Psychiatry Research 326 (2023) 115262

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Psychosocial predictors of trajectories of mental health distress during the COVID-19 pandemic: A four-wave panel study

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ARTICLE INFO

Keywords:
Anxiety
COVID-19
Depression
Emotion regulation
Intolerance of uncertainty
Parallel-process latent class growth analysis

ABSTRACT

Previous research suggested that during the COVID-19 pandemic, mental distress did not affect all people equally. This longitudinal study aims to examine joint trajectories of depressive, anxiety, and stress symptoms in a sample of Italian adults during the pandemic, and to identify psychosocial predictors of distress states. We analyzed four-wave panel data from 3,931 adults who had received assessments of depressive, anxiety and stress symptoms between April 2020 and May 2021. Trajectories of individual psychological distress were identified by Latent Class Growth Analysis (LCGA) with parallel processes, and multinomial regression models were conducted to identify baseline predictors. Parallel process LCGA identified three joint trajectory classes for depression, anxiety and stress symptoms. Most individuals (54%) showed a resilient trajectory. However, two subgroups showed vulnerable joint trajectories for depression, anxiety and stress. Expressive suppression, intolerance to uncertainty, and fear of COVID-19 were risk characteristics associated with vulnerable trajectories for mental health distress. Moreover, vulnerability to mental health distress was higher in females, younger age groups and those unemployed during the first lockdown. Findings support the fact that group heterogeneity could be detected in the trajectories of mental health distress during the pandemic and it may help to identify subgroups at risk of worsening states.

1. Introduction

It has been well-established that the COVID-19 pandemic is having a negative effect on mental health, and there is a need for research to address how to effectively reduce the psychosocial burden among vulnerable groups (COVID-19 Mental Disorders Collaborators, 2021). Several meta-analyses have evidenced that the mental health consequences of COVID-19 are high across countries and gender (Cénat et al., 2021; Robinson et al., 2022; Wu et al., 2021), with a higher prevalence of depression, anxiety, PTSD and insomnia when compared to the general population under normal circumstances (Daly et al., 2022; Kunzler et al., 2021; Prati and Mancini, 2021). Previous meta-analyses of longitudinal studies showed that the overall increase in mental health symptoms was most pronounced during the first months of the pandemic (when measures of shelter-in-place and lockdown had been adopted), before decreasing by mid-2020 (Cénat et al., 2022; Richter et al., 2021; Robinson et al., 2022; Salanti et al., 2022). However, the increase in mental distress did not affect all people equally, with some subgroups showing marked increases. Some prior longitudinal studies identified different mental health distress trajectories during the pandemic (Bendau et al., 2022; Fancourt et al., 2021; Fioravanti et al., 2022; Liang et al., 2022). For example, Pierce et al. (2021) showed that the mental health of most UK adults remained resilient between April and October 2020, whereas around one in nine individuals had deteriorating mental

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https://doi.org/10.1016/j.psychres.2023.115262
Received 12 January 2023; Received in revised form 21 May 2023; Accepted 22 May 2023
Available online 24 May 2023

health. In a French cohort study (Lu et al., 2022), most individuals exhibited trajectories with a relatively low level of anxiety and depressive symptoms, whereas younger individuals and females at large were found to be more vulnerable as regards their mental health. Indeed, female gender was associated with a higher prevalence of anxiety and depression (Cénat et al., 2022). Thus, to sum up, prior research suggested heterogeneity in the psychological responses to the COVID-19 outbreak, and there was a preliminary effort to identify classes of individuals displaying non-resilient mental health trajectories (Ahrens et al., 2021; Shevlin et al., 2021). However, most previous studies did not monitor long-lasting fluctuations in mental health distress, from data reported and collected in 2020. Moreover, research examining psychological predictors of mental health distress trajectories is still limited (Fancourt et al., 2021; McPherson et al., 2021).

In the current study, we will examine intolerance of uncertainty (IU), emotion regulation (ER), and fear of the COVID-19 pandemic as psychological predictors of mental health distress trajectories. The COVID-19 pandemic was an unprecedented event and represented a special challenge for individuals with a low capacity to tolerate uncertainty (Rettie and Daniels, 2021). To date, there is initial evidence that IU could predict mental health problems during the pandemic (Reizer et al., 2021; Shevlin et al., 2021). Individuals with IU often experience difficulties in regulating emotions (Sahib et al., 2023). ER is defined as the process in which individuals manage their emotional experience by using regulation strategies (Aldao et al., 2010; Gross, 2003). ER strategies can be grouped into either adaptive or maladaptive strategies (i.e., if they regulate emotions effectively or if they do not) (Gross, 2014). An example of ER maladaptive strategy is linked to expressive suppression, i.e., when individuals restrain unwanted emotional expressions; on the other hand, an example of ER adaptive strategy includes reappraisal, i.e., when individuals develop positive interpretations of the situation after an initial, negative appraisal (Aldao et al., 2010). To date, only a few studies have examined the role of ER processes on mental health during the COVID-19 pandemic, suggesting that increased emotional suppression was associated with poorer psychological health, whereas cognitive reappraisal to regulate emotions was associated with greater resilience (Cardi et al., 2021; Low et al., 2021; Xu et al., 2020). However, none of the previous studies investigated whether maladaptive ER strategies increased the likelihood of associations with vulnerable mental health trajectories. The present longitudinal study aims to identify (1) empirical trajectories of mental health distress (i.e., depression, anxiety and stress) over time by analyzing panel data from four waves of a national sample of Italian adults collected between April 2020 and May 2021; and (2) to identify which demographic and psychological factors were associated with the different longitudinal profiles. Consistently with prior longitudinal research (Bendau et al., 2022; McPherson et al., 2021; Shevlin et al., 2021), it was predicted that trajectories reflecting worsening mental health distress over four-time points would be associated with demographics such as female gender, and younger age, and psychological variables such as high IU, ER maladaptive strategies and fear of the COVID-19 pandemic.

2. Methods

2.1. Participants and procedures

Data for this study comes from a large-scale national project on the mental health correlates of the COVID-19 pandemic (Di Blasi et al., 2021), which involved a general adult population sample from Italy. Inclusion criteria included: (1) age 18 years or older, (2) resident in Italy at the time the survey was completed, and (3) having sufficient language skills to complete the survey. Participants were assessed repeatedly in up to four waves during the COVID-19 pandemic (i.e., T1 = 7th- 24th April 2020; T2 = 18th-31st May 2020; T3 = 26th June-8th July 2020; T4 = 24th April-11th May 2021). A total of 3864 individuals participated at T1, 1174 individuals at T2, 714 individuals at T3, and 731 individuals at T4. Twenty-five (0.6%) participants were excluded because they were not residents in Italy, and sixteen participants (0.4%) were excluded because of age < 18 years. Since we kept missing data points when matching the data for all four waves, the analytical sample included 3931 participants (n = 3823 at T1; n = 1162 at T2; n = 709 at T3; n = 726 at T4). Two-hundred and ninety-nine participants (7.6%) present complete data on all four waves; 710 participants (18.1%) present data on at least three waves; and 1480 participants (37.6%) present data on at least two waves. Table 1 reports participants' socio-demographic and health-related characteristics. A detailed description of the national Covid-related restrictions as well as the number of cases, deaths and recovery at the moment of the four assessment points are reported in Figure S1 (Supplementary materials). Participants were recruited via social media platforms and were assessed using an online survey. All participants provided written informed consent before inclusion in the study. The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of the University of [blinded for review].

2.2. Measures

2.2.1. Demographic and health-related information

Participants reported their age, gender, educational level, and employment status (categorized as employed vs unemployed based on whether or not having a regular income). Moreover, data about health-related characteristics (i.e., personal and relatives COVID-19 infection, presence of chronic diseases or disabilities) were collected.

2.2.2. Depressive symptoms, anxiety, and stress

The Depression, Anxiety, and Stress Scale (DASS-21; Lovibond and Lovibond, 1995; Bottesi et al., 2015) was used to assess psychological distress. The DASS is a 21-item measure that yields three subscales (7 items each): depression, anxiety, and stress. Participants rate items using a 4-point Likert Scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much or most of the time*). The DASS-21 total score had good to excellent internal consistency in the present study (Cronbach's alpha across T1-T4: depression = range 0.895 - 0.919; anxiety = range 0.874 - 0.900; stress = range 0.916 - 0.933).

2.2.3. Intolerance of uncertainty

The Intolerance of Uncertainty Scale-Revised (IUS-R; Carleton et al., 2007; Lauriola et al., 2016) was used to assess IU. The IUS-R consists of 12 items, rated on a five-point Likert scale ranging from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). Only the IUS-R total score was used in this study, with good internal consistency (T1 Cronbach's alpha = 0.881).

Table 1
Participants' socio-demographic and health-related characteristics.

	Participants (n = 3931)
Age, M (SD)	36.55 (14.76)
Gender, n (%)	
Females	2802 (71.3)
Males	1021 (26.0)
missing	108 (2.7)
Educational level, n (%)	
8–13 years of education	1675 (42.6)
degree/post-degree	2148 (54.6)
missing	108 (2.7)
Employment status, n (%)	
Employed	2059 (52.4)
Unemployed	1764 (44.9)
missing	108 (2.7)
Personal COVID-19 infection at T1, n (%) yes	15 (0.4)
Relatives COVID-19 infection at T1, n (%) yes	780 (19.8)
Chronic diseases, n (%) yes	279 (7.1)
Disabilities, n (%) yes	100 (2.5)

Note: T1 = 7th-24th April 2020.

2.2.4. Emotion regulation

The Emotion Regulation Questionnaire (ERQ; Gross and John, 2003; Balzarotti et al., 2010) was used to measure individuals' tendency to regulate their emotions. The ERQ consists of ten items which yield two subscales: Cognitive Reappraisal (6 items) and Expressive Suppression (4 items). Participants rate items using a 7-point Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). In the current study, the ERQ showed good internal consistency (T1 Cronbach's alphas = 0.871 and 0.607, for Cognitive Reappraisal and Expressive Suppression subscale, respectively; mean inter-item correlation for Expressive Suppression subscale = 0.278).

2.2.5. Fear of the COVID-19 pandemic

The Fear of COVID-19 Scale (Ahorsu et al., 2022; Soraci et al., 2020) was used to measure the individual's fear of the COVID-19 pandemic. This scale includes 7 items, rated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In the current study, this scale showed good internal consistency (T1 Cronbach's alpha = 0.877).

2.3. Plan of data analysis

As a preliminary step, data were screened for missing values. Little's MCAR test revealed that the missing values were not missing completely at random ($\chi^2 = 214.785$, $p = .022$). No significant differences were found in demographics (i.e., sex, employment status, presence of chronic diseases or disabilities, and personal COVID-19 infection), nor in depressive and stress symptoms at T1 among participants with complete data in all waves and those with missing data. Significant differences were only found for participants' educational level ($p < .001$), COVID-19 infection of relatives at T1 ($p < .05$) and anxiety symptoms at T1 ($M \pm SD = 3.85 \pm 4.57$ and 3.07 ± 4.03 for participants with and without missing data, respectively; $t = 3.179$, $p < .01$). The missing data were handled using the full information maximum likelihood (FIML) method, which has been shown to perform better than data deletion-based methods in reducing bias in longitudinal studies, also with high rates of missing data (Lee and Shi, 2021) and is frequently used in latent trajectory studies (van De Schoot et al., 2017). The normality of the continuous variables was checked by using skewness and kurtosis. All continuous variables had a normal distribution ($|Sk| < 2$ and $|Ku| < 7$; Hair et al., 2010). The internal consistency of the scales was computed by Cronbach's α and the mean inter-item correlation (only for the ERQ-Expressive Suppression subscale). Mean inter-item correlations between 0.15 and 0.50 indicate adequate internal consistency (Clark and Watson, 1995). Descriptive statistics were computed for demographics and variables of interest.

Joint trajectories (or co-development) of depressive, anxiety, and stress symptoms were created by using a three process parallel Latent Class Growth Analysis (LCGA; Berlin et al., 2014), following the Guidelines for Reporting on Latent Trajectory Studies (GRoLTS; van de Schoot et al., 2017; more details are reported in Supplementary data, Table S1). Parallel-process LCGA is a data-driven technique that extends the typical univariate LCGA to a parallel-process approach, allowing for the consideration of multiple growth trajectories simultaneously through a small number of classes. Trajectory classes are operationalized as groups of individuals who approximately follow the same developmental trajectory (Andruff et al., 2009). Models with 1 to 5 classes were fitted. To decide the optimum number of classes, the following were used: the Akaike Information Criteria (AIC), the Bayesian Information Criteria (BIC), the sample size adjusted BIC (ssaBIC), the size of the smallest class size (> 5%), entropy, the Lo-Mendel-Rubin Likelihood Ratio Test (LMR-LRT). In addition, the choice of best-fitting solutions was based on theoretical coherence (i.e., substantive interpretability of the trajectory classes and identification of trajectories without overfitting) and explanatory relevance. The nature of classes was examined based on initial levels (i.e., intercept) and changes (i.e., linear slope and quadratic terms) in depression, anxiety and stress symptoms. We used the clinical severity cut-offs for the DASS-21 subscales (Lovibond and Lovibond, 1995) to label the different classes. The syntax file of the selected model is reported in Table S2 (Supplementary data).

Latent class membership was regressed on baseline socio-demographic characteristics (i.e., age, gender, educational level, and employment status), health-related characteristics (i.e., personal and relatives' COVID-19 infection, presence of chronic diseases or disabilities) and psychological factors (i.e., IU, ER, fear of COVID-19 pandemic) in order to identify risk factors associated with trajectories of change for psychological distress (i.e., depressive, anxiety and stress symptoms). More specifically, classes were compared using the chi-square test for categorical variables and ANOVA for continuous variables. Furthermore, multinomial regression models were conducted, whilst adjusted odds ratios (ORs) and 95% confidence intervals (Cis) were calculated in order to examine factors associated with trajectories of change for psychological distress (i.e., depressive, anxiety, and stress symptoms). Only variables with a p-value of < 0.10 on univariate analysis were subjected to multivariable analysis and non-significant variables in the multivariable model were removed by a backward stepwise approach.

Finally, an additional sensitivity analysis was conducted to test whether the trajectory modeling would hold when removing the 36.7% of participants who only have one assessment point. Analyses were conducted in SPSS v. 22 and Mplus v. 7.0.

3. Results

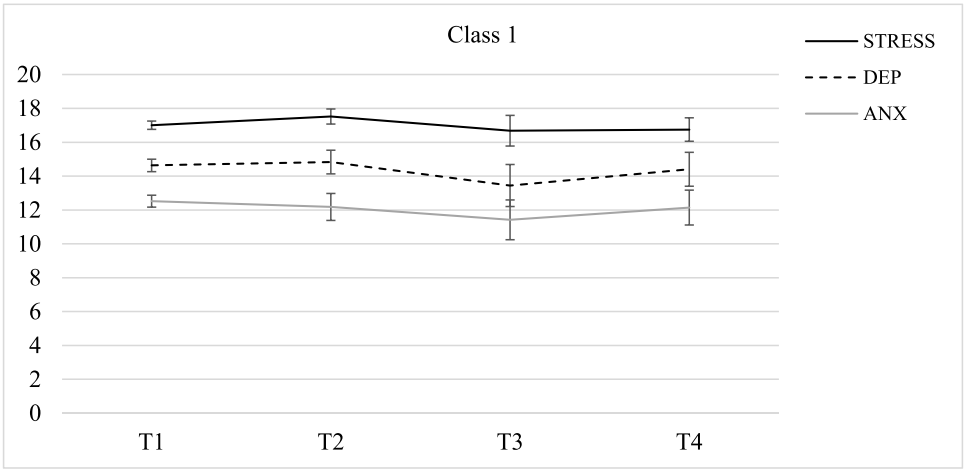
3.1. Joint longitudinal trajectories of depressive, anxiety and stress symptoms

A three-class model (Table S3) was selected for a combination of factors, including (1) the smallest class in the four-class model, which was close to 5%, and thus it may indicate model overfitting, (2) the entropy was lower in the four-class model than in the three-class model, and (3) the classes identified as clinically distinct. As shown in Fig. 1 and Table S4, class 1 (labelled as "Moderate-chronic class"; $n = 505$, 13%) had moderate depression levels (i.e., range 14–20), moderate anxiety levels (i.e., range 10–14), and mild stress levels (i.e., 15–19). Baseline levels of depression, anxiety and stress are higher than the other classes and remain stable over time (both linear and quadratic slopes were not significant; linear slopes: $p = .674$, $p = .441$, and $p = .348$; quadratic slopes: $p = .856$, $p = .603$, and $p = .267$, for depression, anxiety and stress, respectively; Table 2). Class 2 (labelled as "Normal-increasing"; $n = 2110$, 54%) had normal depression, anxiety and stress levels. Baseline scores were in the normal range (furthermore, only a low percentage of subjects in this class exceed the cut-off of mild problems: 4.7%, 2.1%, and 0.8% for depression, anxiety and stress, respectively) and showed a significant decrease from T1 to T3, but a subsequent significant increase at T4 (all linear and quadratic slopes were significant at $p < .001$; Table 2). Class 3 (labelled as "Mild-vulnerable"; $n = 1316$, 33%) had mild depression levels (i.e., range 10–13), but normal levels of anxiety (i.e., range 0–7) and stress (i.e., range 0–14). In this class, the number of subjects who exceed the mild problematic cut-off is higher than in class 2 (i.e., 54.5%, 33.6%, and 45.1% for depression, anxiety and stress, respectively). Depression and anxiety levels showed a significant decrease from T1 to T3, but a subsequent significant increase at T4, remaining in the mild range (linear and quadratic slopes were significant at $p < .05$ and $p < .01$ for depression and anxiety, respectively; Table 2). Stress levels remain stable over time (both linear and quadratic slopes were not significant: $p = .117$ and $p = .099$, respectively; Table 2).

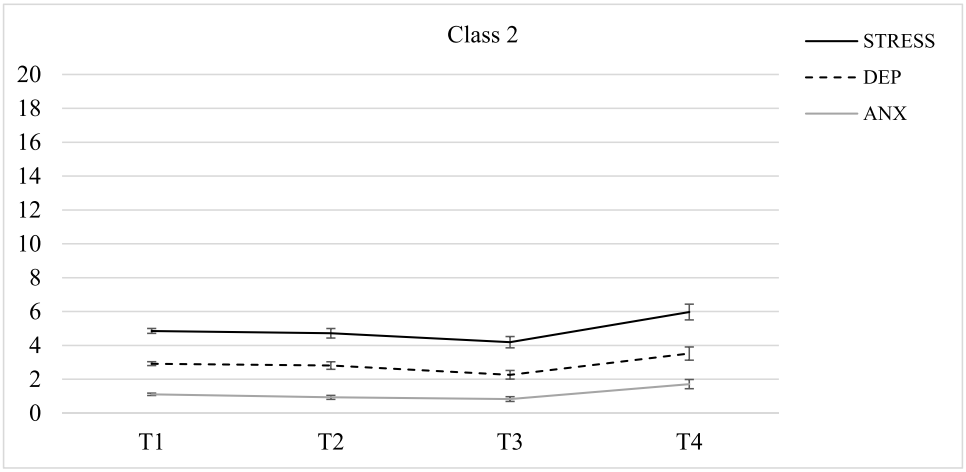
3.2. Predicting joint class membership

Factors associated with joint trajectories of depressive, anxiety and stress symptoms are presented in Tables S5-S6 (Supplementary Materials) and Fig. 2. Univariate analyses (Table S5) showed an association between age, sex, educational level, employment status, IU, ERQ-

a – class 1, “Moderate chronic” (13%)



b – class 2, “Normal-increasing” (54%)



c – class 3, “Mild-vulnerable” (33%)

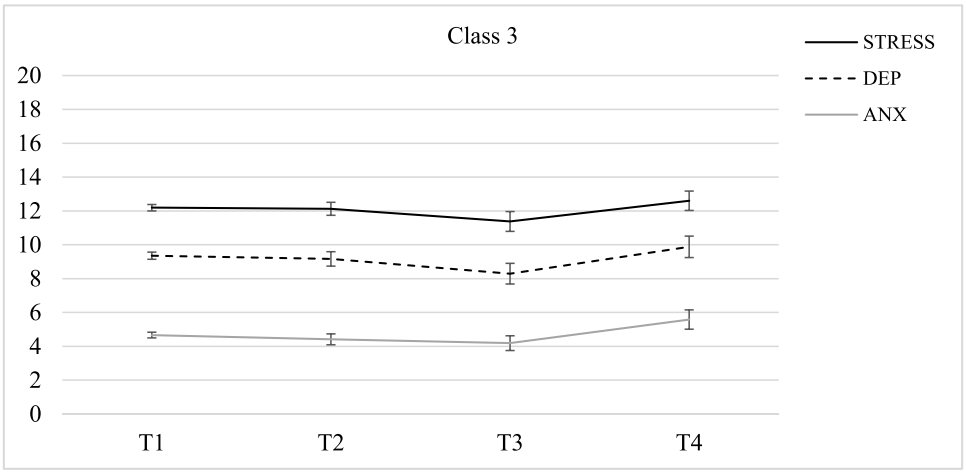


Fig. 1. Plot showing the mean trajectories with 95% CIs of the three-class model for depressive, anxiety and stress symptoms.

Table 2
Intercepts, liner slopes, quadratic terms and standard errors (in parentheses) of the Latent Class Longitudinal Trajectory Groups for depression, anxiety and stress symptoms.

Class	Parameter	Depressive symptoms	Anxiety symptoms	Stress symptoms
Class 1 (n = 505)	Intercept	14.316 (0.281)***	12.445 (0.462)***	16.941 (0.194)***
	Linear	−0.278 (0.660)	−0.677 (0.879)	.465 (0.495)
	Quadratic	.043 (0.240)	.162 (0.311)	−0.197 (0.178)
Class 2 (n = 2110)	Intercept	3.004 (0.123)***	1.152 (0.051)***	4.926 (0.163)***
	Linear	−0.690 (0.163)***	−0.540 (0.098)***	−0.860 (0.211)***
	Quadratic	.268 (0.063)***	.231 (0.042)***	.379 (0.080)***
Class 3 (n = 1316)	Intercept	9.283 (0.312)***	4.645 (0.244)***	12.134 (0.277)***
	Linear	−0.777 (0.358)*	−0.798 (0.285)**	−0.537 (0.343)
	Quadratic	.287 (0.131)*	.354 (0.107)**	.203 (0.123)

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

cognitive reappraisal, ERQ-expressive suppression, fear of the COVID-19 pandemic, and joint trajectories of depressive, anxiety and stress symptoms. Data about the multivariate regression model (Fig. 2) showed that the odds against older and male participants, as well as those with higher scores on cognitive reappraisal, were lower with regard to having a problematic joint trajectory of depressive, anxiety and stress symptoms (i.e., Moderate-chronic or Mild-vulnerable classes). Moreover, for unemployed participants, as well as those with greater IU, expressive suppression and fear of the COVID-19 pandemic, the odds for registering a problematic joint trajectory of depressive, anxiety and stress symptoms (i.e., Moderate-chronic and Mild-vulnerable classes) were higher (see Table S6 - Supplementary Material – for more information).

3.3. Sensitivity analysis

Sensitivity checks were carried out by running the analyses with a subsample of 1480 participants with two+ time points (Supplementary Material). Results about the joint longitudinal trajectories of depressive, anxiety and stress symptoms as well as the factors associated with class membership remained largely unchanged (see Tables S7-S11).

4. Discussion

The current longitudinal study examined joint trajectories of anxiety, depression and stress from April 2020 to May 2021 during the COVID-19 pandemic. The analysis identified a three-class model for relationships between depression, anxiety and stress outcomes, with mental health trajectories able to identify participants in relation to a stability or to a worsening of symptoms over time. Results show that only one subgroup (13% of participants) reported significant moderate levels of depression and anxiety, and a mild level of stress, which remained stable across time. However, the majority of the sample (i.e., 54% of participants) exhibited a resilient mental health trajectory characterized by minimal changes in depression, anxiety and stress. Overall, our findings support the fact that group heterogeneity could be detected in the trajectories of mental health distress during the COVID-19 pandemic and it may help to identify subgroups at risk of chronic distress. Previous studies explored longitudinal trajectories of mental health symptoms in 2020 (Fancourt et al., 2021; Pierce et al., 2021; Shevlin et al., 2021) and suggested a negative impact of the pandemic on some vulnerable subgroups (Liang et al., 2022; Lu et al., 2022; McPherson et al., 2021). A previous longitudinal study with an adult Italian population showed that after the first lockdown, mental health symptoms decreased slightly but, in conjunction with the newly imposed restrictions, they rose, due to the second wave of the pandemic (Fioravanti et al., 2022). Our findings add that more than one year after the national lockdown, around one third of the sample exhibited mild levels of depression and anxiety, which increased in 2021, and around 13% of individuals belonged to a class displaying a moderate level of depression and anxiety. Based on the cut-off points of DASS severity (Lovibond and Lovibond, 1995), these two class trajectories remained in the moderate to mild range. Taken together, these findings seem in line with previous meta-analytic evidence showing a decline in mental health during the onset of the COVID-19 pandemic and a slight decrease in symptoms after the ease of social restrictions (Richter et al., 2021; Robinson et al., 2022; Salanti et al., 2022). Our findings are also in line with those reported in a study with a Chinese population (Chen et al., 2022), which found a three-class solution for depression and anxiety, with similar trajectories of resilience, chronicity and mild, declining symptoms in 2020. However, the current findings suggest that a vulnerable subgroup reported stable and moderate mental health symptoms in mid 2021, which might well reflect an ongoing struggle against the pandemic. This finding differs from those reported in a study with a Polish population (Gambin et al., 2022), which also found a small, worsening class, the members of which experienced an increase in anxiety and depression symptoms in mid-2020 and a slight decrease during the second lockdown in April 2021. It is likely that these different classes may reflect specific reactions to the restrictions due to the pandemic waves. Although the national lockdown in Italy ended in

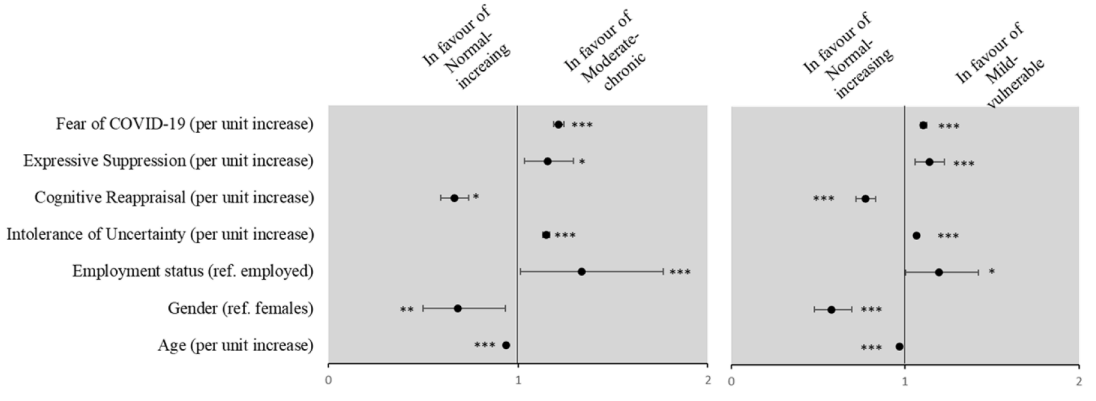


Fig. 2. Multivariable analysis including variables significantly associated with trajectories of depressive, anxiety and stress symptoms. Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

early May 2020, the Italian government activated area-specific differential restrictions for COVID-19 prevention after the spread of the second wave of the pandemic in October 2020. Thus, our data may suggest that some vulnerable individuals showed sustained mental health distress in 2021, given the ongoing social restriction measures due to the high number of cases and hospitalizations due to COVID-19 infection. However, in the present study we were unable to examine the role of participants' adherence to restriction measures, because they differed between Regions and the assessment spanned a period in which these rules changed. Our finding seems also to be in line with those reported by a large community study in Germany (Bendau et al., 2022), which reported some peaks in symptoms during the second and third pandemic waves, in times of increased infection rates. Taken together, these findings suggest that research is certainly needed to examine different trajectories of mental health distress over the course of the pandemic, by also considering the impact of differentiated restrictions in different countries, as well as the occurrence of the immune-escape virus variant Omicron and the uptake of vaccination.

Regarding the psychological and sociodemographic characteristics associated with vulnerable mental health trajectories, the results of the multivariate regression models showed that IU, expressive suppression, and fear of COVID-19 pandemic at baseline were risk characteristics associated with vulnerable joint trajectories for anxiety, depression and stress. To date, the role of IU (Reizer et al., 2021; Shevlin et al., 2021) and maladaptive ER strategies (Chen et al., 2022; Groarke et al., 2021; Low et al., 2021) in predicting mental health distress during the pandemic has received initial support. However, whereas these previous reports tracked mental health during the first year of the pandemic, we found that both these psychological risk factors could allow one to predict individual belonging to vulnerable trajectories for depression and anxiety one year after the end of national lockdown in Italy. Of note, cognitive reappraisal (i.e., modifying the cognitive meaning attributed to a threat) was associated with a lower likelihood that participants would show vulnerable class membership for anxiety, depression, and stress. This finding suggests that an ability to effectively regulate one's emotions may play a role in alleviating the negative mental effects of the pandemic and improve one's resilience to threat of pandemic, in accordance with previous research reports from Italy (Cardi et al., 2021; Preti et al., 2021). The findings of the current study also suggest that high feelings of fear of COVID-19 pandemic during the lockdown were associated with belonging to vulnerable classes as regards depression, anxiety and stress, thus supporting the role of these negative feelings in mental health distress during the pandemic (Alimoradi et al., 2022). Regarding sociodemographic variables, our results showed that vulnerability to depression, anxiety and stress was higher in females, younger age groups and those unemployed during the first lockdown. These results may reflect a gendered and age-related response to the pandemic, which were evidenced by prior reviews (Cénat et al., 2022; Robinson et al., 2022). However, in the current study females and young adults were overrepresented and this pattern of results may constitute a sample artifact.

The current findings have relevant implications for mental health policy makers. Given the ongoing spread of the pandemic and to prepare for future pandemics, policy makers need to ensure that an adequate mental health service provision might be targeted at the vulnerable groups of people reporting enduring patterns of distress. Maladaptive expressive suppression and IU seem to be pronounced risk factors and should get particular attention in therapeutic or preventive interventions. Emotion regulation training aimed at improving reappraisal, in order to tackle psychological stress and protect one from adopting risky behavior, might be especially important in this context. Finally, our results showed that many inequalities in mental health (such as inequalities by age, gender or unemployment) did remain and these vulnerable groups have remained at risk. Thus, it is essential to find ways of supporting vulnerable groups throughout the pandemic.

This study has some limitations. Given the non-probability convenience sampling, participants are not unconditionally representative of the general population in Italy. Secondly, online-based recruitment might amplify a selection bias, as previously outlined in mental health research during the pandemic (Richter et al., 2021). Moreover, high-frequency online data collection in the context of COVID-19 can lead to a loss of participants with poorer mental health, resulting in biased trends of deterioration. Heterogeneity revealed by the LCGA could indicate other time-dependent effects not caught by the model, e.g., localized spikes in infections or local/regional restrictions. Finally, we lacked reliable data on previous mental health diagnosis which can be an important predictor of worsening mental health during the pandemic (Pierce et al., 2021).

In summary, the current study showed that a substantial group of individuals in the general population has been unaffected by mental health distress during the pandemic. However, a chronic and stable mental distress trajectory can be isolated, and psychological characteristics such as IU, ER expressive suppression, and high fear of the COVID-19 pandemic emerged as risk factors for sustained mental health problems during the pandemic. Future research should focus on further clarifying what psychosocial factors might play a key role in heightening or buffering psychological distress in the population (Kunzler et al., 2021) in order to explain why worsening mental distress did not affect all people equally. Furthermore, given the ongoing struggle with the pandemic, future research will need to investigate the impact of new SARS-CoV-2 variants as well as prolonged economic difficulties on mental health distress in the general population.

Author statement

G.L.C.: Conceptualization, Investigation, Supervision, Writing – Original draft preparation. **L.S.:** Methodology, Formal analysis, Writing – Original draft preparation. **G.A.:** Data Curation, Writing - Review & Editing **C.P.:** Data Curation, Writing – Review & Editing. **G.L.:** Data Curation, Writing – Review & Editing. **E.M.:** Data Curation, Writing – Review & Editing **M.F.F.:** Data Curation, Writing – Review & Editing. **G. B.:** Data Curation, Writing – Review & Editing. **C.G.:** Writing – Review & Editing. **S.G.:** Methodology, Formal analysis, Writing – Review & Editing. **M.D.B.:** Conceptualization, Supervision, Project administration. All authors approved the submitted paper.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interest

None of the authors report any conflicts of interest with this work.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2023.115262.

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