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Childhood Adversity Moderates Change in Latent Patterns of Psychological Adjustment during the COVID-19 Pandemic: Results of a Survey of U.S. Adults

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Abstract: Emerging evidence suggests that the consequences of childhood adversity impact later psychopathology by increasing individuals' risk of experiencing difficulties in adjusting to stressful situations later in life. The goals of this study were to: (a) identify sociodemographic factors associated with subgroups of psychological adjustment prior to and after the onset of the COVID-19 pandemic and (b) examine whether and to what extent types of childhood adversity predict transition probabilities. Participants were recruited via multiple social media platforms and listservs. Data were collected via an internet-based survey. Our analyses reflect 1942 adults (*M* = 39.68 years); 39.8% reported experiencing at least one form of childhood adversity. Latent profile analyses (LPAs) and latent transition analyses (LTAs) were conducted to determine patterns of psychological adjustment and the effects of childhood adversity on transition probabilities over time. We identified five subgroups of psychological adjustment characterized by symptom severity level. Participants who were younger in age and those who endorsed marginalized identities exhibited poorer psychological adjustment during the pandemic. Childhood exposure to family and community violence and having basic needs met as a child (e.g., food, shelter) significantly moderated the relation between latent profile membership over time. Clinical and research implications are discussed.

Keywords: COVID-19; latent transition analysis; mental health; family violence; community violence

1. Introduction

Childhood adversity is a prevalent and important public health issue with detrimental effects on development that persist into adulthood (Chapman et al. 2004; Felitti et al. 1998; Green et al. 2010; Nurius et al. 2015). Across several epidemiological studies, the prevalence of exposure to adverse childhood events is estimated at nearly 50% of the U.S. population (Green et al. 2010; Kessler et al. 1997; McLaughlin et al. 2010). These exposures include victimization (e.g., child maltreatment, exposure to family and community violence) and non-victimization adversities (e.g., poverty, neglect), which frequently co-occur (McLaughlin and Sheridan 2016; Shin et al. 2018). Compared to those without such exposure, children exposed to adverse events are more likely to develop psychopathologies, such as anxiety, mood disorders, substance use, and post-traumatic stress disorder (McLaughlin et al. 2012, 2017; Merrick et al. 2017; Mersky et al. 2013).

Among various forms of childhood adversity, the deleterious impacts of childhood exposure to family violence (FV) and community violence (CV) are particularly well-documented. In this paper, we use the term FV to refer to exposure to both direct and indirect experiences of violence and abuse that occur within families and households (e.g., child abuse, intimate partner violence) (Finkelhor et al. 2015; Hong et al. 2021; Perry et al. 2021). The term CV refers to experiences of witnessing or being the victim of incidents involving harm or threat of harm within one's neighborhood or surrounding community (e.g., witnessing or being the victim of neighborhood violence or crime) (Kennedy and Ceballo 2014; Stein et al. 2003; Zinzow et al. 2009). The types of violence that characterize FV and CV are generally considered threat-related adversities that increase risk for psychopathology via heightened emotional reactivity and attention to environmental cues, poor safety–threat discrimination, emotional regulation difficulties, and information processing biases (Lambert et al. 2017; McLaughlin et al. 2014). A meta-analytic review of different forms of FV found significant associations between FV and a variety of mental disorders including depression, anxiety, and post-traumatic stress disorder (Norman et al. 2012). Similarly, exposure to CV has been linked with increased risk for externalizing (e.g., aggression, antisocial behavior) (Farrell et al. 2020; Lambert et al. 2012; Taylor et al. 2018) and internalizing symptoms (e.g., anxiety, depression) (Donnelly and Holzer 2018; Heleniak et al. 2018; Lee et al. 2020).

Although children's exposure to violence has been a predominant focus of research on childhood adversity, the most prevalent form of childhood adversity among U.S. youths is economic hardship (housing insecurity, food insecurity, poverty). The results of the 2016 National Survey of Children's Health found that 22.5% of U.S. youth under the age of 18 years had experienced adversity related to economic hardship (Crouch et al. 2019). This form of adversity is often characterized by material and social deprivation that is associated with poverty, physical neglect, and being deprived of adequate cognitive stimulation (insufficient exposure to cognitive inputs and learning opportunities) (Bradley and Corwyn 2002; Hart and Risley 1995; Lambert et al. 2017). Studies link experiences of economic hardship such as food insecurity and housing instability during childhood with increases in long-term depressive symptoms and overall mental health problems (Hatem et al. 2020; Poole-Di Salvo et al. 2016).

1.1. Stress Sensitization and Mental Health

Across studies, including several national surveys (e.g., Albott et al. 2018; Meyers et al. 2015), there is extensive evidence that individuals with prior childhood adversity are at increased risk for mental health symptoms following adversity (i.e., stressful life events, trauma) in adulthood. The stress sensitization model may explain this relation (Hammen et al. 2000). The model was originally posited to explain the onset of depression, suggesting that individuals become sensitized to stress over time, such that those with prior childhood adversity exposure require lower thresholds of stress to initiate depressive episodes in comparison to those without childhood adversity exposure (Hammen et al. 2000). In support of this hypothesis, several studies demonstrate that for most individuals, early experiences heighten individuals' sensitivity to future stressors, and thus increase the risk of mental health disorders such as depression, anxiety, and post-traumatic stress disorder (Harkness et al. 2006; Kendler et al. 2004; La Rocque et al. 2014; McLaughlin et al. 2010; Meyers et al. 2015). This association has been found to be even more pronounced following major traumatic events, such as a natural disasters or mass casualty incidents (Galea et al. 2002; Garfin et al. 2020; Meyers et al. 2015). Complementing the stress sensitization model are studies based on the polyvagal theory (Porges 1995, 2007), which suggests outcomes are poorer if early adversity is associated with a re-tuned autonomic nervous system expressed as a low threshold to be threat-reactive.

1.2. The COVID-19 Pandemic as a Stressor

Literature on the impact of the COVID-19 pandemic on psychological health is rapidly developing. Studies to date document the unique nature of COVID-19-related stress. Increasing data suggest that living through this global public health crisis is a potential traumatic stressor (Bridgland et al. 2021; Griffin 2020). Specifically, the COVID-19 pandemic is a persistent stressor characterized by the threat of future infection and/or death of oneself, friends, and family (Bridgland et al. 2021). For many, this threat has been exacerbated by economic stressors, social isolation, routine disturbances and other secondary stressors (Carvalho et al. 2020; McGinty et al. 2020). The reduced accessibility of social interactions is particularly concerning given that, through evolution, positive sociality has served as the primary mechanism through which humans calm and dissipate feelings of stress (Porges 2020). Moreover, it is nearly impossible to separate the psychological effects of the COVID-19 pandemic from those of racial trauma and stress associated with the emergence of the largest civil rights movement in U.S. history, which emerged concurrently (e.g., widely publicized police brutality against Black and Brown individuals, surge of Anti-Asian hate crimes) (Liu and Modir 2020; Wakeel and Njoku 2021).

A recent cross-sectional survey study of 1666 U.S. residents found that respondents with prior adversities reported higher levels of PTSD, depression symptoms, and worry related to COVID-19 (Kolacz et al. 2020). However, most of the variance in the model was mediated by a subjective measure of autonomic nervous system reactivity. When the variance associated with autonomic reactivity was removed, the direct effects of adversity history on mental health consequences of the pandemic were greatly attenuated. Other findings from cross-sectional (e.g., Kalia et al. 2020) and longitudinal studies (John-Henderson et al. 2021; Shreffler et al. 2021) in the U.S. have reported the important impact of adversity on reactions to the pandemic. For example, Kalia et al. (2020) found a significant indirect effect of childhood maltreatment on state anxiety via perceived threat of COVID-19, which included perceived risk of contracting the virus and the overall impact and severity of the pandemic. This finding is consistent with the childhood adversity literature that has linked adversity exposure, particularly FV and CV, to enhanced threat detection, and heightened sensitivity to future perceived threats (Hanscom et al. 2020; McCrory et al. 2011; McLaughlin et al. 2019; Porges 2020; Shackman et al. 2007). Therefore, it is important to examine how childhood adversity exposure affects changes in psychological adjustment in the context of the COVID-19 pandemic. In addition, sociodemographic factors (e.g., younger age, identifying as a racial/ethnic, gender, and/or sexual minority, experiencing changes in employment status and wage loss) have been linked to psychological risk in the context of pandemic-related stress (Holman et al. 2020; McGinty et al. 2020; Shanahan et al. 2022). Thus, it is critical to consider how these factors may influence changes in psychological adjustment.

1.3. Person-Centered Approaches

Person-centered approaches, such as latent profile analysis (LPA), have been recommended to capture the complexity and multidimensionality of mental health symptoms (Lanza and Cooper 2016). Such approaches are important given that a majority of individuals experience symptoms of more than one mental health disorder at a single time point, and/or may have comorbid diagnoses (e.g., anxiety and depression) (Kim and Eaton 2017; Vaidyanathan et al. 2011). LPA allows for the identification of subgroups of individuals who share similar patterns in the construct of interest, such as psychological adjustment, based on their responses to specific indicators (e.g., Masyn 2013). The longitudinal extension of LPA, latent transition analysis (LTA), provides estimates of the probability that one's pattern of psychological adjustment changes over time (i.e., the probability that members of one subgroup transition into a different subgroup; Lanza et al. 2013); additionally, LPA and LTA allow for the inclusion of predictors that may influence subgroup membership and probability of subgroup transitions, such as prior childhood adversity (Lanza and Rhoades 2013; Nylund-Gibson and Hart 2014).

To our knowledge, there are only two published studies utilizing LPA to identify subgroups of psychological adjustment among adults since the onset of the pandemic. The first, a cross-sectional study of Argentinian adults conducted by Fernandez et al. (2020) identified three latent subgroups of psychological adjustment in their sample: low, mild, and severe levels of symptoms (i.e., somatization, anxiety, phobic anxiety, obsessive–compulsive, interpersonal sensitivity, depression, hostility, paranoid ideation, psychoticism). The second study (McDonald et al. 2021) examined latent subgroups of psychological adjustment among U.S. adult pet owners prior to and after the onset of the pandemic, as well as the probability that patterns in psychological adjustment changed over time as a function of attachment to pets. Like Fernandez et al.'s (2020), this study identified five subgroups of psychological adjustment prior to and after the onset of the pandemic that were characterized by their symptom severity (i.e., low symptoms, mild, moderate, high, severe). Notably, 11% of participants transitioned to a subgroup with poorer psychological adjustment following the onset of the pandemic, and most participants (80%) remained in the same subgroup.

1.4. Current Study

Although prior studies link COVID-related stress with a variety of mental health outcomes, we are unaware of any studies that have examined how having one's basic needs met and prior exposure to FV- and CV-related adversities in childhood are associated with changes in patterns of psychological adjustment prior to and during the pandemic. Our study builds on the results of McDonald et al. (2021) using the latent subgroups of psychological adjustment identified at each time point in their study, to examine the effect of childhood adversity (i.e., childhood FV and CV, not having basic needs met as a child) on changes in individuals' pattern of psychological adjustment retrospectively pre-pandemic and during the COVID-19 pandemic in a sample of U.S. adults. The goals of the current study were to: (a) identify potential sociodemographic factors that are associated with subgroup membership retrospectively pre-COVID-19 and after the onset of COVID-19 (i.e., between 6 April and 21 July 2020), and (b) examine whether and to what extent types of childhood adversity (i.e., FV, CV, needs not met) predict transition probabilities.

Given the nature of LTA and the lack of studies utilizing person-centered approaches to examine how childhood adversity influences patterns in psychological adjustment during the COVID-19 pandemic, our study was largely exploratory. However, we relied on the broader childhood adversity literature and the results of Fernandez et al. (2020) and McDonald et al. (2021) to formulate hypotheses. We hypothesized that we would find evidence to support a stress sensitization effect for race/ethnicity, gender identity, sexual orientation, and employment status change. Specifically, we hypothesized that those who identified as a racial/ethnic minority, gender minority or sexual minority, and who reported a change in employment status because of COVID-19, would differentiate participants' psychological adjustment, in that these covariates would be associated with greater symptom severity (Galea et al. 2002; Salerno et al. 2020). We also hypothesized that age and relationship status would affect subgroup membership, such that older ages and being in a relationship would be associated with patterns of psychological adjustment characterized by fewer symptoms (Fernandez et al. 2020). Lastly, we hypothesized that each form of childhood adversity tested in our study would moderate changes in psychological adjustment patterns such that childhood adversity would be associated with worsening psychological adjustment, particularly for those with previously elevated symptom severity levels (i.e., moderate, high, or severe symptom severity subgroups). However, given evidence that not all individuals experience increased psychological distress as a function of traumatic events (e.g., Wingo et al. 2010), we also expected to find that some individuals (e.g., those within the low, mild, or moderate symptom severity subgroups) would demonstrate resilience such that the severity of their symptoms would be similar or decrease following the onset of the COVID-19 pandemic. More specific hypotheses regarding the effects of childhood adversity on transition probabilities are not possible given the exploratory nature of these analyses.

2. Materials and Methods

The data presented in this study were collected as part of a larger study investigating relationships between childhood adversity, stressors, psychological health, and interactions with pets during the COVID-19 pandemic. To collect data and disseminate information regarding the effects of the COVID-19 pandemic in a timely manner, we utilized convenience sampling and social media recruitment techniques (e.g., Facebook, Twitter, Instagram, Reddit, and listservs of organizations and groups related to companion animals). Using an anonymous Qualtrics survey distributed via the internet, we collected data from 3006 respondents between 6 April and 21 July 2020. However, only 2019 (67%) completed the survey. Eligibility criteria included: being over the age of 18, residing in the United States, and having at least one pet. All participants completed informed consent prior to beginning the survey, which was only available in English. The study was approved by the University of Florida Institutional Review Board (#IRB202000819). More detailed information about recruitment methods and procedures can be found in McDonald et al. (2021).

2.1. Participants

In the current study, respondents were excluded from the analysis if they had data missing on all mental health indicators or on any covariate, resulting in a final sample of 1942 respondents. Participants' ages ranged from 18 to 85 years (M = 39.68 years, SD = 13.61); the majority of participants were White (87.6%). Approximately 23% of our sample identified as a sexual and/or gender minority (i.e., not cisgender or heterosexual), and 39.8% of participants reported experiencing at least one form of childhood adversity (i.e., FV, CV, and/or not having their basic needs met). Most participants (75.2%) reported having a bachelor's degree or higher, and 75.3% of participants reported a family income of at least USD 50,000. Although 43% of our sample did not experience changes in their employment status, almost half of our sample (46.8%) reported transitioning to working from home; some respondents also reported losing their jobs (7.8%) or beginning a new job (1.3%). Additional demographic information is provided in Table 1.

Table 1. Demographic characteristics of sample (*N* = 1942).

Variable	Variable Categories	*N*	%
Race/ethnicity	Arab/Arab American	2	0.1
	Asian/Asian American	42	2.2
	Black/African American	15	0.8
	First Nations/Indigenous	3	0.2
	Latino/Latina/Latinx	50	2.6
	South Asian/Pacific Islander	7	0.4
	White	1702	87.6
	Multiracial/Mixed Race	111	5.7
	Prefer to self-describe	10	0.5
Gender identity	Cisgender female/woman	1743	89.8
	Cisgender male/man	135	7.0
	Genderqueer/gender non-conforming	21	1.1
	Transgender female/woman	2	0.1
	Transgender male/man	7	0.4
	Multiple identities	29	1.5
	Missing	5	0.3

Table 1. *Cont.*

Variable	Variable Categories	*N*	%
Sexual orientation	Asexual	25	1.3
	Bisexual	157	8.1
	Demisexual	11	0.6
	Gay	21	1.1
	Heterosexual/straight	1510	77.8
	Lesbian	50	2.6
	Pansexual	27	1.4
	Queer	29	1.5
	Two-Spirit	1	0.1
	Multiple identities	83	4.3
	Not sure/questioning	22	1.1
	Prefer to self-describe	6	0.3
Relationship status	Divorced	132	6.8
	Married/permanently partnered	1209	62.3
	Single/never married	522	26.9
	Separated	27	1.4
	Widowed	20	1.0
	Prefer to self-describe	32	1.6
Employment status change due to COVID-19 [a,b]	None	836	43.0
	Work from home	909	46.8
	Laid off/Fired	151	7.8
	New job	25	1.3
	Other	273	14.1
	Missing	1	0.1
Childhood adversity exposure [b]	Family violence	538	27.7
	Community violence	408	21.0
	Basic needs not met	260	13.4

[a] Response categories were not mutually exclusive. [b] Reflects the number and percentage of participants endorsing item.

2.2. Measures

2.2.1. Indicators of Mental Health

Eight dimensions of psychological functioning from the Brief Symptoms Inventory (BSI; Derogatis and Savitz 2000) were evaluated in the LPA analysis to identify subgroups of psychological adjustment: anxiety symptoms (6 items), depressed mood (5 items), hostility (4 items), interpersonal sensitivity (4 items), obsessive-compulsive (6 items), phobic anxiety (5 items), somatization (7 items), and additional items (4 items). One item regarding suicidal thoughts was removed from the depressed mood subscale by request of the IRB, due to an inability to provide crisis management to anonymous participants. Participants completed the BSI twice to indicate the extent to which each item bothered them prior to the onset of the COVID-19 pandemic and during the COVID-19 pandemic; thus, mental health prior to the pandemic was measured retrospectively. Potential response options ranged from 0 (not at all) to 4 (extremely). A total mean score of endorsed items was computed for each subscale. The reliability values of all psychological adjustment subscales were calculated using McDonald's omega, which is based on a single-factor exploratory factor analysis and is recommended instead of Cronbach's alpha (Hayes and Coutts 2020). The additional items subscale had the lowest reliability (prior to COVID $\omega = 0.67$, during COVID $\omega = 0.69$); for all other subscales, $\omega \geq 0.80$.

2.2.2. Childhood Adversity

Having one's needs met as a child was assessed with a single item. A prompt noted that basic needs include shelter, food, education, and physical safety, and was followed by the question, "Were your basic needs met as a child?" Participants responded to a single item to determine their exposure to FV as a child. Following a prompt defining FV as

child abuse and neglect, intimate partner violence, and/or elder abuse, participants were asked: "Thinking about the people who raised you, were you exposed to any form of family violence as a child?" Participants were asked if they experienced any forms of CV as a child, including bullying, weapons attacks, gang activity, crime, robberies, etc. Participants indicated their experience by responding to the following question: "Thinking about the neighborhood(s) you grew up in, were you exposed to any form of CV as a child?" Each of these items was coded such that 0 indicated that the form of adversity was not endorsed and 1 indicated that the individual endorsed adversity exposure.

2.2.3. Covariates

A demographic questionnaire was used to collect respondent sociodemographic information, such as age (in years), race/ethnicity, gender identity, sexual orientation, relationship status, and employment changes due to COVID-19. Respondents were given the opportunity to select multiple options and/or self-describe for questions regarding race/ethnicity, gender identity, and sexual orientation. For purposes of analyses, all variables excluding age were dichotomized: race/ethnicity (1 = White, non-Latino/a/e, 0 = minority race/ethnicity or multiple races/ethnicities); gender identity/sexual orientation (1 = gender *and/or* sexual minority, 0 = cisgender and heterosexual); relationship status (1 = in a relationship (i.e., married or currently cohabitating), 0 = not in a relationship); and employment changes (1 = change in employment (e.g., working from home, laid off or fired), 0 = no changes in employment). To determine how to best dichotomize the change in employment variable, one-way ANOVAs and Welch tests were conducted using all psychological adjustment subscales. Although a few differences between employment change categories occurred (e.g., those working from home had a lower mean on depression scores during the pandemic in comparison to those who had been laid off or fired), the most consistent significant difference occurred between the no change in employment category and employment change categories (e.g., working from home, laid off or fired). Therefore, we proceeded with the dichotomization.

2.3. Analytic Plan

Mplus Version 8.5 was used for all analyses. Our analyses were based on the same data and latent profile models as a recently published study by McDonald et al. (2021). Although we briefly summarize our approach here, a detailed overview of LPA procedures can be found in McDonald et al. (2021). A total of 984 participants had data missing on all indicators and were therefore excluded from analyses. Full information maximum likelihood was used to address other missing data. The optimum number of subgroups was determined based on theory, group size considerations, and the comparison of fit indices (see Masyn 2013). Once we identified the optimal number of subgroups at each time point, we tested whether being classified into each subgroup varied as a function of certain sociodemographic characteristics (i.e., age, change in employment status due to COVID-19 pandemic, race/ethnicity, sexual and gender minority status, and relationship status). We used the three-step manual BCH approach to regress all sociodemographic variables on each latent class variable separately. The overall effect of each variable on subgroup membership was assessed using a Wald test and the subgroup-specific effects were assessed with odds ratios (ORs) calculated within the model constraint command in Mplus.

Latent Transition Analysis

We conducted latent transition analyses (LTAs) to determine the effect of each form of childhood adversity on transition probabilities (see Figure 1). Childhood adversity variables were tested in separate models in order to simplify interpretation and avoid confounding effects (e.g., strong correlation between childhood exposure to FV and having one's needs met as a child; $r = 0.49$). As seen in Figure 1, covariates that were significantly associated with subgroup membership retrospectively pre-pandemic (T1) and/or after (T2) the onset

of the COVID-19 pandemic were regressed on both latent categorical variables in the LTA model. Missing data were handled using full information maximum likelihood estimation.
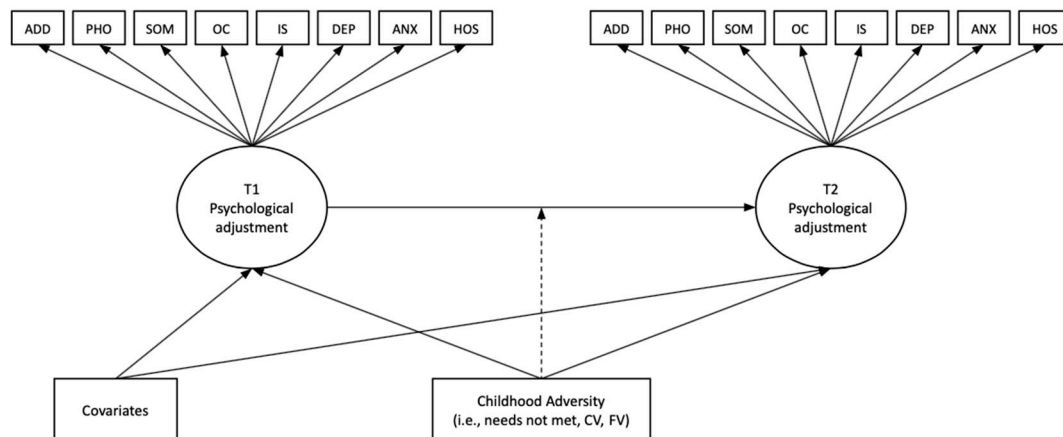

Figure 1. Analytic Model.

To investigate the effect of each childhood adversity variable on transition probabilities, a likelihood ratio chi-square difference test was conducted to compare a model (H0) in which the predictor was regressed on both latent class variables with a model (H1) in which the predictor moderated the relation between the latent class variables. We examined logistic regression coefficients to determine the specific effects of each childhood adversity variable on the stability of subgroup membership from T1 to T2. Latent transition probabilities were calculated using the LTA calculator in Mplus twice: once to determine transition probabilities for those who did not endorse the childhood adversity construct of interest and once to determine transition probabilities for those who did. Using these probabilities, we calculated the odds of moving to a subgroup characterized by more severe symptoms (versus staying in the same subgroup over time) and moving to a subgroup characterized by less severe symptoms (versus staying in the same subgroup over time) among those who experienced childhood adversity and those who did not.

3. Results

3.1. Descriptive Statistics

Means, correlations, and proportions for all study variables are provided in Table 2. Preliminary independent samples *t*-tests and chi-square tests indicate that the only statistical difference on key study variables between respondents who were included and excluded (due to missing data) from the analysis was interpersonal sensitivity scores post-COVID, $t(1996) = 2.02$, $p = 0.044$. However, there was only a small effect size (Cohen's $d = 0.237$, 95% CI: (0.01, 0.47)), which suggests that the magnitude of the difference in mean scores (i.e., 0.24) between those included and excluded in the analysis is trivial (Fritz et al. 2012). Pre-pandemic BSI subscales were moderately to highly correlated with one another, as well as with BSI subscales measured during the pandemic (*r*s range = 0.36 to 0.67 and 21 to 0.69, respectively; see Table 2). As expected, BSI sample means increased slightly from pre- to post-pandemic onset. Between 13% and 28% of the sample endorsed the childhood adversity items (see Table 2).

Table 2. Intercorrelations, means, standard deviations, frequencies, and percentages of key variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Somatization [a]	-																							
2. Obsessive-compulsive [a]	0.47 Δ	-																						
3. Interpersonal sensitivity [a]	0.40 Δ	0.62 Δ	-																					
4. Depressed mood [a]	0.43 Δ	0.64 Δ	0.68 Δ	-																				
5. Anxiety [a]	0.46 Δ	0.62 Δ	0.61 Δ	0.62 Δ	-																			
6. Hostility [a]	0.37 Δ	0.52 Δ	0.52 Δ	0.52 Δ	0.51 Δ	-																		
7. Phobic anxiety [a]	0.35 Δ	0.47 Δ	0.50 Δ	0.46 Δ	0.50 Δ	0.37 Δ	-																	
8. Additional items [a]	0.43 Δ	0.54 Δ	0.47 Δ	0.53 Δ	0.50 Δ	0.36 Δ	0.38 Δ	-																
9. Somatization [b]	0.68 Δ	0.37 Δ	0.34 Δ	0.37 Δ	0.38 Δ	0.29 Δ	0.30 Δ	0.33 Δ	-															
10. Obsessive–compulsive [b]	0.36 Δ	0.69 Δ	0.50 Δ	0.53 Δ	0.53 Δ	0.40 Δ	0.39 Δ	0.45 Δ	0.44 Δ	-														
11. Interpersonal sensitivity [b]	0.34 Δ	0.49 Δ	0.73 Δ	0.55 Δ	0.47 Δ	0.40 Δ	0.42 Δ	0.38 Δ	0.39 Δ	0.55 Δ	-													
12. Depressed mood [b]	0.34 Δ	0.47 Δ	0.54 Δ	0.68 Δ	0.50 Δ	0.38 Δ	0.38 Δ	0.41 Δ	0.46 Δ	0.65 Δ	0.63 Δ	-												
13. Anxiety [b]	0.34 Δ	0.43 Δ	0.45 Δ	0.46 Δ	0.62 Δ	0.34 Δ	0.39 Δ	0.37 Δ	0.48 Δ	0.60 Δ	0.52 Δ	0.66 Δ	-											
14. Hostility [b]	0.26 Δ	0.38 Δ	0.40 Δ	0.41 Δ	0.41 Δ	0.56 Δ	0.29 Δ	0.29 Δ	0.34 Δ	0.41 Δ	0.49 Δ	0.53 Δ	0.52 Δ	-										
15. Phobic anxiety [b]	0.20 Δ	0.28 Δ	0.31 Δ	0.28 Δ	0.34 Δ	0.23 Δ	0.42 Δ	0.26 Δ	0.31 Δ	0.41 Δ	0.36 Δ	0.46 Δ	0.55 Δ	0.30 Δ	-									
16. Additional items [b]	0.33 Δ	0.44 Δ	0.41 Δ	0.45 Δ	0.44 Δ	0.30 Δ	0.34 Δ	0.64 Δ	0.42 Δ	0.57 Δ	0.46 Δ	0.60 Δ	0.57 Δ	0.43 Δ	0.41 Δ	-								
17. Age	−0.08 Ψ	−0.26 Δ	−0.30 Δ	−0.24 Δ	−0.26 Δ	−0.22 Δ	−0.21 Δ	−0.10 Δ	−0.08 Δ	−0.31 Δ	−0.28 Δ	−0.30 Δ	−0.24 Δ	−0.27 Δ	−0.12 Δ	−0.18 Δ	-							
18. Race/ethnicity [c]	−0.01	−0.05 *	−0.03	−0.06 Ψ	−0.04	−0.08 Δ	−0.03	−0.04	−0.02	−0.04	−0.04	−0.02	−0.03	−0.06 Ψ	−0.02	−0.04	0.11 Δ	-						
19. SGM [d]	0.14 Δ	0.18 Δ	0.17 Δ	0.21 Δ	0.19 Δ	0.12 Δ	0.18 Δ	0.12 Δ	0.13 Δ	0.21 Δ	0.17 Δ	0.22 Δ	0.19 Δ	0.10 Δ	0.10 Δ	0.16 Δ	−0.23 Δ	−0.03	-					
20. Relationship status [e]	−0.02	−0.11 Δ	−0.10 Δ	−0.19 Δ	−0.09 Δ	−0.04	−0.04	−0.06	−0.06 *	−0.13 Δ	−0.08 Δ	−0.18 Δ	−0.07 Ψ	−0.04	−0.01	−0.08 Ψ	0.10 Δ	0.04	−0.14	-				
21. Employment change due to COVID [f]	0.04	0.11 Δ	0.09 Δ	0.08 Δ	0.13 Δ	0.08 Δ	0.06 Ψ	0.03	0.05 *	0.15 Δ	0.07 Ψ	0.10 Δ	0.12 Δ	0.07 Ψ	0.07 Ψ	0.07 Ψ	−0.25 Δ	−0.02	0.10 Δ	−0.02	-			
22. Family violence [g]	0.13 Δ	0.13 Δ	0.13 Δ	0.16 Δ	0.17 Δ	0.13 Δ	0.16 Δ	0.14 Δ	0.13 Δ	0.11 Δ	0.12 Δ	0.11 Δ	0.15 Δ	0.07 Ψ	0.08 Δ	0.13 Δ	0.07 Ψ	−0.05 *	0.13 Δ	−0.02	0.01	-		
23. Community violence [g]	0.15 Δ	0.17 Δ	0.12 Δ	0.17 Δ	0.19 Δ	0.09 Δ	0.14 Δ	0.17 Δ	0.14 Δ	0.15 Δ	0.14 Δ	0.12 Δ	0.14 Δ	0.11 Δ	0.09 Δ	0.16 Δ	−0.06 *	−0.13 Δ	0.11 Δ	−0.07 Ψ	0.01	0.27 Δ	-	
24. Needs not met [g]	0.11 Δ	0.12 Δ	0.13 Δ	0.15 Δ	0.15 Δ	0.10 Δ	0.15 Δ	0.11 Δ	0.10	0.13 Δ	0.10 Δ	0.12 Δ	0.14 Δ	0.06 *	0.08 Ψ	0.12 Δ	0.002	−0.03	0.13 Δ	−0.001	0.03	0.50 Δ	0.23 Δ	-
N	1938	1938	1938	1939	1934	1934	1936	1933	1921	1921	1923	1923	1921	1921	1921	1921	1942	1942	1942	1942	1942	1918	1937	1941
M/n	0.96	1.42	1.32	1.29	1.24	1.26	0.89	1.38	1.01	1.64	1.11	1.58	1.46	1.31	1.73	1.67	39.68	1702	446	1233	1262	538	408	260
SD/%	0.80	0.77	0.92	0.87	0.77	0.76	0.92	0.87	0.88	0.90	0.99	0.95	0.88	0.88	1.21	0.91	13.61	87.6	23.0	63.5	65.0	27.7	21.0	13.4

[a] Pre-COVID. [b] Post-COVID. [c] 0 = non-White racial identity and/or Latino/a/e ethnicity, 1 = White/White ethnic and non-Latino/a/e; frequency and percentage reflect those who identified as White/White ethnic and non-Latino/a/e. [d] 0 = cisgender and/or heterosexual, 1 = sexual and/or gender minority (SGM); frequency and percentage reflect those who endorsed a SGM identity. [e] 0 = not in a relationship, 1 = in a relationship; frequency and percentage reflect those who are in a relationship. [f] 0 = no change; 1 = working from home, laid off/fired, or started a new job; frequency and percentage reflect those whose employment changed due to COVID. [g] 0 = not endorsed, 1 = endorsed; frequency and percentage reflect those who endorsed exposure to childhood adversity. * $p < 0.05$. Ψ $p < 0.01$. Δ $p < 0.001$.

3.2. Latent Profile Analyses

Information regarding the latent profile enumeration process (see Table 3) can be found in McDonald et al. (2021). LPAs identified five subgroups of psychological adjustment at each time point that were characterized by symptom severity level: (1) low (pre-COVID (T1): 12%; during COVID (T2): 12%), (2) mild symptoms (T1: 39%; T2: 42%), (3) moderate symptoms (T1: 33%; T2: 32%), (4) high symptoms (T1: 11%; T2: 11%), and (5) severe symptoms (T1: 5%; T2: 4%). Change in employment (T1: X^2 (4) = 31.12, $p < 0.001$; T2: X^2 (4) = 25.63, $p < 0.001$), age (T1: X^2 (4) = 83.30, $p < 0.001$; T2: X^2 (4) = 103.45, $p < 0.001$), race/ethnicity (T1: X^2 (4) = 11.66, $p = 0.020$; T2: X^2 (4) = 30.66, $p < 0.001$), relationship status (T1: X^2 (4) = 15.77, $p = 0.003$; T2: X^2 (4) = 15.13, $p = 0.004$), and sexual and/or gender minority status (T1: X^2 (4) = 43.60, $p < 0.001$; T2: X^2 (4) = 50.75, $p < 0.001$) significantly predicted subgroup membership at each time point (see Table 4). Those who endorsed COVID-related employment changes were more likely to have moderate or mild symptom patterns at both time points, but less likely to have severe or low symptom patterns. At both time points, being older in age was associated with increased odds of having a moderate, mild, or low symptom patterns. Individuals who endorsed both White and non-Latino/a/e racial/ethnic identities exhibited increased odds of being classified into the high or moderate symptom subgroup at each time point, and lower odds of having a low or severe symptom pattern at either time point relative to those endorsing a minority racial or ethnic identity. Compared with those who were single, individuals in a relationship were less likely to be classified into the severe symptom subgroup and more likely to belong in any other subgroup, and this finding was consistent at both time points. Those with at least one sexual or gender minority identity were more likely to exhibit high or severe symptom patterns and had lower odds of being grouped into the low, mild, or moderate symptom subgroups (see Table 4).

Table 3. Fit indices for unconstrained pre-COVID and post-COVID LPA models.

	k	Par	LL	AIC	BIC	aBIC	VLMR-LRT *p*-Value	LMR-LRT *p*-Value	BLRT *p*-Value	Entropy	Smallest Class *n*	Smallest Class %	Condition Number
Pre-COVID	1	16	−20,027.8	40,087.5	40,177.3	40,126.5	NA	NA	NA	NA	2021	100%	3.63×10^{-2}
	2	25	−17,758.9	35,567.8	35,708.0	35,628.6	0.000	0.000	0.000	0.888	482	24%	1.92×10^{-2}
	3	34	−16,789.1	33,646.2	33,837.0	33,728.9	0.000	0.000	0.000	0.855	286	14%	5.04×10^{-3}
	4	43	−16,438.3	32,962.7	33,204.0	33,067.3	0.021	0.022	0.000	0.846	150	7%	1.33×10^{-3}
	5	**52**	**−16,277.8**	**32,659.5**	**32,951.3**	**32,786.1**	**0.000**	**0.000**	**0.000**	**0.809**	**91**	**5%**	**5.41×10^{-4}**
	6	61	−16,221.7	32,565.3	32,907.6	32,713.8	0.318	0.325	0.000	0.826	95	5%	2.77×10^{-6}
Post-COVID	1	16	−21,822.8	43,677.6	43,767.2	43,716.4	NA	NA	NA	NA	2000	100%	1.73×10^{-2}
	2	25	−19,516.7	39,083.4	39,223.5	39,144.0	0.000	0.000	0.000	0.860	672	34%	3.46×10^{-2}
	3	34	−18,651.1	37,370.3	37,560.7	37,452.7	0.000	0.000	0.000	0.844	267	13%	9.08×10^{-3}
	4	43	−18,309.1	36,704.3	36,945.1	36,808.5	0.000	0.000	0.000	0.833	198	10%	2.62×10^{-3}
	5	**52**	**−18,203.7**	**36,511.5**	**36,802.7**	**36,637.5**	**0.036**	**0.037**	**0.000**	**0.823**	**80**	**4%**	**6.78×10^{-4}**
	6	61	−18,122.4	36,366.9	36,708.5	36,514.7	0.002	0.002	0.000	0.796	77	4%	5.03×10^{-4}
	7	70	−18,034.2	36,208.5	36,600.5	36,378.1	0.412	0.418	0.000	0.861	92	4.6%	2.77×10^{-6}

Note. Bolded values indicate the optimal latent class model at each time point that was used in subsequent analyses. Par = number of free parameters in the model. LL = best loglikelihood. AIC = Akaike information criterion. BIC = Bayesian information criterion. aBIC = adjusted Bayesian information criterion. VLMR-LRT = Vuong–Lo–Mendell–Rubin likelihood ratio test. LMR-LRT = Lo–Mendell–Rubin adjusted likelihood ratio test. BLRT = parametric bootstrapped likelihood ratio test.

Table 4. Wald tests (X^2) and odds ratios (OR) for the effects of covariates on pre-COVID and post-COVID latent profile membership.

	Pre-Pandemic				During Pandemic			
	OR	X^2	*df*	*p*	*OR*	X^2	*df*	*p*
Employment		31.12	4	0.000		25.63	4	0.000
Severe	0.94 ***				0.65 **			
High	0.80 ***				1.13 ***			
Moderate	1.43 ***				1.62 ***			
Mild	1.24 ***				1.25 ***			
Low	0.48 ***				0.56 ***			
Age		83.30	4	0.000		103.45	4	0.000
Severe	0.79 ***				0.86 ***			
High	0.71 ***				0.73 ***			
Moderate	1.21 ***				1.08 ***			
Mild	1.56 ***				1.57 ***			
Low	1.71 ***				1.65 ***			
Race/Ethnicity		11.66	4	0.020		30.66	4	0.000
Severe	0.48 **				0.32 **			
High	1.21 ***				1.75 **			
Moderate	1.53 ***				1.89 ***			
Mild	0.99 ***				1.56 ***			
Low	0.69 ***				0.59 **			
In a Relationship		15.77	4	0.003		15.13	4	0.004
Severe	0.86 ***				0.53 ***			
High	0.73 ***				1.44 ***			
Moderate	1.08 ***				1.08 ***			
Mild	1.57 ***				1.36 ***			
Low	1.65 ***				2.17 ***			
Sexual/Gender Minority		43.60	4	0.000		50.75	4	0.000
Severe	1.12 ***				1.04 ***			
High	1.51 ***				1.46 ***			
Moderate	0.85 ***				0.99 ***			
Mild	0.44 ***				0.45 ***			
Low	0.28 **				0.24 **			

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

3.3. Latent Transition Analysis

LTAs were conducted to determine the stability of subgroup membership retrospectively pre-pandemic and during COVID. The results of a log likelihood chi-square difference test did not support measurement invariance across time, $X^2(40) = 1766.0$, $p < 0.001$. Thus, indicator means were allowed to vary across time in subsequent analyses. Table 5 displays transition probabilities, proportions, and logistic regression coefficients. As described by McDonald et al. (2021), approximately 80% of participants remained in the same symptom subgroup between retrospective pre- and post-COVID, with another 9% transitioning to subgroups with lower symptom severity and 11% transitioning to subgroups with higher symptom severity.

Childhood exposure to FV significantly moderated the relation between latent subgroup membership over time, $X^2(16) = 25.61$, $p = 0.012$. In particular, exposure to FV had a significant positive effect on those within the severe symptom subgroup at pre-COVID, regardless of their profile membership post-COVID (see Table 5). For each symptom subgroup at pre-COVID, we examined the odds of transitioning to a less severe symptom subgroup (versus staying in the same subgroup) at post-COVID between those who endorsed childhood exposure to FV and those who did not endorse childhood exposure to FV. Relative to those who did not endorse childhood exposure to FV, individuals who endorsed childhood exposure to FV and were classified into the severe (*OR* = 1.30, 95% CI: (0.74, 2.29)), high (*OR* = 1.58, 95% CI: (0.85, 2.92)), moderate (*OR* = 1.35, 95% CI: (0.58, 3.11)), or mild (*OR* = 1.41, 95% CI: (0.32, 6.17)) symptom subgroup at retrospective pre-COVID had higher odds of transitioning to a less severe symptom subgroup over time. We also examined the odds of transitioning to a more severe symptom subgroup over time between those who endorsed and those who did not endorse childhood exposure to FV. Those who endorsed childhood exposure to FV and had a high (*OR* = 1.56, 95% CI: (0.56,

4.36)), moderate (*OR* = 1.58, 95% CI: (0.64, 3.94)), or mild (*OR* = 1.27, 95% CI: (0.56, 2.86)) symptom pattern at retrospective pre-COVID had higher odds of transitioning to a more severe symptom subgroup post-COVID than those who did not endorse childhood FV exposure. Individuals with a history of FV exposure had lower odds of staying in the same subgroup over time if they were classified into a severe (*OR* = 0.77, 95% CI: (0.44, 1.36)), high (*OR* = 0.64, 95% CI: (0.36, 1.12)), moderate (*OR* = 0.69, 95% CI: (0.36, 1.33)), or mild (*OR* = 0.77, 95% CI: (0.37, 1.60)) symptom subgroup based on their retrospective pre-pandemic self-report of mental health symptoms.

Table 5. Transition probabilities and logistic regression coefficients for the effects of predictors on transitions.

| | | Post-COVID | | | | |
		Low Symptoms (12%)	Mild Symptoms (42%)	Moderate Symptoms (32%)	High Symptoms (11%)	Severe Symptoms (4%)
Pre-COVID	Transition probabilities					
	Low symptoms (12%)	0.67	0.23	0.08	0.03	0.00
	Mild symptoms (39%)	0.02	0.81	0.14	0.03	0.00
	Moderate symptoms (33%)	0.00	0.09	0.79	0.12	0.01
	High symptoms (11%)	0.00	0.04	0.23	0.70	0.03
	Severe symptoms (5%)	0.01	0.06	0.20	0.34	0.39
	Transition proportions (%)					
	Low symptoms (12%)	10.14%	1.34%	0.36%	0.05%	0.00%
	Mild symptoms (39%)	1.85%	33.52%	3.50%	0.77%	0.26%
	Moderate symptoms (33%)	0.26%	3.50%	25.49%	3.30%	0.36%
	High symptoms (11%)	0.00%	0.46%	2.21%	7.11%	0.82%
	Severe symptoms (5%)	0.05%	0.21%	0.57%	0.88%	2.99%
	Childhood exposure to FV (X^2)—*n* = 1918					
	Low symptoms (12%)	a	0.41	−21.03 ***	−22.93 ***	1.41 [b]
	Mild symptoms (39%)	a	−0.35	0.02	−1.63	0.58
	Moderate symptoms (33%)	a	−0.40	−0.66	−0.46	1.43
	High symptoms (11%)	a	−0.26	−1.32	−1.54	−1.10
	Severe symptoms (5%)	a	23.46 [b]	23.39 ***	24.74 ***	23.59 ***
	Childhood exposure to CV (X^2)—*n* = 1937					
	Low symptoms (12%)	a	0.28	−4.08	−22.29 ***	−0.36 [b]
	Mild symptoms (39%)	a	−1.04	−1.40	−0.58	−19.19 ***
	Moderate symptoms (33%)	a	23.62 ***	23.86 ***	24.61 ***	28.01 ***
	High symptoms (11%)	a	12.12 [b]	10.69 ***	10.26 ***	10.06 ***
	Severe symptoms (5%)	a	46.16 ***	21.77 ***	22.19 ***	22.35 ***
	Childhood needs not met (X^2)—*n* = 1941					
	Low symptoms (12%)	a	0.19	1.27	8.77 **	0.05 [b]
	Mild symptoms (39%)	a	0.21	1.25	−23.77 ***	−21.80 ***
	Moderate symptoms (33%)	a	−1.63	−2.08 *	−1.29	1.01
	High symptoms (11%)	a	8.72 [b]	7.52 ***	6.87 ***	7.66 ***
	Severe symptoms (5%)	a	22.19 ***	22.44 ***	22.74 ***	22.13 ***

[a] Reference group. [b] The significance of the effect could not be determined, as some of the multinomial logit parameters were fixed within the model to avoid singularity of the information matrix. Logistic regression analyses controlled for age, race/ethnicity, LGBTQIA+ identities, relationship status, and employment status. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Childhood exposure to CV significantly moderated the relation between latent subgroup membership over time, $X^2(16) = 48.98$, $p = 0.023$. CV exposure had a significant positive effect on those within the moderate, high, or severe symptom subgroups at retrospective pre-COVID, regardless of their subgroup membership post-COVID (with one exception; see Table 5). There was also a significant negative effect of CV exposure on those who transitioned from the low to the high symptom subgroup, as well as those who

transitioned from the mild to the severe symptom subgroup. We examined the odds of transitioning to a less severe or more severe symptom subgroup (versus staying in the same subgroup over time) for those who endorsed CV exposure versus those who did not. Individuals who endorsed CV exposure and were classified into a retrospective pre-COVID high (OR = 2.02, 95% CI: (1.11, 3.67)) or mild (OR = 2.86, 95% CI: (0.67, 12.16)) symptom subgroup had higher odds of transitioning to a less severe symptom subgroup than those who did not endorse CV exposure. Individuals within the moderate symptom subgroup based on retrospective pre-COVID data who endorsed CV exposure had greater odds of transitioning to a more severe subgroup (OR = 2.65, 95% CI: (1.07, 6.56)) than those who did not endorse CV exposure.

Whether needs were met as a child significantly moderated the relation between latent subgroup membership over time, $X^2(16) = 69.00$, $p = 0.001$. Regardless of their subgroup membership post-COVID (with one exception; see Table 5), having one's needs met as a child had a significant positive effect on individuals within high or severe symptom subgroups at pre-COVID, as well as on those who transitioned from the low to the high symptom subgroup. On the other hand, having one's needs met as a child also demonstrated a significant negative effect on those within the stable moderate symptom subgroup and those who transitioned from a mild symptom subgroup to a high or severe symptom subgroup. We examined the odds of each subgroup transitioning to a less severe or more severe symptom subgroup (versus staying in the same subgroup over time) for those who endorsed having their needs met as a child versus those who did not. Those who had their needs met as a child and were classified into a severe, high, or moderate symptom subgroup at retrospective pre-COVID had higher odds of transitioning to a less severe symptom subgroup (OR = 1.48, 95% CI: (0.84, 2.60), OR = 2.23, 95% CI: (1.21, 4.10), and OR = 1.62, 95% CI: (0.72, 3.63), respectively) than those who did not have their needs met. Those within a high, moderate, or mild symptom subgroup at retrospective pre-COVID who had their needs met as a child had greater odds of transitioning to a more severe symptom subgroup (OR = 1.55, 95% CI: (0.52, 4.59), 2.95, 95% CI: (1.24, 7.05), and 2.17, 95% CI: (1.00, 4.69), respectively) relative to those who did not have their needs met.

4. Discussion

The current study examined latent subgroups of retrospective pre-pandemic and current psychological functioning during the global COVID-19 pandemic, and the extent to which experiencing different forms of childhood adversity may influence changes in these subgroups over time. Our findings build on the extant literature (e.g., Fernandez et al. 2020) demonstrating that different populations are at risk of psychological maladjustment in response to experiencing COVID-19. Specifically, our findings suggest that while symptom subgroups mostly remained stable over time, those with a history of adversity may be more sensitive to changes in psychological functioning after experiencing a global stressor such as COVID-19. This is consistent with research showing that individuals with prior adversities are more vulnerable to poor mental health in the context of the COVID-19 pandemic (Kolacz et al. 2020).

The observed relations between adversity history and experiences of COVID-19 are consistent with the polyvagal theory (Porges 1995, 2007), which proposes that autonomic state functions as an intervening variable mediating stress reactions and health-related symptoms in response to the pandemic. Thus, the influence of adversity history on health and social disruptions due to the pandemic could be hypothesized to be mediated by a functionally retuned autonomic nervous system that is prepared to be more threat-reactive and less homeostatic, self-regulatory, and resilient. This explanation would be consistent with a stress sensitivity model in which the autonomic nervous system is both more threat-responsive and more labile over time.

Considerable research demonstrates that mental health symptomatology is fairly stable in adulthood (Gustavson et al. 2018; Keyes et al. 2010). For example, Gustavson et al. (2018) found that young adults who experience anxiety and/or depression are at

considerable risk of experiencing similar mental health concerns approximately 10 years later. In contrast, positive mental health is also stable over time (Keyes et al. 2010). This is in line with our finding that a majority of our sample remained in the same symptom subgroup retrospectively pre-pandemic and during COVID-19. Indeed, subgroups differed with respect to the severity of psychological symptoms, ranging from "low" to "severe". Given that most participants were classified into the "mild symptoms" subgroup, it is possible that these participants were protected from the burden of COVID-19. In fact, the mental health promotion and protection hypothesis suggests that positive psychological functioning is not merely the absence of poor mental health, but rather a combination of feeling good and functioning well in life (Keyes 2007). Moreover, polyvagal theory supports this hypothesis by articulating the role that social interaction plays in regulating the autonomic nervous system and fostering homeostatic functions of health, growth, and restoration (see Porges 2020). Therefore, although there were increased emotional and behavioral reactions such as fear and anxiety in response to the global public health threat, participants who endorsed low or mild symptoms prior to the pandemic may have been unaffected to the extent that they had more resilient physiological (i.e., autonomic nervous system) functioning, which may have allowed them to adapt to the pandemic circumstances in more adaptive ways (not moving into a state of threat); it is also possible they did not experience significant declines in their day-to-day feelings and functioning.

Despite continuity in perceived psychological functioning over time for the majority of the sample, we found that 11% of our sample transitioned to a subgroup defined by worse psychological functioning following the inception of the COVID-19 pandemic. Emerging research states that pandemic-related stressors, including changes in employment, financial loss, and increased isolation, may have deleterious effects on health and well-being (Panchal et al. 2021). Indeed, relatively high rates of psychological distress (34–38%) have been reported during the COVID-19 pandemic, with risk factors implicated in greater psychological maladjustment including unemployment, younger age, and presence of chronic illness, among others (Xiong et al. 2020). To this list of risk factors, we add a history of adversity as a pre-existing condition which, for some, led to worsening psychological adjustment in response to the pandemic.

4.1. Sociodemographic Characteristics and Adjustment

Our findings also show that certain contextual and sociodemographic factors were associated with psychological functioning. Consistent with prior research (e.g., McKnight-Eily et al. 2021; Peterson et al. 2020; Robillard et al. 2020; Xiong et al. 2020), we found that younger age and marginalized racial, ethnic, and sexual and/or gender identities are associated with poorer psychological adjustment during COVID-19. This finding is in line with the minority stress model, which refers to the discrepancies between the values of a minority group and the "majority" group, and the conflict that arises from these discrepancies (Meyer 2003). This model has primarily been used to describe the experiences of individuals with minoritized sexual and gender identities, who experience a number of unique proximal and distal stressors that can enhance their risk of poor mental health outcomes (Scandurra et al. 2021). Individuals experiencing more employment changes were characterized by mild and moderate symptom subgroups compared to their counterparts in low, high, or severe symptom subgroups. That changes in employment were not implicated in worse psychological functioning may be due in part to the status of employment before COVID-19. Individuals in the mild and moderate subgroups, which characterized the majority of the sample, may have been able to transition to remote work or begin new employment, while those with higher symptom subgroups may have experienced no change due to extant unemployment or employment accommodations. Prior research suggests that flexible scheduling, reduced hours, and modified job responsibilities are common accommodations for individuals with persistent mental illness (McDowell and Fossey 2014), with such accommodations likely unaffected due to COVID-19.

4.2. Childhood Adversity and Adjustment

Although individuals classified into the severe symptom subgroup experienced higher levels of FV and CV exposure during childhood, regardless of the impact of COVID-19, we found that changes in psychological functioning during COVID-19 were evident among those with a history of childhood adversity. Our person-centered analytical approach allowed for the opportunity to examine whether individuals transitioned into latent subgroups that were characterized by more or less severe symptoms. Regarding transitioning from a less severe symptom subgroup to a more severe symptom subgroup, our findings demonstrate that, compared to individuals without FV exposure, individuals exposed to FV in childhood were 27 to 58% more likely to experience worse psychological functioning. In addition, individuals with exposure to CV in childhood were roughly 2.5 times more likely to experience poorer psychological adjustment relative to their non-exposed counterparts. These findings suggest that exposure to early adversity may confer lasting vulnerability to poor psychological functioning into adulthood, and that may be further exacerbated by experiencing a significant stressor such as COVID-19.

Our study not only supports prior findings that childhood adversity increases the negative effects on mental health, but also suggests that psychological functioning is dynamic at the individual level, with some individuals more resilient than others. Despite experiencing childhood exposure to FV or CV, some subgroups of individuals were two to three times more likely to transition to a symptom subgroup characterized by more positive psychological adjustment. We also found that having needs met during childhood could be implicated in better psychological outcomes. For instance, among individuals within the retrospective pre-COVID mild symptom subgroup, those who endorsed childhood exposure to CV were nearly three times more likely to transition to the low subgroup during COVID-19 compared with those who did not endorse childhood exposure to CV. Considering our finding that individuals in a relationship were more likely to be classified into the low or mild subgroups and that those with marginalized racial, ethnic, sexual, or gender identities were more likely to show moderate, high, and/or severe symptoms, it may be that individuals who possess fewer stressors related to their identities experience less distress than those with minority identities. Although we did not examine specific factors linked to psychological resilience in the present study, Killgore et al. (2020) found that individuals who were able to be outdoors, exercise, receive more social support, and get quality sleep were more psychologically resilient during the pandemic. Furthermore, in a prior study using the same sample, our team found that attachment to pets also buffered the effects of early adversity on psychological functioning during COVID-19, but only for individuals who belonged to the moderate or high symptomatology subgroup (McDonald et al. 2021). However, individuals experiencing severe symptomatology and reporting high attachment to pets were less likely to transition to a less severe symptom subgroup. These studies highlight the importance of considering individual factors and utilizing person-centered approaches when investigating the impact of adversity on mental health.

Future research is needed to identify the specific factors associated with mental health promotion and protection during COVID-19, especially among individuals who have experienced prior adverse events. Measures of ANS re-tuning may provide insight into the mechanisms resulting either in resilience or vulnerability. Recently, Kolacz et al. (2020) documented a strong monotonic relationship between a cumulative index of adversity history, severity, and subjective reports of autonomic regulation using the Body Perception Questionnaire (Porges 1993). In addition, the study supported this elaboration of the stress sensitization model by documenting that the impact of adversity history on mental health symptoms during the pandemic was mediated by subjective measures of autonomic reactivity. To refine knowledge of the pathway from childhood adversity to psychological maladjustment, future research should explore whether individuals' autonomic state mediates transitions in patterns of mental health using a longitudinal person-centered framework, such as LTA methodology.

4.3. Limitations

Our study has methodological limitations that warrant consideration. Due to our priority of gathering information quickly following the onset of COVID-19, we recruited participants using internet-based convenience sampling. One manifestation of this limitation is the poor completion rate (67%) for the survey, a common issue with this sampling approach. To reduce participant burden, we measured exposure to each form of adversity via a single variable. Given prior studies documenting the unique impacts of specific forms and patterns of childhood adversity on psychological outcomes, as well as the importance of assessing for the proximity, frequency, and severity of FV and CV exposure, this is a limitation of our study. Another limitation is that our assessment of childhood adversity and indicators of pre-COVID psychological adjustment were assessed retrospectively; this may have led to bias, such as under- or over-reporting. However, the use of retrospective assessment to capture pre-pandemic status in comparison to during the COVID-19 pandemic has been frequently employed by other researchers seeking to contribute to the current body of literature regarding the effects of the COVID-19 pandemic (e.g., Busse et al. 2021; Dumas et al. 2020; Ho and Moscovitch 2022). Additionally, our study focused solely on pet-owners. While the majority of U.S. households include pets, there are notable differences in demographic characteristics among pet owners, compared to households that do not include pets; for example, recent estimates suggest that 70% of non-Latino/a/e White households have pets, versus 29% of non-Latino/a/e Black households, and that women and/or LGBTQ+ individuals are more likely to live with pets (Applebaum et al. 2020; Community Marketing & Insights 2019; Harris Interactive 2010). This may explain why the majority of our sample was non-Latina White women with high socioeconomic status and the higher than anticipated prevalence of LGBTQ+ individuals in our sample. Replication of these results is needed to ensure the generalizability of the findings in representative samples.

5. Conclusions

In summary, this study identified factors that impact individual differences in psychological risk and resilience retrospectively pre-pandemic and during the COVID-19 pandemic. We found that participants who were younger in age, and endorsed a marginalized racial, ethnic, sexual and/or gender identity were characterized by poorer psychological adjustment during the COVID-19 pandemic. Transitions in latent patterns of adjustment were moderated by exposure to the three forms of retrospectively reported childhood adversity that were measured in our sample: FV, CV, and the perception that one's basic needs were not met. Our findings demonstrate both stability and unique adversity-specific transitions in psychological functioning over time. A person-centered approach may be a useful method for understanding the nuanced pathways through which childhood adversity may come to be associated with later psychological functioning during COVID-19, and offer important implications for advancing intervention to meet the needs of vulnerable populations.

Our findings, along with the extant research, have important clinical and policy implications. Considerable research has shown that the cumulative effects of early life adversity are detrimental to long-term health and well-being. Given the added stressors experienced during COVID-19 and worsening psychological functioning among individuals with histories of adversity, enhanced clinical screening and monitoring tools may be warranted to support this vulnerable group. Moreover, our study highlights the disparate mental health outcomes of marginalized and historically underserved populations during COVID-19. Thus, specific efforts to enhance factors known to mitigate the effects of adversity and its health consequences are needed. For example, strategies to ensure basic needs are met and to promote opportunities for socioemotional connections would be beneficial to inform selective interventions to reach those who experience more systemic inequities and who may have greater vulnerability to negative outcomes. At a policy level, strategies to make mental health services more accessible (e.g., telehealth therapy) and affordable will be an

important avenue to alleviate the mental health crisis caused by the COVID-19 pandemic (Moreno et al. 2020; Penninx et al. 2022).

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