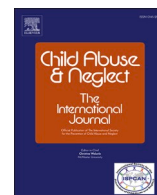




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Disentangling the associations between past childhood adversity and psychopathology during the COVID-19 pandemic: The mediating roles of specific pandemic stressors and coping strategies

Maria Jernslett^{a,*}, Xenia Anastassiou-Hadjicharalambous^a, Chrysanthi Lioupi^a, Ioannis Syros^{b,c}, Alexandros Kapatais^a, Vassia Karamanoli^d, Eleftheria Evgeniou^a, Kostas Messas^a, Triada Palaiokosta^a, Eleni Papathanasiou^a, Annett Lotzin^{e,f}

^a Psychology Program, University of Nicosia, 46 Makedonitissas Avenue, P.O. Box 24005, 1700 Nicosia, Cyprus

^b Department of Child Psychiatry, School of Medicine, National and Kapodistrian University of Athens, "Aghia Sophia" Children's Hospital, Athens, Greece

^c Child and Adolescent Psychiatry Unit, "Sotiria" General Hospital, Athens, Greece

^d Hellenic Military Academy, Faculty of Military Sciences, Division of Theoretical Sciences, Vari, Greece

^e Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

^f MSH Medical School Hamburg, Hamburg, Germany

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ABSTRACT

Background: Individuals with a history of adverse childhood experiences (ACEs) display heightened symptoms of psychopathology during the COVID-19 pandemic. Yet, no study has investigated what aspects of the pandemic are of particular concern for this population and ways in which strategies to coping with pandemic stressors may exacerbate their clinical symptomatology.

Objective: This study explores what pandemic stressors and coping strategies are associated with ACEs, depression, and posttraumatic stress disorder (PTSD) during the COVID-19 pandemic, before investigating whether the identified chief stressors and coping styles mediate the effects of ACEs on depression and PTSD.

Participants and setting: 1107 Greek adults were sampled from the general population.

Methods: Participants completed the Adverse Childhood Experiences Questionnaire, Patient Health Questionnaire, Primary Care PTSD Screen for DSM-5, Pandemic Stressor Scale, and Brief Cope Scale.

Results: ACEs and depression were both predominantly associated with difficult housing conditions as a stressor ($b = 0.079, p < .001$ and $b = 0.046, p < .001$, respectively), whereas PTSD was mainly related to fear of contracting the COVID-19 virus ($b = 0.065, p < .001$). Self-blame was the main coping strategy associated with both ACEs ($b = 0.046, p = .010$), depression ($b = 0.071, p < .0005$), and PTSD ($b = 0.088, p < .0005$). Difficult housing conditions and self-blame further demonstrated a significant serial mediation effect in the relationship between ACEs with both depression ($b = 0.105, 95\% \text{ CI } [0.0607, 0.158]$) and PTSD ($b = 0.019, 95\% \text{ CI } [0.011, 0.031]$).

* Corresponding author.

E-mail address: mariajern@hotmail.com (M. Jernslett).

Conclusions: The findings indicate that policy makers should identify ways of ameliorating challenging housing conditions, and that service providers should target self-blame in the psychological treatment of adults with ACEs during the COVID-19 pandemic.

1. Introduction

The COVID-19 pandemic has instigated challenging ramifications, disrupting the everyday lives of individuals worldwide (Giuntella et al., 2021; Zhang et al., 2020). Yet, there is a marked difference in the degree to which individuals are affected by these stressors, with many displaying resilience (Barzilay et al., 2020), and some demonstrating increased psychological vulnerability (Coulombe et al., 2020). Enhancing the understanding of the latter group is imperative to help service providers and policy makers with identifying trajectories of recovery. The term ‘psychological vulnerability’ is herein applied to refer to the susceptibility of developing psychopathological symptoms. Psychological vulnerability in general comprises a complex variety of variables, including genetic predispositions (Cross-Disorder Group of the Psychiatric Genomics Consortium, 2013), biological factors (Labonte & Turecki, 2010), early environmental conditions (Nelson et al., 2020), cultural and socioeconomic variations (Dressler et al., 2008), the presence of external stressors (Banica et al., 2021; Heim & Binder, 2012), the ways in which individuals cope with stressors (Kalial et al., 2020; Sheffler et al., 2019), and interactions between such variables (Heim & Binder, 2012). Hence, in working towards a comprehensive understanding of vulnerable individuals in the COVID-19 era, insights about distinct risk factors, pandemic stressors, coping strategies, and psychological health should be addressed in tandem. The current study addresses the associations between adverse childhood experiences with depression and posttraumatic stress because other studies suggest a relationship between these variables during the COVID-19 pandemic (Kim et al., 2020; Seitz et al., 2021). However, to the authors' knowledge, no study has explored what aspects of the pandemic and ways of coping with these stressors may explain these associations. Fig. 1 below presents a conceptual roadmap that outlines the pathways to be explored in this study.

1.1. Risk factor: adverse and traumatic childhood experiences

One factor that has been demonstrated to predispose individuals for heightened psychological vulnerability during the COVID-19 pandemic is past exposure to adverse and traumatic childhood experiences (Chi et al., 2020; Kim et al., 2020; Seitz et al., 2021; Shreffler et al., 2021; Tsur & Abu-Raiya, 2020). The World Health Organization defines childhood adversity and trauma as all experiences that involve abuse, neglect, or maltreatment, and that leads to potential or actual harm to children (Butchart et al., 2006). The definitions of ‘adversity’ and ‘trauma’ are subject to controversies in the literature, with some suggesting that ‘trauma’ describes events on the high-end of adversity (Krupnik, 2019). This paper applies the term ‘adversity’ to refer to the experiences themselves, and

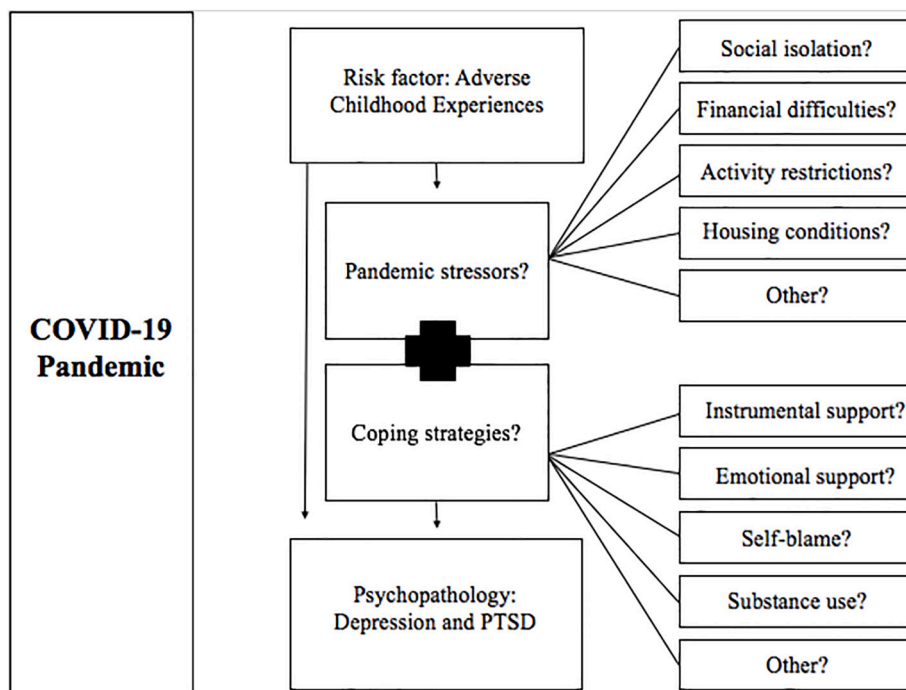


Fig. 1. Conceptual roadmap of variable pathways.

'trauma' to reflect the psychological impact of these events (Trickey, 2021). These terms are therefore herein used in conjunction to capture the potential impact of all such experiences. Childhood adversity is one of the most important risk factors in the aetiology of psychiatric disorders throughout the life span (Felitti et al., 1998; Nelson et al., 2020), posing a notably increased risk for the onset of internalizing psychopathology, such as depression and anxiety disorders (Li et al., 2016; Lindert et al., 2014; Liu et al., 2012; Maniglio, 2013). The psychological vulnerability implicated in this factor can be explained through the stress sensitization hypothesis (Hammen et al., 2000), which suggests that early exposure to adverse and traumatic experiences results in a decreased tolerance for stress (Hammen et al., 2000; Heim et al., 2019). This notion is supported by evidence demonstrating that childhood adversity and trauma may lead to a dysregulation of biological regulatory systems involved in stress responses that results in a heightened affective and physiological reactivity to stressors (Nusslock & Miller, 2016; Taylor et al., 2011), with these effects being particularly detrimental in cases of cumulative adverse experiences (Felitti et al., 1998). In line with this, a recent longitudinal study compared data collected before and during the COVID-19 pandemic and showed that elevated exposure to childhood adversity is related to heightened levels of posttraumatic stress during the pandemic (Seitz et al., 2021). However, no participant in this study identified the COVID-19 pandemic as the culprit for their posttraumatic stress symptoms, suggesting that exposure to pandemic stressors exacerbated preceding trauma-related symptomatology.

1.2. Pandemic stressors

A critical question, then, is what pandemic stressors interact with adverse and traumatic childhood experiences as a risk factor in aggravating existing psychopathology. In light of the aforementioned findings (Seitz et al., 2021), it may be that certain pandemic features mirror previous experiences of childhood adversity and trauma (Taggart et al., 2021). For instance, trauma survivors have previously reported feelings of entrapment to negatively influence their psychological health (Karatzias, 2017). The pandemic restrictions posed on social activities may reproduce this sense of entrapment by reflecting past abuse and neglect, ultimately resulting in re-traumatization (Jennings, 2009; Taggart et al., 2021), and consequently, elevated levels of psychopathology. In support of this notion, some studies suggest that feelings of loneliness and a perceived lack of social support mediate the effects of childhood adversity and trauma on pandemic mental health (Seitz et al., 2021; Shreffler et al., 2021), indicating that the pandemic consequences related to social restrictions are of particular concern for this at-risk group. However, it is also plausible that past experiences of childhood adversity and trauma are reflected by other pandemic ramifications, such as stay-at-home orders. This is particularly concerning due to the strong associations between childhood maltreatment and later adult intimate partner violence (Widom et al., 2014), indicating that adults with a history of maltreatment in childhood are more likely to be engaged in adult relationships that exhibit violent behaviours. Past exposure to adverse and traumatic childhood experiences is further associated with having a low socioeconomic status (Fonta & Maguire-Jack, 2016), indicating that the pandemic may confine these individuals within homes that offer limited opportunities to escape any abusive dynamics. As such, some of the pandemic restrictions may not only mirror past adversity and trauma, but also facilitate a recreation of the past adversity in a literal sense. This possibility is supported by a range of evidence gleaned from across the globe demonstrating a sharp rise in domestic violence during the pandemic (Office for National Statistics, 2020; Oliveira et al., 2020; Piquero et al., 2021). Identifying the focal pandemic stressors in relation to this at risk-group is therefore essential both to identify avenues for alleviating further psychiatric escalation and to guide the installment of appropriate protective measures.

1.3. Coping strategies

The potential re-traumatizing effects of the COVID-19 pandemic may also be reflected through the ways in which adversity and trauma-exposed individuals respond to the pandemic stressors. Individuals with a history of childhood adversity and trauma do not only display an inherent biological vulnerability to stressors (Hammen et al., 2000; Heim et al., 2019; Nusslock & Miller, 2016), but also a propensity for employing maladaptive approaches to coping that increase the risk for psychopathology (Dorresteijn et al., 2019; Filipas & Ullman, 2006). The maladaptive nature of coping is postulated to be shaped by the early adverse and traumatic experiences themselves, such as those involving abuse and neglect (Lahousen et al., 2019; Thomson & Jaque, 2017). For example, in cases where the child maltreatment is perpetrated by a parental character, children may internalize a sense of deserving the mistreatment in an attempt to preserve their relationship with their attachment figure; a relationship that is pivotal to their survival (Lahousen et al., 2019). This pernicious internalization may also take place in order for the children to gain a sense of control amidst the adversity, which could explain this response to instances of maltreatment by alternative adult perpetrators as well. In line with these postulations, a coping strategy that is strongly associated with exposure to childhood adversity and trauma is self-blame; that is, the tendency to blame and criticize oneself for exposure to adverse experiences (Dorresteijn et al., 2019; Filipas & Ullman, 2006). This coping strategy, in turn, is related to higher levels of trauma-related psychopathology (Kline et al., 2021), including depression (Zahn et al., 2015). Thus, combined with the delineation of distinct stressors, variations of coping strategies may help explain some of the pandemic mental health disparities among individuals with a history of childhood adversity and trauma. This notion is supported by a growing body of literature demonstrating the mediating role of coping strategies in accounting for the effects of childhood adversity and trauma and subsequent stressors on adult psychological health (Kalial et al., 2020; Sheffler et al., 2019). Coping strategies are further postulated to be contingent upon the nature of a particular stressor (Lazarus, 1981), highlighting the importance of examining the ways in which individuals exposed to childhood adversity and trauma respond to the COVID-19 pandemic specifically; an unprecedented event comprising a range of potentially traumatic ramifications.

In spite of the complex nature of psychological vulnerability (Banica et al., 2021; Heim & Binder, 2012; Labonte & Turecki, 2010) and the compounding nature of the pandemic, there appears to be no study that has examined how previous exposure to childhood

adversity and trauma and distinct pandemic stressors relate in vulnerable individuals. Disentangling the COVID-19 pandemic and its stressors is essential to identify avenues for preventing and alleviating further escalation of psychological difficulties in this at-risk group. Moreover, addressing coping strategies within this complex risk and pandemic stressor relationship is imperative to inform interventions on what behaviours, affections, and cognitions to target. Together, the exploration of distinct pandemic stressors and coping strategies in relation to past childhood adversity and trauma and current psychopathology may help capture some of the most vulnerable individuals during the COVID-19 pandemic and prompt appropriate trajectories of rehabilitation.

The current study first has two explorative research aims, followed by a third main objective:

- 1) To explore what pandemic stressors are of particular concern for adults with a history of childhood adversity by investigating the stressors associated with both childhood adversity and depression, and/or posttraumatic stress;
- 2) To further explore the coping strategies that adults exposed to childhood adversity are most likely to employ during the pandemic, with a particular interest in what coping styles may be linked with both childhood adversity and depression, and/or posttraumatic stress.

The results of the explorative analyses will then provide a basis for forming hypotheses, which will underpin the final research aim:

- 3) To examine mediation effects of the emerging chief pandemic stressors and coping strategies in the relationship between childhood adversity and symptoms of depression and posttraumatic stress during the pandemic. It is hypothesized that the stressors and coping strategies with the largest significant effect sizes in relation to adverse childhood experiences and depression and/or posttraumatic stress will mediate the effects of past childhood adversity on current depressive and posttraumatic stress symptoms.

2. Methods

2.1. Study design and setting

The present study is part of a larger longitudinal pan-European project titled ‘ADJUST Study’, which explores associations between risk and resilience factors, stressors, and symptoms of mental health during the COVID-19 pandemic in Germany, Sweden, Portugal, Italy, Croatia, Poland, the Netherlands, Georgia, Lithuania, Greece, and Austria (for the main protocol, see Lotzin et al., 2020). The present study used first-wave data from Greece.

2.2. Sample

Table 1 presents the demographic characteristics of the sample. The eligibility criteria were: 1) aged above 18 years and 2) ability to

Table 1
Sociodemographic characteristics of the sample ($N = 1107$).

Age	<i>M</i>	<i>SD</i>
Mean and <i>SD</i>	35.9	12.5
Range	18–82	
<hr/>		
	<i>N</i>	%
<i>Gender</i>		
Female	753	68%
Male	354	32%
<i>Education</i>		
Less than 6 years of schooling	11	1%
6–9 years of schooling	22	2%
10–13 years of schooling	171	15.4%
Completed vocational studies	96	8.7%
Completed university studies	538	48.6%
Completed postgraduate studies	269	24.3%
<i>Income^a</i>		
Very low (<€500)	110	9.9%
Low (€500 to <€1000)	390	35.2%
Low moderate (€1000 to <€2000)	371	33.5%
High moderate (€2000 to <€3000)	137	12.4%
High (≥€3000)	58	5.2%
Other	41	3.7%

^a Income categories refer to monthly household salaries.

complete the survey in Greek.

2.3. Measures

2.3.1. Demographic characteristics

A demographic questionnaire assessed age, gender, income, and risk for severe COVID-19 infection.

2.3.2. Adverse Childhood Experiences

The Adverse Childhood Experiences (ACE) questionnaire was administered to evaluate the participants' history of childhood adversity (Felitti et al., 1998). The ACE questionnaire is a 10-item measure that evaluates the degree to which individuals have been subject to childhood adversity on two subscales: child maltreatment and household dysfunction. Participants respond to each statement in a yes or no format (e.g., 'Before your 18th birthday, *did a parent or other adult in the household often or very often ... Swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?*'). A higher score indicates a more severe history of childhood adversity. Internal consistency in the present study was acceptable ($\alpha = 0.69$).

2.3.3. Posttraumatic Stress Disorder (PTSD)

The Primary Care PTSD Screen for DSM-5 was employed to assess PTSD (PC-PTSD-5; Prins et al., 2015). The PC-PTSD-5 consists of five items that prompt participants to indicate whether they have experienced different symptoms within the last month in a yes or no format. This screening tool has demonstrated strong results with respect to diagnostic precision (Prins et al., 2015). In the present study, the internal consistency was good ($\alpha = 0.77$).

2.3.4. Depression

Depressive symptoms were measured by applying the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). The PHQ-9 consists of nine items where participants are asked to rate their experience of depressive symptoms within the last two weeks, including fatigue, adverse thoughts and loss of appetite, with response choices ranging from 0 to 3 (0 = not at all, 3 = nearly every day). The PHQ demonstrated good internal consistency within this sample ($\alpha = 0.86$).

2.3.5. Pandemic stressors

The Pandemic Stressor Scale (PaSS) was used to evaluate the stressors related to the COVID-19 pandemic (Lotzin et al., 2022). PaSS is a 30-item measure that includes questions in relation to nine major pandemic stressors: problems with childcare (e.g., difficulties with combining work with childcare, loss of childcare), restricted physical social contact (e.g., isolation, restricted face-to-face contact with loved ones), work-related problems (e.g., reduced income, redundancy), fear of infection (e.g., fear of oneself or loved ones contracting the virus), burden of infection (e.g., fear of transmitting the virus, stigma associated with having the virus), restricted activity (e.g., restrictions around leisure), crisis management and communication (e.g., government management and media coverage of the pandemic), restricted access to resources (e.g., restricted access to commodities and healthcare services), and difficult housing conditions (e.g., no place to retreat, conflicts and violence at home). All stressors were assessed with a 4-point Likert scale (0 = not at all burdened, 3 = strongly burdened), asking participants to rate their experience of each stressor during the last month (Lotzin et al., 2020). The measure showed good internal consistency in the present study ($\alpha = 0.87$).

2.3.6. Coping strategies

Coping Strategies were assessed using the Brief Cope; a multidimensional questionnaire involving fourteen approaches to coping with stressors (Carver, 1997). These strategies include self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion and self-blame. Each coping strategy is assessed by two items each, comprising a total of 28 items, each on 4-point Likert scale (ranging from 1 = 'I have not been doing this at all' to 4 = 'I have been doing this a lot'). The internal consistency in the present study was good ($\alpha = 0.89$).

2.4. Procedure

The study received ethical approval by the Social Sciences Ethics Review Board (SSERB) at the University of Nicosia (SSERB 00209). Data collection took place between June and November 2020. Recruitment was conducted online. To enhance the variability of the sample with respect to demographic characteristics (e.g., age, gender, income, and education), the study was advertised on a range of social platforms (e.g., Twitter, Facebook, and WhatsApp), online forums, and by disseminating information about the study through universities and professional organizations. Individuals who were interested in participating were provided a link to the survey, and were able to participate after providing written informed consent. Participants received no monetary compensation. The survey further outlined a variety of helplines and websites that participants could use if they experienced psychological distress and needed assistance. These helplines and websites included hotlines for emergency support, a suicide intervention hotline, hotlines for victims of violence and abuse, support with depression and anxiety, and general guidance on coping psychologically with the stressors of the COVID-19 pandemic.

2.5. Data analysis

Of the 1107 participants, 209 cases missed all of the data on all variables of interest. Little's MCAR test showed that the data were missing completely at random, $\chi^2(84) = 86.815$, $p = .395$. Further investigation revealed that these participants terminated their participation in the survey early on, rendering imputation methods inappropriate. This left 898 participants for inclusion in the analyses. Participants with missing values did not differ from those with no missing values in terms of age ($r = 0.012$, $p > .05$), gender ($r = 0.024$, $p > .05$), or income ($r = 0.036$, $p > .05$). The study employed two statistical analyses; multivariate multiple regression and mediation analysis.

Two multivariate multiple regression analyses were employed to address the first two explorative research aims, and indicated associations between adverse childhood experiences, depression, and posttraumatic stress disorder with pandemic stressors and coping strategies, and were conducted using SPSS version 25. Both regression analyses included age, gender, income, and risk for severe COVID-19 disease as control variables. The p -value was adjusted for multiple testing, setting the significance levels for the regression analyses to .025 and .005.

The first multivariate multiple regression analysis predicted the pandemic stressors, and therefore included the following outcome variables: problems with childcare, restricted physical social contact, work-related problems, fear of infection, burden of infection, restricted activity, crisis management and communication, restricted access to resources, and difficult housing conditions. An inspection of Q-Q Plots and histograms revealed that the residuals of 'problems with childcare' demonstrated extreme skewness, and the distribution did not improve when transformations were employed (i.e., squaring, log10, and inversion). Since the variable did not display any significant associations with the predictors, it was excluded from the analysis. This left a total of eight outcome variables. Of these, fear of infection, burden of infection, restricted activity, and crisis management and communication displayed moderate skewness, and were therefore squared to meet the assumption of normality. Preliminary analyses further revealed 16 outliers, which were excluded after observing their influence on the results. After selecting for a listwise inclusion of variables, the final analysis consisted of 846 cases.

The other multivariate multiple regression analysis predicted the following coping strategies: active coping, planning, positive reframing, acceptance, humour, religion, using emotional support, using instrumental support, self-distraction, denial, self-blame,

Table 2
Means and standard deviations of variables.

	<i>M</i>	<i>SD</i>	<i>N</i>
<i>Predictors</i>			
Adverse childhood experiences	0.67	1.26	877
Depression	5.33	4.87	846
PTSD	1.01	1.43	872
<i>Outcome variables: Pandemic stressors</i>			
Restricted physical social contact	2.4	0.65	877
Work-related problems	1.08	0.98	877
Fear of infection	−0.82	0.45	877
Burden of infection	0.67	0.56	877
Restricted activity	−0.89	0.45	877
Crisis management and communication	−0.94	0.50	877
Restricted access to resources	1.16	0.84	877
Difficult housing conditions	0.75	0.71	877
<i>Outcome variables: Coping strategies</i>			
Active coping	3.62	1.63	857
Planning	2.69	1.68	857
Positive reframing	3.40	1.77	857
Acceptance	4.36	1.47	857
Humour	2.23	1.62	857
Religion	1.71	1.96	857
Using emotional support	2.04	1.79	857
Using instrumental support	1.93	1.66	857
Self-distraction	3.51	1.62	857
Denial	0.73	1.36	857
Venting	2.56	1.50	857
Substance use	0.41	1.12	857
Behavioural disengagement	0.81	1.28	857
Self-blame	0.9358	1.50057	857
<i>Control variables^a</i>			
	% no	% yes	<i>N</i>
Risk for severe COVID-19 disease	85.20%	14.80%	877

^a See Table 1 for the values of the other control variables.

substance use, venting, and behavioural disengagement. Of these, active coping, acceptance, humour, religion, denial, self-blame, substance use, and behavioural disengagement demonstrated skewness. Substance use and behavioural disengagement displayed more severe skewness, and inversion and log10 proved to be the most suitable transformation methods for these variables, respectively. All other variables with skewness were squared, except from active coping, because the distribution did not improve following any of the transformation methods. Further, 18 outliers were removed as they had a bearing on the results. The selection of a listwise inclusion of variables left 852 cases for the final analysis.

Following the multivariate multiple regression analyses, mediation analyses explored the mediation effects of pandemic stressors and coping strategies in the relationship between adverse childhood experiences with depression and PTSD as outcome variables in two separate analyses. Pandemic stressors and coping strategies that showed the largest effect sizes in relation to adverse childhood experiences and depression and/or PTSD in the multivariate multiple regression analyses were included. This resulted in two mediation analyses that investigated the serial mediation effects of one pandemic stressor and one coping strategy in the relationship between adverse childhood experiences with depression and PTSD, which included 867 and 878 cases, respectively. The mediation analyses were conducted using the PROCESS macro v4.0 (Hayes, 2018).

3. Results

Table 2 presents the means and standard deviations of all variables. The correlations between the variables can be found in the supplementary material.

3.1. Multivariate multiple regression predicting pandemic stressors

The association between adverse childhood experiences and the pandemic stressors combined was statistically significant, $F(8, 831) = 5.697, p < .0005$; Wilks' $\Lambda = 0.948$; partial $\eta^2 = 0.052$. Of all predictors, depression produced the largest effect, $F(8, 831) = 11.524, p < .0005$; Wilks' $\Lambda = 0.900$; partial $\eta^2 = 0.100$, followed by PTSD, $F(8, 831) = 6.523, p < .0005$; Wilks' $\Lambda = 0.941$; partial $\eta^2 = 0.059$.

Adverse childhood experiences predicted challenges with five stressors. The pandemic stressor with the largest effect size was difficult housing conditions ($b = 0.079, p < .001, \eta^2 = 0.021$). The positive beta-value suggests that participants with a more severe history of childhood adversity were more likely to report challenges with this pandemic stressor.

Depression was associated with three pandemic stressors, and difficult housing conditions was also the stressor yielding the greatest effect size in relation to this predictor ($b = 0.046, p < .001, \eta^2 = 0.087$). As with adverse childhood experiences, this beta-value is also positive, suggesting that participants scoring higher on depression were more likely to experience challenges with this stressor.

PTSD displayed associations with six stressors. Of these, fear of infection was the pandemic stressor of largest effect with a positive beta-value; $b = 0.065, p < .001, \eta^2 = 0.034$, indicating that participants with a more severe PTSD symptomatology were more likely to perceive this stressor as particularly challenging. While past childhood adversity was also associated with this stressor ($b = -0.042, p < .001, \eta^2 = 0.013$), the beta-value was negative, indicating that individuals who scored higher on adverse childhood experiences were less likely to report challenges with this stressor.

For a complete overview of the results of this multivariate multiple regression analysis see Table 3.

3.2. Multivariate multiple regression predicting coping strategies

The association between adverse childhood experiences and coping strategies combined was statistically significant, $F(14, 831) = 2.304, p = .004$; Wilks' $\Lambda = 0.963$; partial $\eta^2 = 0.037$. Of the main predictors, depression was the predictor of greatest effect, producing a large effect size, $F(14, 831) = 22.852, p < .0005$; Wilks' $\Lambda = 0.722$; partial $\eta^2 = 0.278$. PTSD generated a moderate to large effect size,

Table 3

Multivariate multiple regression predicting pandemic stressors ($N = 846$).

Outcome variables: Pandemic stressors	Main predictors								
	ACE			Depression			PTSD		
	B	Std. error	η^2	B	Std. error	η^2	B	Std. error	η^2
Restricted social physical contact	-0.029	0.019	0.002	0.003	0.005	0.000	0.078**	0.018	0.022
Work-related problems	0.019	0.027	0.001	0.028**	0.008	0.016	0.110**	0.026	0.020
Burden of infection	-0.037*	0.016	0.006	0.003	0.005	0.000	0.026	0.016	0.003
Fear of infection	-0.042**	0.013	0.013	0.006	0.003	0.003	0.065**	0.012	0.034
Restricted activity	-0.012	0.013	0.001	0.013**	0.004	0.015	0.035**	0.012	0.009
Crisis management and communication	-0.036*	0.015	0.007	0.003	0.004	0.001	0.033*	0.014	0.007
Restricted access to resources	-0.063*	0.024	0.008	0.007	0.007	0.001	0.078**	0.023	0.013
Difficult housing conditions	0.079**	0.019	0.021	0.046**	0.005	0.087	0.017	0.018	0.001

Note. (ACE) = Adverse childhood experiences. This table excludes the control variables to enhance the readability of the main results. Please see supplementary material for an overview of the results of the control variables together with the main predictors.

* $p < .025$.

** $p < .005$.

$F(14, 813) = 4.195, p < .0005$; Wilks' $\Lambda = 0.934$; partial $\eta^2 = 0.066$.

Adverse childhood experiences predicted the application of three coping styles. These were active coping ($b = -0.145, p = .002, \eta^2 = 0.011$), behavioural disengagement ($b = 0.048, p = .012, \eta^2 = 0.008$), and self-blame ($b = 0.046, p = .010, \eta^2 = 0.008$). While the beta-value for behavioural disengagement and self-blame are positive, suggesting that participants scoring higher on adverse childhood experiences were more likely to report employment of these coping styles, the beta-value of active coping is negative, indicating that these participants are less likely to use this strategy to cope with stressors. However, these effect sizes are all small.

Depression predicted nine coping styles, with self-blame generating a particularly large effect size ($b = 0.071, p < .0005, \eta^2 = 0.191$). Behavioural disengagement and substance use generated moderate to large effect sizes, with values of $b = 0.051, p < .0005, \eta^2 = 0.099$ and $b = 0.018, p < .0005, \eta^2 = 0.105$, respectively. The positive beta-values suggest that participants with more severe depression are more likely to employ these coping styles in the face of adversity.

PTSD symptomatology was associated with the greatest amount of coping styles. Similarly to depression, participants who scored higher on the PTSD measure were most likely to report the use of self-blame to cope with stressors ($b = 0.088, p < .0005, \eta^2 = 0.029$).

For a comprehensive outline of the results from the multivariate multiple regression analysis predicting the coping strategies, see Table 4 below.

3.3. Mediation analysis of association between adverse childhood experiences and depression

The mediators were selected based on the results of the multivariate multiple regression analyses. In the first regression, the pandemic stressor yielding the greatest effect size with both adverse childhood experiences and depression was difficult housing conditions. Thus, difficult housing conditions were used as a mediator when testing for the effects of childhood adversity on current depression. In the regression predicting coping strategies, depression displayed a substantial association with self-blame, and self-blame was also associated with adverse childhood experiences. Therefore, self-blame comprised the second mediator in the first mediation analysis.

A serial mediation model demonstrated that difficult housing conditions and self-blame serially partially mediated the association between adverse childhood experiences and depression. Using a 95% bootstrap resampling technique with 5000 samples, the total indirect effect was significant ($b = 0.582, SE = 0.096, 95\% CI: 0.405-0.786$). The indirect effect of childhood adversity on depression through housing conditions ($b = 0.187, SE = 0.0438, 95\% CI: [0.110, 0.282]$) and through self-blame ($b = 0.290, SE = 0.082, 95\% CI [0.144, 0.464]$) were both significant, as well as the serial indirect effect ($b = 0.105, SE = 0.0247, 95\% CI [0.0607, 0.158]$). The full model, as shown in Fig. 2, explained 34.8% of the variance in depression ($R^2 = 0.348, F(3,86) = 153.57, p < .001$).

3.4. Mediation analysis of association between adverse childhood experiences and PTSD

The pandemic stressor for this mediation analysis was identified by combining the results of the regression with the results of the correlation analysis (Table 3). Since the pandemic stressor of greatest effect in relation to childhood adversity was difficult housing conditions in the regression, and this stressor further displayed a significant association with PTSD in the correlation analysis ($r = 0.216, p > .01$), difficult housing conditions was selected for this mediation analysis as well. The coping style with the largest effect with respect to PTSD was self-blame, and as this was also associated with childhood adversity in the regression, this coping strategy was also again used as the second mediator.

Table 4
Multivariate multiple regression predicting coping strategies ($N = 852$).

Outcome variables: Coping strategies	Main predictors								
	ACE			Depression			PTSD		
	B	Std. error	η^2	B	Std. error	η^2	B	Std. error	η^2
Active coping	-0.145**	0.047	0.011	-0.008	0.013	0.000	0.170**	0.045	0.017
Planning	-0.030	0.048	0.000	0.033*	0.013	0.007	0.193**	0.046	0.020
Positive reframing	-0.023	0.050	0.000	-0.030	0.014	0.005	0.191**	0.049	0.018
Acceptance	-0.022	0.021	0.001	-0.020**	0.006	0.013	0.017	0.020	0.001
Humour	0.011	0.020	0.000	0.009	0.006	0.003	0.044*	0.019	0.006
Religion	-0.034	0.025	0.002	0.004	0.007	0.000	0.086**	0.025	0.014
Using emotional support	-0.008	0.049	0.000	0.074**	0.013	0.034	0.127*	0.047	0.009
Using instrumental support	-0.015	0.046	0.000	0.059**	0.013	0.025	0.155**	0.044	0.014
Self-distraction	-0.050	0.046	0.001	0.025	0.013	0.005	0.180**	0.045	0.019
Denial	-0.002	0.007	0.000	0.009**	0.002	0.028	0.002	0.007	0.000
Venting	0.053	0.041	0.002	0.046**	0.011	0.019	0.153**	0.040	0.017
Substance use	0.007	0.007	0.001	0.018**	0.002	0.105	-0.006	0.006	0.001
Behavioural disengagement	0.048*	0.019	0.008	0.051**	0.005	0.099	-0.002	0.018	0.000
Self-blame	0.046*	0.018	0.008	0.071**	0.005	0.191	0.088**	0.017	0.029

Note. (ACE) = Adverse childhood experiences. This table excludes the control variables to enhance the readability of the main results. Please see supplementary material for an overview of the results of the control variables together with the main predictors.

* $p < .025$.

** $p < .005$.

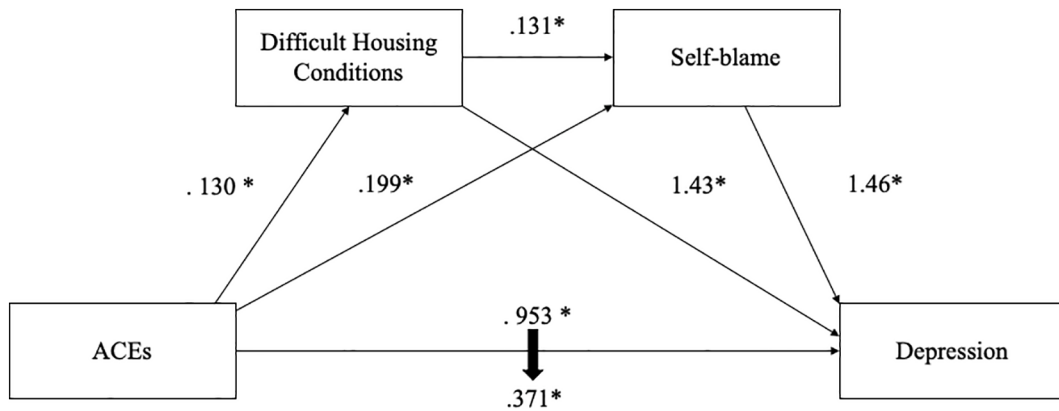


Fig. 2. Serial mediation of housing conditions and self-blame on the association between adverse childhood experiences and depression; $*p < .01$.

The second serial mediation model demonstrated that difficult housing conditions and self-blame serially partially mediated the association between adverse childhood experiences and PTSD. Using a 95% bootstrap resampling technique with 5000 samples, the total indirect effect was significant ($b = 0.092$, $SE = 0.0198$, 95% CI: [0.554, 0.133]). The indirect effect of childhood adversity on PTSD through housing conditions ($b = 0.0153$, $SE = 0.009$, 95% CI: [-0.002, 0.034]) was non-significant, but was significant through self-blame ($b = 0.051$, $SE = 0.017$, 95% CI [0.027, 0.093]); as the serial indirect effect through both mediators was significant ($b = 0.019$, $SE = 0.005$, 95% CI [0.011, 0.031]). The full model, as shown in Fig. 3, explained 20.3% of the variance in PTSD ($R^2 = 0.203$, $F(3,874) = 74.38$, $p < .001$).

4. Discussion

This study aimed to explore what pandemic stressors are of particular concern for adults with a history of childhood adversity and current symptoms of depression and PTSD, what strategies these adults employ to cope with the stressors, and subsequently whether the identified chief stressors and coping strategies mediate the associations of past exposure to childhood adversity with depression and PTSD during the COVID-19 pandemic.

In a large sample of Greek adults, it was found that the pandemic stressor of greatest challenge to individuals with a history of adverse childhood experiences and depression was related to difficult housing conditions, whereas PTSD was predominantly associated with a fear of being infected with the COVID-19 virus. As the purpose of this study was to examine the pandemic stressors linked with both adverse childhood experiences and psychopathology, a combined examination of the correlation and regression analyses emphasized difficult housing conditions as the chief stressor associated with childhood adversity and overall poor mental health. A second regression analysis identified self-blame as the main coping strategy linked with both adverse childhood experiences, depression, and PTSD. The ensuing mediation analyses then demonstrated a significant serial mediation effect of difficult housing conditions and self-blame, respectively, in both the relationship between adverse childhood experiences with depression and PTSD. However, difficult housing conditions was only a significant mediator via self-blame when PTSD was the outcome variable.

These findings both provide new insights and corroborate the existing literature on the adult ramifications of childhood adversity and trauma. For instance, to the best of our knowledge, this was the first study to explore what pandemic stressors present the greatest challenge to adults with a history of adverse and traumatic childhood experiences by investigating associations with a range of major stressors. Hence, while previous research found that pandemic stressors related to social restrictions partially mediate the effects of

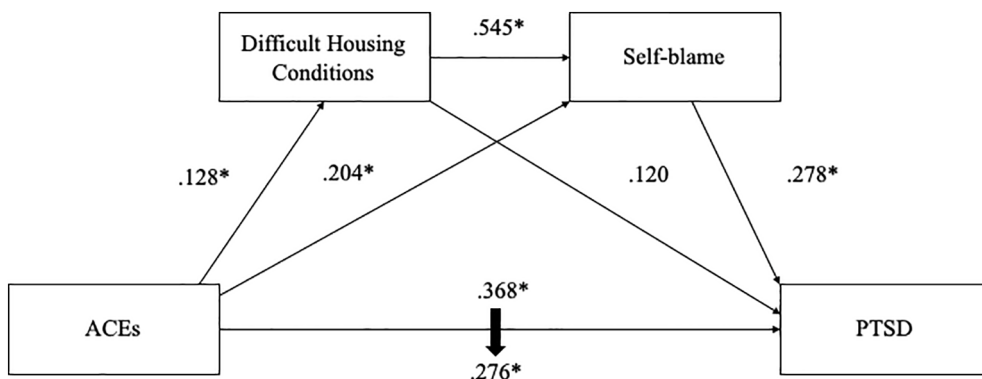


Fig. 3. Serial mediation of housing conditions and self-blame on the association between adverse childhood experiences and PTSD; $*p < .01$.

childhood adversity on pandemic mental health (Seitz et al., 2021; Shreffler et al., 2021), this study suggested that difficult housing conditions may be an even more concerning consequence of the COVID-19 pandemic for adults with a history of adverse and traumatic childhood experiences. The sense of entrapment that is suggested to negatively impact the mental health of adversity and trauma survivors during the pandemic (Taggart et al., 2021) may thus predominately be explained by stay-at-home orders; and the ensuing challenges might both mirror and recreate past experiences of child adversity and trauma. While difficult housing conditions has not previously been identified as the most challenging stressor related to the COVID-19 pandemic for adults with a history of adverse and traumatic childhood experiences, the surge of domestic violence during the pandemic (Office for National Statistics, 2020; Oliveira et al., 2020; Piquero et al., 2021), together with evidence of the strong association of exposure to childhood adversity and trauma and later adult intimate partner violence (Widom et al., 2014), lend some support to this finding.

Further, while past studies have found self-blame to be significantly associated with both adverse childhood experiences, depression, and PTSD (Dorresteyna et al., 2019; Filipas & Ullman, 2006; Kline et al., 2021; Zahn et al., 2015), to the best of our knowledge, this was the first study to suggest the importance of this coping style in explaining psychopathology in adults with past childhood adversity and trauma during the COVID-19 pandemic, as well as to pinpoint its serial mediation effect in conjunction with difficult housing conditions as a stressor. This finding may provide further support to the notion of the re-traumatizing effects of the pandemic on adults with past childhood adversity and trauma. If the challenges related to pandemic housing conditions are of a re-traumatizing nature, then it can be expected that the strategies to cope with such stressors also reflect exposure to previous adversity and trauma; self-blame is postulated to develop from an internalization of early adverse and traumatic experiences (Lahousen et al., 2019; Thomson & Jaque, 2017), and may thus be particularly strongly reinforced in instances where the past adversity and trauma are reflected or re-surfaces.

Together, these findings highlight two imperative points with implications that need to be considered by policy makers and service providers: firstly, difficult housing conditions may cause internalizations of previous childhood adversity and trauma to re-surface, thus leading to an increase in domestic conflicts, violence, and abuse. Secondly, the re-surfacing or mirroring of childhood adversity and trauma appears to be particularly detrimental when self-blame is employed as a coping strategy. The first point implicates the necessity of an increased attunement to the effects of childhood adversity and trauma with respect to social determinants of health. In particular, policy makers need to explore ways of improving the living circumstances of adversity- and trauma-exposed individuals during pandemics and other similar situations. For instance, the surge of domestic violence during the COVID-19 pandemic, together with the present findings, suggest that policy makers may need to consider whether some support centres for abuse victims should remain open during lockdowns. Moreover, it may be beneficial to develop a curriculum module for mental health and social workers that promote insight into ways of identifying detrimental housing conditions for adversity- and trauma-exposed adults and different avenues for alleviating them. The second point implicates the importance of employing a trauma-informed approach when helping childhood adversity and trauma-exposed individuals. The use of self-blame as a coping strategy, and its harmful effects on mental health, prompts the need for mental health professionals to help re-frame the victims' self-cognitions from 'what is wrong with me?' into 'what happened to me?' (Gilliver, 2018). In this way, childhood adversity and trauma victims can become empowered to recognize the impact of their past experiences and begin the process of mitigating the internalized abuse; thus breaking free from abusive dynamics.

Although the study improves previous research by illuminating the pandemic stressors and coping strategies within the relationship of past childhood adversity and trauma and current symptoms of mental health during the COVID-19 pandemic, it does not do so without limitations. Firstly, the cross-sectional design precludes causal inferences, and is particularly limiting with respect to the conclusions that can be drawn from the mediation analyses (Maxwell & Cole, 2007). For instance, the relationship between self-blame with depression and PTSD has been demonstrated previously to be of an intricate nature, with self-blame both leading to and resulting from mental health problems (Kline et al., 2021). Thus, although the current mediation models suggest that the employment of self-blame precipitates psychopathology, it is likely that these variables influence each other within more complex multidirectional relationships.

Another important limitation presents itself in the representativeness of the sample. While the mean score of adverse childhood experiences in the sample is 0.65, suggesting that the majority of the participants have no past experiences with adversity during childhood, other studies suggest that most of the general population have been subject to at least one adverse event during childhood (Felitti et al., 1998). For instance, a recent study investigated the frequency of adverse childhood experiences in a sample of 211,376 adults, and found the overall mean of adverse childhood events to be 1.56 (Giano et al., 2020). The low mean of childhood adversity in the present sample may be partially explained by the participants' high level of education, as individuals with more experiences of childhood adversity tend to display lower educational attainment (Houtepen et al., 2020). While the percentage of the population in Greece with university degrees is 29% (OECD, 2019), the percentage of the current sample is 72.9%. Thus, the conclusions that can be drawn from this study are somewhat curtailed by the biased representativeness of the sample.

The study nevertheless appears to be the first to investigate what stressors are particularly concerning during the COVID-19 pandemic for adults with past exposure to childhood adversity and trauma and what coping strategies these adults employ in response to the stressors. It is further the first to demonstrate the serial mediating effects of difficult housing conditions as a pandemic stressor and self-blame as a coping strategy in explaining the exacerbated clinical symptoms of individuals with a history of adverse and traumatic childhood experiences during the pandemic. This study thus provides an important contribution to the current literature by capturing some of the most psychologically vulnerable individuals during the COVID-19 pandemic. The results pinpoint the importance of exploring ways to alleviate stressors related to difficult housing conditions and to target self-blame cognitions to help individuals with previous exposure to childhood adversity and trauma as the COVID-19 pandemic continues, as well as in preparation for future pandemics and other similar situations.

Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chiabu.2022.105673>.

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