processes load on their respective first-order factors, with the exception of experiential avoidance, which remained problematic in ESEM. In fact, its factor loading on the PI factor was not significant, and it displayed a significant standardized factor loading on the PF factor 0.216, $p < 0.001$, which failed to reach the factor loading criteria of >0.32.

In summary, the results of the CFA and the ESEM analyses indicate that the two-factor solution with the PF and PI processes as observed variables loading on a PF and a PI factor, respectively, is unstable in the context of the first COVID-19 wave and lockdown. In particular, although all PF processes loaded onto the first-order PF factor, experiential avoidance (EA) was not related to the other five PI processes and instead loaded on the first-order PF factor. Nevertheless, the results of the CFA, composed of a 12--factor model of all 12 PF and PI processes, displayed a very good model fit, indicating that each of the corresponding five items load onto their respective 12 PF and PI processes.

3.2.1 | Correlations among the 12 PF and PI Processes

To explore associations among the 12 PF/PI processes in the total sample, we conducted Pearson's correlations. Table 2 shows that global PF and PI were significantly positively correlated with their respective six processes. Global PF was also significantly negatively related to the PI processes with the exception of EA, which displayed a positive association with global PF ($r = 0.18$, $p < 0.001$). Global PI was significantly negatively correlated with all PF processes. All PF processes were significantly positively correlated with each other. All PI processes were significantly positively correlated with each other with the exception of EA, which was significantly negatively correlated with fusion, lack of contact with values, and inaction, although the coefficients were small in magnitude. All PF and PI processes were significantly negatively correlated with each other apart from the following exceptions: EA displayed significant positive associations with self-as-context, defusion, values, and committed action (range 0.18–0.25), while acceptance was only significantly negatively correlated with EA and lack of contact with the present moment, but was unrelated to self-as-content, fusion, lack of contact with values, and inaction.

3.3 | Latent profile analysis of PF and PI processes

LPAs were run on the observed values of the 12 PF and PI processes extracting one to six profiles. Fit indices are reported in Table 3 and indicated that the five-class solution was the most parsimonious. It was better than the two, three and four-class solutions (low SSA BIC). Finally, although the six-class solution had a lower SSA BIC, when a sixth class was extracted, a profile representing only 2.71% of the sample emerged, reducing its interpretability and meaningfulness. Hence, the five-class solution was selected because it displayed satisfactory entropy (0.840), indicating appropriate levels of clarity in the classification associated with it.

The means and standard deviations for the 12 PF/PI processes for each profile are presented in Table 4, along with statistics indicating significant differences among the profiles. This data is also graphically represented in Figure 1, which depicts the levels of PF and PI processes in each of the five profiles. The first profile consisted of 18.45% ($n = 191$) of the sample. It was characterized by high levels of all six PF processes and low levels of the PI processes and was labeled "highly flexible profile." However, one exception to this pattern was EA, which was higher in Profile 1 than all other profiles. Profile 2 had the largest proportion of the sample (37.97%; $n = 393$). The predominant PI/PF pattern relative to the other profiles was moderate levels across most of the PF processes and relatively low levels of most of the PI processes and was labeled "moderately flexible profile." Profile 3 consisted of 17.58% ($n = 182$) of the sample. It was characterized by low levels of all six PF processes and medium levels of the PI processes except for EA. Regarding the latter, compared to the other profiles, Profile 3 evidenced the lowest levels of EA. It was labeled "low PF and medium PI with low EA (low PF/medium PI/low EA)." Profile 4 included 16.71% ($n = 173$) of the sample. It was characterized by moderate levels of five PF processes and EA as well as moderately high levels of the other five PI processes, and was labeled "moderately flexible/inflexible profile." Interestingly, although this profile reported above-average levels of both PF and PI, they also reported below-average levels of engagement in defusion, indicating difficulties for this group of individuals in observing feelings

TABLE 2 Person's correlations among global psychological flexibility and inflexibility and their respective process ($N = 1035$).

	1	1a	1b	1c	1d	1e	1 f	2	2a	2b	2c	2d	2e	2f
1. Global psychological flexibility	–													
1a. Acceptance	0.54***	–												
1b. Present moment awareness	0.74***	0.47***	–											
1c. Self-as-context	0.83***	0.34***	0.56**	–										
1d. Defusion	0.80***	0.27***	0.45***	0.70***	–									
1e. Values	0.79***	0.23***	0.45***	0.54***	0.54***	–								
1f. Committed action	0.78***	0.17***	0.38***	0.56***	0.59***	0.75***	–							
2. Global psychological inflexibility	−0.39***	−0.05	−0.16***	−0.30***	−0.40***	−0.37***	−0.41***	–						
2a. Experiential avoidance	0.18***	−0.17***	0.06	0.18***	0.21***	0.21***	0.25***	0.25***	–					
2b. Lack of contact with present moment	−0.34***	−0.07*	−0.22***	−0.24***	−0.25***	−0.37***	−0.37***	0.72***	0.10***	–				
2c. Self-as-content	−0.29***	−0.01	−0.10**	−0.23***	−0.37***	−0.24***	−0.30***	0.77***	0.01	0.38***	–			
2d. Fusion	−0.38***	0.06	−0.09**	−0.36***	−0.52***	−0.34***	−0.41***	0.80***	−0.10***	0.46***	0.64***	–		
2e. Lack of contact with values	−0.38***	−0.02	−0.19***	−0.29***	−0.31***	−0.42***	−0.45***	0.70***	−0.08**	0.48***	0.47***	0.50***	–	
2f. Inaction	−0.42***	0.02	−0.15***	−0.34***	−0.45***	−0.45***	−0.51***	0.82***	−0.09**	0.53***	0.59***	0.75***	0.63***	–

Note: Pakenham et al. (2020) and Supporting Information S2.

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

TABLE 3 Latent profile analysis (LPA) of psychological flexibility and inflexibility processes.

Classes specified	SSA BIC	Entropy	Adj. LMR-LRT	Group prevalence %					
				1	2	3	4	5	6
1	35,859.985	-	-	100					
2	33,198.259	0.851	2680.978**	54.30	45.70				
3	32,109.592	0.842	1125.158**	42.71	40.58	16.71			
4	31,656.613	0.849	496.436*	40.77	32.27	16.43	10.53		
5	**31,186.920**	**0.840**	**512.968****	18.45	37.97	17.58	16.71	9.28	
6	30,976.120	0.852	256.912	36.43	18.26	16.91	15.94	9.76	2.71

Note: Bold indicates the best-fitting solution ($N = 1035$).

Abbreviations: Adj. LMR-LRT, adjusted Lo–Mendell–Rubin likelihood ration test; SSA BIC, sample size adjusted Bayesian Information Criterium.

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

and thoughts without attachment. Finally, Profile 5 included 9.28% ($n = 96$) of the sample. The pattern of PF/PI responding that typified this profile was low levels across the six PF processes and high levels on the six PI processes and was labeled "highly inflexible profile."

The profiles significantly differed from each other on all PF and PI processes except for EA, which evidenced low variability among profiles (see Table 4). In particular, the mean level of EA in the highly flexible profile was the highest and differed significantly from the mean levels of EA in three other profiles (low PF/medium PI/low EA, moderately flexible/inflexible, and highly inflexible). The mean level of EA in the low PF/medium PI/low EA was the lowest and significantly differed from the highly flexible and moderately inflexible profiles but not from the moderately flexible/inflexible, and the highly inflexible profiles. To further investigate relations among the 12 PI and PF processes we conducted correlations among these processes for each profile (see Supplementary Materials 2). However, due to the marked variations in sample sizes across the profiles, differences in the magnitude of the correlation coefficients are difficult to interpret. Hence, we limit our reporting of the results to the identification of broad patterns of associations. Overall, relations among the 12 PI and PF processes in each profile were consistent with the hexaflex model except for acceptance and EA. For example, unexpectedly acceptance was positively related to fusion in the highly flexible and moderately flexible profiles ($r = 0.20$ and $r = 0.25$, respectively, $p < 0.01$), negatively correlated with committed action in the highly flexible and moderately flexible profile ($r = -0.16$, and $r = -0.12$, respectively, $p < 0.05$), positively related to lack of contact with values in the highly flexible profile ($r = 0.22$, $p < 0.01$), and positively correlated with inaction in the highly flexible ($r = 0.26$, $p < 0.01$), moderately flexible ($r = 0.18$, $p < 0.01$), and low PF/medium PI/low EA profiles ($r = 0.22$, $p < 0.01$).

Regarding EA, it was unexpectedly positively associated with global PF in the highly inflexible profile ($r = 0.22$, $p < 0.05$), positively correlated with four PF processes (self-as-context, defusion, values, and committed action) across all five profiles, and evidenced nonsignificant associations with the other five PI processes in all profiles.

3.4 | Associations between latent profile membership and socio-demographics and COVID-19/Lockdown Index

A multinomial logistic regression was conducted to investigate associations between latent profile membership and socio-demographics and COVID-19/lockdown. Results are displayed in Table 5 and indicate that of the socio-demographics, only unemployment status significantly discriminated among groups, specifically between membership in the highly inflexible profile compared to the highly flexible profile. That is, the odds of being in

TABLE 4 Means and standard deviations for the psychological flexibility and inflexibility processes for each of the five profiles.

	Total sample (N = 1035)	Highly flexible profile (n = 191)	Moderately flexible profile (n = 393)	Low PF/medium PI/low EA (n = 182)	Moderately flexible/ inflexible (n = 173)	Highly inflexible (n = 96)	Test of group difference	Cohen's d for biggest pairwise difference between profiles
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)		
Acceptance	2.83 (1.05)	3.56 (1.40)^{b,c,d,e}	2.70 (0.93)^{a,c,d}	2.18 (0.58)^{a,b,d,e}	3.03 (0.86)^{a,b,c}	2.82 (0.78)^{a,c}	$F(4,1034) = 52.48$**	0.90
Present moment awareness	3.65 (1.17)	4.95 (0.86)^{b,c,d,e}	3.54 (0.90)^{a,c,d}	2.57 (0.79)^{a,b,d,e}	3.81 (1.02)^{a,b,c,e}	3.26 (1.03)^{a,c,d}	$F(4,1034) = 169.00$**	1.62
Self-as-context	3.74 (1.14)	5.24 (0.58)^{b,c,d,e}	3.82 (0.78)^{a,c,d,e}	2.57 (0.72)^{a,b,d,e}	3.59 (0.86)^{a,b,c,e}	2.90 (0.81)^{a,b,c,d}	$F(4,1034) = 334.06$**	2.28
Defusion	3.44 (1.15)	4.98 (0.67)^{b,c,d,e}	3.63 (0.80)^{a,c,d,e}	2.41 (0.61)^{a,b,d}	2.93 (0.75)^{a,b,c,e}	2.44 (0.81)^{a,b,d}	$F(4,1034) = 366.30$**	2.38
Values	4.32 (1.13)	5.46 (0.62)^{b,c,d,e}	4.62 (0.79)^{a,c,d,e}	3.1 (0.81)^{a,b,d}	4.37 (0.75)^{a,b,c,e}	3.04 (0.90)^{a,b,d}	$F(4,1034) = 295.59$**	2.14
Committed action	4.13 (1.19)	5.40 (0.57)^{b,c,d,e}	4.46 (0.84)^{a,c,d,e}	2.99 (0.84)^{a,b,d,e}	4.00 (0.83)^{a,b,c,e}	2.68 (0.91)^{a,b,c,d}	$F(4,1034) = 306.32$**	2.18
Experiential avoidance	3.40 (1.18)	3.74 (1.50)^{c,d,e}	3.45 (1.15)^{c}	3.03 (0.95)^{a,b}	3.35 (1.00)^{a}	3.30 (1.06)^{a}	$F(4,1034) = 8.42$**	0.38
Lack of contact with present moment	2.03 (1.03)	1.49 (0.81)^{c,d,e}	1.65 (0.76)^{c,d,e}	2.28 (1.02)^{a,b,e}	2.48 (0.88)^{a,b,e}	3.35 (1.03)^{a,b,c,d}	$F(4,1034) = 100.68$**	1.30
Self-as-content	2.12 (1.14)	1.48 (0.68)^{c,d,e}	1.63 (0.62)^{c,d,e}	1.96 (0.79)^{a,b,d,e}	3.19 (1.12)^{a,b,c,e}	3.70 (1.20)^{a,b,c,d}	$F(4,1034) = 208.17$**	1.88
Fusion	2.15 (1.11)	1.35 (0.46)^{b,c,d,e}	1.61 (0.59)^{a,c,d,e}	2.10 (0.65)^{a,b,d,e}	3.21 (0.93)^{a,b,c,e}	4.07 (0.89)^{a,b,c,d}	$F(4,1034) = 397.58$**	2.59
Lack of contact with values	1.83 (0.84)	1.31 (0.47)^{b,c,d,e}	1.51 (0.54)^{a,c,d,e}	1.93 (0.60)^{a,b,d,e}	2.24 (0.75)^{a,b,c,e}	3.23 (1.03)^{a,b,c,d}	$F(4,1034) = 178.49$**	1.74
Inaction	1.80 (0.93)	1.17 (0.30)^{b,c,d,e}	1.30 (0.36)^{a,c,d,e}	1.87 (0.55)^{a,b,d,e}	2.37 (0.64)^{a,b,c,e}	3.84 (0.81)^{a,b,c,d}	$F(4,1034) = 591.03$**	3.16

Note: Means having the same superscript (a,b,c,d,e) are significantly different from each other in post hoc analysis. Cohen's d was estimated from the eta-squared of the ANOVAs.
Abbreviations: ANOVA, analysis of variance; SD, standard deviation.
*$p < 0.01$; **$p < 0.001$.

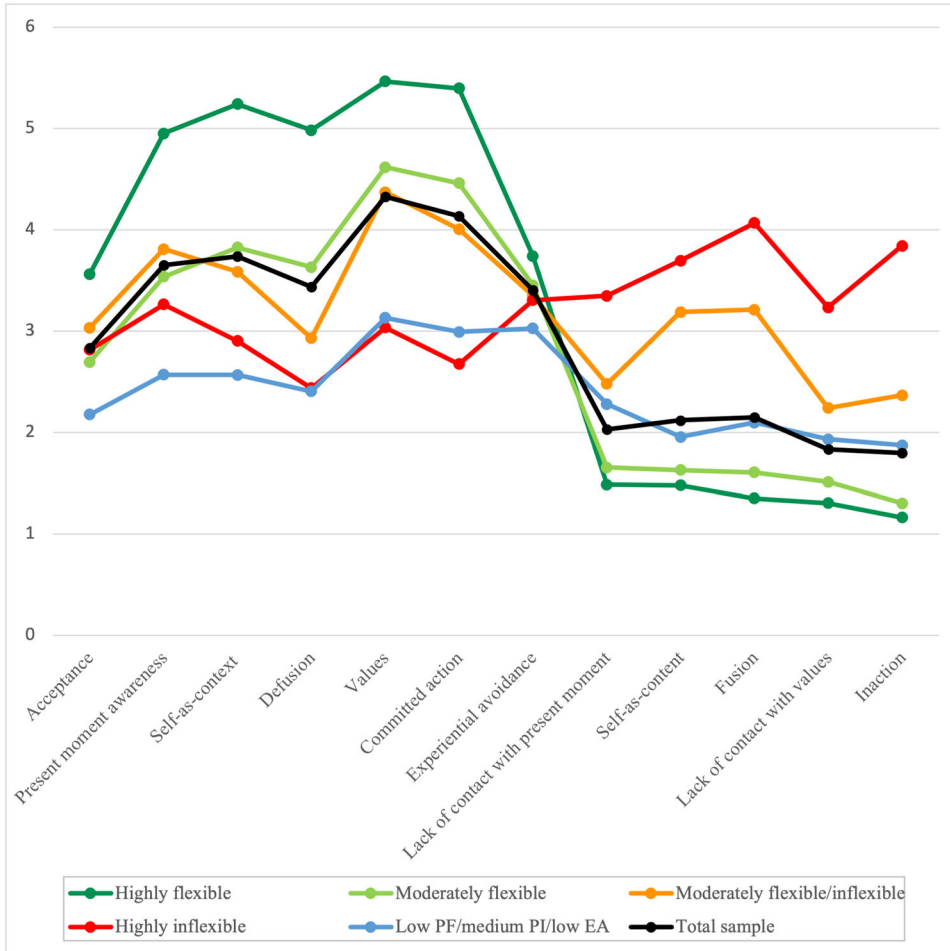

FIGURE 1 Observed means of psychological flexibility and inflexibility processes in each profile during the first COVID-19 Lockdown in Italy. **Black and White Version**.

the highly inflexible profile increased by a factor of 0.46 (0.27–0.81) when unemployed. The COVID-19/lockdown Index significantly discriminated between the highly flexible profile relative to the low PF/medium PI/low EA profile, the moderately flexible/inflexible profile, and the highly inflexible profile, but not the moderately flexible profile. Specifically, the odds of being in the low PF/medium PI/low EA, the moderately flexible/inflexible, and the highly inflexible profiles, as compared to the highly flexible profile, increase by 1.53 (1.30–1.80), 1.73 (1.47–2.05), and 2.22 (1.83–2.70) units for each unit increase in COVID-19/lockdown Index.

3.5 | Differences in mental health across PI/PF profiles

Differences among the five profiles in mental health outcomes are reported in Table 6. Controlling for employment status and the COVID-19/Lockdown Index, all five profiles significantly differed from each other on anxiety, depression, and COVID-19 distress. In particular, the highly flexible profile evinced the highest mental health scores, followed by the moderately flexible, the low PF/medium PI/low EA, the moderately flexible/inflexible, and the highly inflexible profiles. Cohen's *d*'s effect sizes for these analyses (range 1.12–1.22) were indicative of very

TABLE 5 Multinomial logistic regression of the association between demographics and COVID-19/Lockdown Index and latent profile membership.

	Moderately flexible profile		Low PF/medium PI/low EA		Moderately flexible/inflexible		Highly inflexible	
	B (SE)	Odds ratio (95% CI)	*B* (SE)	Odds ratio (95% CI)	*B* (SE)	Odds ratio (95% CI)	*B* (SE)	Odds ratio (95% CI)
Demographics:								
Gender (female)	−0.130 (0.212)	0.878 (0.580– 1.330)	−0.037 (0.253)	0.963 (0.587–1.580)	−0.378 (0.274)	0.685 (0.401–1.171)	−0.614 (0.361)	0.541 (0.267–1.098)
Age	−0.006 (0.008)	0.994 (0.979–1.009)	−0.015 (0.010)	0.985 (0.967–1.004)	−0.02 (0.010)	0.98 (0.961–1.000)	−0.013 (0.012)	0.987 (0.964–1.012)
Low education (secondary school or below)	−0.045 (0.199)	0.956 (0.647–1.413)	0.158 (0.234)	1.171 (0.740– 1.854)	0.178 (0.240)	1.195 (0.746–1.914)	0.156 (0.288)	1.168 (0.665–2.055)
Marital status (single)	−0.188 (0.207)	0.828 (0.552–1.242)	−0.187 (0.246)	0.829 (0.512–1.344)	−0.258 (0.253)	0.772 (0.471–1.267)	−0.190 (0.313)	0.827 (0.448–1.526)
Occupation (currently employed)	0.317 (0.195)	1.373 (0.937–2.012)	0.189 (0.235)	1.208 (0.763–1.914)	0.092 (0.240)	1.096 (0.684–1.757)	−0.768** (0.285)	0.464 (0.265–0.811)
Low socio-economic status	−0.113 (0.318)	0.893 (0.479–1.664)	0.429 (0.340)	1.536 (0.789–2.992)	0.276 (0.352)	1.318 (0.661–2.630)	−0.304 (0.446)	0.738 (0.308–1.768)
Nationality (Italian)	0.622 (0.812)	1.862 (0.379–9.150)	1.146 (0.862)	3.144 (0.581–17.014)	0.744 (0.942)	2.104 (0.332–13.336)	−18.265 (0.000)	0.000 (0.000–0.000)
COVID-19/ Lockdown Index	0.094 (0.073)	1.098 (0.952–1.267)	0.425*** (0.083)	1.530 (1.299–1.801)	0.549*** (0.085)	1.732 (1.467–2.045)	0.797*** (0.100)	2.220 (1.825–2.700)

Note: All latent profiles are compared to the highly flexible profile. Model χ^2 (32) = 187.53, $p < 0.001$.

Abbreviations: *B*, coefficient; CI, 95% confidence interval; SE, standard error.

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

TABLE 6 Differences between demographics, COVID-19/Lockdown Index, and mental health between the five profiles.

	Total sample (N = 1035)	Highly flexible profile (n = 191)	Moderately flexible profile (n = 393)	Low PF/medium PI/ low EA (n = 182)	Moderately flexible/ inflexible (n = 173)	Highly inflexible (n = 96)	Test of group difference	Cohen's d for biggest pairwise difference between profiles
	M(SD) or %	M(SD) or %	M(SD) or %	M(SD) or %	M(SD) or %	M(SD) or %		
Mental health:								
Anxiety	5.51 (3.90)	2.67 (2.36)^{b,c,d,e}	4.13 (2.83)^{a,c,d,e}	6.62 (3.30)^{a,b,d,e}	8.03 (3.62)^{a,b,c,e}	10.15 (4.09)^{a,b,c,d}	$F(4,1034) = 95.17$**	1.22
Depression	6.63 (4.49)	3.64 (2.68)^{b,c,d,e}	4.98 (3.23)^{a,c,d,e}	7.91 (4.15)^{a,b,d,e}	9.26 (3.90)^{a,b,c,e}	12.15 (5.10)^{a,b,c,d}	$F(4,1034) = 84.31$**	1.15
COVID-19 distress	22.19 (12.03)	14.04 (7.37)^{b,c,d,e}	18.13 (8.66)^{a,c,d,e}	25.36 (11.34)^{a,b,d,e}	29.01 (11.17)^{a,b,c,e}	36.80 (12.90)^{a,b,c,d}	$F(4,1034) = 81.19$**	1.12

Note: Means having the same superscript (a,b,c,d,e) are significantly different from each other in post hoc analysis. Cohen's d was estimated from the eta-squared of the ANOVAs and chi-squared statistic.

Abbreviations: ANOVA, analysis of variance; COVID-19, coronavirus disease 2019; SD, standard deviation.

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

large effects, suggesting strong real-world significant differences among the five profiles in mental health. Furthermore, the highly inflexible, the moderately flexible/inflexible, and the low PF/medium PI/low EA profiles reported the highest rates of severe symptomatology (based on normative data for the mental health measures), that is, anxiety 15.63%, 5.78%, and 3.30%; depression 29.17%, 10.40%, and 7.69%; COVID-19 distress 10.42%, 1.73%, and 2.20%, respectively. In contrast, the highly flexible and moderately flexible profiles had zero rates of severe symptomatology for anxiety and COVID-19 distress, and 0.52% and 1.02% for depression, respectively.

4 | DISCUSSION

The purpose of this study was to further our understanding of how the 12 hexaflex processes cluster together in characteristic ways to form identifiable groups of individuals based on their PF/PI profiles in the context of the COVID-19 pandemic using a person-centered approach. To this end, the study had four aims each of which are addressed as follows.

4.1 | MPFI factor structure

The first aim was to examine the MPFI factor structure in an independent sample in the context of immense pandemic hardships. The factor structure of a 12-factor model of all PF/PI processes provided a very good fit to the data, confirming the construct validity of MPFI in assessing each of the 12 PF/PI processes. However, the factor structure of a two-factor model composed of the PF and PI global factors provided an unsatisfactory fit, suggesting instability of this model in the context of the first COVID-19 wave and lockdown.

4.2 | Distinguishing PF/PI profiles within the COVID-19 and lockdown context

Our second aim was to identify latent profiles of the 12 PF/PI processes during the first COVID-19 wave and lockdown. LPAs distinguished five profiles. Three profiles represented varying levels of PF with corresponding inverse levels of PI: highly flexible, moderately flexible, and highly inflexible. Although these three profiles were identified by Stabbe et al. (2019), an additional similar profile emerged in their study, the moderately inflexible profile (i.e., moderate levels of PI with corresponding low PF) which was not evident in our study. In the present study, two additional profiles represented more distinct patterns of engagement in the 12 PF/PI processes. The first, the moderately flexible/inflexible profile, was characterized by moderate levels of five PF processes and by moderately high levels of all PI processes except for EA. A similar profile was also identified by Stabbe et al. (2019). The second profile, low PF/medium PI/low EA, was characterized by low levels of all six PF processes and medium levels of the PI processes but the lowest levels of EA. A similar profile was not identified by Stabbe et al. (2019) and might represent a PF/PI response style that is related to the adversities that characterized the first phase of the COVID-19 pandemic. Despite the similarities between four of the profiles in both studies, the pattern of variations in EA across the five profiles in the present study did not emerge in Stabbe et al's (2019) research. In particular, the highly flexible profile evinced the highest levels of EA and differed significantly from three profiles (low PF/medium PI/low EA, moderately flexible/inflexible, and highly inflexible profiles), while the low PF/medium PI/low EA displayed the lowest EA levels and differed significantly from the highly flexible, and moderately inflexible profiles. As discussed below, the pattern of variations in EA relative to levels of PF and other PI processes may reflect ways of engaging in avoidant coping when confronted with a life-threatening pandemic that, in turn, vary in the extent to which they protect mental health. The co-occurrence of high EA and high PF or low EA and low PF in the same profiles with correspondingly high and moderate levels of mental health respectively, appear to be inconsistent with

the hexaflex model which graphically portrays PF and PI as distinct and on opposite sides of a two-dimensional model.

Interestingly, the PF counterpart to EA, acceptance, also showed associations with the other processes that were inconsistent with the hexaflex model. For example, correlations in the total sample showed that acceptance was unrelated to four of the PI processes. Correlations within profiles showed that acceptance was positively related to fusion and negatively related to committed action (highly flexible and moderately flexible profiles), and positively associated with lack of contact with values (highly flexible profile), and inaction (highly flexible, moderately flexible, and low PF/medium PI/low EA profiles). These hexaflex inconsistent results regarding acceptance are in accord with findings from our review of PF/PI COVID-19 studies which showed unexpected relations between acceptance and mental health (see Table 1). Acceptance was unrelated to mental health in three independent samples (Landi, Pakenham, Giovannetti, et al., 2021; Landi, Pakenham, Mattioli, et al., 2022; McCracken et al., 2022), and displayed positive cross-loadings with a latent distress factor in another study (Landi, Pakenham, Crocetti, et al., 2021).

Findings from the present study have emerged from a person-centered reanalysis of data used in prior variable-centered research (Landi et al., 2020; Landi, Pakenham, Mattioli, 2022; Pakenham et al., 2020). These previous studies revealed hexaflex inconsistent idiosyncrasies associated with EA and acceptance. Specifically, they found that EA was related to better mental health (Pakenham et al., 2020) and acceptance was unrelated to mental health (Pakenham et al., 2020; Landi Pakenham, Mattioli, 2022) and related to poorer mental health (Landi et al., 2020). Present results provide some insights into these findings. For example, findings from the present study showed hexaflex inconsistent variability in how EA and acceptance related to other PF/PI processes within profiles and how their relations with mental health outcomes vary in accord with different profile patterns of PF/PI responding.

One explanation for the hexaflex model deviations evidenced by the EA–acceptance sub-dimensions is that in the context of a significant health crisis that involves severe lifestyle disruptions, EA may be adaptive in the short term. Engagement in EA necessarily downgrades a reliance on acceptance, rendering it weaker. It may be beneficial to use strategies to avoid intense distress associated with a fear-provoking pandemic and restrictive social isolation measures, which may be perceived as time limited. In this regard, EA may serve as an "emotional holding" strategy while awaiting for the crisis to pass. In support of this proposal, there is evidence showing that in an acute health crisis, avoidance of inner discomfort can be effective in the short term (e.g., Clwiton et al., 1999). However, data on the five PI/PF profiles from the present study suggest that a reliance on EA is only effective when it is counterbalanced by high to moderate levels of PF and is moderately effective when offset by low levels of other PI processes even when PF is low.

EA might enable redirection of emotional and mental energy from engagement with intense distress into the pursuit of values-based goals, while at the same time engaging in other PF strategies to center and permit limited openness to inner experiencing. This could explain the findings showing links between EA and PF. This view is consistent with the functional contextualism philosophy of science underlying ACT and the hexaflex, which posits that the function of a coping strategy can only be understood by accounting for context (Hayes et al., 2012). Hence, coping strategies should not be categorically labeled as "adaptive" or "maladaptive." Accordingly, ACT only focuses on EA that is not functional or impedes the pursuit of personal values (Hayes et al., 2012). However, sometimes the discourse on EA tends to cast it as categorically maladaptive, which obscures the nuances associated with a functional contextual view of EA.

A study of coping profiles in a German community sample ($n = 2326$) during the first COVID-19 lockdown identified a "highly functional" profile that was similar to the highly flexible profile found in the present study (Kenntemich et al., 2022). LPAs were conducted on data collected from generic and pandemic purpose-built coping scales. Of the five profiles identified, one labeled "highly functional" evinced the highest level of well-being. This profile was characterized by a high reliance on acceptance coping but also an elevated use of self-distraction coping, which is typically regarded as an avoidance strategy (Lazarus & Folkman, 1984). Consistent with our abovementioned explanation, the authors suggested that the combination of accepting uncontrollable

pandemic-related circumstances while also distracting oneself from the associated distress in the short term is likely to foster mental health.

Another possible explanation for the beneficial relations between EA and better mental health during the pandemic is that those high in EA may simply have felt more comfortable with relying on their avoidance strategies during the health crisis because they viewed them as appropriate responses given the heightened fear evident in the broader community and avoidance implicated in social distancing measures. Consequently, those with high EA may have experienced less cognitive dissonance when engaging in avoidance coping. For example, in the context of the pandemic, avoidance of social situations may be less associated with a sense of "missing out" or feeling impaired due to the prevailing public health social distancing protocols. In this context, their avoidance may be viewed by these individuals and others as functional coping.

4.3 | PI/PF profiles and socio-demographics and COVID-19/Lockdown Index

Our third aim was to explore associations between membership of the PF/PI profiles and socio-demographics and COVID-19/Lockdown mental health risk factors. Employment was the only demographic that significantly differed across the five profiles, with those in the highly inflexible profile more likely to be unemployed than those in the highly flexible profile. One possible explanation for this finding is that people who were unemployed before the pandemic or who became unemployed due to the economic impacts of lockdowns felt that their career goals were lost and hence, relied more on avoidant PI strategies to manage their sense of helplessness and distress which therefore accounts for the fewer unemployed people represented in the highly flexible profile. Regarding the COVID-19/Lockdown Index, the highly flexible and moderately flexible profiles reported exposure to fewer COVID-19/lockdown mental health risk factors than the other three profiles.

4.4 | PI/PF profiles and mental health

Our final aim was to investigate differences across the PF/PI profiles on three mental health outcomes (anxiety, depression, and COVID-19 distress). After controlling for employment status and the COVID-19/Lockdown Index, all five profiles significantly differed from each other on the mental health outcomes. Importantly the effect sizes for these differences were large, suggesting that these profiles may have practical relevance with respect to identifying those most at risk of mental health difficulties during a pandemic. Essentially a gradient of progressive decreases in five PI processes (except for EA), corresponded with increments in mental health across the five profiles. In contrast, a gradient of progressive increases in all PF processes and EA corresponded with increments in mental health in the highly flexible and moderately flexible profiles, but this gradient was not present in the other three profiles. In fact, the low PF/medium PI/low EA profile displayed higher mental health than the moderately flexible/inflexible profile which was characterized by moderate levels of five PF processes and EA. This might be because the moderately flexible/inflexible profile also displayed moderately high levels of the other five PI processes. Consistent with Stabbe et al.'s (2019) findings, overall, in the present study, relations between the PI processes and poorer mental health were stronger than the associations between the PF processes and better mental health. In this regard, it is important to note that the highly inflexible, moderately flexible/inflexible, and low PF/medium PI/low EA profiles evidenced the highest rates of severe anxiety, depression, and COVID-19 distress symptoms. These findings are in accord with those of Stabbe et al's (2019) study in which profiles with higher inflexibility evidenced links to poorer mental health.

It is noteworthy that the two profiles which evidenced the highest levels of mental health (i.e., the highly flexible and moderately flexible profiles) also had the greatest proportion of the sample 56.42% (n = 584), and the highest levels of both PF and EA. These findings and the results of analyses investigating the interrelations among

the PF/PI processes across the profiles should serve as a caution against a priori judgments of them being "adaptive" or "maladaptive" and encourage assessment of their functionality based on their workability (i.e., enabling pursuit of personal values) in a specific context.

Research on the roles of PF and PI during the pandemic suggest that at the global level, PF and PI function as mental health protective and risk factors, respectively, which is consistent with the hexaflex model. However, research that has examined the roles of the PF and PI processes during the pandemic (see Table 1), including the present study, reveal some variability in the interrelations among these processes and between them and mental health outcomes that appear to be at odds with the hexaflex model. However, these associations can be explained when considering the broader theoretical underpinnings of the hexaflex model. For example, the hexaflex model is typically graphically portrayed and verbally described as two-dimensional: one side representing PF and the reverse reflecting PI. This two-dimensional perspective may encourage a perception of PI and PF as opposite ends of a continuum. Whereas findings from this and other studies (e.g., Stabbe et al., 2019) suggest a more complex relationship between these two empirically distinct but related meaningful dimensions. According to relational frame theory, which underpins the hexaflex model, the PI and PF processes are related via a network of bidirectional relational frames (Hayes et al., 2012). In addition, functional contextualism suggests that the functional significance of the PI and PF dimensions are dependent on context because function and context influence each other (Hayes et al., 2012). Hence, as mentioned above, in the context of a pandemic and in the presence of high levels of PF within an individual, engaging in EA may serve to enable a person to pursue their values-based goals. In view of these theoretical considerations and the findings from the present study, we suggest that the hexaflex model may be better represented as three-dimensional, such that the PF and PI dimensions and their corresponding related sub-dimensions are portrayed as being interrelated and influenced by context. A three-dimensional hexaflex would also be more aligned with the shift to process-based therapy and the associated use of network analytic approaches to understand PF and PI intersections within an individual (Hofmann & Hayes, 2019).

The practice implications of the present findings include the identification of sub-groups at risk for the adverse mental health impacts of the pandemic. Specifically, results suggest that those individuals characterized by high levels of PI or moderate or low PF but also high PI are at the highest risk of mental health problems during the pandemic and should be prioritized for receiving ACT. Although the findings from this and other studies (e.g., Landi et al., 2022; Pakenham et al., 2020) demonstrate the mental health protective role of PF during the COVID-19 pandemic, results from the present study also suggest that ACT interventions should include training in how to identify when EA is helpful and unhelpful. Additionally, findings suggest that clinicians should avoid using language that infers a coping strategy as "good" or "bad." Instead, clinicians should train clients in how to identify whether a strategy is helpful or unhelpful. For example, by questioning whether a particular behavior in a given context fosters the pursuit of personal values.

Also of potential clinical relevance is the finding that higher COVID-19/lockdown mental health risk factors were associated with membership of the profiles with poorer mental health relative to that of the highly flexible and moderately flexible profiles, which evidenced the best mental health and lowest COVID-19/lockdown risk factors. Pandemic public mental health promotion approaches should consider the degree of exposure to COVID-19/lockdown mental health risk factors to identify those vulnerable to PF/PI response styles that are associated with poorer psychological outcomes.

4.5 | Limitations

This study has limitations as follows. First, our online convenience sampling limits the generalizability of findings to the general population. Second, the study used a cross-sectional design, and hence, the causal directions among the PF and PI processes and between them and the mental health outcomes remain ambiguous. Third, the reliance on self-report data increases the risk of common method variance. Fourth, a larger sample size may have yielded more

than five PF/PI profiles and may account for why we found fewer profiles than Stabbe et al. (2019), who had a bigger sample.

In addition to these methodological weaknesses, interpretation of the variations in the relationships among the PI and PF processes that emerged in this study should be tempered by the following considerations. First, the noted variations in PI and PF processes may be specific to a pandemic context and to the first wave of COVID-19, although similar variations emerged in other studies that collected data at different COVID-19 phases (see Table 1). Second, given the number of correlations among the PF/PI processes and that some of the significant coefficients were of a low magnitude, the risk of Type I errors is increased. Third, the hexaflex inconsistent relations between both EA and acceptance and the other PI and PF processes and mental health outcomes may be an artifact of the snowballing recruitment strategies used by a single research team (Pakenham, et al., 2020). However, the variations in how EA and acceptance functioned in the pandemic context emerged across three independent samples from two different countries (Sweden and Italy) and their respective research teams (McCracken et al., 2022; Pakenham et al., 2020). Finally, the factorial structure and psychometric integrity of the MPFI subscales may be inadequate and require refinement as suggested by Thomas et al., (2022), who found that most of the subscale scores evidenced redundancy with their respective general PF and PI factors. Additionally, except for acceptance and EA subscale scores, the other subscales did not provide additional incremental utility above and beyond the general PF and PI factors in predicting mental health. Future research should examine the stability of the MPFI factor structure in different contexts. Additionally, future work should investigate latent PF/PI profiles longitudinally across multiple contexts to further understand the dynamic interplay among the processes and their relations with mental health outcomes.

5 | CONCLUSIONS

Overall, findings support the use of a person-centered approach to investigating variations in engagement in the PI and PF processes in the context of significant health adversity. Five empirically distinct PI/PF profiles emerged: three reflected gradations of high to low PF with corresponding inverse levels of PI, while more complex relationships between PI and PF emerged in the other two profiles. The five profiles demonstrated differences in mental health controlling for demographic and COVID/lockdown contextual factors, such that profiles with higher inflexibility evidenced worse mental health and that profiles with higher PF and lower PI evinced better mental health. However, one notable deviation to these patterns of results was the profiles with the highest PF (i.e., the highly flexible and moderately flexible), which also had the highest EA, as well as the best mental health and the greatest proportion of the sample. Findings from this and similar studies suggest intersecting complex relationships among the PI and PF processes that are likely to shift in response to changing contexts. We suggest that this network of relationships could be better represented by a three-dimensional hexaflex than a simplistic two-dimensional depiction of the model. Distinguishing different PF/PI profiles identified groups most at risk for the adverse mental health impacts of the pandemic and exposed variations in the mental health protective and risk roles of PF and PI processes, respectively. These findings can inform ACT-based mental health promotion interventions.

ACKNOWLEDGMENTS

We thank the Australian and New Zealand (ANZ) Association for Contextual Behavioral Science (ACBS) Annual Conference Organising Committee for inviting an abbreviated oral keynote presentation of this study in November 2022. The informal peer review discussions of this presentation helped shape the final paper. We also thank the reviewers for their helpful suggestions in revising the manuscript.

CONFLICTS OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

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

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PEER REVIEW

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/jclp.23536.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Pakenham, K. I., Landi, G., Cattivelli, R., Grandi, S., & Tossani, E. (2023). Identification of psychological flexibility and inflexibility profiles during the COVID-19 pandemic. *Journal of Clinical Psychology*, 1–26. https://doi.org/10.1002/jclp.23536