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Titel | Title

Psychological Responses to the COVID-19 Pandemic Across Different European Countries - A Longitudinal Mixed-Methods Analysis of Mental Health Trajectories and Subjective Experiences

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Irina Zrnić Novaković, BSc MSc

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Abstract (English)

The COVID-19 pandemic represented one of the major public health crises in the recent history. During three years of the pandemic, everyday life of people around the world was characterised by various restrictions, changes, fear, and uncertainty, which impacted people's psychological adjustment. Although numerous studies on mental health amidst the pandemic were conducted, individual experiences and longitudinal trajectories of mental health indicators were rarely investigated. The main aim of this dissertation was to assess subjective perceptions and psychological reactions in different pandemic phases, and across different European countries. To capture the variety of people's responses, a longitudinal mixed-methods approach was applied.

Overall, the results pointed to pandemic-related changes in mental health over time, with several cross-country differences being observed. In times of stricter lockdown measures, higher COVID-19 incidence, and higher death rates, approximately one in five people reported being at risk for developing depression, anxiety or adjustment disorder. Socioeconomic factors, different coping mechanisms, and cross-country variations in pandemic management could partly explain the observed differences in mental health. In the qualitative responses, the most common pandemic-related challenges included changes in daily life, emotional distress, and work-related difficulties. However, the participants also highlighted many positive aspects of the pandemic, such as time for pleasant activities, new learning experiences, and relational improvements. Population-informed recommendations to cope with the pandemic included a wide range of strategies with either behavioural (e.g. being active), cognitive-emotional (e.g. adopting a positive inner attitude), or social (e.g. maintaining contact with loved ones) elements.

Summarising the insights gained, people's psychological reactions and coping strategies were shaped by the shifting context of the pandemic, cross-country differences, individual characteristics and experiences. The dissertation thus underscores the heterogeneity

of people's responses to adversity, which should be considered amidst public health emergencies. The findings further suggest that resource-oriented interventions which target psychological flexibility might foster psychological adjustment during future pandemics.

Keywords: Mental Health, Adjustment Disorder, Well-Being, Pandemic, COVID-19, Mixed-Methods Design, Qualitative Content Analysis, Latent Growth Curve Modelling

Abstract (German)

Die COVID-19 Pandemie stellte eine der größten Gesundheitskrisen der jüngsten Geschichte dar. In den drei Pandemiejahren war das alltägliche Leben von verschiedenen Einschränkungen, Veränderungen, Angst und Unsicherheit geprägt, die sich auf die Anpassungsfähigkeit der Bevölkerung auswirkten. Obwohl viele Studien die psychische Gesundheit während der COVID-19 Pandemie untersuchten, wurden die individuellen Erfahrungen und die langfristigen psychischen Folgen nur selten erforscht. Das Hauptziel dieser Dissertation war es, die subjektiven Sichtweisen und die psychischen Reaktionen in mehreren europäischen Ländern und in verschiedenen Pandemiephasen besser zu verstehen. Um die Vielfalt der Reaktionen auf die Pandemie zu erfassen, wurde ein längsschnittlicher Mixed-Methods-Ansatz angewendet.

Insgesamt wiesen die Ergebnisse auf Veränderungen der psychischen Gesundheit im Laufe der Pandemie hin. Während strengerer Präventionsmaßnahmen und höherer COVID-19-bezogener Erkrankungs- und Todesraten nahm die psychische Belastung zu; ungefähr jede fünfte befragte Person berichtete erhöhte Symptome einer Depression, Angst- oder Anpassungsstörung. Sozioökonomische Faktoren, unterschiedliche Bewältigungsmechanismen und länderspezifisches Pandemiemanagement trugen möglicherweise zu den beobachteten Unterschieden in der psychischen Gesundheit bei. In den qualitativen Antworten wurden zahlreiche pandemiebedingte Herausforderungen genannt, wobei Veränderungen im täglichen Leben, emotionale Belastungen und arbeitsbezogene Schwierigkeiten besonders häufig beschrieben wurden. Die Teilnehmenden betonten jedoch auch viele positive Aspekte der Pandemie, wie beispielsweise mehr Zeit für angenehme Aktivitäten, neue Lernerfahrungen und bessere Beziehungen. Zum Umgang mit pandemiebedingten Belastungen empfahlen die Teilnehmenden eine Vielzahl von Strategien mit entweder verhaltensbezogenen (z.B. aktiv bleiben), kognitiv-emotionalen (z.B. positive

innere Haltung einnehmen) oder sozialen (z.B. Kontakt zu Nahestehenden pflegen) Elementen.

Zusammenfassend kann festgestellt werden, dass die psychologischen Reaktionen und Bewältigungsstrategien während der COVID-19 Pandemie durch sich stetig verändernde pandemische Anforderungen, individuelle Gegebenheiten sowie länderspezifische Unterschiede mitbeeinflusst wurden. Die Dissertation unterstreicht somit die Heterogenität der menschlichen Reaktionen auf belastende Ereignisse, die in zukünftigen gesellschaftlichen Krisen berücksichtigt werden soll. Außerdem legen die Ergebnisse nahe, dass ressourcenorientierte Interventionen, die psychologische Flexibilität stärken, die psychologische Anpassung während Pandemien fördern könnten.

Schlüsselwörter: Psychische Gesundheit, Anpassungsstörung, Wohlbefinden, Pandemie, COVID-19, Multimethodenansatz, Qualitative Inhaltsanalyse, Latente Wachstumskurvenmodelle

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1 Introduction

The outbreak of the Coronavirus disease (COVID-19) was declared a global pandemic in March 2020 (World Health Organization [WHO], 2020). It was only more than three years later, in May 2023, that the WHO announced the end of COVID-19 as a global health emergency (Harris, 2023)[1]. During the emergency phase of the pandemic, various measures were introduced to control the virus spread, including the use of face masks, school closure, remote work, travel restrictions, and cancellation of mass gatherings (Ferguson et al., 2020; Güner et al., 2020). These public health measures led to job and financial losses, disruptions of social relationships, and changes in daily routines (Pietrabissa & Simpson, 2020; Rodríguez-Rey et al., 2020). Consequently, the majority of studies conducted during the early phases of the pandemic focused on its detrimental impact, reporting increased prevalence rates of different mental health disorders (Pieh et al., 2020; Rossi et al., 2020). At this time, there was little interest in exploring subjective experiences and positive reactions to the pandemic (Krajewski et al., 2021; Sandbakken & Moss, 2021). As the pandemic progressed, the number of longitudinal studies covering several weeks (O'Connor et al., 2021) or a few months (Fancourt et al., 2021) of the pandemic increased. However, studies with longer assessment periods were rare. Notably, some mental health problems, e.g. anxiety and depression, were investigated extensively during the pandemic (Cénat et al., 2021), while there were only few attempts to examine other disorders, such as adjustment disorder (Brunet et al., 2022).

In essence, this doctoral thesis set out to address the above-mentioned research gaps (i.e. diversity of psychological responses, adjustment disorder, and long-term consequences of

[1] At the time of writing the dissertation, COVID-19 is not anymore considered a public health emergency. Therefore, past simple tense is used when referring to the emergency phase of the pandemic (i.e. March 2020 – May 2023).

the pandemic) by exploring subjective pandemic-related experiences, indicators of positive mental health, and trajectories of adjustment disorder. The overarching aim was to better understand how people reacted and adapted to the pandemic, and which factors affected their mental health across different pandemic phases.

The first chapters of the thesis are concerned with the relevant theoretical concepts and existing findings on mental health amidst the COVID-19 pandemic, which have informed the dissertation. This is followed by an overview of the publications included in the dissertation, and a concluding discussion based on all studies conducted in course of the dissertation project.

1.1 Understanding Psychological (Mal)Adjustment to the COVID-19 Pandemic

Apart from various restrictions, the pandemic situation was characterised by high uncertainty in terms of COVID-19 transmission, the effectiveness of preventive measures, the course of the disease and its long-term impact, including the financial repercussions (Bodrud-Doza et al., 2020; Williams et al., 2020). In such times of elevated stress and uncertainty, people's capacity to adjust is likely to be challenged. However, research on previous health emergencies and different global challenges (e.g. epidemics, major armed conflicts or natural disasters) has shown that highly stressful circumstances do not always imply negative mental health outcomes (Bonanno & Mancini, 2012; Kalisch et al., 2019).

In general, the psychological responses to adverse events might involve some form of psychological dysfunction (e.g. manifested as elevated symptoms of anxiety or depression) or psychological strength (e.g. manifested as mental well-being; Galatzer-Levy et al., 2018). For a long time, the latter was neglected and the research was mainly concerned with pathological outcomes following adversities (Bonanno & Mancini, 2012; Seligman & Csikszentmihalyi, 2000). By way of illustration, symptoms of trauma- and stress related disorders as well as emotional responses of fear and anger were extensively investigated during past disease outbreaks (Esterwood & Saeed, 2020). The positive psychology perspective has gained

increased attention relatively recently, with a growing interest in healthy adjustment to adversity, often referred to as *resilience* (Bonanno, 2004; Bonanno et al., 2015). In this context, resilience can be briefly defined as the ability to maintain stable levels of functioning following adverse events (Bonanno, 2004). Individuals showing a pattern of stable healthy adjustment are likely to experience positive emotions and report different aspects of positive mental health, including well-being (Bonanno & Diminich, 2013; Bonanno et al., 2011). Transferred to the context of COVID-19, the findings stemming from previous global crises suggest that both negative (e.g. symptoms of mental health disorders) and positive mental health outcomes (e.g. well-being) can be expected when adapting to the pandemic situation.

Thus far, diverse approaches have been applied to explain the psychological adjustment processes during disease outbreaks, disasters, and other major stressful events (Bonanno et al., 2010; Esterwood & Saeed, 2020; Hobfoll et al., 2016). Given the duration of the pandemic and its impact on different areas of life, people's reactions and adjustment are likely to vary as a function of time, individual and environmental factors. Hence, dynamic approaches are highly needed to account for the expected fluctuating and context-dependent reactions in the wake of the COVID-19 pandemic. Two concepts that consider variations in adjustment and the rationale for using them in the pandemic context are outlined below.

1) *Psychological flexibility* can be understood as a set of processes which modulate behavioural, cognitive, and emotional strategies in response to changing situational demands (Kashdan & Rottenberg, 2010). It is a dynamic construct that acknowledges the interactions between people and their environment over time, and can thus help to explain how people navigate uncertain environments, such as the COVID-19 pandemic (Dawson & Golijani-Moghaddam, 2020). Conceptually, psychological flexibility means recognising requirements of the ongoing situation and responding to them effectively, while pursuing important values and goals. In difficult life situations, e.g. after a job loss, individuals with high psychological

flexibility acknowledge and accept the arising thoughts and feelings, including the unpleasant ones (e.g. anger towards their boss), but are not consumed by them (Hayes et al., 2006). Rather, they try to step back, observe their experience in a non-judgemental way, and take actions that are consistent with their values. To illustrate, a values-based action for a family-oriented person who lost a job might be to actively look for a new job with flexible working hours. On the other hand, individuals with low levels of psychological flexibility tend to ruminate on negative thoughts (e.g. "I cannot find a new job.") and unpleasant emotions (e.g. fear of not finding a job) after a difficult life event. Moreover, they often lack clarity regarding their values, which might lead to inaction or impulsivity (Hayes et al., 2006). While psychological inflexibility has been associated with different mental health disorders, psychological flexibility has been considered essential for maintaining mental health and used in different psychological therapies (Kashdan & Rottenberg, 2010; Moran & Ming, 2020).

2) The *conservation of resources theory (COR)* proposes that individual responses to stressful circumstances might be explained by the actual or perceived changes in resources (Hobfoll, 1989). In a range of major stressful events, (threat) of resource loss has been linked to psychological distress, with a greater vulnerability being found in resource-poor individuals (Hobfoll et al., 2016). The relevance of the COR theory in the pandemic context is based on the fact that the pandemic threatened both internal (e.g., physical health, hope, optimism) and external resources (e.g., social support, income, healthcare). According to the COR theory, people severely impacted by COVID-19 (e.g. women, people who have lost income) might be at greater risk of experiencing loss spirals and mental health problems (Hertz-Palmor et al., 2021; Peck, 2020).

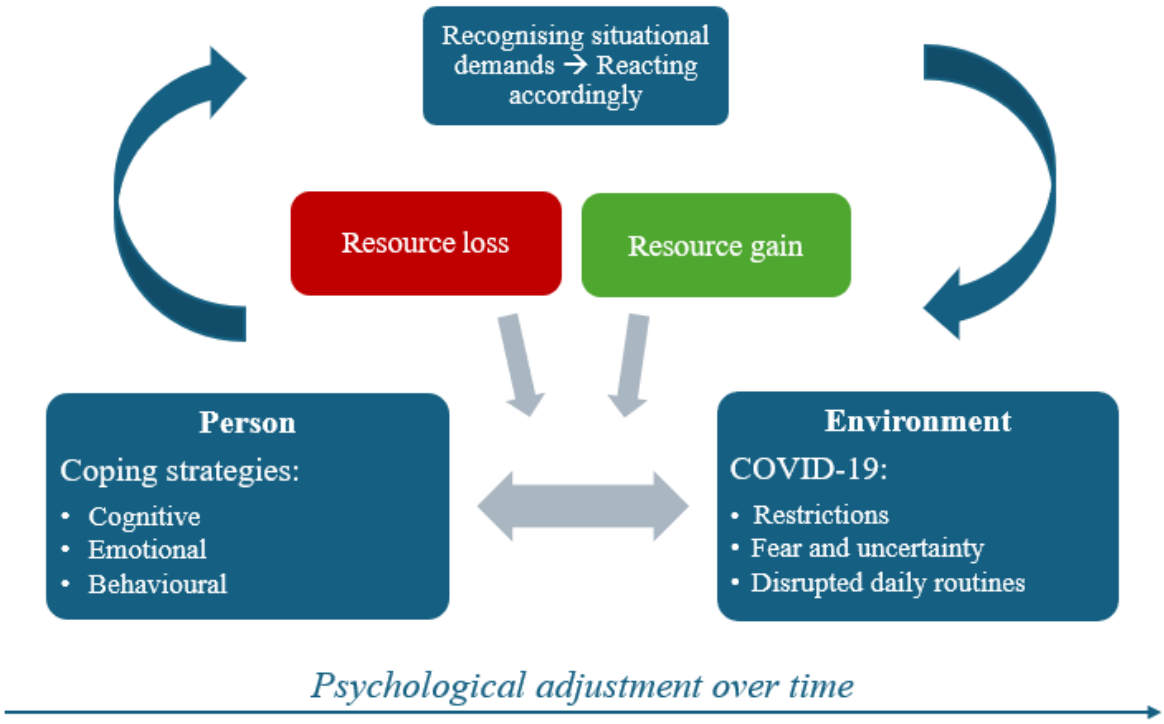
Taken together, psychological flexibility appears to be a useful framework for understanding mid- and long-terms adjustment to the pandemic since it accounts for

temporality, i.e. time-related effects of the pandemic. Moreover, it acknowledges that risk and protective factors for mental health might change as the pandemic situation unfolds (Chen & Bonanno, 2020). On the other hand, the COR theory might help to better understand how pandemic-related resource losses are linked to psychological adjustment to the pandemic.

Therefore, this dissertation explored people's responses to the pandemic and possible mechanisms underlying psychological adjustment through the lens of psychological flexibility and the COR theory. Figure 1 shows how the key concepts of the COR theory and psychological flexibility are interrelated. The presented concepts build the theoretical framework which has informed the present dissertation. Apart from the theoretical concepts, the dissertation has drawn on findings on mental health amidst COVID-19, which are presented in the following chapters.

Figure 1

Key concepts of the COR theory and psychological flexibility which comprise the theoretical framework of the dissertation



1.2 Psychological Reactions to the COVID-19 Pandemic

The scientific community has been investigating the psychological consequences of the COVID-19 pandemic ever since its beginning. In the first months of the pandemic, numerous rapid studies were published on the effect of COVID-19 and related containment measures on mental health. One of the first reviews on this topic found sleep disturbances and psychological distress to be the most common psychological problems amidst the pandemic (Krishnamoorthy et al., 2020). Increased levels of anxiety, depression, and post-traumatic stress symptoms were also reported early on (Salari et al., 2020; Vindegaard & Benros, 2020). Importantly, several risk factors for developing mental health problems amidst COVID-19 have been identified, including lower income, female gender, and a history of mental health difficulties (Di Crosta et al., 2020; Pieh et al., 2020; Valiente et al., 2021). Elevated levels of adverse psychological outcomes have further been found in regions more strongly affected by COVID-19, such as the Lombardy region in Italy (Chirico et al., 2020).

Notably, the validity and generalisability of the studies published during the early phase of COVID-19 were questioned due to their methodological flaws and the widely used cross-sectional design (Nieto et al., 2020; Rajkumar, 2020). One common criticism was that the evidence mostly emerged from only a few countries (Krishnamoorthy et al., 2020), although cross-country differences in policy interventions and the number of COVID-19 tests, cases, and deaths were identified early on (Balmford et al., 2020). Concerns were also brought regarding the lack of longitudinal studies and the limited assessment of contextual factors (Manchia et al., 2022). It is widely accepted that the role of context, including individual circumstances and different perspectives on public health events, might best be captured using qualitative methodology (Teti et al., 2020; Wolff et al., 2019). However, qualitative studies, which are known to be time-consuming, were relatively uncommon during the initial phases of the COVID-19 pandemic, since the focus of the scientific community was on delivering rapid evidence on the mental health impact of the pandemic.

The first review and meta-analysis of longitudinal studies and natural experiments showed a small, but considerable negative effect of COVID-19 lockdowns on mental health of the general population (Prati & Mancini, 2021). Interestingly, this review did not find a reduction of positive psychological functioning outcomes, such as well-being. This is in accordance with the *two continua model*, which suggests that mental health difficulties and positive mental health can be experienced simultaneously (Westerhof & Keyes, 2010). In times of disease outbreaks and natural disasters, identification of positive consequences might help to maintain positive mental health. To give an example, the severe acute respiratory syndrome (SARS) epidemic in Hong Kong had a positive impact on social connectedness, mental health awareness, and healthy lifestyle habits. These positive changes were negatively associated with post-traumatic stress symptoms and other indicators of mental health problems (Lau et al., 2006).

In the context of COVID-19, pleasant experiences during the first lockdown were reported in France (Fouques et al., 2021). As a result of social restrictions imposed to control the virus spread, people from Poland spent more time with their families (Krajewski et al., 2021), whereas people from Spain experienced relational improvements (Günther-Bel et al., 2020). Moreover, the initial phase of COVID-19 had a positive impact on the environment; air and water quality improved and the emission of dangerous pollutants was reduced (Khan et al., 2020; Lal et al., 2020).

These initial findings on positive consequences suggest that people were not solely burdened by COVID-19. Even in the very first phase of the pandemic, some positive aspects emerged, pointing to considerable variations across individuals. In Chapter 1.4, positive psychological functioning is discussed in more detail. As mentioned earlier, the heterogeneity of people's reactions to adversities was already researched in the aftermath of other global crises (Bonanno & Mancini, 2012). Although differences in individual responses have been discussed in the context of COVID-19 (Mancini, 2020), they have not been investigated in

detail. For example, little is known about how people's reactions have changed in the course of the pandemic. As shown during previous global health challenges, qualitative inquiries are the best methods to embrace different perspectives and assess changes in people's perceptions over time (Johnson & Vindrola-Padros, 2017; Teti et al., 2020). Especially qualitative studies involving multiple countries could provide valuable insights into the variety of people's experience. Throughout the pandemic, cross-country studies were mainly conducted in a quantitative manner (e.g. Olff et al., 2021).

Another limitation of the psychological research on COVID-19, particularly in its early stage, concerns the disorders investigated. Whereas high rates of anxiety, depression, and post-traumatic stress symptoms in the first year of the pandemic were repeatedly reported (Cénat et al., 2021; Dettmann et al., 2022; Necho et al., 2021; Sousa et al., 2021; S. X. Zhang et al., 2022), adjustment disorder was largely overlooked (Brunet et al., 2022). This was surprising, since it is well-established that this disorder might develop following stressful life events or major life changes (Zelviene & Kazlauskas, 2018), both being common during COVID-19 (for an overview of pandemic-related stressors, see Javakhishvili et al., 2020). For this reason, the next chapter focuses on adjustment disorder and its relationship with the COVID-19 pandemic.

1.3 Adjustment Disorder Amidst the COVID-19 Pandemic

According to the 11th revision of the International Classification of Diseases (ICD-11; WHO, 2019), adjustment disorder represents a maladaptive response to one or more psychosocial stressors, which usually manifests itself within a month of the stressor(s). Adjustment disorder is characterised by two core symptom clusters, namely: 1) preoccupation with the stressor, and 2) failure to adapt. The former includes excessive worry, distressing thoughts, and rumination about the stressor or its consequences, while the latter causes notable difficulties in different areas of life, e.g. work, family, or social life. Normal

functioning can only be maintained if a considerable amount of effort has been devoted to cope with the stressor and its consequences (WHO, 2019).

Although adjustment disorder is a common diagnosis in clinical praxis (Reed et al., 2011; Sundquist et al., 2017), it has received relatively little attention in research (Morgan et al., 2022). Data on prevalence of adjustment disorder are hence limited, with estimates ranging between 1% and 2% in the general population (Zelviene & Kazlauskas, 2018). Typically, the symptoms of adjustment disorder resolve within six months, but they might continue after this period, if the stressor persists longer (WHO, 2019). However, research into the course of adjustment disorder is scarce and little evidence exists on the development of adjustment disorder symptoms over time (O'Donnell et al., 2019). In contrast, predictors of adjustment disorder have been studied frequently. Apart from sociodemographic characteristics, well-established predictors include low social support, illness, stress, and history of mental health disorders (Spanovic Kelber et al., 2022).

Adjustment difficulties have been repeatedly associated with job loss, work- and health-related stressors (Lorenz et al., 2018; Zelviene et al., 2020) – all of which have been highly present amidst COVID-19. On these grounds, an increased prevalence of adjustment disorder during the pandemic was expected when the pandemic started (Kazlauskas & Quero, 2020). And indeed, 55% of participants met the clinical threshold for adjustment disorder in a large-scale international study conducted in spring 2020 (Brunet et al., 2022). Other studies during the similar period reported lower prevalence rates, ranging from 8.2% to 18.8% (Jannini et al., 2022; Levin et al., 2022; Lotzin et al., 2021).

Numerous stressors that might trigger symptoms of an adjustment disorders have been highly present throughout the COVID-19 pandemic. By way of illustration, many people have been impacted by job and financial losses (Hertz-Palmor et al., 2021; Nicola et al., 2020). Fear of infection (Mahat-Shamir et al., 2021), isolation and loneliness (Pietrabissa & Simpson, 2020) have further challenged people‘s ability to adapt. In addition, some have

experienced potentially traumatic events, including a severe infection or losing a loved one due to COVID-19 (Gersons et al., 2020).

Apart from these adversities, several risk factors for adjustment disorder have been identified amidst the pandemic. During its early phase, the risk for developing symptoms of adjustment disorder was shown to be higher in women (Makhashvili et al., 2020), parents (Wamser-Nanney et al., 2021), and people with a history of mental disorders (Fineberg et al., 2021). Furthermore, adjustment difficulties have been associated with low emotional stability (Kestler-Peleg et al., 2022), and depressive symptomatology (Hamama-Raz, Goodwin, et al., 2021). Cross-country differences regarding adjustment disorder were also found, with less symptoms in Israel compared to the USA (Coiro et al., 2021). The authors suggested that the recent history of traumatic experiences in Israel might have promoted resilience in this country, thus leading to better adjustment to the pandemic-related difficulties (Coiro et al., 2021). Further cross-country studies could enhance the understanding of factors underlying different adjustment disorder levels in different countries.

Taken together, both individual (e.g. emotional stability) and environmental (e.g. country's history of trauma) factors seem to be relevant for the development of adjustment disorder amidst COVID-19. However, little is known about changes in adjustment disorder symptoms over time. The existing longitudinal studies were conducted at the beginning of the pandemic and covered rather short assessment intervals (i.e. several weeks to several months). For instance, a German study found a decrease in adjustment disorder symptoms between spring and autumn 2020 in patients with pre-existing mental disorders (Bartels et al., 2022). An Israeli study applied a trajectory-based approach to explore adjustment disorder symptoms before (summer 2020) and after (autumn 2020) the second lockdown (Ben-Ezra et al., 2021). In total, four main trajectories, i.e. patterns of change over time, were identified. The trajectories were described as stable-low (71.3%), stable-high (11.8%), recovery (8.9%), and exacerbation (8.0%), depending on whether the participants were at risk for adjustment

disorder at neither of the timepoints, both timepoints, only at T1, or only at T2, respectively (Ben-Ezra et al., 2021).

The presented results point to different courses of adjustment disorder symptoms, signalising that people reacted and adapted to the pandemic differently, at least in its initial phases. Findings on positive mental health outcomes further support this idea. These are addressed in the next chapter.

1.4 Positive Psychological Functioning During the COVID-19 Pandemic

As discussed in Chapter 1.2, the psychological research amidst the pandemic was mainly focused on its adverse effects, especially during the early phase of COVID-19 (for an overview, see Witteveen et al., 2023). Studies on positive aspects of psychological functioning, such as well-being and resilience, have been comparatively rare and often embedded in research on negative mental health amidst the pandemic (Egozi Farkash et al., 2022; Krok & Zarzycka, 2020). Interestingly, a longitudinal study conducted in China found resilience (here defined as stable low symptoms) to be the most common response to the pandemic-related stressors (Chen et al., 2022). A similar pattern was described in a review of studies on adjustment trajectories following other potentially traumatic events and major life stressors, with resilience being the modal psychological response (Galatzer-Levy et al., 2018). It is worth noting, however, that both a decrease in resilience and a relatively stable levels of resilience were shown in the first year of the pandemic (Kimhi et al., 2020; To et al., 2022).

Regarding well-being, several studies focused on specific target groups (e.g. students; Kulcar et al., 2023) or specific forms of well-being (e.g. spiritual well-being; González-Sanguino et al., 2021). It should also be mentioned that well-being was often not directly assessed. Rather, symptoms of mental health problems were used as indicators of well-being (Farrell et al., 2023; Larson et al., 2023). When well-being was directly assessed, a decrease was shown in the early phase of the pandemic, compared to pre-pandemic data (Würtzen et al., 2022). Longitudinal studies conducted during the pandemic yielded contradictory

findings. Whereas some studies reported increase (O'Connor et al., 2021), other found decrease in the level of well-being over time (Wetherall et al., 2022). It is plausible that well-being improved in the summer of 2020, when some of the restrictions were lifted, but then declined following the reimplementation of restrictions over the winter months of 2020/2021 (Fioravanti et al., 2022; Toffolutti et al., 2022). Little is known about changes in well-being in the later phases of the pandemic.

Thus far, numerous factors have been linked to resilience and well-being amidst COVID-19 pandemic, including age, gender, employment, and physical activity (Thygesen et al., 2023; To et al., 2022). Furthermore, seeking social support, adopting positive attitude, and relying on personal values have been identified as resilience-promoting behaviours (Luo et al., 2022; Slavich et al., 2022), while higher income and a healthy lifestyle have been associated with greater well-being (O'Connor et al., 2021; Sfeir et al., 2022). Trust in authorities, the stringency of public health measures, as well as COVID-19 incidence and death rates could also affect people's adjustment and psychological functioning during the pandemic (Kimhi et al., 2020; Salanti et al., 2022).

Overall, psychological adjustment to the pandemic seems to depend on various individual and environmental factors. The variety of people's responses might also be explained by coping strategies they have used, which are discussed in the following.

1.5 COVID-19 Pandemic and Coping

In order to broaden the knowledge about psychological adjustment to the pandemic, it is important to understand which coping strategies people have employed to deal with pandemic-related stressors. In general, coping can be defined as a sum of action-oriented efforts, emotional, cognitive, and behavioural modifications undertaken to overcome stressful situations (Taylor & Stanton, 2007).

In the pandemic context, people reported different coping strategies, for instance: maintaining hope and positivity, keeping in touch with family and friends, adhering to

preventive measures, and adopting a healthy lifestyle (Kar et al., 2021; Waselewski et al., 2020; Y. Zhang et al., 2020). Moreover, positive thinking and social support were linked to well-being during the pandemic (Budimir et al., 2021; Gori et al., 2020). A protective effect of approach-oriented coping strategies, such as planning, problem solving, and acceptance, was also shown (Kavčič et al., 2022; Krok & Zarzycka, 2020). On the other hand, avoidance coping (e.g. avoiding to think about the pandemic), substance use, and increased media use could predict negative mental health outcomes in numerous COVID-19 studies (Eden et al., 2020; Femia et al., 2020; Kar et al., 2021; Okafor et al., 2021).

Notably, only a small number of studies focused on the coping strategies associated with adjustment disorder. A French study found more adjustment difficulties in people using avoidant coping strategies (e.g. denial, substance use, behavioural disengagement), and less adjustment difficulties in people using humour, planning, and positive reframing (Vancappel et al., 2021). In a Georgian study, relaxation exercises, meditation, as well as activities such as reading, doing the housework, and watching TV were related to lower symptoms of adjustment disorder, whereas drinking alcohol and expressing negative feelings (e.g. being aggressive, crying, arguing) were linked to higher symptoms (Makhashvili et al., 2020).

In sum, considerable research has been carried out on behaviours to cope with pandemic-related stressors. However, the generalisability of these findings might be limited given the cross-country differences in coping observed during the pandemic. Specifically, in a study on university students, avoidance coping (e.g. blocking out disturbing thoughts) was more common in Georgia than in German-speaking Switzerland (Bachem et al., 2023). It is also worth noting that many studies on coping relied on general coping strategies, paying relatively little attention to pandemic-specific coping. Moreover, the investigated coping strategies were mostly pre-selected by the authors, leaving little room for exploring the diversity of coping behaviours used by the general population. Finally, little is known about changes in coping strategies over time.

Given the novelty of the pandemic and its long-term impact, it has been argued that new concepts are needed to explain how people adjusted to the pandemic situation over time (Kira et al., 2021). In addition to the traditional approaches to coping, more dynamic approaches might account for the changing living conditions due to COVID-19. One such approach is psychological flexibility, here conceptualised as a combination of processes that unfold over time, aiming to adequately respond to changing situational demands (Chen & Bonanno, 2020; Kashdan & Rottenberg, 2010).

In the pandemic context, psychological flexibility processes were positively associated with well-being and negatively associated with psychological problems (Dawson & Golijani-Moghaddam, 2020; Landi et al., 2020). Conceptualised as a state, psychological flexibility was related to decreases in psychological distress and increases in well-being levels in a longitudinal study conducted in Ireland (Browne et al., 2022). When examined as a measure of coping, flexibility could predict chronic anxiety and depression across 13 months of the pandemic (Hemi et al., 2023) as well as half-year longitudinal trajectories of post-traumatic stress disorder (PTSD), depression, and anxiety (Chen et al., 2022).

Summarising, the research on psychological adjustment to the pandemic situation has revealed mixed results, ranging from adjustment difficulties and mental health problems to the capacity for resilience and successful adjustment (e.g. Ben-Ezra et al., 2021; Cénat et al., 2022). Whereas cross-sectional data and longitudinal data assessed in the initial phases of the COVID- 19 pandemic are rich, there is still uncertainty regarding adjustment processes in the mid- to long-term. To the best of our knowledge, studies covering longer assessment intervals, involving multiple countries, and combining qualitative and quantitative methodology are lacking. Such studies would offer novel insights into the variety of people's psychological responses and coping strategies under different pandemic circumstances.

2 Aims and Objectives

Overall, the presented findings support the idea of psychological adjustment as a dynamic response (Ungar & Theron, 2020) shaped by a combination of biological (e.g. age differences), psychological (e.g. depressive symptomatology), and social factors (e.g. social support). The complex interaction between coping processes, individual characteristics, and environmental effects which shape people's responses to adversities has been well-established outside of the pandemic context (Kalisch et al., 2019; Taylor & Stanton, 2007). However, at the time of preparing the dissertation, the complexity of factors and mechanisms underlying psychological adjustment to the pandemic was poorly understood, mainly due to the lack of longitudinal and qualitative studies. To provide some new evidence on adjustment processes and their outcomes, this dissertation explored people's psychological responses and coping behaviours across different phases of the pandemic. The overarching aim was to better understand how people react to the pandemic, and which individual and environmental factors shape their mental health over time.

Given the paucity of data on people's lived experiences during the initial phases of the pandemic, these were investigated first. Subsequently, the focus was placed on changes in mental health over time. In this way, the dissertation could timely address research gaps identified in different phases of the pandemic. Following the main aim, the specific objectives of the dissertation, presented in a chronological order of investigation, were to:

(1) explore subjective pandemic-related experiences in different European countries across different phases of the pandemic;
(2) broaden the knowledge about the diversity of behaviours and mechanisms to cope with the pandemic situation;
(3) investigate mental health outcomes across different European countries in different phases of the pandemic; and

(4) estimate the trajectories of adjustment disorder symptoms and well-being, and determine the predictors of these trajectories.

The four aims were addressed in four studies, published in peer-reviewed journals, which comprise the body of this dissertation. An overview of studies and corresponding aims is provided in Table 1. The research questions addressed in the respective studies are presented in Figure 2.

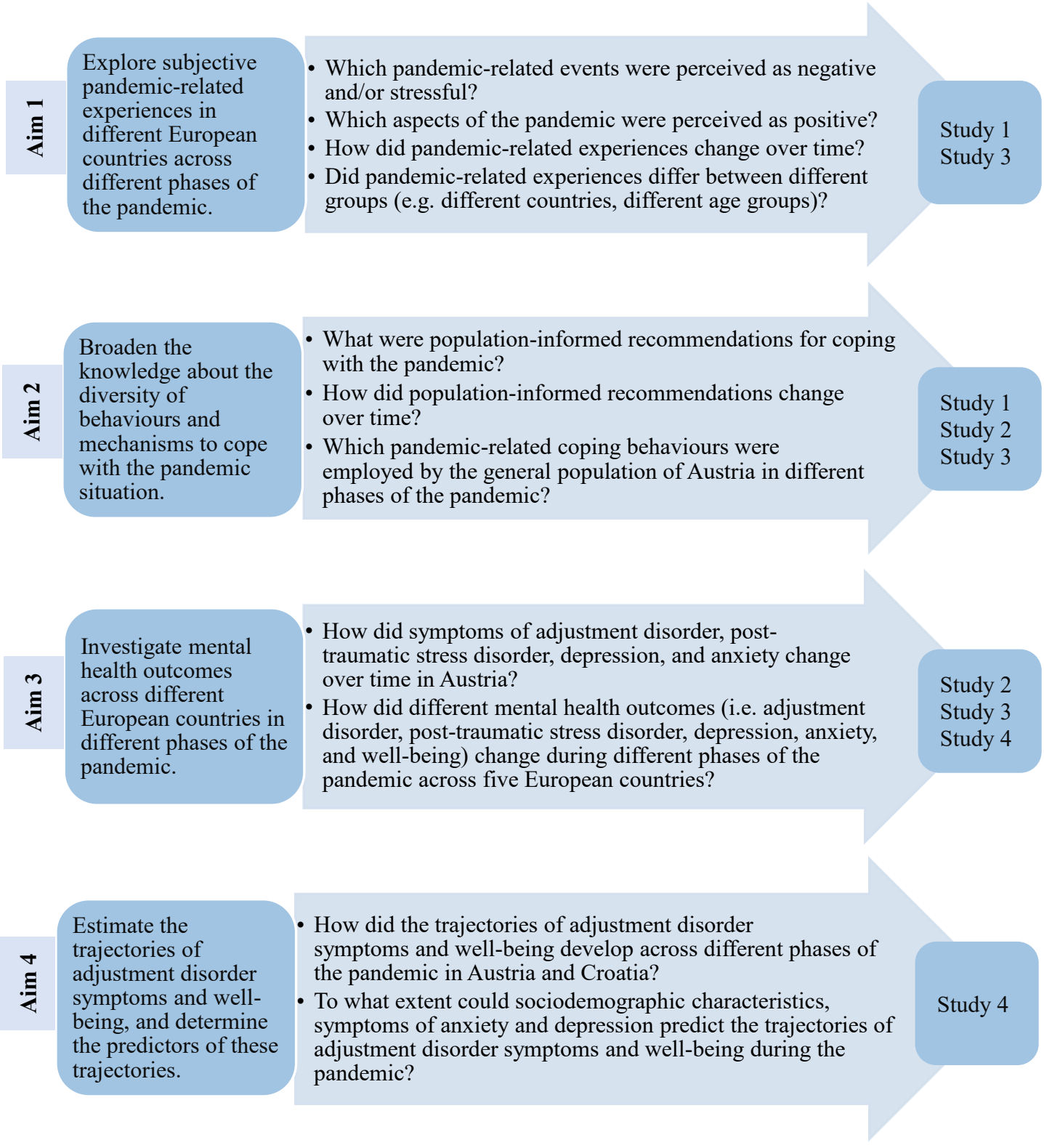
Table 1

Assignment of the dissertation's aims to the conducted studies

Study		Aims
1	You can't do anything about it, but you can make the best of it: A qualitative analysis of pandemic-related experiences in six European countries	(1), (2)
2	Two years of COVID-19 in Austria-Exploratory longitudinal study of mental health outcomes and coping behaviors in the general population	(2), (3)
3	Shaped by the COVID-19 pandemic: Psychological responses from a subjective perspective-A longitudinal mixed-methods study across five European countries	(1), (2), (3)
4	Trajectories of adjustment disorder and well-being in Austria and Croatia during 20 months of the COVID-19 pandemic.	(3), (4)

Figure 2

Overview of the PhD project: Aims, research questions and studies



3 Research Context and Methodology

The present dissertation sought to better understand psychological reactions to the COVID-19 pandemic by applying a mixed-methods approach and combining cross-country and within-country analyses. All studies included in the dissertation were conducted in the course of the ADJUST study (Lotzin et al., 2020), which was initiated by the European Society for Traumatic Stress Studies (ESTSS; for details, see https://estss.org/adjust/). The ADJUST study is a large-scale, pan-European study on stressors, risk and protective factors related to symptoms of adjustment disorder. Eleven European countries have been involved in the study, namely: Austria, Croatia, Germany, Georgia, Greece, Italy, Lithuania, the Netherlands, Poland, Portugal, and Sweden. In all countries, three assessment waves were conducted at 6-month intervals starting from June 2020 (Lotzin et al., 2020). In addition, Austria and Croatia launched a forth wave in winter 2021/2022 to assess mental health outcomes one year after the significant rise in the number of COVID-19-related cases and deaths in winter 2020/2021 (Looi, 2020; Mathieu et al., 2020).

Prior to its start, the ADJUST study was preregistered in the OSF registry (https://osf.io/8xhyg). Ethical approval was obtained at all study sites. For Austria, the approval was granted by the Ethics Committee of the University of Vienna (reference number: 00554; date of approval: 29th of May, 2020).

3.1 Participants and Procedure

To recruit participants, convenience sampling was used in all countries except for Poland, where a professional panel service was responsible for the recruitment (Lotzin et al., 2021). In other countries, different recruitment strategies were implemented, ranging from advertisements in social media and distribution of flyers in public spaces, to contacting key stakeholders (e.g. mental health services, universities), professional organisations (e.g. cultural institutions, large companies), and various interest groups (e.g. sport groups, senior

citizen clubs). A comprehensive overview of recruitment strategies per country is provided elsewhere (Lotzin et al., 2021).

All assessments were carried out online since face-to-face contact was restricted due to the preventive measures against COVID-19. To be eligible for participation, interested individuals had to be at least 18 years old, able to read and write in the language of the respective study site, and willing to participate (Lotzin et al., 2021). At the first assessment timepoint of the ADJUST study, $N = 15\ 563$ participants from the general population of the eleven countries could be recruited, out of which $n = 13\ 301$ completed the survey. In the course of this dissertation, data collected in Austria, Croatia, Georgia, Greece, Poland, and Portugal have been used (for details, see Chapter 4), as agreed with principal investigators of the respective countries.

3.2 Research Design and Measures

Previous research has suggested that complex interactions between individual characteristics, coping behaviours, and contextual factors might explain psychological adjustment to the pandemic (Chen et al., 2022; Sandbakken & Moss, 2021). To address all these factors, the present dissertation applied a mixed-methods approach, with two quantitative studies (Study 2 and Study 4), one qualitative (Study 1), and one mixed-methods study (Study 3). Mixed-methods approach allows to yield triangulated findings, increase validity and credibility of the findings, and provide a more comprehensive picture of the studied phenomenon (Bans-Akutey & Tiimub, 2021; Noble & Heale, 2019). Therefore, we combined qualitative and quantitative data to better understand which factors shape people's perceptions, reactions, and coping strategies during the COVID-19 pandemic. All studies except for Study 1 were conceptualised as longitudinal studies. Further details on the research methodology of each study are provided below and in the respective publications (see Appendix).

3.2.1 Qualitative Methodology

Qualitative methods are essential for understanding reactions to novel phenomena, such as the psychological impact of the COVID-19 pandemic and the related restrictions (Teti et al., 2020). They have also proven to be of vital importance for capturing a variety of people's experiences amidst past global crises and natural disasters (Rowney et al., 2014). However, only a small number of qualitative studies was published in the beginning of the pandemic. These were mostly interested in the experiences of specific target groups, such as healthcare workers (Arnetz et al., 2020), COVID-19 survivors (Olufadewa et al., 2020), and pregnant women (Javaid et al., 2021). General population studies were scarce, which is why the first study of the dissertation investigated subjective experiences regarding the COVID-19 pandemic in a qualitative manner. The data included answers to four open-ended questions, collected at baseline (i.e. summer/autumn 2020) in six European countries (Austria, Croatia, Georgia, Greece, Poland, and Portugal). The questions, listed in Table 2, assessed 1) stressful events, 2) positive, and 3) negative aspects of the pandemic, as well as 4) recommendations to cope with the pandemic situation.

In order to find out how pandemic-related experiences changed over time, Study 3 also included qualitative data (i.e. answers to the four open-ended questions collected at baseline and one-year follow-up). These were complemented by quantitative data consisting of sociodemographic characteristics and mental health outcomes (for an overview of measures used, see 3.2.2 Quantitative Methodology) to better understand how and why psychological reactions to the pandemic changed in relation to personal and environmental factors. This study used data collected in five countries, namely: Austria, Croatia, Georgia, Greece, and Portugal. The Polish data were not included since Poland did not collect qualitative data at the one-year follow-up.

3.2.2 Quantitative Methodology

A range of validated self-report measures was used for Study 2, Study 4, and the quantitative part of Study 3. An overview of the measures is provided in Table 2. In addition, self-constructed items were used in all studies to assess sociodemographic (e.g. age, gender) and health-related (e.g. COVID-19 infection) characteristics, as well as social (e.g. relationship status) and financial (e.g. pandemic-related income loss) factors.

Table 2

Overview of assessment methods used in the dissertation

Assessment method	Purpose	Used in studies (Study Number)
Open-ended questions: 1) What has been the *most stressful event(s)* during the coronavirus pandemic? 2) Overall, what do you find *most negative* about the coronavirus pandemic? 3) Overall, what do you find *most positive* about the coronavirus pandemic? 4) What *recommendations* would you give to other people on how to deal with the current situation?	Assessment of subjective pandemic-related experiences and population-informed recommendations for coping with the pandemic situation	1, 3
Adjustment Disorder New Module - 8 (ADNM-8; Kazlauskas et al., 2018)	Assessment of ICD-11 adjustment disorder symptoms	2, 3, 4
Primary Care PTSD Screen for DSM-5 (PC-PTSD-5; Prins et al., 2015)	Assessment of main PTSD symptoms according to DSM-5	2, 3
2-Item Patient Health Questionnaire (PHQ-2; Kroenke et al., 2003)	Screening for common symptoms of depressive disorders	2, 3, 4
2-Item Generalised Anxiety Disorder Scale (GAD-2; Kroenke et al., 2007)	Screening for common symptoms of anxiety disorders	2, 4
5-Item World Health Organization Well-Being Index (WHO-5; World Health Organization, 1998)	Measuring well-being over the last two weeks	3, 4
Pandemic Coping Scale (PCS; Lotzin, Ketelsen, et al., 2022)	Measuring coping behaviours specific for a pandemic	2

Note. ICD-11 = The 11th Revision of the International Classification of Diseases; PTSD = Post-traumatic stress disorder; DSM-5 = Diagnostic and Statistical Manual of Mental Disorders (5th edition).

All self-report measures of mental health have been validated in several studies (Ben-Ezra et al., 2018; Bovin et al., 2021; Löwe et al., 2010; Topp et al., 2015) and frequently used in the pandemic context (Fioravanti et al., 2022; Kazlauskas et al., 2022; Marvaldi et al., 2021; Ptak et al., 2023; Toffolutti et al., 2022). The Pandemic Coping Scale (PCS) was developed at the beginning of the pandemic by experts in the field of traumatic stress (Lotzin, Ketelsen, et al., 2022). It measures different coping behaviours specific for a pandemic, including leading a healthy lifestyle, maintaining a daily structure, adhering to preventive measures, and performing joyful activities. A validation study of the PCS provided evidence for good reliability, convergent, divergent, and criterion validity of the scale (Lotzin, Ketelsen, et al., 2022).

3.3 Data Analysis

This section presents the qualitative and quantitative methods used throughout the dissertation project.

3.3.1 Qualitative Data Analysis

Answers to open-ended questions collected for Studies 1 and 3 were analysed using Qualitative Content Analysis (QCA; Mayring, 2010, 2014). The QCA is a structured, step-by-step approach which allows the use of frequencies (i.e., semi-quantification; Neale et al., 2014). The method is thus well-suited for international studies, where a transparent, pre-defined procedure is essential for the analysis. Moreover, the QCA is applicable when having large samples (Mayring, 2014), which was the case in our studies.

Studies 1 and 3 were conducted in line with the current guidelines for cross-country (Kull et al., 2019; Wendt, 2020), qualitative (Tong et al., 2007), and longitudinal mixed-

methods (Grossoehme & Lipstein, 2016; Tuthill et al., 2020) research. Given that both studies involved several countries, regular meetings with the team members from the involved countries were held to discuss arising issues and ensure consistency in the analysis. *MAXQDA* software was used for data management and analysis in both studies (VERBI Software, 2019, 2021).

In Study 1, we first applied an inductive approach to develop preliminary categories based on the data of $n = 80$ randomly selected participants from Austria. For each category, a definition and a few anchor examples were provided to create a preliminary coding scheme (i.e. coding book). This scheme was subsequently revised in an iterative process involving the six countries, using a deductive approach. Figure 3 shows all major steps of the analysis. The final coding scheme including all categories, definitions, and anchor examples is provided in elsewhere (https://doi.org/10.1371/journal.pone.0285078.s002). For illustrative purposes, the definition and anchor examples for the category "Travel restrictions" are presented below:

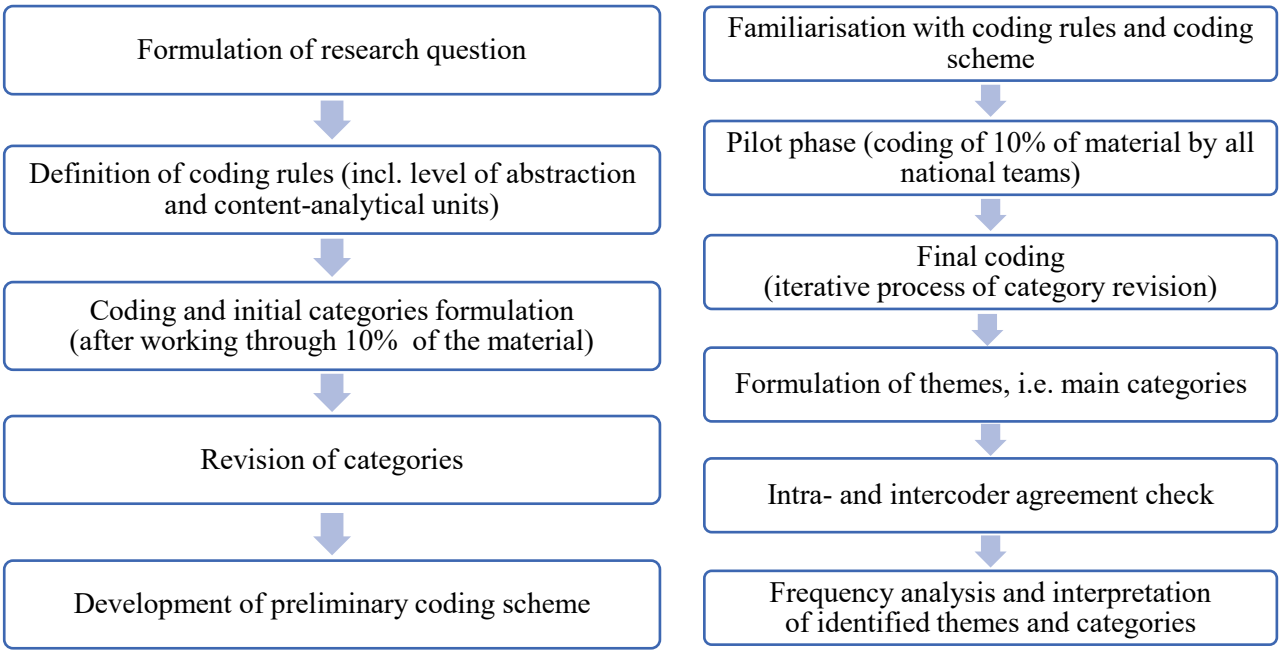
- **Definition:** Travel restrictions (domestic and international) per se, as well as none/restricted opportunities to visit loved ones due to travel restrictions, are recorded here. Cancellations of travel and inability to travel (incl. home travel) are also included.
- **Anchor examples:** "Not being able to visit life partner abroad", "No travel", "Not being able to travel to family in another state".

In Study 3, data collected at the one-year follow-up (i.e. T3 of the ADJUST study) were analysed in a deductive manner, applying the coding scheme developed in Study 1. If necessary, new categories were added to represent new segments not corresponding to any of the categories included in the original coding scheme. The coding scheme was revised based on 10% randomly selected answers of participants from all five countries. Afterwards, the rest of the material was coded, and intra- and interrater agreement were calculated. The themes

identified at baseline and follow-up were then compared based on participants' characteristics (e.g., positive aspects identified by men and women), and differences between the two timepoints were examined using the respective *MAXQDA* functions (e.g., joint displays, crosstabs; VERBI Software, 2021). The quantitative analysis of Study 3, which was conceptualised as a mixed-methods study, is presented in the next chapter (see 3.3.2 Quantitative Data Analysis).

Figure 3

Qualitative data analysis: Step-by-step approach used in Study 1



Note. This figure presents the two-fold analytical strategy applied in Study 1, comprising: a) Inductive category development, and b) Deductive category assignment.

3.3.2 Quantitative Data Analysis

Quantitative data were analysed in all studies except for Study 1. The analyses were performed in SPSS (version 26 and 27; IBM Corp, 2019, 2020) and RStudio (version 2022.12.0.353; R Core Team, 2022) and are briefly outlined in the following.

Study 2 examined mental health and coping behaviours over 18 months of COVID-19 in Austria. At the time of designing the study, research on mental health during the pandemic in Austria was limited, mainly focusing on the initial pandemic stages. Therefore, we aimed to rapidly share data on changes in mental health outcomes and pandemic-related coping behaviours. First, prevalence rates were calculated using the established cut-offs. Second, differences between the determined prevalence rates were compared using the Cochran's Q test with a post-hoc analysis. Third, one-way repeated measures analysis of variance

(ANOVA) and a two-way mixed ANOVA were applied to compare mean scores of all measures over time and to test for gender differences, respectively. As sensitivity analysis, multiple imputation using Fully Conditional Specifications was performed to rule out a possible bias due to the exclusion of incomplete cases. The 26th version of SPSS (IBM Corp., 2019) was used for all analyses.

Study 3 was conceptualised as a longitudinal mixed-methods study. The qualitative part of the study is described in the previous chapter; see 3.3.1 Qualitative Data Analysis. In the quantitative part of the study, comprehensive descriptive analyses were performed first, acknowledging the importance of contextual information in mixed-method studies. Subsequently, differences in adjustment disorder, PTSD, depression, and well-being scores over time were examined with a *t*-test or Wilcoxon signed-rank test. As appropriate, one-way ANOVA with Tukey post hoc test or Welch's ANOVA with Games-Howell post hoc test was run to analyse cross-country differences.

In Study 4, latent growth curve (LGC) modelling was applied within the structural equation modelling framework (SEM; Bollen & Curran, 2006) to estimate trajectories (i.e. growth curves) of adjustment disorder symptoms and well-being in Austria and Croatia over 20 months of the COVID-19 pandemic. LGC modelling is the method of choice when investigating within-person changes and between-person differences (Curran et al., 2010). It can identify individual differences in a longitudinal design and handle missing data effectively, which is not possible using conventional methods (Preacher et al., 2008).

Prior to testing the models in the current study, measurement invariance was assessed to evaluate the psychometric equivalence of the included mental health measures over the four timepoints (i.e. *longitudinal measurement invariance*) and between the two countries (i.e. *invariance over populations*). The results showed that all measures had strong invariance over time and across the Austrian and Croatian samples, providing support for the planned LGC analysis.

Following the invariance testing, the LGC modelling was carried out in a step-by-step process, starting from univariate models to separately assess the trajectories of adjustment disorder symptoms and well-being, and gradually increasing models' complexity by adding covariates. In the more complex models, both time invariant (age, gender, education, and income) and time-varying (depression and anxiety scores) covariates were included to examine whether these can predict the adjustment disorder and well-being trajectories. As a last step, the model with all covariates was estimated for the Austrian sample and the Croatian sample separately, to explore possible cross-country differences.

4 Synopsis of Publications

This chapter briefly presents all studies included in the doctoral thesis (for an overview, please see Table 3). Following journal metrics are provided for all journals in which the included papers have been published:

1) **Journal Impact Factor (JIF)**[2] is a journal-level metric based on the yearly mean number of citations. It is calculated using the data indexed in the Web of Science Core Collection (Clarivate).
2) **CiteScore**[3] represents a transparent, freely available metrics of journal impact, calculated using the Scopus data. It considers all publications (research articles, reviews, conference papers, book chapters, data papers) and uses a 4-year window, thus contributing to the robustness and stability of the respective calculation.
3) **Quartiles**[4] are bands of serial titles grouped together based on the same subject area. First quartile (Q1) contains publications in top 25% of the respective subject area. The quartiles reported in the following are calculated using the Scopus data.

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[2] For details, please see: Journal Profile (clarivate.com)

[3] For details, please see: What is CiteScore? - Scopus: Access and use Support Center (elsevier.com)

[4] For details, please see: How do I use the Scopus Sources feature? - Elsevier Support Center

Table 3

Overview of papers included in the present dissertation

Paper	Citation	Status	Contribution of the thesis' submitter
1	**Zrnić Novaković, I.**, Lueger-Schuster, B., Verginer, L., Bakić, H., Ajduković, D., Borges, C., Figueiredo-Braga, M., Javakhishvili, J. D., Tsiskarishvili, L., Dragan, M., Nagórka, N., Anastassiou-Hadjicharalambous, X., Lioupi, C., & Lotzin, A. (2022). You can't do anything about it, but you can make the best of it: A qualitative analysis of pandemic-related experiences in six European countries. *European Journal of Psychotraumatology*, *13*(1), 2065431. https://doi.org/10.1080/20008198.2022.2065431	published	Conceptualisation, development of the preliminary coding scheme, data coding, writing – original draft, review and editing
2	Lueger-Schuster, B.*, **Zrnić Novaković, I.***, & Lotzin, A. (2022). Two years of COVID-19 in Austria-Exploratory longitudinal study of mental health outcomes and coping behaviors in the General Population. *International Journal of Environmental Research and Public Health*, *19*(13), 8223. https://doi.org/10.3390/ijerph19138223 * Shared first authorship	published	Conceptualisation, methodology, formal analysis, investigation, visualisation, writing – original draft, review and editing.
3	**Zrnić Novaković, I.**, Ajduković, D., Bakić, H., Borges, C., Figueiredo-Braga, M., Lotzin, A., Anastassiou-Hadjicharalambous, X., Lioupi, C., Javakhishvili, J. D., Tsiskarishvili, L., & Lueger-Schuster, B. (2023). Shaped by the COVID-19 pandemic: Psychological responses from a subjective perspective-A longitudinal mixed-methods study across five European countries. *Plos One*, *18*(4), e0285078. https://doi.org/10.1371/journal.pone.0285078	published	Conceptualisation, formal analysis, investigation, methodology, project administration, visualisation, writing – original draft, review and editing
4	**Zrnić Novaković, I.**, Streicher, A., Ajduković, D., Ajduković, M., Kiralj Lacković, J., Lotzin, A., & Lueger-Schuster, B. (2023). Trajectories of adjustment disorder and well-being in Austria and Croatia during 20 months of the COVID-19 pandemic. *International Journal of Environmental Research and Public Health, 20*(19), 6861. https://doi.org/10.3390/ijerph20196861	published	Conceptualisation, methodology, validation, formal analysis, investigation, visualisation, writing – original draft, review and editing.

4.1 Study 1

Paper 1 entitled "You can't do anything about it, but you can make the best of it: A qualitative analysis of pandemic-related experiences in six European countries" was published in May 2022 in the *European Journal of Psychotraumatology* (2023 JIF: 4.2[5]; CiteScore: 7.6; Q1: Psychiatry and Mental Health[6]; Zrnić Novaković et al., 2022). This paper addressed self-perceived challenges and opportunities related to the COVID-19 pandemic across six European countries: Austria, Croatia, Georgia, Greece, Poland, and Portugal. The main objective was to shed light on subjective perceptions of the pandemic and individual strategies to cope with the pandemic situation.

The sample included $N = 7309$ participants ($M_{age} = 41.5$) from the six countries. Qualitative content analysis (Mayring, 2010, 2014) was performed to analyse participants' answers to open-ended questions about stressful events, positive and negative aspects of the pandemic, and coping strategies. We combined inductive and deductive approach, thus applying a two-fold analytical strategy in an iterative coding process. *MAXQDA* software (VERBI Software, 2019) was used for data management and analysis.

Answers about stressful events and negative pandemic consequences were largely centred around the themes *Restrictions and changes in daily life*, *Emotional distress*, and *Work and finances*. The findings were thus in line with previous COVID-19 studies showing that people were burdened by the lack of social contacts, negative emotional responses (fear, anxiety, feelings of loneliness, insecurity and uncertainty), as well as work-related and financial problems (Bodrud-Doza et al., 2020; Dahlberg, 2021; Ozamiz-Etxebarria et al., 2020). The most prominent themes regarding the positive pandemic consequences included:

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[5] 2023 JIF calculated by Web of Science. Journal Citation Reports - Journal Profile (clarivate.com)

[6] 2023 CiteScore and quartiles calculated by Scopus on 5th of May 2024. Scopus preview - Scopus - European Journal of Psychotraumatology

Reflection and growth, *Opportunity for meaningful/enjoyable activities*, and *Benefits on interpersonal level*. Despite the high psychosocial impact of COVID-19, people seem to have found a silver lining, with re-evaluation of priorities, engagement in leisure activities, and spending quality time with loved ones being some of the positively evaluated aspects. In order to cope with the pandemic situation, participants recommended to maintain contact with other people, echoing previous work (Valero Cedeño et al., 2020). Adherence to containment measures, daily routine, and a positive, resilience-promoting attitude (i.e. attitude characterised by gratitude, calmness, and mindfulness) were further recommendations offered by the participants, all of which are well-documented in the scientific literature regarding mental health amidst COVID-19 (Branquinho et al., 2020; Budimir et al., 2021).

Overall, this study has highlighted the variety of people's experiences in the initial stage of the pandemic, ranging from traumatic events and emotional difficulties to joyful moments and opportunities for growth. At the same time, participants' recommendations to cope with the pandemic included various cognitive, emotional, and behavioural strategies, underscoring the importance of psychological flexibility. To maintain mental health in uncertain environments such as a pandemic, it might be essential to stay flexible by adjusting coping strategies in response to changing situational demands. In addition, our study suggests that individual challenges and positive consequences need to be acknowledged when providing psychosocial support during pandemics and similar global crises.

4.2 Study 2

Paper 2 entitled "Two years of COVID-19 in Austria-Exploratory longitudinal study of mental health outcomes and coping behaviors in the general population" was published in July 2022 in the *International Journal of Environmental Research and Public Health* (JIF:

4.6[7]; CiteScore: 7.3; Q1: Public Health, Environmental and Occupational Health[8]; Lueger-Schuster, Zrnić Novaković et al., 2022). At the time of preparing this study, no longitudinal studies covering a longer period of the pandemic in Austria were available. Therefore, we set out to examine changes in mental health and coping behaviours in Austria across four stages of the COVID-19 pandemic. Acknowledging the time-sensitive nature of the content and aiming to timely inform the public about the results, the study has been published as a *short communication* article.

The sample included $N = 234$ ($M_{age} = 48.75$) participants from all federal states of Austria who responded to four study waves between June 2020 and December 2021. Data on pandemic-related coping behaviours (PCS), symptoms of adjustment disorder (ADNM-8), posttraumatic stress disorder (PC-PTSD-5), depression (PHQ-2), and anxiety (GAD-2) were assessed with standardised self-report questionnaires administered in an online survey. To assess changes over time, we conducted Cochran's Q test and one-way repeated measures ANOVA. In addition, we tested for gender differences using a two-way mixed ANOVA.

The percentage of participants at risk for mental health problems changed significantly over time, with the highest prevalence rates at T2 (i.e. winter of 2020/2021) for probable adjustment disorder (22.6%), and at T4 (i.e. winter of 2021/2022) for probable depression (22.7%) and anxiety disorder (20.9%). The mean scores of these mental health outcomes also varied between the timepoints, with highest scores at T2 and T4. This might indicate a higher mental health burden in wintertime, which was characterised by stricter public health measures, higher COVID-19 incidence, and higher death rates. Previous research already

[7] 2021 JIF calculated by Web of Science. Journal Citation Reports - Journal Profile (clarivate.com)

[8] 2023 CiteScore and quartiles calculated by Scopus on 5th of May 2024. Scopus preview - Scopus - International Journal of Environmental Research and Public Health

found a link between mental health problems, stringency of governmental measures, and number of reported cases of COVID-19 (Salanti et al., 2022; Santomauro et al., 2021).

Across all assessment waves, female participants showed significantly higher levels of adjustment disorder, depression, and anxiety ($p < .05$). These results are consistent with those reported in other countries and at different pandemic stages (Hamama-Raz, Goodwin, et al., 2021; Makhashvili et al., 2020; Witteveen et al., 2023), supporting the idea of female gender being a risk factor for mental health problems during the COVID-19 pandemic. Due to a very low number of participants who completed PC-PTSD-5 at all timepoints, only descriptive analyses were conducted for this measure. The analyses suggested the highest prevalence of probable PTSD at T1 (7.7%), highest mean score at T4 (1.57%) and higher scores in female than male participants, thus echoing some existing findings (Carmassi et al., 2022).

Apart from changes in mental health, our results also indicated changes in coping behaviours. Over time, the total score of the coping scale as well as the scores on subscales "Healthy lifestyle", "Prevention adherence", and "Joyful activities" decreased significantly ($p < .01$), indicating a decline in adaptive coping behaviours as the pandemic progressed. Regarding gender differences, significantly higher scores for women were found on subscales "Healthy lifestyle" and "Daily structure". Women were hence more likely to choose a healthy diet, rest and exercise regularly, and maintain daily routine.

In conclusion, this study identified notable changes in mental health and coping behaviours in later stages of the pandemic, adding to the earlier studies covering shorter assessment intervals. It seems crucial to acknowledge the fluctuations of psychological problems throughout pandemics, in order to provide adequate support. According to our findings, the promotion of easy-to-implement coping strategies (e.g. joyful activities such as quality time with loved ones) might boost well-being during challenging times.

4.3 Study 3

Paper 3 entitled "Shaped by the COVID-19 pandemic: Psychological responses from a subjective perspective-A longitudinal mixed-methods study across five European countries" was published in April 2023 in *PLoS ONE* (JIF: 2.9[9]; CiteScore: 6.2; Q1: Multidisciplinary[10]; Zrnić Novaković, Ajduković, et al., 2023). The aim of this study was to broaden the knowledge about differences in mental health outcomes and pandemic-related experiences over time and across countries.

The sample consisted of $N = 1070$ ($M_{age} = 42.9$) participants recruited from the general population of Austria, Croatia, Georgia, Greece, and Portugal. Applying a mixed-methods approach, we analysed participants' responses to validated mental health measures (ADNM-8, PC-PTSD-5, PHQ-2, WHO-5) and to four open-ended questions on stressful events, negative and positive aspects of the pandemic, and strategies to deal with the pandemic situation. Both quantitative and qualitative data were collected at two measurement timepoints, in summer/autumn 2020 (baseline) and summer/autumn 2021 (one-year follow up).

The assessed mental health outcomes as well as subjective experiences related to the pandemic changed between baseline and follow-up, with several cross-country differences being observed. By way of illustration, we found a decrease in the symptoms of depression and adjustment disorder in Greece. There are several possible explanations for this finding. Among the five countries, the proportion of participants with a current or previous mental health diagnosis was lowest in the Greek sample, indicating a lower mental health burden in this country. Moreover, gratitude, positive thinking, calmness, and patience were often emphasised in the qualitative responses of the Greek participants, and all of these aspects

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[9] 2023 JIF calculated by Web of Science. Journal Citation Reports - Journal Profile (clarivate.com)

[10] 2023 CiteScore and quartiles calculated by Scopus on 5th of May 2024. Scopus preview - Scopus - PLoS ONE

could buffer the negative impact of the pandemic in earlier studies (Budimir et al., 2021; Kumar et al., 2022). Another important finding is that the symptoms of adjustment disorder showed a significant increase over time in Georgia. The prevalence of self-reported adjustment disorder in this country was also higher at one-year follow-up (35.4%) than at baseline (26.5%). These findings point to considerable difficulties in adjusting to the pandemic situation in Georgia. Among the five national samples, the Georgian sample had the lowest mean age, and the highest proportion of female participants and participants who experienced a pandemic-related income loss. It is well established that women, young people, and those with financial problems were at increased risk of developing mental health problems during the pandemic (Del-Valle et al., 2022; Humer et al., 2022), which might explain the results found in the Georgian sample.

With regard to the subjective perspectives of the pandemic, we observed variations in participants' accounts over time. In terms of frequency of themes, some themes were equally represented at both timepoints (e.g., *Restrictions and changes in daily life*), while others were more prominent at baseline (e.g. *Work and finances, Opportunity for meaningful/enjoyable activities*), reflecting the changes both in the impact of pandemic-related stressors and in the perception of positive aspects of the pandemic. Notably, COVID-19-related deaths and health problems were more often mentioned at follow-up than at baseline, suggesting that people with post-COVID symptoms and those who lost a loved one due to COVID-19 might need special attention both in research and clinical practice (see Naidu et al., 2021; Wallace et al., 2020). It is also worth mentioning that several new themes emerged at follow-up, including *Vaccination issues*. Vaccine hesitancy, dissatisfaction about the pressure to get vaccinated, and concerns about side-effects of the vaccination were some of the prominent issues. Finally, at both timepoints, behavioural modifications (e.g. adherence to preventive measures), cognitive-emotional strategies (e.g. acceptance, positive attitude) and social support were

recommended for dealing with the pandemic. In addition, predominantly older participants often recommended to get vaccinated to "get the pandemic under control".

Taken together, the findings of Study 3 suggest that people's responses to the pandemic were shaped by a combination of country-related factors, individual characteristics and circumstances. In accordance with the COR theory, people who suffered pandemic-related resource losses (e.g. loss of income, loss of family stability in women) were disproportionately susceptible to mental health problems. Furthermore, people's perceptions and reactions often reflected changes in the course of the pandemic, corroborating the idea of psychological flexibility. This finding implies that a context-sensitive perspective in research and practice is vital for understanding people's needs and challenges in different phases of a crisis.

4.4 Study 4

Paper 4 entitled "Trajectories of adjustment disorder and well-being in Austria and Croatia during 20 months of the COVID-19 pandemic" was published in the *International Journal of Environmental Research and Public Health* (JIF: 4.6[11]; CiteScore: 7.3; Q1: Public Health, Environmental and Occupational Health[12]; Zrnić Novaković, Streicher, et al., 2023) in September 2023. This study investigated the trajectories of adjustment disorder symptoms and well-being in Austria and Croatia – two countries that are closely related in terms of historical ties, economic and cultural exchanges (Federal Ministry for European and International Affairs, 2023), but differ with regard to their socioeconomic situations, life satisfaction of their citizens, and responses to the COVID-19 pandemic (Helliwell et al., 2023; Mathieu et al., 2020; The World Bank, 2023).

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[11] 2021 JIF calculated by Web of Science. Journal Citation Reports - Journal Profile (clarivate.com)

[12] 2023 CiteScore and quartiles calculated by Scopus on 5th of May 2024. Scopus preview - Scopus - International Journal of Environmental Research and Public Health

The overall sample (N = 1144, M_{age} = 44.0) consisted of n = 415 participants from Austria and n = 729 participants from Croatia who responded to at least two out of four assessment waves. As a first step, we performed descriptive and missing data analyses, followed by the testing of measurement invariance. The trajectories of adjustment disorder symptoms and well-being were subsequently estimated using LGC modelling (Bollen & Curran, 2006), firstly without and then with covariates.

The prevalence rates of probable adjustment disorder ranged between 9.8% and 15.1%, with the highest percentage being found at the second timepoint in the winter of 2020/2021. This period was characterised by an increase in the COVID-19 incidence and higher levels of government stringency compared to other timepoints, which might account for more adjustment difficulties. The association between other mental health problems (e.g. anxiety, depression) and the intensity of the pandemic has already been shown in reviews and metanalyses (Salanti et al., 2022; Witteveen et al., 2023). The majority of the models tested using LGC modelling pointed to a slight increase in the symptoms of adjustment disorder and a decrease in well-being over time. It is plausible that the duration of the pandemic, fluctuations in the number of infections and in the strictness of governments policies (Mathieu et al., 2020), along with numerous pandemic-related stressors (Javakhishvili et al., 2020) have repeatedly challenged people's ability to adapt and thus contributed to the observed deterioration of mental health. Remarkably, the Austrian participants reported more adjustment difficulties and a lower well-being at baseline, which might be related to the higher COVID-19 incidence in Austria during the baseline assessment. Another explanation might be that the Croatian participants perceived the pandemic less adversely than previous crises in their country (e.g. major earthquakes in 2020, the Homeland War from 1991 to 1995; Gizdic et al., 2022; Matić et al., 2021), which helped them to adapt more rapidly. It is also possible that these crises have helped people in Croatia to develop a routine and achieve

confidence in dealing with stress and trauma, thus facilitating their adjustment to the pandemic situation.

In our study, both time-invariant and time-varying covariates were predictive of adjustment disorder and well-being scores. Age could predict the initial levels of both mental health outcomes, while gender and income could only predict the initial levels of adjustment disorder. The findings are hence consistent with previous COVID-19 studies which found worse mental health outcomes in women and people with low income (Lotzin et al., 2021; Makhashvili et al., 2020). The results regarding time-varying covariates were in line with our expectations, showing a link between anxiety and depression scores, and both adjustment disorder and well-being. Earlier research has identified the symptoms of anxiety and depression as common emotional responses to epidemics and natural disasters (Esterwood & Saeed, 2020). They were also frequently associated with adjustment disorder symptoms and well-being during the COVID-19 pandemic (Hamama-Raz, Goodwin, et al., 2021; Mahat-Shamir et al., 2021). Finally, it should be noted that the initial levels of adjustment disorder symptoms and well-being, and their rates of change differed significantly across participants, suggesting considerable differences in people's reactions to the pandemic.

Overall, Study 4 has contributed to a better understanding of the trajectories and predictors of adjustment disorder symptoms and well-being amidst COVID-19. Moreover, the study has identified important cross-country difference and a great inter-individual variability in mental health outcomes throughout the pandemic.

4.5 Side Projects

Apart from the four publications which comprise the body of this thesis, I co-authored several journal articles cited below. Although not being included as distinct entities, these articles have informed the dissertation and provided a broader context for its findings. Most of the articles have been published as part of the ESTSS ADJUST Study, namely:

Lotzin, A., Stahlmann, K., Acquarini, E., Ajdukovic, D., Ajdukovic, M., Anastassiou-Hadjicharalambous, X., Ardino, V., Bondjers, K., Bragesjö, M., Böttche, M., Dragan, M., Figueiredo-Braga, M., Gelezelyte, O., Grajewski, P., Javakhishvili, J. D., Kazlauskas, E., Lenferink, L., Lioupi, C., Lueger-Schuster, B., Mooren, T., Sales, L., Tsiskarishvili, L., **Zrnic Novakovic, I.**, Schäfer, I., & ADJUST Study Consortium (2024). A longitudinal study of risk and protective factors for symptoms of adjustment disorder during the COVID-19 pandemic. *European Journal of Psychotraumatology*, *15*(1), 2318944. https://doi.org/10.1080/20008066.2024.2318944

Kazlauskas, E., Gelezelyte, O., Kvedaraite, M., Ajdukovic, D., Johannesson, K. B., Böttche, M., Bondjers, K., Dragan, M., Figueiredo-Braga, M., Grajewski, P., Anastassiou-Hadjicharalambous, X., Javakhishvili, J. D., Lioupi, C., Lueger-Schuster, B., Mouthaan, J., Bagaric, I. R., Sales, L., Schäfer, I., Soydas, S., Tsiskarishvili, L., **Zrnic Novakovic, I.**, & Lotzin, A. (2023). Psychometric properties of the Patient Health Questionnaire-4 (PHQ-4) in 9230 adults across seven European countries: Findings from the ESTSS ADJUST study. *Journal of Affective Disorders*, *335*, 18–23. https://doi.org/10.1016/j.jad.2023.05.007

Lioupi, C., Anastassiou-Hadjicharalambous, X., Acquarini, E., Ajdukovic, D., Ardino, V., Böttche, M., Dragan, M., Figueiredo-Braga, M., Gelezelyte, O., Grajewski, P., Darejan Javakhishvili, J., Kazlauskas, E., Lenferink, L., Lueger-Schuster, B., Tsiskarishvili, L., Mooren, T., Sales, L., Ajdukovic, M., **Zrnic Novakovic, I.**, Eklund,

R., Hensler, I., Schäfer I., & Lotzin, A. (2023). Predictors of traumatic experiences among individuals experiencing pandemic-related stressors: a cross-sectional study in Europe during the COVID-19 crisis. *Current Psychology*, 1-10. https://doi.org/10.1007/s12144-023-05036-8

Lotzin, A., Flechsenhar, A., Garthus-Niegel, S., Georg, A. K., Holl, J., von Hülsen, L., Kenntemich, L., Kliem, S., Kröger, C., Mack, J. T., Mojahed, A., Nunius, S., Schröder, J., Seitz, K., Thadden, A. von, Volkert, J., **Zrnic Novakovic, I.**, & Lueger-Schuster, B. (2023). Häusliche Gewalt und ihre psychischen Folgen während der COVID-19-Pandemie – Zentrale Befunde aus dem deutschsprachigen Raum [Domestic violence and its psychological consequences during the COVID-19 pandemic-key findings from German-speaking countries]. *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz*, *66*(8), 920–929. https://doi.org/10.1007/s00103-023-03747-8

Lotzin, A., Ketelsen, R., **Zrnic, I.**, Lueger-Schuster, B., Böttche, M., & Schäfer, I. (2022). The Pandemic Stressor Scale: Factorial validity and reliability of a measure of stressors during a pandemic. *BMC Psychology*, *10*(1), 92. https://doi.org/10.1186/s40359-022-00790-z

Lotzin, A., Krause, L., Acquarini, E., Ajdukovic, D., Anastassiou-Hadjicharalambous, X., Ardino, V., Bondjers, K., Böttche, M., Dragan, M., Figueiredo-Braga, M., Gelezelyte, O., Grajewski, P., Javakhishvili, J. D., Kazlauskas, E., Lenferink, L., Lioupi, C., Lueger-Schuster, B., Mooren, T., Sales, L., Stevanovic, A., Sveen, J., Tsisharishvili, L., **Zrnic Novakovic, I.**, Schäfer, I., & ADJUST Study Consortium (2022). Risk and protective factors for posttraumatic stress disorder in trauma-exposed individuals during the COVID-19 pandemic – findings from a pan-European study. *European Journal of Psychotraumatology*, *13*(2), Article 2138099. https://doi.org/10.1080/20008066.2022.2138099

Lotzin, A., Krause, L., Acquarini, E., Ajdukovic, D., Ardino, V., Arnberg, F., Böttche, M., Bragesjö, M., Dragan, M., Figueiredo-Braga, M., Gelezelyte, O., Grajewski, P., Anastassiou-Hadjicharalambous, X., Javakhishvili, J. D., Kazlauskas, E., Lenferink, L., Lioupi, C., Lueger-Schuster, B., Tsiskarishvili, L., Mooren, T., Sales, L., Stevanovic, A., **Zrnic, I.**, Schäfer, I., & ADJUST Study Consortium (2021). Risk and protective factors, stressors, and symptoms of adjustment disorder during the COVID-19 pandemic – First results of the ESTSS COVID-19 pan-European ADJUST Study. *European Journal of Psychotraumatology*, *12*, 1–16. https://doi.org/10.1080/20008198.2021.1964197

In addition, I have co-authored the following journal articles:

Havermans, D. C. D., Hoeboer, C. M., Sobczak, S., Primasari, I., Coimbra, B. M., Hovnanyan, A., **Zrnic Novakovic, I.**, Langevin, R., Aakvaag, H. F., Grace, E., Dragan, M., Lueger-Schuster, B., El-Hage, W., & Olff, M. (2023). The mental health impact of the COVID-19 pandemic and exposure to other potentially traumatic events up to old age. *Journal of Traumatic Stress*, *36*(4), 738–749. https://doi.org/10.1002/jts.22937

Olff, M., Primasari, I., Qing, Y., Coimbra, B. M., Hovnanyan, A., Grace, E., Williamson, R. E., Hoeboer, C. M., & the **GPS-CCC Consortium*** (2021). Mental health responses to COVID-19 around the world. *European Journal of Psychotraumatology*, *12*(1), 1929754. https://doi.org/10.1080/20008198.2021.1929754

*Contributed as consortium member.

5 General Discussion

The present dissertation aimed at deepening the knowledge about people's reactions to the COVID-19 pandemic and about factors affecting psychological adjustment in different European countries across different pandemic phases. Perhaps the most important finding is that psychological responses to the pandemic and the related preventive measures greatly varied between individuals, which could be partly explained by cross-country differences, sociodemographic factors, and the changing course of the pandemic. Apart from many stressful events, people also experienced numerous positive consequences of the pandemic and reported various strategies to cope, signalising a great amount of resilience in the general population. In the following, the aims of the dissertations are discussed against the background of the relevant theoretical concepts and existing research on the mental health impact of the COVID-19 pandemic.

5.1 Aim 1: Exploring Subjective Pandemic-Related Experiences

The first aim of the present dissertation was to explore subjective pandemic-related experiences in different European countries across different phases of the COVID-19 pandemic. Whereas Study 1 focused on the personal perceptions of the pandemic in its first year, Study 3 compared how people reacted to the pandemic in the first and the second year of the pandemic.

Overall, people's reactions reflected the shifting context of the pandemic. By way of illustration, several themes related to COVID-19 vaccine emerged only in the second year of the pandemic, when the vaccine first became available to the general public. In response to the questions about stressful and negative aspects of the pandemic, participants mentioned misconceptions about the vaccine, but also their concerns about its side effects. Furthermore, some were critical of the pressure to get vaccinated and hesitant to receive the vaccine. According to previous research, COVID-19 vaccine hesitancy is related to concerns about vaccine safety and relevance, personal perception of risk, and a lack of trust in scientists and

authorities (Lindholt et al., 2021; Troiano & Nardi, 2021). These factors were identified even beyond the context of the COVID-19 pandemic (Dubé et al., 2013). Building confidence in science, health care system, and policy makers might thus be vital for vaccine acceptance. Among others, this can be done through clear communication of the authorities and easily understandable information from credible sources (Pourrazavi et al., 2023). However, according to our results, pandemic communication was often inadequate. The participants criticised the large amount of contradictory and misleading information, unprofessional media coverage, as well as government's scaremongering about COVID-19. Especially in times of uncertainty, transparency and confidence in decision makers might be crucial for maintaining mental health while effectively managing the respective crisis (Bäuerle et al., 2020; Enria et al., 2021; Esterwood & Saeed, 2020; Kimhi et al., 2020).

5.1.1 Stressful and Negative Aspects of the Pandemic

Apart from vaccination issues and pandemic management and communication, many participants were burdened by emotional distress and COVID-19 restrictions. Both in the first and in the second year of the pandemic, social restrictions, inability to travel, limited leisure activities, along with feelings of anxiety, loneliness, uncertainty, and insecurity were perceived as negative and stressful. The detrimental effect of COVID-19 restrictions on mental health was already shown in early pandemic stages (Prati & Mancini, 2021; Rodríguez-Rey et al., 2020) and confirmed in later reviews and meta analyses (Salanti et al., 2022; Witteveen et al., 2023). The present dissertation expanded on these findings by unveiling the variety of individual challenges. Depending on their life circumstances, different participants were burdened by different containment measures. To give an example, participants who had families abroad were hit hard by travel restrictions. At the same time, limited leisure opportunities, e.g. sports and cultural activities, represented a significant burden for other participants. Importantly, the majority of participants agreed that the pandemic caused some form of emotional distress, with fear and anxiety being expressed

most often. This is consistent with a large number of studies reporting elevated levels of anxiety symptoms in different countries and in different phases of the COVID-19 pandemic (Dettmann et al., 2022; Mahat-Shamir et al., 2021; Ozamiz-Etxebarria et al., 2020; S. X. Zhang et al., 2022).

When asked about stressful events and negative aspects of the pandemic, financial and work-related difficulties were also frequently mentioned. This was expected, given the economic impact of the pandemic and numerous workplace disruptions due to COVID-19 (Blustein & Guarino, 2020; Nicola et al., 2020). The applied qualitative approach allowed to identify a wide range of job-related problems, including poor working conditions, increased workload, job losses, and difficulties finding a new job. Regarding the financial strain, participants commented on the worsening economic situation in their country and worldwide, but also described their own financial problems, which were often related to unemployment and lower salaries due to the pandemic.

Over time (i.e. between summer/autumn 2020 and summer/autumn 2021), the slight improvements in the global economy seem to have led to a decrease in the financial and work-related burden, which was reported both in qualitative and quantitative data. However, a striking finding was that a substantial burden was still present in some participants. These participants experienced multiple stressors related to work and finances, including but not limited to job loss, inability to find a new job, debts, and unexpected expenses within their families. This finding is in agreement with the COR theory, according to which people severely impacted by a crisis are particularly susceptible to further losses (Hobfoll et al., 2016). Already early on in the pandemic, the most pronounced economic downturn was expected in low-income countries (Yeyati & Filippini, 2021). Among the countries participating in our study, Georgia had the lowest GDP per capita (World Bank, 2021) and the highest proportion of people who have experienced a pandemic-related income loss. The Georgian participants also reported the lowest levels of well-being and highest adjustment

disorder symptoms, further supporting the COR theory. A number of studies has demonstrated the link between financial burden, income loss, and mental health problems (Hertz-Palmor et al., 2021; McGuire et al., 2023). The quantitative results, which are discussed later on (Chapter 5.4), also support this relationship.

5.1.2 Positive Aspects of the Pandemic

In addition to various challenges encountered during the pandemic, most participants were unanimous in the view that the pandemic had its positive sides. Both at baseline and follow up, people commented on their learning experiences, re-evaluation of priorities and increased awareness for topics such as hygiene. Appreciation and gratitude were also emphasised in terms of the availability of resources, health, time with loved ones, and small things that used to be taken for granted. Rethinking priorities, being grateful, and gaining new insights were identified as positive aspects of the COVID-19 pandemic in different COVID-19 studies (August & Dapkewicz, 2021; Krajewski et al., 2021), whereas better mental health awareness was found following the SARS epidemic in Hongkong (Lau et al., 2006).

Social interactions and relational improvements were positively evaluated both in the present dissertation and in earlier studies (Eklund et al., 2022; Günther-Bel et al., 2020). Participants in the ADJUST Study appreciated the time spent with loved ones, with some noting that families came together, and family bonds strengthened due to the pandemic. Other benefits on an interpersonal level included various forms of prosocial behaviour within families, friends, work groups, and society as a whole. The capacity of stress to trigger affiliative behaviour has long been known (Taylor, 2006). The so-called “tend and befriend” response can be understood as a tendency to come together in groups and engage in prosocial behaviour following life-altering events (Mancini, 2019; Taylor, 2006). In threatening and uncertain times, such as the COVID-19 pandemic, it does not surprise that people showed the tendency to affiliate with and tend to others as much as possible. This form of response has been observed in the aftermath of different adversities, including mass traumas and natural

disasters, and has been associated with different indicators of positive psychological functioning (Mancini, 2019). In our work, benefits on the interpersonal level were predominantly described by women, people in a relationship, and those having children. Similarly, earlier research has found affiliative responses to stress to be more common in mothers and women in general, which could be partly explained by the hormone oxytocin (Taylor, 2006). Given its stress-buffering and pro-social effects, oxytocin has even been suggested for reducing pandemic-related stress and facilitating recovery after a COVID-19 infection (Gryksa & Neumann, 2022).

Apart from social interactions and learning experiences, positive aspects of the pandemic encompassed meaningful and/or enjoyable activities, increased time resources for such activities, and a more peaceful daily life. Regarding the latter, some participants positively evaluated the reduction of traffic, tourism, and travels. As touched upon earlier, the inability to travel represented a significant source of burden for many participants, while others positively evaluated the restrained mobility. Divergent discourses also emerged with regard to the possibility to work and study from home. Whereas some enjoyed this possibility, others characterised it as a burden, partly due to the resulting work-family conflict. These examples nicely illustrate how the COVID-19 pandemic was perceived differently, depending on individual circumstances and preferences. The complex, varying reactions to pandemic and containment measures have been discussed in several studies, pointing to the role of context when examining psychological adjustment to the pandemic (Ben-Ezra et al., 2021; Manchia et al., 2022). The present dissertation has contributed to this line of research by capturing the voices of people from different cultural backgrounds in different phases of the pandemic.

5.1.3 Pandemic-Related Experiences Across Different Groups and Over Time

The discussed pandemic-related experiences were largely similar across the investigated countries, with social restrictions being perceived as stressful, and newly gained

knowledge and skills being perceived as positive in all countries. Nevertheless, some cross-country differences were observed. For example, the positive impact of the pandemic on the environment was predominantly reported by Austrian participants. This topic received little attention in other countries, although the benefits of the restrictions for air and water quality, along with the nature's recovery, have been extensively discussed amidst the pandemic (Khalifa et al., 2021; Khan et al., 2020). In Austria, the Green Party is part of the ruling coalition, and the overall confidence in environmental organisation is very high (Haerpfer et al., 2021), which might account for the observed country-specific difference.

Notably, some of the identified pandemic-related experiences differed between age and gender groups. Home-schooling, work-family imbalance, and other events related to loved ones (e.g. conflicts, illnesses) were mainly indicated as stressful by female participants. This finding accords with a German quantitative study reporting that women, compared to men, felt more burdened by difficulties reconciling work and childcare, loss of childcare, and conflicts at home (von Hülsen et al., 2023). During the pandemic, women were predominantly responsible for domestic labour and childcare, which often led to work-family conflicts (OECD, 2021; Zamarro & Prados, 2021). This loss of balance between work and family might have made women more vulnerable to further pandemic-related losses, as proposed by the COR theory (Hobfoll, 1989; Peck, 2020). The mental health impact of the pandemic on women is also tackled below (Chapter 5.4).

In contrast to women, men as well as older participants were more likely to perceive the pandemic management and communication as stressful. This result corroborates earlier findings that men were more concerned about COVID-19 policies, political and financial situation, whereas women's concerns were more related to family, friends, and emotional burden of the pandemic (van der Vegt & Kleinberg, 2020). On discussion platforms and social media, men also tended to comment more on politics and economy than women, whose posts were mainly about socio-emotional aspects of the pandemic (Aggarwal et al., 2020;

Thelwall & Thelwall, 2020). Moreover, males were more prone to endorse conspiracy theories amidst the pandemic (Cassese et al., 2020). At the same time, females were more likely to perceive COVID-19 as a serious health issue and, consequently, adhere to containment measures (Galasso et al., 2020). Conspiracy beliefs and lower risk perception in men might hence explain why incompetent management, inadequate media handling, and politicisation of the pandemic were more common sources of stress for men than for women in our study. In previous research, excessive consumption of pandemic-related news was linked to adverse psychological outcomes (Lotzin, Krause, et al., 2022; Lotzin et al., 2021). Especially older adults in long-term care settings were deemed vulnerable to mental health problems due to the frequent exposure to news about the pandemic (Schroyer, 2021). This might be a reason why pandemic management and communication were often perceived as stressful by older participants in our study.

With respect to age differences in positive aspects of the pandemic, opportunities for meaningful and/or enjoyable activities were appreciated by rather younger participants. Due to the cancellation of various events and the increased possibilities for working/studying from home, many young people had more free time. Thus, they had more time for self-care and hobbies, which were commonly brought up in our study. For the elderly, increased time resources are more readily available under non-pandemic circumstances, e.g. due to their retirement. For this reason, it is possible that free time was not as positively evaluated by older as by younger people.

Gender and age were not the only factors accounting for variability in pandemic-related experiences. Different reactions also reflected the shifting course of the pandemic. To illustrate, answers pertaining to the theme *Reflection and growth* were common at both timepoints, indicating that appreciation for life and restructuring of values and priorities were positively evaluated in different phases of the pandemic. On the other hand, increased time resources, family bonding, social cohesion, and the opportunity to practise hobbies were more

often considered positive at the beginning than in the later phases of the pandemic. This finding might be attributed to the loosening of COVID-19 restrictions and the gradual return to "normality" in the second year of the pandemic.

Over time, some negative aspects of the pandemic also changed. As discussed above, vaccination issues became more prevalent in the second year of the pandemic, while work-related and financial burden were more pronounced in the first year of the pandemic. These findings indicate that support services amidst pandemics need to be tailored to individuals' changing needs. For instance, in times of lockdowns and serious economic downturns, financial support might be of vital importance. Conversely, when vaccines or other medications become available, it is essential to provide easy-to-understand information about their mechanisms of function, benefits, and possible side effects. Furthermore, building trust by addressing people's concerns, increasing health literacy and communication through diverse channels might help to reduce anxiety and uncertainty of the general population (Pourrazavi et al., 2023).

Finally, it is important to note that health problems and deaths due to COVID-19 and other causes showed an upward trend between our baseline and follow-up assessment. People commented on the high number of deaths due to COVID-19, but also on their own COVID-19 infection or infection of a loved one. As anticipated, this theme was particularly widespread in Greece, a country hit hard by the pandemic (Mathieu et al., 2020). Throughout the pandemic, media regularly reported on the number of COVID-19 infections and deaths, which might be one reason why the confrontation with human suffering and dying was perceived as stressful by many participants. As noted above, the connection between consumption of news related to crises and the risk of mental health problems has been well-established (Garfin et al., 2020). Besides, a large-scale study conducted in the USA showed that media consumption could increase perceptions of COVID-19 threats (Stainback et al., 2020). In order to buffer the negative effects of disturbing news, such as COVID-19 incidence

and death rates, media coverage should include references to support services and emphasise available resources. Another implication of the present dissertation is that more support for people with long COVID is needed, since a large number of participants raised complains about persisting symptoms after a COVID-19 infection. Studies on mental health burden in long COVID patients are increasing (Merikanto et al., 2022; Naidu et al., 2021), but a systematic understanding of this condition is still lacking.

Remarkably, health problems not caused by COVID-19 were also reported. In many cases, participants criticised the inadequate handling of conditions other than COVID-19, adding that the pandemic and related restrictions negatively impacted health services. Moreover, some participants found it problematic that the mental health needs of the society were not properly addressed amidst the pandemic, an issue raised in another qualitative study (Ivbijaro et al., 2020). These findings call for better preparedness of healthcare systems in future pandemics, as discussed in several scientific papers (Alami et al., 2021; Mustafa et al., 2022).

Overall, this dissertation has broadened the knowledge about people's lived experience in the first and second year of the COVID-19 pandemic, by identifying a range of positive and negative consequences across different European countries. Although some universality of people's experiences has been shown, the findings also emphasise the relevance of country-specific factors and individual circumstances in perceiving the pandemic and reacting to it. Furthermore, we have observed changes in the subjective perceptions over time, indicating that psychological adjustment to the pandemic is a dynamic process that can be fully understood only be applying a longitudinal design.

5.2 Aim 2: Diversity of Behaviours and Mechanisms to Cope

The second aim of the present dissertation was to shed light on the diversity of behaviours and mechanisms to cope with the pandemic. Studies 1 and 3 used qualitative methodology to investigate population-informed recommendations for coping across different

European countries, whereas Study 2 addressed pandemic-related coping behaviours used in Austria across four phases of the pandemic. In the first and in the second year of the pandemic, the overwhelming majority of population-informed recommendations was clustered around three themes: *Beneficial behavioural adjustment*, *Beneficial cognitive-emotional strategies*, and *Social support*. These are discussed next, along with results stemming from the quantitative study.

5.2.1 Beneficial Behavioural Adjustment

As the name suggests, the first theme, emerged in Studies 1 and 3, comprised participants' responses focused at altering behaviour. For some, being active and filling the day with pleasant activities was considered a useful strategy to overcome pandemic challenges more easily. The participants often recommended to learn new things, spend time in nature, and do sports, echoing earlier COVID-19 research. For instance, in a study with older adults from the USA, keeping busy by pursuing hobbies and engaging in entertainment activities was identified as an important source of joy at the very beginning of the pandemic (Whitehead & Torossian, 2021). The behavioural adjustment theme further comprised recommendations to look after oneself, to relax regularly, and to establish routines. Similar behaviours were repeatedly reported in the first year of the pandemic, e.g. across Africa, Asia, and the USA (Ivbijaro et al., 2020; Sameer et al., 2020; Y. Zhang et al., 2020). The present dissertation adds to these studies by providing evidence about the use of pandemic-specific coping behaviours in later phases of the pandemic across different European countries.

It is important to note that recommendations to adjust behaviour were prominent at both assessment waves (i.e. summer/autumn 2020 and summer/autumn 2021), with a pronounced decrease being observed only in Georgia. Compared to other countries, financial strain was highest in Georgia. Moreover, symptoms of adjustment disorder increased in this country between the baseline and follow-up assessment, indicating growing difficulties in adjusting to the pandemic over time (for details, see Chapter 5.3). This might be linked to the

reduction of adaptive coping behaviours over time. Unfortunately, differences in population-informed recommendations between seasons could not be examined since qualitative data were not collected in winter months. Nevertheless, the quantitative data collected in Austria during different seasons could offer some insights on this topic.

By and large, the obtained qualitative findings resembled the pandemic-specific coping behaviours assessed in the quantitative study, namely: performing pleasant activities, paying attention to a healthy lifestyle, and maintaining a daily structure. This study was conducted over four different stages of the pandemic, providing evidence that the use of these coping behaviours changed significantly over time. Between summer 2020 (T1) and winter 2021/2022 (T4), healthy habits became less frequent. Physical activity, good sleeping habits, healthy diet, and relaxation have been positively associated with adaptive coping strategies and well-being, and negatively associated with mental health problems amidst COVID-19 (Lotzin, Ketelsen, et al., 2022; Marconcin et al., 2022; Sfeir et al., 2022; Yuksel et al., 2021). The connection between a healthy lifestyle and mental health is also been well-established beyond the context of COVID-19 (Hautekiet et al., 2022; Walsh, 2011). Thus, our results provide support for healthy lifestyle campaigns during pandemics and similar public health emergencies. Such campaigns are easy-to-implement and might have a positive effect on both physical and mental health.

Another noteworthy finding of the Austrian quantitative study is that more people engaged in joyful activities in summertime than in wintertime. Winter months were characterised by higher COVID-19 incidence and death rates as well as stricter regulations. It can be assumed that the participants found it laborious to engage in pleasant activities under the more restrictive regime. The difference between summertime and wintertime could also be due to seasonal effects, given that the association between weather, mood, and behaviour has been found in several studies (Garriga et al., 2021; Harmatz et al., 2000).

Interestingly, the coping behaviours related to maintaining a daily structure remained constant over the four assessment waves, implying that these behaviours were equally used in all pandemic phases. Following a routine has proven to have a positive effect on mental health during the pandemic (Fullana et al., 2020), while uncertainty and unpredictability represented a significant burden for many in the present dissertation and earlier research (Williams et al., 2020). It is possible that planning and scheduling of daily activities provided a sense of stability and control which were highly needed under uncertain circumstances of the pandemic, which is why these recommendations remained relevant across different phases of the pandemic.

Another coping behaviour investigated both quantitatively and qualitatively was adherence to containment measures. Population-informed recommendations to follow the guidelines for reducing the spread of COVID-19, e.g. by wearing a face mask or by keeping physical distance, were particularly common in the first year of the pandemic. Over time, the frequency of this recommendation decreased, which was also evident in the quantitative study conducted in Austria. In particular, coping behaviours building the subscale "Prevention adherence" showed a downward trend between summer 2020 and winter 2021/2022. This suggests that a full compliance with the pandemic measures could not be maintained over 18 months of the pandemic. Even though the strictness of measures varied during the assessment period, some forms of restrictions were constantly in place, impacting daily lives of the Austrian general population. According to the research carried out amidst earlier epidemics and pandemics, voluntary measures that last for a rather short period of time should be preferred in order to reduce the negative effects of restrictions (Brooks et al., 2020). Nevertheless, various mandatory regulations, including multiple nationwide lockdowns, were implanted in Austria, even in later pandemic stages (i.e. December 2021; Hale et al., 2021). The observed decline in adherence to preventive measures over time, accompanied by the reduction of joyful activities discussed above, might signalise pandemic fatigue. Pandemic

fatigue was already shown in studies conducted in later phases of the pandemic (Abdul Rashid et al., 2023), whereas studies conducted in the first months of the pandemic suggested enduring precautionary behaviour (Brankston et al., 2022). Given that our study covered almost two years of the pandemic, thus including the later phases of the pandemic, the existence of pandemic fatigue cannot be ruled out.

With respect to population-informed recommendations to modify behaviour, an important difference was identified between the baseline and follow-up assessment of Study 3. At the one-year follow-up, a new theme emerged, namely *Get vaccinated*. This recommendation was particularly common in Austria and Georgia. At follow-up, the COVID-19 incidence and death rates were considerably higher in Georgia than in the remaining countries, which might account for the high numbers of recommendations to get vaccinated in this country. In Austria, mandatory vaccination was a broadly discussed topic, with a COVID-19 vaccine mandate being approved in early 2022, but suspended a few weeks later (Druml & Czech, 2022; Mtimkulu-Eyde et al., 2022). It is plausible that people's perceptions about strategies to deal with the pandemic reflected the public discussion about mandatory vaccination. Lastly, it should be mentioned that mostly older participants enunciated the recommendation to get vaccinated. Higher age and comorbidities are well-known risk factors for a severe course of COVID-19 and personal risk perceptions represent a significant predictor of vaccine acceptance (Lindholt et al., 2021). This might explain why predominantly elderly participants perceived the vaccine as a solution to "get the pandemic under control".

Taken together, the changes in the recommended coping behaviours align with some theory-informed expectations. According to the concept of psychological flexibility, factors that impact psychological adjustment might change as the pandemic situation unfolds (Chen & Bonanno, 2020). As illustrated in this chapter, people's recommendation on coping with

the pandemic were influenced by the phase of the pandemic and the availability of vaccines, supporting the idea of coping as a dynamic process shaped by different factors.

5.2.2 Beneficial Cognitive-Emotional Strategies

In addition to behavioural adjustment, the participants frequently recommended employing cognitive-emotional strategies to deal with the pandemic situation. One common view among the participants was that a positive inner attitude could help in overcoming pandemic-related difficulties. In our study, such attitude was characterised by acceptance, gratitude, hope, serenity, and optimism, with numerous prior studies showing its protective effect against mental health problems (Budimir et al., 2021; Kavčič et al., 2022; Kumar et al., 2022). Especially in less controllable situations, such as a pandemic, it appears vital to use positive reframing/reappraisal (i.e. focusing on positive aspects of a stressful situation) and accept the aspects that are uncontrollable (Avsec et al., 2022; Riepenhausen et al., 2022). Hence, the population-informed recommendations described in our studies are in agreement with scientific literature (e.g. Shamblaw et al., 2021), stressing the importance of a positive inner attitude in the face of adversity.

In the present dissertation, the beneficial strategies with cognitive and/or emotional elements emerged as important in the first as well in the second year of the pandemic. This provides some evidence for their universality in the context of COVID-19. By contrast, behavioural strategies seemed to depend on the environmental factors, such as the changes in pandemic restrictions. Notably, we observed one important cross-country difference with respect to cognitive-emotional strategies. Although being present in all countries, these strategies were particularly common in Greece. A large proportion of Greek participants emphasised the role of positive thinking, optimism, and hope that things will get better, and normalcy will return. A similar pattern of findings was found in another study conducted in Greece (Kleanthous et al., 2023), which might be attributed to mental toughness (i.e. ability to embrace challenges as opportunities) among Greek individuals (Truhan et al., 2022).

Although Greece was hit hard by the pandemic, which was followed by the employment of strict government measures, symptoms of depression and adjustment disorder among Greek participants decreased over time in our study. Hopefulness and positivity have been repeatedly linked to positive mental health outcomes (Dymecka et al., 2023; Thartori et al., 2021; Yıldırım & Arslan, 2020). This could partly explain the improved mental health in Greece, but not in other countries examined in this dissertation. However, it must be mentioned that some studies also reported worsening of mental health in Greece over time (Di Long et al., 2022). Considering the high drop-out rate in this country after the baseline assessment, it can be assumed that people with greater mental health burden could not be captured in our study. By contrast, people adopting a positive inner attitude and thus better adapting to the pandemic might have shown greater willingness to participate, which might have biased the results. Future studies should more closely examine cross-country differences in coping amidst public health emergencies.

5.2.3 Social Support

Social support was another recurrent theme related to recommendations for coping with the pandemic. This theme encompassed advice to maintain contact with loved ones, to socialise in a responsible way, and to seek help when needed. Participants stressed the importance of talking and sharing worries with other people and accepting their support. This is not surprising, given that social support is a well-established protective factor for mental health, which has been shown in the aftermath of different adversities (Lee, 2019; Lueger-Schuster et al., 2015; Prati & Pietrantoni, 2009; Schwarzer et al., 2004). In the context of the COVID-19 pandemic, social support has been associated, inter alia, with lower depressive symptoms, less stress, and better self-reported health (Philpot et al., 2021; Sommerlad et al., 2021; Ye et al., 2020). In our studies, the participants from all countries seem to have been aware of the benefits of social support, highlighting its relevance at baseline and one-year follow-up.

Another noteworthy finding is that many participants appealed to empathy and solidarity by suggesting reaching out to others and offering support. Even though everyone was going through hard times, people from different backgrounds promoted prosocial behaviour. This is in accord with the tending and befriending response to stress (Taylor, 2006) which was referred to earlier. Furthermore, this dissertation extends on previous findings on the negative impact of social isolation (Kim & Jung, 2021) and the positive impact of compassion on mental health during COVID-19 (Matos et al., 2022).

Interestingly, answers pertaining to the theme *Social support* were especially frequent in women and people without children. The preference of women to rely on social support was identified in earlier COVID-19 research (Liozidou et al., 2023). Besides, it is possible that people without children spent more time alone than parents. For this reason, they might have sought social contact more actively and, in further consequence, more often recommended social support as a good way of coping with the pandemic. However, this is only an assumption that should be investigated in the upcoming studies.

Taken together, our findings on coping point to a great diversity in the way people dealt with the pandemic. Consistent with the concept of psychological flexibility (Chen & Bonanno, 2020), people adjusted their coping strategies depending on different pandemic phases. This can be interpreted as a sign of resilience, giving that sticking to a fixed set of strategies can have a detrimental effect on mental health (Avsec et al., 2022; Hemi et al., 2023; Kashdan & Rottenberg, 2010). Furthermore, our findings constitute compelling evidence for the value of meaning-centred coping in times of uncertainty. This coping style comprises emotional, cognitive, and behavioural elements and is characterised by proactivity, hopefulness, and prosocial behaviour (Eisenbeck et al., 2021), mirroring the coping strategies identified in our study. In order to maintain mental health over long periods of stress and uncertainty, it might be vital to find and make meaning by engaging in meaningful activities, adopting a positive attitude, but also by showing affiliative behaviours, talking, and sharing

worries with other people (Eisenbeck et al., 2021). In line with COR theory, cultivating resources by taking care of oneself, engaging in situation that are likely to evoke feelings of happiness, and accepting support could further promote psychological adjustment in face of challenges (Hobfoll, 2002). A number of studies have indicated beneficial outcomes of resources and resource gain during the COVID-19 pandemic (Egozi Farkash et al., 2022; Pellerin & Raufaste, 2020).

5.3 Aim 3: Mental Health Outcomes Across Countries and Over Time

Study 3 of the present PhD project examined several mental health outcomes in the first and second year of the COVID-19 pandemic across five European countries, whereas Study 2 focused on changes in mental health across four phases of the pandemic in Austria. The primary aim of these two studies was to explore whether symptoms of adjustment disorder, PTSD, depression, and anxiety varied depending on time and location of data collection.

In Austria, data were collected at four time points, during the summer months of 2020 (T1) and 2021 (T3) as well as during the winter months of 2020/2021 (T2) and 2021/2022 (T4). Both the self-reported prevalences and the mean scores of the assessed mental health outcomes changed significantly over time. In general, mental health problems tended to increase in wintertime and decrease in summertime. The highest proportion of people at risk for probable adjustment disorder (22.6%) was found in winter 2020/2021, whereas the prevalence rates of probable depression (22.7%) and anxiety disorder (20.9%) were highest in winter 2021/2022. As indicated in previous chapters, the number of infections and the death toll associated with COVID-19 were higher in wintertime than in summertime. This was accompanied by more restrictive measures in the winter months, as measured by the Oxford stringency index (Hale et al., 2021). This index represents the strictness of government policies (e.g. movement restrictions, cancellation of events, school and workplace closures) on a scale from 0 to 100, with 100 indicating the strictest response. By way of illustration, the

mean stringency index during the first assessment wave (summer 2020) in Austria was 38.59, and during the second assessment wave (winter 2020/2021) it was 77.58. Previous research has established a connection between strictness of government policies and mental health problems, with e.g. higher stringency being linked with lower well-being (Di Long et al., 2021). Furthermore, systematic reviews provided evidence for a linear association between COVID-19 incidence, restricted mobility, anxiety and depression symptoms (Salanti et al., 2022; Santomauro et al., 2021). It is well known that psychological stress can arise when stressful environmental demands overwhelm people's capacity to adjust (Cohen et al., 2007). In the wake of the COVID-19 pandemic, people were exposed to different stressors (Javakhishvili et al., 2020). In wintertime, additional restrictions (e.g. nationwide lockdown) further exacerbated the mental fragility of the Austrian society, which might have led to elevated levels of depression, anxiety and adjustment disorder observed in our study. Some previous investigations also demonstrated a decrease in symptoms of mental disorders towards summer months (Bendau et al., 2021).

Remarkably, the highest prevalence rates in our study were lower than those reported in reviews and meta-analyses. For example, some of the pooled prevalence rates of depression included 24.4%, 28.2%, 34.3%, and 33.7%, whereas following prevalences were recorded for anxiety: 22.9%, 29.6%, 31.9%, and 38.1% (Bower et al., 2023; Mahmud et al., 2023; Necho et al., 2021; Salari et al., 2020). Adjustment disorder has not been studied in systematic reviews, since only a small number of studies investigated this disorder amidst the pandemic. The prevalence rates found in these studies varied considerably, with three studies reporting prevalence rates lower than 20% (Jannini et al., 2022; Levin et al., 2022; Lotzin et al., 2021) and two studies reporting prevalence rates between 44.1% and 55% (Bambrah et al., 2022; Brunet et al., 2022). In any case, the prevalence rates published during the pandemic were considerably higher than the 1%–2% prevalence of adjustment disorder reported outside the pandemic context (Zelviene & Kazlauskas, 2018). Different assessment tools and cut-offs, but

also cross-country factors, could account for these discrepancies, as proposed by a recent umbrella review on psychological impact of the pandemic (Witteveen et al., 2023).

Study 3 of this PhD project corroborates the idea that differences in mental health problems could be assigned to cross-country differences. This study was conducted in Austria, Croatia, Georgia, Greece, and Portugal – five countries with different socioeconomic situations and distinct cultural backgrounds. Regarding the levels of depression and adjustment disorder, more than 50% of the variance could be attributed to country, signalising that the pandemic-related changes in mental health are greatly dependent on country-specific factors. At both timepoints (i.e. in summer/autumn 2020 and summer/autumn 2021) higher well-being and lower levels of adjustment disorder and depression were found in Austria and Croatia than in other countries. In Georgia, symptoms of adjustment disorder were highest among the participating countries, and the average well-being was suboptimal at both timepoints, resonating with other Georgian studies (Basishvili et al., 2021; Sikharulidze et al., 2022). Particularly concerning is that mental health worsened in this country between baseline (summer/autumn 2020) and one-year follow-up. According to a repeated cross-sectional study, worsening of mental health indicators was already evident at the beginning of winter 2020 (Shekriladze et al., 2022). In terms of COVID-19 incidence and death rates, Georgia was hit harder than other countries investigated within this PhD project. As stated before, the financial burden was also notably higher, and financial problems were related to mental health difficulties in past COVID-19 studies conducted in Georgia (Nadareishvili et al., 2022). Taken together, these findings point to serious difficulties in adapting to pandemic-related challenges among the Georgian general population. It seems essential to provide large-scale psychosocial support to boost mental health in this country, especially in the light of the ongoing Russo-Ukrainian War and its proximity to Georgia.

Lastly, this section deals with the symptoms of PTSD. In both studies devoted to changes in mental health outcomes over time, only a small number of participants reported a

traumatic event during the COVID-19 pandemic. In addition, the sample sizes of people experiencing a traumatic event varied considerably between the timepoints. Therefore, only descriptive analyses could be conducted for post-traumatic stress symptoms. In Austria (Study 2), these were highest in wintertime, thus showing a similar pattern over time as other mental health indicators. Among the five countries investigated in Study 3, the greatest symptoms of PTSD were found in Georgia, with approximately three out of five symptoms being reported per participant. This is in line with evidence presented above, underscoring the importance of addressing mental health problems in this country.

Throughout the pandemic, many studies have reported high prevalence rates of PTSD, although a comparably low number of studies assessed PTSD Criterion A (i.e. exposure to threatened or actual death, serious injury or sexual violence; APA, 2013; WHO, 2019). According to the APA (2013) and WHO (2019), the Criterion A must be met in order to establish a diagnosis of PTSD. However, this criterion has often been overlooked in COVID-19 studies, raising doubts with regard to the reported high rates of PTSD in the general population. Indeed, it could be shown that distress experienced amidst COVID-19 might be better captured by the diagnosis of adjustment disorder (Brunet et al., 2022; Kazlauskas & Quero, 2020). Acknowledging that the majority of pandemic-related stressors (e.g. job loss, financial difficulties, fear of infection) do not include a life-threatening component and are thus more likely to lead to symptoms of adjustment disorder, a specific aim of this dissertation was to broaden the knowledge about this often-neglected disorder. The following chapter is dedicated to this aim.

5.4 Aim 4: Trajectories of Adjustment Disorder and Well-Being

The last aim of the present dissertation was to better understand how adjustment disorder symptoms and well-being changed in course of the pandemic. This aim was addressed in Study 4, which encompassed four assessment waves conducted in Austria and Croatia. Earlier work has pointed to differences between these two countries with respect to

mental health and life satisfaction, which could be attributed to differences in socioeconomic status (GBD 2019 Mental Disorders Collaborators, 2022; Helliwell et al., 2023; The World Bank, 2023). Amidst the pandemic, COVID-19 incidence and death rates as well as government polices also differed between these two countries (Mathieu et al., 2020; WHO, 2023). However, in Study 3, Austrian and Croatian participants indicated significantly better mental health outcomes compared to other countries (i.e. Georgia, Greece, and Portugal). Taken together, these similarities and differences formed a compelling foundation for comparing adjustment and well-being trajectories in Austria and Croatia.

To account for both within-person changes and between-person differences in adjustment and well-being trajectories, multiple models were estimated within the latent growth curve modelling approach. According to the majority of models tested, the adjustment disorder symptoms showed an upward trend, whereas well-being showed a downward trend between June 2020 and January 2022. This extends previous findings on adjustment disorder during COVID-19, which mostly stemmed from cross-sectional studies (e.g. Kestler-Peleg et al., 2022) or longitudinal studies with shorter assessment waves (e.g. Bartels et al., 2022). Our study also provides novel insights into well-being during the pandemic. Previous studies revealed mixed findings regarding changes in well-being over time, which probably reflected different COVID-19 restrictions at different times of data collection (Fioravanti et al., 2022; Toffolutti et al., 2022). Our study addressed the paucity of research on well-being in later phases of the pandemic, suggesting that the decrease in well-being was not only related to government policies, but also to the prolonged duration of the pandemic.

The worsening of mental health over 20 months of COVID-19 is concerning, since it indicates that the long-term psychological adjustment to the pandemic circumstances was often not successful. A review on mental health trajectories following a broad range of adverse life events found that worsening trajectories were most common in studies including numerous stressors (Galatzer-Levy et al., 2018). The authors concluded that the observed

deterioration in mental health was likely due to repeated exposure to stressors over time. In the wake of the pandemic, the general population had to cope with different stressors. As our qualitative results showed, limited opportunities to travel and meet loved ones, financial problems, fears, and uncertainty were just some of the stressful aspects of the pandemic which sustained over time. It is thus possible that the prolonged exposure to various pandemic-related stressors hindered the long-term psychological adjustment. This is also in accordance with the COR theory (Hobfoll, 1989, 2002). Cumulative stressors might have eroded people's resources, resulting in a deterioration of mental health over time.

At baseline, lower well-being scores were associated with higher adjustment disorder scores. Hence, people with adjustment difficulties during the first assessment wave reported a reduced well-being. Before the pandemic, an Israeli study found a negative correlation between adjustment disorder symptoms and well-being (Hamama-Raz, Ben-Ezra, & Lavenda, 2021). In this study, well-being also moderated the relationship between daily stressors and adjustment disorder symptoms. In times when different stressors are accumulating, such as during a pandemic, interventions targeting well-being might buffer the negative effects of these stressors.

Another noteworthy finding of Study 4 is a great inter-individual variability both in the levels of adjustment disorder symptoms and well-being. This is consistent with a large body of knowledge on the heterogeneity of people's reactions to stressful and disruptive life events (Bonanno & Mancini, 2012; Galatzer-Levy et al., 2018). Individual differences have also received increasing attention in the COVID-19 literature, with studies highlighting complex and non-homogenous reactions to the pandemic (Ben-Ezra et al., 2021; Manchia et al., 2022; Shevlin et al., 2023). Both quantitative and qualitative results of the present dissertation support this idea. How people perceive and adjust to the pandemic seems to be largely impacted by the events experienced during the pandemic, by individual factors as well as by country-specific factors. This implies that population prevalence estimates should be

interpreted with caution, as these may not adequately capture the diversity of mental health responses amidst the pandemic.

Apart from estimating adjustment and well-being trajectories, the fourth aim of this PhD project was to determine the predictors of the trajectories' starting point and rate of change. In Study 4, women and people with lower income were found to be at risk for higher symptoms of adjustment disorder. Female gender and low income are well-known risk factors for pandemic-related mental health problems (Robinson et al., 2022; Witteveen et al., 2023). Compared to men, women also reported higher symptoms of adjustment disorder, but also depression and anxiety, across all four assessment waves carried out in Study 3. Pandemic-related stressors, e.g. difficulties in reconciling childcare and/or home-schooling with working from home, higher levels of abuse in childhood, and a history of mental health problems might account for higher clinical symptoms in women (von Hülsen et al., 2023). On the other hand, income losses were common throughout the pandemic (Nicola et al., 2020), representing a significant burden for many (Bodrud-Doza et al., 2020; Hertz-Palmor et al., 2021). The variety of difficulties associated with low income has been depicted in qualitative studies of the present dissertation. It was thus not surprising that Study 4 identified this group as being at risk for adjustment difficulties.

Notably, women and people with lower income were deemed vulnerable even before the pandemic, indicating that gender and income disparities remained during the pandemic (Aknin et al., 2022). As proposed by the COR theory, vulnerable population are at heightened risk of resources losses, which can result in further loss spirals (Hobfoll et al., 2016). To mitigate such spirals in the aftermath of COVID-19, interventions tailored to women and people with financial difficulties are very much needed.

In addition to sociodemographic factors, Study 4 also established anxiety and depression symptoms as important predictors of adjustment disorder and well-being levels. At all four timepoints, anxiety and depression symptoms were predictive of both initial scores

and changes over time in the levels of adjustment disorder and well-being. These results were anticipated, given that adjustment difficulties have been linked to low emotional stability and depression symptoms (Kestler-Peleg et al., 2022), whereas depressive and anxiety symptomatology were identified as primary indicators of well-being in other COVID-19 studies (Farrell et al., 2023; Larson et al., 2023). Overall, our results suggest that adjustment disorder with anxiety and/or depressed mood might be the most common type of adjustment disorder in the context of pandemics. However, this assumption warrants further research.

In Study 4, country was another significant predictor of adjustment disorder and well-being trajectories. Not only were initial levels of well-being higher in Croatia, but adjustment disorder symptoms were also lower in this country at the baseline assessment. These findings corroborate those of a large pan-European study, which demonstrated that Austria suffered a greater pandemic-related mental health impact than some other European countries (Grané et al., 2021). At baseline, the number of confirmed COVID-19 infections per million people was higher in Austria than in Croatia. It is plausible that this exacerbated the fear of infection in Austria, thus hampering successful adjustment. Qualitative accounts provide support for this idea. Namely, emotional distress, which was mostly characterised by worry, fear and uncertainty, was more pronounced in Austria than in Croatia during the first assessment wave. An alternative explanation for differences in mental health outcomes is that individuals in these two countries may have perceived the pandemic as differentially threatening. In their recent history, people from Croatia have experienced some highly distressing events, including major earthquakes in 2020 and the Homeland War between 1991-1995 (Gizdic et al., 2022; Matić et al., 2021). It has been suggested that nations with a background of stress and trauma might show better mental health outcomes amidst the pandemic (Coiro et al., 2021), which could account for higher well-being and lower symptoms of adjustment disorder in Croatia.

In sum, both quantitative and qualitative findings of the present dissertation point to heterogeneity of people's reactions to the COVID-19 pandemic. Our evidence supports the idea of psychological adjustment as a complex and dynamic process formed by individual characteristics (e.g. gender), contextual factors (e.g. country of residence), and coping strategies (e.g. adopting a positive inner attitude). Psychological responses during pandemics should not be generalised, but rather considered in light of people's experiences and their living circumstances.

6 Strengths

The present dissertation considered various dimensions of psychological functioning, ranging from indicators of mental health problems (e.g. adjustment difficulties) to indicators of positive psychological functioning (e.g. well-being). We placed a special focus on adjustment disorder, which was largely neglected in COVID-19 research, although it was considered a highly probable mental health outcome during the pandemic (Kazlauskas & Quero, 2020). To assess adjustment disorder, we used a state-of-the-art measure (ADNM-8; Kazlauskas et al., 2018), developed in line with the ICD-11 diagnostic criteria (WHO, 2019). Moreover, we could capture first-hand experiences of people from different cultural and socioeconomic backgrounds. Another advantage is the inclusion of multiple timepoints, which enabled us to assess changes in mental health across different phases of the pandemic.

A further major strength of the PhD project lies in its longitudinal mixed-methods design. The qualitative accounts provided context to the quantitative results, offering a more differentiated picture of people's challenges and needs amidst the COVID-19 pandemic. Apart from this methodological triangulation, data triangulation could also be achieved by combining data from different countries and timepoints, enhancing the understanding of factors that shape psychological adjustment to the pandemic, and contributing to the validity and credibility of the findings.

Another notable feature of the dissertation is the diversity of the samples analysed, along with the close collaboration within the international project team. Regular meetings with researchers from the participating countries could reduce the research bias and open new perspectives. Furthermore, the use of validated self-report measures of mental health and state-of-the-art methodologies need to be mentioned. Whereas qualitative content analysis by Mayring is a well-established method for analysing large amounts of qualitative data, latent growth curve modelling can accommodate missing data and identify population

heterogeneity. Hence, both methods were well-suited for the large and diverse sample used in course of the PhD project.

A final strength of the dissertation lies in a high number of answers to open-ended questions, which is rarely seen in qualitative research. Also, keeping a substantial response rate (ca. 30%) between the timepoints must be considered as an asset of the study, given the long period of data collection (almost two years) and the fact that the present PhD project has been conducted within a study that has not received any funding.

Taken together, the dissertation could address important research gaps in the field of COVID-19 and mental health, broadening the knowledge about subjective perspectives of the pandemic and heterogeneity of people's psychological responses.

7 Limitations

The findings of this doctoral thesis should be considered in the light of several limitations. First, convenience sampling was used to recruit participants. Although the ESTSS ADJUST study was actively promoted using various strategies, the samples in the four PhD studies did not mirror the demographic distribution of the countries included. Second, of all countries participating in the ESTSS ADJUST, only Poland used a panel service to recruit a representative sample. In Study 1, the data representative of the Polish population were combined with non-representative data of other countries, which might have biased the results.

Third, a drop-out observed in longitudinal studies (Study 2, 3 and 4) must be acknowledged. A considerable number of participants did not provide their e-mail address in the first assessment wave and could thus not be approached for further waves. Moreover, a selection bias might have occurred. It is plausible that individuals highly burdened by the pandemic were particularly interested in taking part in the study on pandemic-related mental health. However, it is also possible that individuals with better mental health were overrepresented, as suggested by an earlier study (Pierce et al., 2020).

Another limitation is that the data collection started in June 2020, approximately four months after the WHO declared the COVID-19 outbreak a global pandemic (WHO, 2020). For this reason, we were not able to assess initial reactions to the pandemic and related containment measures. Furthermore, we did not have baseline data on the participants' mental health status. Thus, it cannot be ruled out that psychological problems detected in our study, to some extent, reflected earlier levels of distress.

The predominantly female sample with high educational attainment represents a further issue which limits the generalisability of the findings. Although special efforts were made to recruit male participants (e.g. by contacting companies with mainly male employees), the vast majority of participants in all countries were women. This remains a common

problem in psychological research. To better assess mental health of men amidst pandemics and similar crises, innovative recruitment strategies as well as studies with representative samples are highly needed.

A final limitation of the present dissertation lies in the fact that all data were collected via online surveys. Hence, older participants and those who did not spend much time online had a lower chance to participate. In addition, qualitative responses collected in an online survey do not have the same depth as data gathered in a face-to-face interview or focus groups. This should be considered when interpreting qualitative findings of the dissertation.

8 Implications and Future Directions

Overall, the results of the present thesis indicate a notable amount of resilience in the general population, with many adaptive coping strategies and positive consequences of the pandemic being identified. This is a reason for optimism, especially given the duration, novelty, and overall impact of COVID-19 on daily lives. However, the results also point to suboptimal well-being and difficulties in adapting to the pandemic. Summarising the insights gained throughout this PhD project, important clinical and socio-political implications, along with recommendations for future research, can be drawn. These are presented next.

8.1 Implications for Practitioners and Policy Makers

Following adverse life events, even people who do not develop a mental health disorder may have transient stress reactions and need support to adapt successfully (Hobfoll et al., 2007). Therefore, emotional distress and individual challenges related to pandemic restrictions, as shown in our research, should be acknowledged by both stakeholders and healthcare workers in order to facilitate coping during future pandemics. In clinical practice, *personalised medicine* and *precision psychiatry* are increasingly being discussed (Češková & Šilhán, 2021; Fernandes et al., 2017), and our findings support the relevance of such approaches in a pandemic context.

8.1.1 Pandemic Management

As indicated in previous investigations, it is vital to find the right balance between the efforts to protect physical and mental well-being when managing pandemics (Eklund et al., 2022). Our results clearly show that the COVID-19 pandemic was a source of burden for many participants, impacting their relationships, professional lives, and leisure activities. In future pandemics, governments should provide guidance on how to live as normally as possible, while reducing transmission risk, as proposed by the WHO (2020). Based on our evidence, guidelines on meeting other people and engaging in joyful activities under safe conditions might alleviate people's hardship, thus protecting their mental health. Besides,

such guidelines could be more effective than strict lockdown measures. Research on previous disease outbreaks has shown beneficial effect of government policies based on voluntary measures and encouragements, compared to compulsion (Brooks et al., 2020).

8.1.2 Pandemic Communication

Pandemic communication is another aspect that needs to be improved in the future. In the qualitative part of the PhD project, many participants described ambiguity and contradictory information in politicians' statements as particularly stressful. In order to build trust and increase adherence to preventive measures, authorities should establish coherent communication with the public and provide comprehensible justification for their decisions (Enria et al., 2021; Pourrazavi et al., 2023). Moreover, our data suggest that the media coverage of the COVID-19 pandemic was often inadequate, further increasing peoples' distress. Although the severity and the significance of a pandemic should not be downplayed, the reporting should not be solely negatively connotated. Our results thus support the idea that media contents should include references to available resources (Su et al., 2021), to buffer the negative effects of disturbing news in the wake of health emergencies.

8.1.3 Resource-Oriented Approach

The findings of this dissertation complement those of earlier studies (Kikuchi et al., 2021; Peck, 2020), showing that the pandemic has had a disproportionate impact on women and people with low income. These populations, which were deemed vulnerable even before COVID-19, were deeply impacted by the pandemic, making them more likely to experience further losses. According to the COR theory, resource gain may counterbalance loss of resources following disruptive life events (Hobfoll et al., 2016). Hence, resource-oriented interventions should be given priority amidst global crises. Instead of focusing on problems, mental health campaigns should motivate people to utilise their own personal and social resources (see examples in Priebe et al., 2014). Moreover, efforts should be made to reach vulnerable populations and offer them support tailored to their individual needs. This is

particularly relevant considering other global crises happening at the moment (e.g. wars, climate crisis), which are likely to have a disproportional impact on at-risk groups.

8.1.4 Flexibility Approach

Our data further suggest that adopting a positive inner attitude (i.e. attitude marked by acceptance, hopefulness, tranquillity, and optimism), pursuing meaningful goals, and restructuring values and priorities might ease adjustment to pandemic circumstances. These features resemble some of the key aspects of the *Acceptance and Commitment Therapy* (ACT; (Hayes et al., 2006). The ACT targets psychological flexibility (Moran & Ming, 2020) and is proven to be effective in treating various mental health problems (Gloster et al., 2020). During stressful and uncertain times such as a pandemic, strategies to improve adjustment to fluctuating situational demands might be vital for maintaining mental health. Thus, mental health campaigns with elements of ACT, aiming to promote psychological flexibility, should be considered in the aftermath of this and other global crises.

8.2 Implications for Future Research

Apart from clinical implications, the present dissertation has also some implications for the scientific community. First, more research on adjustment disorder is highly needed, especially with regard to its longitudinal trajectories. Although it is frequently diagnosed in clinical settings (Sundquist et al., 2017; Zelviene & Kazlauskas, 2018), both basic research and specific interventions for treating this disorder are scarce (Morgan et al., 2022). Considering the variety of crises the world is currently facing, more profound understanding of adjustment disorder is of utmost importance. With long-term consequences of the pandemic still being noticeable, effects of the climate crisis being more obvious than ever, wars taking place in different parts of the globe, and one refugee crisis happening after another, humans' ability to adjust is likely to be repeatedly challenged. Low-threshold interventions and prevention programmes are thus highly needed to foster psychological adjustment. In order to reach various target populations, self-help and online-based

programmes seem to be particularly promising (Bachem & Maercker, 2016; Eimontas et al., 2018).

According to our data, men and women responded to the pandemic differently. There is hence a need for close examination of gender-specific needs in times of global crises. Moreover, our findings suggest that vulnerable populations, such as people with long-COVID and those with low income, warrant further research. Given that pandemic-related psychological problems may be sustained for years (Esterwood & Saeed, 2020), it is also vital to monitor mental health of the general population. Future studies should investigate very long-term mental health consequences using longer follow-up periods (e.g. one year after the official end of the COVID-19 pandemic) and taking into consideration the possible cumulative impact of this and other global crises (e.g. armed conflicts in Gaza Strip). In addition, qualitative studies could provide in-depth insights on how people perceive these crises, to what extent they present a burden, and whether they impact their daily functioning.

Finally, the present dissertation clearly shows that personal characteristics, events experienced during the pandemic, country-specific factors, and the changing course of COVID-19 shaped people's psychological reactions throughout the pandemic. This underlines the importance of applying a context-sensitive approach in research and practice amidst public health emergencies and other major crises. Even when a stressor is shared, its ramifications are diverse. Therefore, individual living conditions should be acknowledged when planning public health policies and addressing the needs of people with mental health issues. In the upcoming studies, the integration of qualitative and quantitative data might be a promising approach to better understand the differing reactions to public health emergencies.

9 Conclusion

Taken together, the present PhD project has addressed different research gaps amid the COVID-19 pandemic by exploring subjective pandemic-related experiences, indicators of positive mental health, and trajectories of different mental health problems. By applying a mixed-methods approach and combining cross-country and within-country analyses, the project has provided novel insights into the variety of people's reactions to the pandemic and highlighted differences in psychological adjustment over time.

Overall, this thesis suggests that the effects of the pandemic on everyday life and mental health were not solely negative. Strengthening of social relationships, engaging in meaningful activates, and contemplating about values and priorities were just some of the positive aspects of the pandemic identified by our participants. Moreover, various adaptive strategies with social, behavioural, and cognitive-emotional elements were used to cope with pandemic-related challenges. These strategies varied in response to differing situational demands, supporting the idea of psychological flexibility as a useful framework for explaining long-term adjustment to pandemic and similar crises (Chen & Bonanno, 2020; Kashdan & Rottenberg, 2010). Importantly, both quantitative and qualitative data indicated considerable variations in people's individual experiences of the pandemic, echoing previous research (Clotworthy et al., 2021; Sandbakken & Moss, 2021). Consequently, mental health outcomes also varied depending on the phase of the pandemic, individual and cross-country factors.

In line with earlier work (Waters et al., 2022; Westerhof & Keyes, 2010), the present dissertation implies that positive and negative reactions are likely to co-exist in times of prolonged stress and uncertainty, such as the COVID-19 pandemic. Therefore, such times require flexible approaches in both research and clinical practice in order to timely and effectively respond to differing challenges faced by the general population, while acknowledging opportunities and silver lining of the respective crisis.

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Curriculum Vitae

Irina Zrnić Novaković, MSc

Education and academic degrees

Since 03/2020	**PhD candidate** at the Faculty of Psychology, University of Vienna, Austria
Since 10/2018	**Postgraduate Training in Clinical Psychology** Austrian Academy for Psychology (*ÖAP; Österreichische Akademie der Psychologie*) Professional Association of Austrian Psychologists (*BÖP; Berufsverband Österreichischer PsychologInnen*), Vienna, Austria
06/2018	**Master of Science (MSc)** in Psychology (with distinction), University of Vienna, Austria
08/2016	**Bachelor of Science (BSc)** in Psychology, University of Vienna, Austria

Professional career

Since 03/2020	**University assistant (research and teaching assistant)** Faculty of Psychology, University of Vienna, Austria
Since 03/2019	**Workshop moderator** - Organisation and evaluation of workshops for people with disabilities and their relatives (e.g., on autonomy, caregiver burden, quality of life) Lebenshilfe Österreich (Austrian organisation advocating on behalf of people with intellectual disabilities and their relatives)
05/2019 – 01/2020	**Research associate and clinical psychologist in training** Medical University of Vienna (Vienna General Hospital: Division of Neonatology, Pediatric Intensive Care Medicine and Neuropediatrics)
10/2017 – 06/2018	**Student assistant** Faculty of Psychology, University of Vienna, Austria

Internships, projects and voluntary work

09/2018	**Conference staff** Scientific conference "Gesundheit ohne Barrieren" (Health without barriers)
04/2017 – 07/2017	**Voluntary internship** at the Vienna General Hospital Parental counselling and developmental diagnostics of children born pretern
03/2017	**Interviewer and project staff** Project "Self-determination and sports in people with intellectual disabilities" PI Prof. Dr. Germain Weber
11/2016 – 09/2017	**Project staff** Project "CaPoChiMi" (Cared for by pooled child minders) PI Prof. Dr.Dr. Lieselotte Ahnert
11/2016 – 09/2017	**Project staff** CENOF Project (The Central European Network on Fatherhood) PI Prof. Dr.Dr. Lieselotte Ahnert
07/2016	**Voluntary staff** Project "Kinderuni Wien 2016" (Children's University)

Peer-reviewed publications in career to date

1. Zeilinger, E. L., **Zrnic Novakovic, I.**, Oppenauer, C., Fellinger, M., Knefel, M., Unseld, M., Wagner, T., Lubowitzki, S., Bartsch, R., Zöchbauer-Müller, S., Raderer, M., Staber, P. B., Valent, P., & Gaiger, A. (2024). Prevalence and biopsychosocial indicators of fatigue in cancer patients. *Cancer Medicine*, *13*(11), e7293. https://doi.org/10.1002/cam4.7293

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3. **Zrnić Novaković, I.**, Streicher, A., Ajduković, D., Ajduković, M., Kiralj Lacković, J., Lotzin, A., & Lueger-Schuster, B. (2023). Trajectories of Adjustment Disorder and Well-Being in Austria and Croatia during 20 Months of the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *20*(19), 6861. https://doi.org/10.3390/ijerph20196861

4. Lioupi, C., Anastassiou-Hadjicharalambous, X., Acquarini, E., Ajdukovic, D., Ardino, V., Böttche, M., Dragan, M., Figueiredo-Braga, M., Gelezelyte, O., Grajewski, P., Javakhishvili, J. D., Kazlauskas, E., Lenferink, L., Lueger-Schuster, B., Tsiskarishvili, L., Mooren, T., Sales, L., Ajdukovic, M., **Zrnic Novakovic, I.**, . . . Lotzin, A. (2023). Predictors of traumatic experiences among individuals experiencing pandemic-related stressors: a cross-sectional study in Europe during the COVID-19 crisis. *Current Psychology.* Advance online publication. https://doi.org/10.1007/s12144-023-05036-8

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Talks, posters and conference presentations

1. Zrnić Novaković, I. (2024, 22-24 February). *Anpassung und Wohlbefinden in späteren Phasen der COVID-19 Pandemie – Ein Vergleich zwischen Österreich und Kroatien* [*Adjustment and well-being in later phases of the COVID-19 pandemic - A comparison between Austria and Croatia*; Conference presentation]. 24th Annual Meeting of the German Speaking Society for Psychotraumatology (DeGPT), Vienna, Austria.

2. Zrnić Novaković, I. (2023, 17-17 June). *Pandemic-related experiences over time and across five European countries - A longitudinal mixed-methods study* [Conference presentation]. 17th biennial conference of the European Society for Traumatic Stress Studies, Belfast, Northern Ireland.

3. Zrnić Novaković, I. (2023, 25 April). *Longitudinal mixed-methods approach* [Guest Talk]. Methodological Workshop for Doctoral Students, Zagreb, Croatia.

4. Zrnić Novaković, I. (2023, 16-18 February). *Gefühle, Gedanken und Herausforderungen in Zeiten der COVID-19 Pandemie – Eine qualitative Studie* [*Feelings, thoughts and challenges in times of the COVID-19 pandemic - A qualitative study*; Conference presentation]. 23rd Annual Meeting of the German Speaking Society for Psychotraumatology (DeGPT), Zürich, Switzerland.

5. Zrnić Novaković, I. (2022, November 11-12). *Challenges and opportunities of the COVID-19 pandemic – A longitudinal mixed-methods study across five European countries.* [Conference presentation]. EACLIPT Conference 2022: "Clinical Psychology Now!", Warsaw, Poland.

6. Zrnić Novaković, I. (2022, June 29). *Qualitative Forschung: Methodische Aspekte der Nutzung im Längsschnitt* [*Qualitative research: Methodological aspects to be considered in longitudinal studies*; Guest talk]. Young Researcher Day at the Center for Health Care Research of the University Medical Centre Hamburg-Eppendorf, Hamburg, Germany.

7. Zrnić Novaković, I. (2022, April 7). *Challenges and opportunities of the COVID-19 pandemic: A qualitative cross-country analysis* [Guest talk]. Colloquim at the Centre of Interdisciplinary Addiction Research, Hamburg, Germany.

8. Zrnić Novaković, I. (2022, February 3–4). *Pandemic-related experiences across six European countries–Is there a silver lining?* [Conference presentation]. VDS CoBeNe PhD Academy, Vienna, Austria.

9. Zrnić, I. (2021, June 17-18*). Feelings, thoughts and challenges amidst the COVID19 pandemic -A qualitative approach* [Conference presentation]. Virtual Conference ESTSS 2021, Maastricht, The Netherlands.
10. Zrnić, I. (2021, March 17-20). *Factors influencing (mal)adjustment in post-lockdown Austria - Is there a bright side of COVID 19?* [Poster presentation]. Online Annual Meeting of the German Speaking Society for Psychotraumatology (DeGPT), Würzburg, Germany.
11. Zrnić, I. (2018, July 18-20). *Letting Go to Move Forward – Well-Being of Families Dealing with Empty Nest Transition* [Poster presentation]. The 5th IASSIDD Europe Congress "Diversity and Belonging", Athens, Greece.

Appendix: Publications Included in the Dissertation

Study 1 (*Status: published*)

Zrnić Novaković, I., Lueger-Schuster, B., Verginer, L., Bakić, H., Ajduković, D., Borges, C., Figueiredo-Braga, M., Javakhishvili, J. D., Tsiskarishvili, L., Dragan, M., Nagórka, N., Anastassiou-Hadjicharalambous, X., Lioupi, C., & Lotzin, A. (2022). You can't do anything about it, but you can make the best of it: A qualitative analysis of pandemic-related experiences in six European countries. *European Journal of Psychotraumatology*, *13*(1), 2065431. https://doi.org/10.1080/20008198.2022.2065431

Study 2 (*Status: published*)

Lueger-Schuster, B., Zrnić Novaković, I.*, & Lotzin, A. (2022). Two years of COVID-19 in Austria-Exploratory longitudinal study of mental health outcomes and coping behaviors in the general population. *International Journal of Environmental Research and Public Health*, *19*(13), 8223. https://doi.org/10.3390/ijerph19138223

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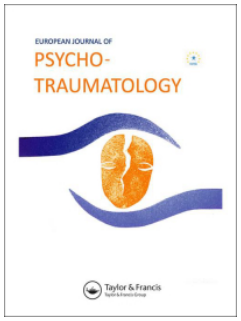
Study 4 (*Status: published*)

Zrnić Novaković, I., Streicher, A., Ajduković, D., Ajduković, M., Kiralj Lacković, J., Lotzin, A., & Lueger-Schuster, B. (2023). Trajectories of Adjustment Disorder and Well-Being in Austria and Croatia during 20 Months of the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *20*(19), 6861. https://doi.org/10.3390/ijerph20196861



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You can't do anything about it, but you can make the best of it: a qualitative analysis of pandemic-related experiences in six European countries

Irina Zrnić Novaković, Brigitte Lueger-Schuster, Lucia Verginer, Helena Bakić, Dean Ajduković, Camila Borges, Margarida Figueiredo-Braga, Jana (Darejan) Javakhishvili, Lela Tsiskarishvili, Małgorzata Dragan, Nadia Nagórka, Xenia Anastassiou-Hadjicharalambous, Chrysanthi Lioupi & Annett Lotzin

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You can't do anything about it, but you can make the best of it: a qualitative analysis of pandemic-related experiences in six European countries

Irina Zrnić Novaković [a,b], Brigitte Lueger-Schuster [a], Lucia Verginer[a], Helena Bakić [c], Dean Ajduković [b], Camila Borges[d], Margarida Figueiredo-Braga [d,e], Jana (Darejan) Javakhishvili[f], Lela Tsiskarishvili[g], Małgorzata Dragan [h], Nadia Nagórka[h], Xenia Anastassiou-Hadjicharalambous [i], Chrysanthi Lioupi[i] and Annett Lotzin [j,k]

[a]Department of Clinical and Health Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria; [b]Vienna Doctoral School in Cognition, Behavior and Neuroscience, University of Vienna, Vienna, Austria; [c]Department of Psychology, Faculty of Humanities and Social Sciences, University of Zagreb, Zagreb, Croatia; [d]Trauma Observatory, Centre for Social Studies (CES) of the University of Coimbra, Coimbra, Portugal; [e]Faculty of Medicine, University of Porto, Porto, Portugal; [f]Institute of Addiction Studies, Ilia State University, Tbilisi, Georgia; [g]Faculty of Arts and Science, Ilia State University, Tbilisi, Georgia; [h]Faculty of Psychology, University of Warsaw, Warsaw, Poland; [i]Psychology Program, School of Humanities, Social Sciences and Law, University of Nicosia, Nicosia, Cyprus; [j]Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [k]Department of Psychology, MSH Medical School Hamburg, Hamburg, Germany20654312065431

ABSTRACT

Background: The complex system of stressors related to the coronavirus disease 2019 (COVID-19) pandemic has affected the global population, provoking a broad range of psychological reactions. Although numerous studies have investigated the mental health impact of COVID-19, qualitative research and cross-country comparisons are still rare.

Objective: This qualitative study aimed to explore self-perceived challenges and opportunities related to COVID-19 across six European countries. The overall objective was to provide a differentiated picture of individual subjective experiences in the early stages of the pandemic.

Method: The present study included 7309 participants from Austria, Croatia, Georgia, Greece, Poland, and Portugal. We performed qualitative content analysis according to Mayring analyse open-ended questions regarding stressful events, positive and negative aspects of the pandemic, and recommendations to cope with the pandemic situation. *MAXQDA* software was used for data management and analysis.

Results: Participants' accounts were moderately consistent across the countries. The most prominent themes regarding stressful and negative pandemic aspects included: *Restrictions and changes in daily life*, *Emotional distress*, and *Work and finances*. Answers about positive pandemic consequences were mainly centred around the themes *Reflection and growth*, *Opportunity for meaningful/enjoyable activities*, and *Benefits on interpersonal level*. Key themes identified from participants' recommendations to cope with the pandemic included *Beneficial behavioural adjustment*, *Beneficial cognitive–emotional strategies*, and *Social support*.

Conclusions: Participants experienced various challenges, but also shared several positive pandemic consequences and recommendations to cope with the pandemic. These first-hand data could inform mental health practices to promote well-being during COVID-19 and similar global challenges in the participating countries and possibly beyond.

Puedes no ser capaz de hacer algo al respecto, pero puedes sacar lo mejor de la situación: Un análisis cualitativo de experiencias relacionadas con la pandemia en seis países europeos

Antecedentes: El complejo sistema de factores estresantes relacionados con la pandemia por la COVID-19 ha afectado a la población mundial, generando un amplio rango de reacciones psicológicas. A pesar de que múltiples estudios han investigado el impacto sobre la salud mental de la COVID-19, las investigaciones cualitativas y las comparaciones entre países aún son infrecuentes.

Objetivo: Este estudio cualitativo buscó explorar los retos y las oportunidades autopercibidas asociadas a la COVID-19 en seis países europeos. El objetivo general fue el de brindar un panorama diferenciado de experiencias individuales subjetivas en las etapas tempranas de la pandemia.

Método: Este estudio incluyó a $N = 7309$ participantes de Austria, Croacia, Georgia, Grecia, Polonia y Portugal. Se empleó el análisis de contenido de Mayring para analizar preguntas abiertas acerca de experiencias estresantes, de experiencias positivas y negativas de la

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PALABRAS CLAVE
COVID-19; pandemia; coronavirus; salud mental; afrontamiento; aspectos positivos; estudios entre países; análisis cuantitativo del contenido

关键词
COVID-19; 疫情; 冠状病毒; 心理健康; 应对; 积极方面; 跨国研究; 定性内容分析

HIGHLIGHTS

- We examined COVID-19-related experiences in 7309 adults from six European countries.
- Besides challenges, participants identified many positive pandemic consequences.
- Participants' recommendations to cope with COVID-19 included behavioural and cognitive–emotional strategies.

CONTACT Irina Zrnić Novaković irina.zrnic@univie.ac.at Department of Clinical and Health Psychology, Faculty of Psychology, University of Vienna, Wächtergasse 1, Vienna 1010, Austria

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pandemia, y recomendaciones para afrontar la situación de la pandemia. Se empleó el software MAXQDA para la gestión y el análisis de la información.
Resultados: Los relatos de los participantes eran moderadamente consistentes entre los países. Los temas más prominentes respecto a los aspectos estresantes y negativos de la pandemia incluyeron a: *restricciones y cambios en la vida diaria, angustia emocional,* y *trabajo y finanzas*. Las respuestas sobre las consecuencias positivas de la pandemia se centraban principalmente alrededor de los temas de *reflexión y crecimiento personal, oportunidad para realizar actividades significativas / placenteras,* y *beneficios en a nivel interpersonal*. Los temas clave identificados a partir de las recomendaciones de los participantes para afrontar la pandemia incluyeron *adaptaciones conductuales beneficiosas, estrategias cognitivo-emocionales beneficiosas,* y *soporte social*.
Conclusiones: Los participantes experimentaron diversos desafíos, pero también compartieron varias consecuencias positivas de la pandemia y recomendaciones para afrontarla. Esta información de primera mano podría informar sobre las prácticas de salud mental a promover durante la COVID-19 o desafíos globales similares en los países participantes y, posiblemente, más allá.

你无能为力，但你可以充分利用它——对六个欧洲国家疫情相关经验的定性分析

背景：COVID-19 疫情相关复杂应激源系统影响了全球人口，引发了广泛的心理反应。尽管大量研究调查了 COVID-19 对心理健康的影响，但定性研究和跨国比较仍然很少见。
目的：本定性研究旨在探索六个欧洲国家 COVID-19 相关的自我认知挑战和机遇。总体目标是为疫情早期阶段的个人主观体验提供不同的描述。
方法：本研究包括来自奥地利、克罗地亚、格鲁吉亚、希腊、波兰和葡萄牙的 $N = 7309$ 名参与者。我们通过 Mayring 行了定性内容分析，以分析有关紧张事件、疫情积极和消极方面以及应对疫情情况建议的开放式问题。使用MAXQDA软件进行数据管理和分析。
结果：参与者的解释在各国之间是适度一致的。关于紧张和疫情消极方面最突出的主题包括：日常生活的限制和变化、情绪困扰以及工作和财务。关于疫情积极后果的回答主要集中在反思和成长、有意义/愉快活动的机会和人际层面的好处等主题上。从参与者应对疫情的建议中确定的关键主题包括有益的行为调整、有益的认知情绪策略和社会支持。
结论：参与者经历了各种挑战，但也分享了一些积极的疫情后果和应对疫情的建议。这些第一手数据可以为心理健康实践提供信息，以促进 COVID-19 期间的福祉以及参与国甚至更远地区的相似全球挑战。

1. Introduction

Changes in daily life caused by the coronavirus disease 2019 (COVID-19) pandemic have impacted people differently (Sandbakken & Moss, 2021). Whereas a considerable number of studies have reported a detrimental impact of COVID-19 on mental health (Krishnamoorthy, Nagarajan, Saya, & Menon, 2020), much less is known about individual mechanisms of coping and adapting to this new environment. Applying a qualitative approach, the present study examines self-experienced challenges and opportunities of the pandemic across six European countries, and explores population-informed recommendations for successful adaptation.

1.1. Mental health problems and COVID-19

Around the globe, COVID-19 has taken a toll on mental health. Apart from depression and anxiety symptoms (Ozamiz-Etxebarria, Idoiaga Mondragon, Dosil Santamaría, & Picaza Gorrotxategi, 2020; Parola, Rossi, Tessitore, Troisi, & Mannarini, 2020), an increase in symptoms of trauma- and stress-related disorders has been reported (Lotzin et al., 2021; Pieh, Budimir, & Probst, 2020). Even people who have not reached the threshold for mental health disorders have been burdened by work-related problems, financial issues, and lack of social support (Nitschke et al., 2021; Rodríguez-Rey, Garrido-Hernansaiz, & Collado, 2020).

Several protective factors for mental health have been identified. These include positive social relationships and frequent face-to-face contact with loved ones (Dong et al., 2020; Lotzin et al., 2021). Positive beliefs and trust in government to handle the pandemic (Bäuerle et al., 2020; Vazquez et al., 2021) can also buffer the negative mental health effects of COVID-19.

On the other hand, pre-existing physical or mental health comorbidities (Lotzin et al., 2021; Valiente et al., 2021), female gender (Peck, 2021), and low income (Bodrud-Doza, Shammi, Bahlman, Islam, & Rahman, 2020; Pieh et al., 2020) have been linked to poorer mental health. Risk factors also include some pandemic features, e.g. living in areas heavily affected by COVID-19 (Chirico et al., 2020) and perceiving pandemic management as incompetent (Bodrud-Doza et al., 2020). To fully comprehend how different containment measures and COVID-19 affectedness impact mental health, more cross-country studies are needed.

1.2. Coping with COVID-19

Several studies investigated coping amidst COVID-19. On one hand, maladaptive coping, e.g. avoidance and

substance use, was associated with mental health problems (Eden, Johnson, Reinecke, & Grady, 2020; Okafor, Bautista, Asare, & Opara, 2022). On the other hand, responding with adaptive coping strategies, e.g. acceptance and positive thinking, could buffer the negative effects of COVID-19 (Budimir, Probst, & Pieh, 2021; Ye et al., 2020). However, since pandemic circumstances are changing rapidly and the efficacy of these strategies is context-dependent, their role throughout different pandemic stages is arguable.

Relying on a fixed set of strategies, even if these are considered adaptive, may be insufficient given the scale, pace, and unpredictability of COVID-19 (Chen & Bonanno, 2020). Instead, it seems crucial to maintain psychological flexibility, i.e. the ability to pay attention to changing situational demands and effectively respond to them (Dawson & Golijani-Moghaddam, 2020; Kashdan & Rottenberg, 2010). Being flexible by combining emotional, cognitive, and behavioural strategies could be particularly relevant for maintaining mental health (Eisenbeck et al., 2022).

The perception of positive pandemic-related consequences may also promote healthy adjustment. Such consequences include the impact of COVID-19 on the environment (Khan, Shah, & Shah, 2021; Lal et al., 2020) and spending more time with family (Krajewski, Frąckowiak, Kubacka, & Rogowski, 2021). However, evidence on this topic is still limited, as research has mainly focused on the negative pandemic-related consequences.

Taken together, these initial findings suggest that the reactions to the pandemic vary considerably. Since the psychological, social, and financial burden is expected to persist after the pandemic has been brought under control, people's adaptational capacities are likely to be repeatedly challenged (Gersons, Smid, Smit, Kazlauskas, & McFarlane, 2020). To disentangle the mechanisms of healthy adjustment, it is vital to investigate individual perceptions of the pandemic situation and people's everyday coping strategies.

1.3. Qualitative research on COVID-19

Qualitative methodology is indispensable in order to capture the broad range of individual experiences. Yet qualitative studies on mental health amidst COVID-19 are rare. The existing qualitative studies were mainly interested in experiences of selected target groups, such as healthcare workers, adolescents, and pregnant women (Arnetz, Goetz, Arnetz, & Arble, 2020; Javaid et al., 2021; Waselewski, Waselewski, & Chang, 2020). Only a few qualitative studies have investigated the general population, providing insights into positive consequences of the pandemic (Günther-Bel, Vilaregut, Carratala, Torras-Garat, & Pérez-Testor, 2020), emotional reasons for stockpiling (Lehberger, Kleih, & Sparke, 2021), and meaning-making processes during the pandemic (Marinaci et al., 2021; Sandbakken & Moss, 2021). In the UK, a focus group study found that loss, unclear governmental communication, social distancing, and uncertainty were prevailing themes among participants (Williams et al., 2020). Mixed-methods studies were also conducted, showing both positive (e.g. when focusing on the change in the society at large) and negative pandemic-related experiences (e.g. when focusing on the immediate needs) in the first year of COVID-19 (Fouques et al., 2021).

1.4. Aims of the current study

Acknowledging the great individual differences in responding to stress and adjusting to new environments (Bonanno & Mancini, 2012; Prati & Mancini, 2021), it seems essential to investigate subjective experiences during the ongoing COVID-19 pandemic. Moreover, cross-country comparisons are necessary to better understand the link between COVID-19 affectedness, containment measures, and mental health.

Using qualitative methodology, we set out to explore personal perceptions of the pandemic and individual coping strategies across six European countries in order to gain insight into the complexity and variety of experiences. Our overarching aim was to reveal a differentiated picture of self-perceived challenges and opportunities during the early pandemic stage in different parts of Europe. Specific aims were to:

- identify which events were perceived as the most stressful
- examine the most salient negative aspects of the pandemic
- explore the positive consequences of the pandemic
- explore population-informed recommendations for coping with the COVID-19 pandemic.

2. Methods

2.1. Research context and study design

This research is part of the ADJUST study – a longitudinal, pan-European study launched by the European Society for Traumatic Stress Studies (ESTSS). (For details, see the study protocol in Lotzin et al., 2020.) The present paper draws on qualitative data collected in six countries: Austria, Croatia, Georgia, Greece, Poland, and Portugal.

The ADJUST study was preregistered in the OSF registry (doi:10.17605/OSF.IO/8XHYG). Ethical approval was obtained at all study sites. For details see Supplement 1.

2.2. Data collection

Data were collected during the first wave of the ADJUST study, which was conducted as an online survey between June and November 2020 (see Supplements 2 and 3). All participants received information about the study aims, data management, and their right to withdraw, and provided informed consent. The online survey consisted of multiple quantitative measures and four open-ended questions. The latter are the subject of this article; quantitative results of the ADJUST study are presented elsewhere (Lotzin et al., 2021).

2.3. Participants

Participants in the current study were recruited from the general population of Austria, Croatia, Georgia, Greece, Poland, and Portugal. Various strategies were used to increase the heterogeneity of the sample in terms of age, gender, socioeconomic status, and occupation. Among others, we contacted universities, professional associations (e.g. firemen's associations, sport unions), social services (e.g. organizations supporting the elderly), and cultural institutions (e.g. theatres). We also promoted the study via social media and the newsletters of large companies. In Poland, participants were recruited via a professional panel service (i.e. representative sampling).

The participants were eligible for inclusion if they were over 18 years old, were able to read and write in the respective language, were willing to participate in the survey, and completed sociodemographic information and responded to the voluntary open-ended questions.

2.4. Open-ended questions

Participants responded to four open-ended questions, namely:

(1) 'What was the most stressful event(s) during the coronavirus pandemic?'
(2) 'Overall, what do you find most negative about the coronavirus pandemic?'
(3) 'Overall, what do you find most positive about the coronavirus pandemic?'
(4) 'What recommendations would you give other people on how to deal with the current situation?'

The questions were developed by a group of professionals in the field of psychotraumatology.

2.5. Data analysis

All project steps were realized in line with COREQ (Tong, Sainsbury, & Craig, 2007) and recommendations for cross-country qualitative studies (Kull, Petersen, & Camp, 2019; Wendt, 2020). We used *MAXQDA* 2020 (VERBI Software, 2019) for data management and analysis. Regular meetings of the study team were held to ensure consistency during analysis.

The four open-ended questions were analysed using qualitative content analysis (QCA) (Mayring, 2010, 2014). The QCA is a systematic, step-by-step method of text analysis, following strict procedural rules. We applied a two-fold analytical strategy. First, the Austrian study team, which conceptualized the study, used an inductive approach to develop a preliminary coding scheme out of the data collected in Austria (Figure 1). Next, the other five countries applied this coding scheme to their data sets, first using a deductive approach (Figure 2). Consequently, the coding scheme was adapted, and final categories and themes (i.e. main categories) were formulated. Details of the procedure and coding scheme are provided in Supplements 1 and 4, respectively.

In each country, the answers of 10% of participants, selected at random, were repeatedly coded to calculate intrarater and interrater agreement. The results are presented in Table 1.

3. Results

In total, $N = 7309$ participants from Austria (AT), Croatia (CRO), Georgia (GEO), Greece (GR), Poland (PL), and Portugal (PT) provided answers to the open-ended questions. The overall sample was dominated by women, constituting between 51.8% and 81.6% of the national subsamples. The average age across countries was 41.5 years, with the lowest country mean in Greece ($M = 35.7$) and highest in Portugal ($M = 47$). Detailed information about the sociodemographic characteristics of the participants can be found in Table 2.

At the time of data assessment, the vast majority of participants (81%, $n = 5923$) indicated having spent more time at home owing to COVID-19. The percentage of people who had spent more time at home was highest in Greece (92.6%, $n = 781$) and lowest in Poland (71.7%, $n = 1365$). Nearly half of the overall sample (44.9%, $n = 3284$) had daily virtual contact with loved ones (i.e. by phone, Skype or Zoom), with the highest percentage in Georgia (68.6%, $n = 495$) and the lowest in Poland (34%, $n = 647$) and Austria (34.2%, $n = 273$).

3.1. Themes

The identified themes, including their frequencies per country, are depicted in Tables 3–6. In the following, we elaborate solely on the most frequently mentioned themes and highlight some cross-country similarities

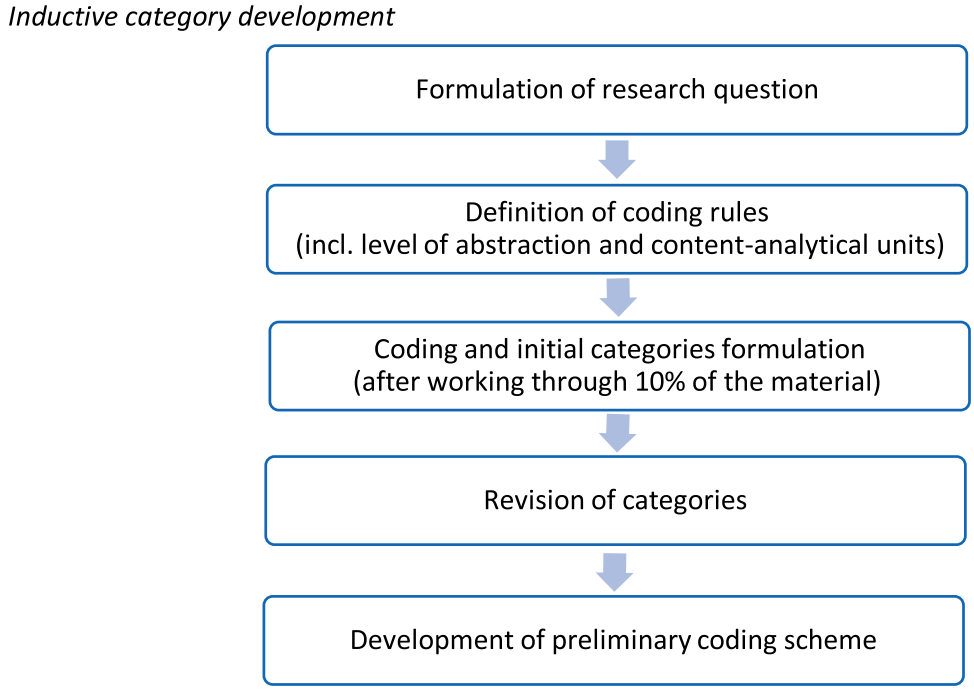

Figure 1. Inductive category development. The figure shows the steps performed to develop a preliminary coding scheme and identify initial categories in the Austrian sample.

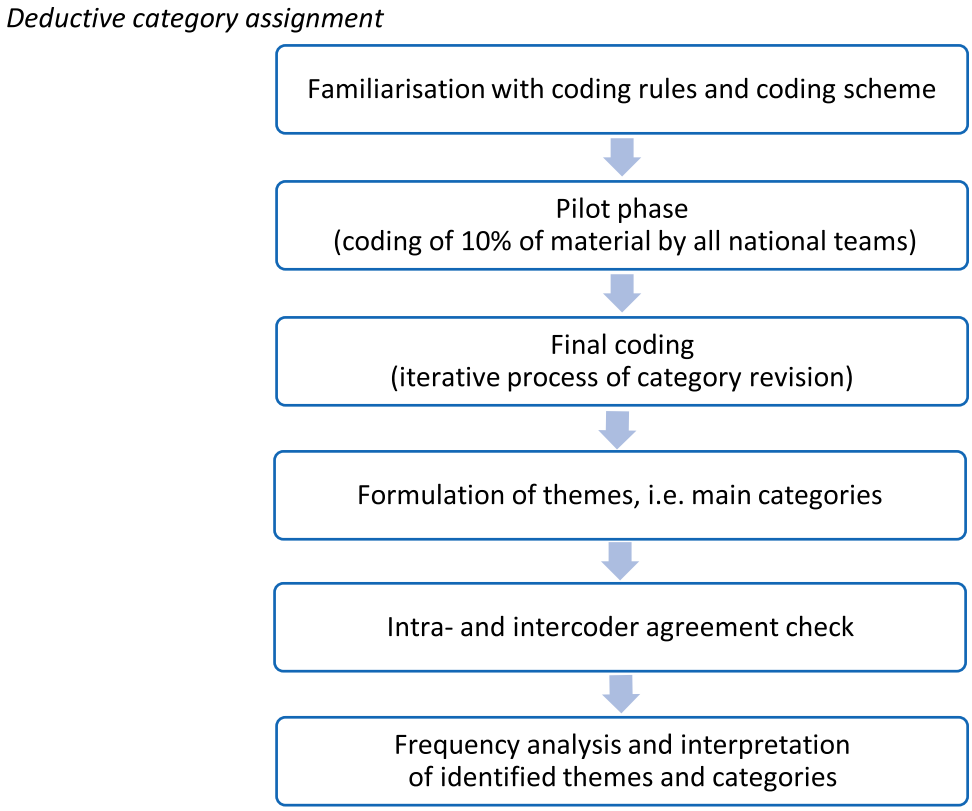

Figure 2. Deductive category assignment. The figure shows the steps performed in all countries to adapt the preliminary coding scheme (developed by Austria) and identify final themes.

and differences by using simple counts (i.e. semi-quantification) (Neale et al., 2014). To illustrate the themes, participants' quotes are presented, including a reference to their gender, age, and country of residence. An executive list of all themes and subsumed categories can be found in Supplement 4.

3.1.1. The most stressful event

The first question assessed participants' subjective view on stressful events experienced during the pandemic. The answers yielded nine themes. The frequencies of themes across the six countries are depicted in Table 3.

Table 1. Intrarater and interrater agreement across countries.

	Austria %	Croatia %	Georgia %	Greece %	Poland %	Portugal %
Interrater agreement	96.19	92.94	95.90	99.91	94.81	94.61
Intrarater agreement	97.23	91.23	98.20	92.79	97.78	95.39

The agreement was calculated using the respective MAXQDA function. The selected criterion was 'code frequency in the document', as this option is suitable for survey responses and a large number of codes (Online Manual; Verbi Software, 2019).

Table 2. Overview of participants' sociodemographic characteristics.

	Austria ($n = 798$)		Croatia ($n = 2191$)		Georgia ($n = 722$)		Greece ($n = 843$)		Poland ($n = 1904$)		Portugal ($n = 851$)	
	M (*SD*)		*M* (*SD*)		*M* (*SD*)		*M* (*SD*)		*M* (*SD*)		*M* (*SD*)	
	45.1 (14.2)		41.6 (12.4)		36.0 (14.0)		35.7 (12.21)		45.1 (16.0)		47 (12.9)	
Age	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Gender												
Female	537	67.3	1533	70.0	589	81.6	568	67.4	986	51.8	528	62.0
Male	258	32.3	651	29.7	133	18.4	275	32.6	918	48.2	323	38.0
Other	3	0.4	5[a]	0.3	0	0	0	0	0	0	0	0
Education												
University degree	370	46.4	1569	71.6	549	76.0	626	74.3	800	42.0	646	76.0
Living area												
Large city	523	65.5	693[b]	31.6	583	80.7	505	59.9	554	29.1	346	41.0
Children												
Yes	428	53.6	1345	61.4	339	47.0	287	34	1274	66.9	494	58.0
No	370	46.4	846	38.6	383	53.0	556	66	630	33.1	357	42.0

The Polish sample was representative. Other countries had convenience samples.
[a]Total valid *n* was 2189.
[b]Total valid *n* was 2175.

Table 3. Themes related to stressful events.

	Austria		Croatia		Georgia		Greece		Poland		Portugal		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Mean value (%)
Restrictions and changes	319	40.3	695	44.2	325	32.3	239	28.8	654	38.2	217	29.8	33.51
COVID-19 and other health issues	45	5.7	78	5	99	9.9	158	19.1	150	8.8	113	15.5	8.80
Emotional distress	193	24.4	472	30	257	25.6	192	23.2	202	11.8	182	25	20.50
Work and finances	145	18.3	270	17.2	101	10	159	19.2	174	10.2	129	17.7	13.38
Burden related to loved ones	161	20.4	149	9.5	48	4.8	72	8.7	117	6.8	116	16	9.07
Societal impact	49	6.2	60	3.8	30	3	26	3.1	52	3	27	3.7	3.34
Pandemic management and communication	88	11.1	120	7.6	78	7.8	61	7.4	159	9.3	70	9.6	7.88
No stressful events	22	2.8	62	3.9	17	1.7	34	4.1	307	17.9	34	4.7	6.51
Other burden	37	4.7	216	13.7	50	5	17	2.1	77	4.5	61	8.4	6.27

Table 4. Themes related to negative pandemic aspects.

	Austria		Croatia		Georgia		Greece		Poland		Portugal		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Mean value (%)
Restrictions and changes	250	31.6	350	22	312	34.1	262	31.6	635	36.5	367	50.6	29.77
COVID-19 and other health issues	91	11.5	175	11	59	6.4	203	24.5	239	13.8	68	9.4	11.42
Emotional distress	241	30.4	284	17.8	211	23	173	20.9	304	17.5	199	27.4	19.32
Work and finances	114	14.4	422	26.5	122	13.3	179	21.6	181	10.4	101	13.9	15.31
Burden related to loved ones	20	2.5	36	2.3	41	4.5	11	1.3	34	2	3	0.4	1.98
Societal impact	200	25.3	326	20.5	42	4.6	78	9.4	122	7	62	8.5	11.36
Pandemic management and communication	141	17.8	329	20.6	69	7.5	96	11.6	301	17.3	77	10.6	13.86
No negative aspects	7	0.9	25	1.6	13	1.4	5	0.6	95	5.5	9	1.2	2.11
Other negative aspects	54	6.8	186	11.7	47	5.1	28	3.4	65	3.7	76	10.5	6.24

Table 5. Themes related to positive pandemic aspects.

	Austria		Croatia		Georgia		Greece		Poland		Portugal		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Mean value (%)
Reflection and growth	306	39	523	33.2	187	24.9	265	32.6	230	13.6	281	39.7	24.52
Opportunity for meaningful/enjoyable activities	209	26.6	326	20.7	169	22.5	201	24.7	362	21.4	85	12	18.50
Environmental effects	79	10.1	115	7.3	31	4.1	24	2.9	55	3.3	43	6.1	4.75
Benefits on interpersonal level	200	25.5	394	25	159	21.1	130	16	271	16.1	153	21.6	17.88
Digitalization and working/studying from home	84	10.7	143	9.1	58	7.7	48	5.9	76	4.5	86	12.2	6.77
Competent pandemic management	25	3.2	66	4.2	18	2.4	23	2.8	11	0.7	15	2.1	2.16
No positive aspects	71	9	166	10.5	106	14.1	149	18.3	660	39.1	92	13	17.02
Other positive aspects	40	5.1	182	11.5	24	3.2	48	5.9	109	6.5	73	10.3	6.51

Table 6. Themes related to recommendations how to cope with the pandemic.

	Austria		Croatia		Georgia		Greece		Poland		Portugal		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Mean value (%)
Beneficial behavioural adjustment	371	48.2	858	58.3	454	57.2	348	42	670	43.7	457	67.3	43.21
Beneficial cognitive–emotional strategies	423	54.9	478	32.5	187	23.6	593	71.5	671	43.7	234	34.5	35.38
Social support	155	20.1	249	16.9	73	9.2	107	12.9	105	6.8	112	16.5	10.96
Political recommendations	2	0.3	3	0.2	0	0	11	1.3	15	1	1	0.1	0.44
No recommendations	61	7.9	92	6.3	53	6.7	25	3	171	11.1	28	4.1	5.88
Other recommendations	39	5.1	277	18.8	27	3.4	21	2.5	83	5.4	73	10.8	7.11

Restrictions and changes in daily life was the most prominent theme in all countries. A considerable number of participants were burdened by social restrictions, including the inability to visit loved ones, the lack of physical contact, and the impossibility of a proper farewell, for example:

> (Most stressful was) not being able to attend the funeral of a family member whose cause of death were health complications due to the COVID-19 virus, nor to provide my support to the remaining family. (female, 32, PT)

Other restrictions imposed because of COVID-19, e.g. travel restrictions, and the pandemic circumstances in general were also considered stressful. For instance, a man from Croatia stated:

> The hardest thing for me was the change of lifestyle in terms of losing the daily routine and normal socializing with people, without any subconscious fear that someone is infected. (male, 24, CR)

The second most frequently reported theme was *Emotional distress*. Participants were worried about their relatives at high risk for severe COVID-19, anxious about the future, and feared getting infected. Many were lonely and strained by the ongoing uncertainty and unpredictability.

> During this period, I did not think directly about the deaths caused by the coronavirus, but the fear of losing loved ones was intensified, because of this I was very anxious, in the evenings I was panicking and I often found it very difficult to control these emotions. Because of this, I was often melancholic, I cried, I had a feeling of helplessness, and I often thought about bad things. (female, 34, GEO)

> Uncertainty about the future and especially inability to plan, e.g. travel. (female, 31, GR)

Work and finances was another prominent theme. Work-related burden seemed to be particularly high in Austria and Portugal. Some participants complained about the increased workload: 'The significantly increased workload, no chance to get some rest' (female, 47, AT). Others were burdened by frequent changes in work schedule (e.g. due to working from home), lack of protective equipment, and reduced working hours. In Georgia, Greece, and Poland, financial problems were more common than work-related ones.

> I didn't work, and I didn't get paid. I couldn't pay my medical bills. (female, 29, GR)

A further, often-mentioned theme was *Burden related to loved ones*. This theme included stressors involving close people, ranging from conflicts to illnesses and deaths not associated with COVID-19. A large number of participants described issues with home-schooling *per se*, and difficulties in reconciling home-schooling and/or childcare with working from home, for instance:

> Reconciling work roles and caring for children with different needs (older child needed my support with online schooling and preschool child was also at home). (female, 41, CRO)

In Georgia and Poland, stressful events related to loved ones were rarely reported (GEO: 4.8%; PL: 6.8%). We also observed some cross-country differences with regard to the theme *COVID-19 and other health issues*. While being quite common in Greece (19.1%) and Portugal (15.5%), only a low percentage of Austrian (5.7%) and Croatian (5%) participants indicated health issues as the most stressful events. Remarkably, a high proportion of the Polish sample (17.9%) reported not having experienced any stressful event during the pandemic.

3.1.2. Negative aspects of the pandemic

In contrast to the first question, the second one was a very general question, allowing for a wide range of responses about negative pandemic consequences. As depicted in Table 4, the nine generated themes largely resembled those found in the first question. However, differences were evident in the less prominent themes, i.e. beyond the three most common themes.

The most prominent theme was *Restrictions and changes in daily life*. As one woman from Croatia (65) stated: 'The pandemic has greatly affected social relations. The most difficult challenge is to avoid physical, direct contact with people in our own environment (inability to hug grandchildren, brothers, etc.)'. General terms such as 'lockdown', 'shutdown', and 'restrictions of personal freedom' were also frequently mentioned.

The next major theme was *Emotional distress*. Many participants referred to fear and anxiety as negative aspects of the pandemic, with answers such as

'anxiety about the future', 'fear of the invisible enemy', and 'fear for people who belong to a risk group' being common in all countries. Uncertainty in terms of pandemic duration, containment measurements, and further developments was stated repeatedly, e.g. 'Uncertainty regarding the duration of the pandemic, but also regarding the vaccine development' (female, 51, CRO).

Work and finances was the third most prevalent theme, with economic problems being most common. Many participants negatively evaluated COVID-related income losses, weakening of the global economy and higher unemployment rates, as illustrated by a man from Croatia: 'The great economic decline that is yet to come, which will affect all people in the Republic of Croatia' (male, 43, CRO).

Pandemic management and communication was a further often-mentioned theme. Participants from all countries criticized the way the pandemic was handled and pointed out the insufficient or inadequate healthcare during the pandemic. According to many, media coverage of the pandemic was unprofessional or misleading, false news was shared, and the information was often contradictory.

> All the ill-conceived restrictions and the government's insistence on how great they are. Just propaganda before the election, and later everything will probably collapse. Let's hope not. (male, 67, PL)

> Failure to take suitable and more critical measures, e.g. more bus routes, care for ICUs, […] media panic mongering using horror movie music every time they present data. (female, 25, GR)

In Austria and Croatia, *Societal impact* was also a very common theme. In both countries, around one-fifth of participants referred to the reactions of the population as the most negative aspect of the pandemic. Some were unsatisfied by people who were deemed 'irresponsible' for not adhering to the containment measures, as illustrated by the following participants' quotes:

> The society that did not adhere to the measures and thus increased the risk for the transmission of the infection. (female, 43, CR)

> That many people fall seriously ill or even have to die from it due to the unreasonableness of others. (female, 23, AT)

Others considered 'panic reactions' to be the most negative pandemic aspect, as formulated by a woman from Croatia (24) 'the general panic and fear that arose in society' and by a man from Austria (57) 'panic of the people'.

In contrast to other countries, *COVID-19 and other health issues* was a very prominent theme in Greece and Poland. About one-quarter of the Greek sample described COVID-19 infections and deaths as particularly negative, e.g. '(Negative is) the fact that death has become a numerical value. Every day we hear numbers of people who have passed away and we move on to the next topic as if nothing happened' (female, 33, GR). Surprisingly, health issues, including COVID-19 infections, were seldom mentioned in Georgia (6.4%).

3.1.3. Positive aspects of the pandemic

A total of eight themes emerged from the participants' answers about positive pandemic aspects. The themes with corresponding frequencies can be found in Table 5.

Reflection and growth was the most prominent theme. It comprised new insights and learning experiences gained during the pandemic, including better awareness of oneself, hygiene, and dangers in the environment. As one participant stated:

> (The pandemic) warned us of realities that we are not prepared for and that will happen more often. After this we can no longer be taken by surprise, but know how to live with the situations by making all the necessary adaptations. (male, 54, PT)

The theme *Reflection and growth* further included answers related to rethinking and restructuring of tasks, desires, and options, with statements such as 'rethinking values' and 'setting priorities' being common in all countries. Being grateful and appreciating available resources (both internal and external) also pertained to this theme. For instance, a woman (35) from Austria mentioned 'the greater appreciation of health and essential workers'.

The second most frequently mentioned positive aspect of the pandemic was *Opportunity for meaningful/enjoyable activities*. Whereas some participants positively evaluated the increased time resources (e.g. 'more time with yourself'), others referred to specific activities they were able to perform, such as reading, cooking, and gardening. A reduction of stress and a slower pace of life, e.g. 'opportunity to slow down our everyday rhythm' (male, 42, CRO), were also considered positive.

Benefits on interpersonal level was the next major theme. It included participants' statements about social cohesion during the pandemic. While participants from Georgia and Poland more often referred to family bonding and quality family time, participants from Austria and Portugal were more likely to also describe the cohesion within other social groups (e.g. family, friends, colleagues) and society as a whole.

> Personally, it turned out to be good for me to spend more time with my children. For example, I took better care of the quality of their food. The eldest son was an entrant and received more support from me than it would have been possible in terms of walking to work. (female, 43, GEO)

> The tangible cohesion. Not only in the family and among friends, but also in politics. (female, 42, AT)

No positive aspects was a further, often-mentioned theme. A high percentage of participants in all countries did not report anything positive about the pandemic. This was particularly evident in Poland (39.1%) and Greece (18.3%).

Digitalization and working/studying from home was another well-represented theme, with frequencies between 4.5% in Poland and 10.7% in Austria. For instance, according to a participant from Greece (male, 32), a positive aspect was 'the creation of electronic services at the educational, social and political level'.

Unexpectedly, *Environmental effects* was a major theme only in Austria. Participants positively evaluated the overall impact of COVID-19 on climate and nature, as well as the reduction in travel, traffic, and tourism. For instance, they stated:

> Less environmental pollution […], less traffic. (male, 50)

> Flying has been reduced, which has had a positive effect on the climate. (female, 75)

3.1.4. Participants' recommendations for coping with the pandemic

Six themes could be identified when analysing participants' recommendations on how to cope with the pandemic. These are presented in Table 6.

The most prominent theme was *Beneficial behavioural adjustment*. Many participants shared the idea of coping with the pandemic through changes in behaviour. Answers such as 'adhere to government guidelines', 'wear a mask', and 'keep your distance' could be found in all countries. Besides, participants often recommended actively shaping everyday life by establishing routines, pursuing one's own interests and performing pleasant activities, e.g. spending time in nature, meditating, and doing sports. A participant from Georgia described:

> I started studying new things (foreign language), I also walked a lot and spent most of my time in nature. Therefore, I think that starting a new business or studying has a positive effect and time also passes quickly. (female, 35)

Apart from such concrete advice, general recommendations to use common sense, and to look after oneself and one's own health, were also present.

Beneficial cognitive–emotional strategies was the second most prominent theme. According to many participants, a positive inner attitude could help one to cope with the pandemic. Such an attitude was characterized, among others, by positive thinking, gratitude, mindfulness, and serenity.

> You can't do anything about it, but you can make the best of it. (female, 39, AT)

> Don't put 'life on hold' but try to find something good for yourself. It is important to […] maintain a sense of humour, to know that it will pass and to be grateful that your loved ones and you are not infected. (female, 58, CRO)

> Be optimistic, tomorrow is another day and it will be better than today. (male, 69, PL)

The third most common theme was *Social support*. Many participants recommended keeping up social contacts, either in presence or virtually, talking about worries, and seeking help when needed.

> Spend quality time with the ones you love, whether in person or using new technology. Tell whoever is important to you how much you love the person. (female, 38, PT)

> Deal openly with any possible stress caused by the situation – seek (virtual) contact with family/friends/other people you trust and talk about your own worries. (female, 26, AT)

Participants also repeatedly suggested reaching out to others, supporting them, and showing empathy and solidarity in these challenging times.

> We are not alone, no matter how much we think we are, there is always someone who is in the same situation and can listen, understand, and try to help in the same way you are helping that person. (female, 18, PT)

> Love each other. Take care of others more than you take care of yourself. Do not focus only on your own problems. Think about the fact that others are in much more need than you and you can benefit them. (female, 51, GEO)

Across all countries, some participants could not offer any recommendations, partly because of 'being overwhelmed by the situation'. The theme *No recommendations* was hardly present in Greece (3%), but was quite often seen in Poland (11.1%).

4. Discussion

This exploratory qualitative study sought to investigate experiences of people from six European countries in the first year of COVID-19, and their recommendations on how to cope with the pandemic. Participants experienced different stressful events, described numerous positive and negative pandemic consequences, and identified different coping strategies, mirroring the heterogeneity of the sample. Although all identified themes were present in all of the countries, their frequency distributions varied. The variety of participants' accounts and observed cross-country differences support studies which highlight the role of context in perceiving pandemic-related events and coping with them (Sandbakken & Moss, 2021). Thus, country-specific factors and individual particularities seem to be essential for understanding how people adjust to the pandemic.

While we acknowledge that the quantification of qualitative results is a controversial topic (see e.g. Maxwell, 2010), we provide simple counts (i.e. semi-quantification), being aware that these counts help to identify patterns, improve clarity of the findings, and show characteristics of the setting, but do not imply generalizability (Neale et al., 2014).

4.1. Stressful events and perceived negative aspects of the pandemic

To a great extent, themes related to stressful events did not differ from themes related to negative pandemic consequences. Restrictions, emotional difficulties, and work and financial issues were aspects that most people found negative, and at the same time considered particularly stressful.

4.1.1. Restrictions and changes in daily life

People were mostly burdened by the lack of social contacts. Social support is one of the most extensively investigated protective factors for mental health; it can help to overcome stressful events, alleviate adverse effects of trauma, and rebuild resilience (Lee, 2019). In times of social restrictions, people cannot rely on the support of their loved ones as much as they previously could, thus missing an important resource to cope with pandemic-related stressors. This is in line with studies reporting that virtual communication may represent a useful tool to keep contact with others, but cannot fully replace face-to-face interactions (Dahlberg, 2021; Lotzin et al., 2021).

Limited opportunities and the need to adapt were also considered stressful. Under usual circumstances, leisure activities, travel, and religion offer people new perspectives, helping them to recharge after work and achieve balance. At the same time, routine is what helps people to navigate and better organize their daily lives. Amidst COVID-19, these aspects are missing, and people are forced to modify their lifestyles. Rodríguez-Rey et al. (2020) already found that pandemic-related changes in daily life were a significant burden. Previous research has also shown that people can adapt successfully following potentially traumatic events such as a disease outbreak (Chen & Bonanno, 2020). However, COVID-19 has caused multiple changes in work and private lives, which might hinder healthy adjustment.

4.1.2. Emotional distress

Of all the emotional states, fear and anxiety were the most prominent. Participants were worried about the well-being of their loved ones and at-risk groups. Fear of contracting the virus and anxiety about the future were also mentioned. These findings are consistent with a large body of evidence showing increased levels of fear and anxiety during the pandemic (Ozamiz-Etxebarria et al., 2020; Parola et al., 2020).

As expected, feelings of loneliness were prevalent. Loneliness has gained increasing attention in the context of COVID-19, being linked with anxiety symptoms, sleep problems, and depressive mood (Rossi et al., 2020; Santini & Koyanagi, 2021).

Emotional distress manifested itself further through the presence of uncertainty and insecurity. Some referred to uncertainty and a lack of predictability in general. Others referred to specific situations (e.g. uncertainty about attending a funeral, planning a vacation) and pandemic developments (e.g. insecurity regarding further waves). These results illustrate the variety of people's emotional reactions to the pandemic, strongly supporting the existing quantitative studies on the emotional burden amidst COVID-19.

4.1.3. Work and finances

In our sample, work-related burden resulted from working too much, too little, and/or under difficult conditions. Tremendous changes in the world of work have already been described in the literature. COVID-19 has impacted various industries, leaving millions of people underemployed or unemployed (Blustein & Guarino, 2020; Nicola et al., 2020). As a consequence, the impeding economic crisis is perceived as a major stressor (Bodrud-Doza et al., 2020; Hertz-Palmor et al., 2021). Consistent with the literature, the participants in our study expressed worry about financial losses and the overall economic impact of COVID-19. Interestingly, financial issues were more frequently perceived as a negative consequence, whereas work-related issues were more frequently perceived as stressful events. A possible explanation for this is that problems at work manifest themselves as concrete events, whereas financial burden cannot always be linked to a specific event. Rather, it is noticed later on, as a consequence of a series of pandemic-related events.

4.1.4. Burden related to loved ones

Especially in Austria and Portugal, stressors in the circle of loved ones were very prevalent. These included conflicts, difficulties reconciling work and childcare, and illnesses/deaths unrelated to COVID-19. Why these burdens were less pronounced in other countries remains unclear. The discrepancy may be due to a lack of childcare in Austria and Portugal, making it difficult for parents to balance work and family duties. This, in turn, may have led to increasing conflicts between partners (see e.g. Andrade & Petiz Lousã, 2021). The observed divergence could also be linked to family values, underlining the necessity for further sociological studies and country-specific interventions.

4.1.5. Pandemic management and communication

Participants in all countries elaborated on the pandemic management; governments, institutions, and the media were perceived as having failed to act properly, acted too late, or provided contradictory and false information. Previous studies have noted the importance of pandemic management and communication for mental health. While trust in government and adequate information could buffer against mental health problems (Bäuerle et al., 2020), incompetent pandemic management and frequent exposure to news about COVID-19 hindered healthy psychological adjustment (Bodrud-Doza et al., 2020; Lotzin et al., 2021).

4.1.6. COVID-19 and other health issues

Health problems were reported in all countries, but were particularly prominent in Greece. This might be attributed to the higher death rates and later survey start in Greece (autumn) than in other countries (summer). In Poland, health issues were often perceived as negative, but seldom as stressful, possibly owing to the relatively stable pandemic situation, and well-organized, universal access to medical care. In Portugal, on the other hand, participants rarely described health issues as negative, but frequently identified them as stressful events. This may be related to the particularly high COVID-19 incidence in Portugal during data assessment (401.09 per million). Additional studies are needed to confirm this assumption.

4.2. Positive aspects of the pandemic

Despite the high emotional, psychological, social, and financial impact of COVID-19, participants in all countries identified several positive pandemic-related consequences. As stated above, the imposed restrictions forced people to change their daily routines. At the same time, this gave them the opportunity to appreciate available resources and pay more attention to people, things, and activities that they may have neglected or taken for granted under non-pandemic circumstances.

4.2.1. Reflection and growth

Better awareness of individual and societal matters, rethinking priorities, and various learning experiences were positively evaluated by the participants. This pattern of findings is consistent with the literature pointing out a chance for systematic change in the wake of COVID-19 (Krajewski et al., 2021). The perception of positive consequences might be associated with post-traumatic growth (i.e. positive changes in self-perception, relationships, and attitude towards life following a trauma), personality, and coping (Kowalski, Carroll, & Britt, 2021; Schmiedeberg & Thönnissen, 2021); however, the interplay of these factors has to be examined in more detail.

4.2.2. Opportunity for meaningful/enjoyable activities

During the early pandemic stage, participants found joy in activities such as reading, gardening, cooking, doing sports, and spending time in nature. Having more time and peace was also positively evaluated. These results reflect those of Krajewski et al. (2021) and Kowalski et al. (2021), who found that the slower pace of life was an important benefit of the current pandemic.

4.2.3. Benefits on an interpersonal level

Participants appreciated quality time spent with loved ones, which was previously lacking because of different obligations. Increased cohesion within smaller social groups (e.g. working groups) and society in general was also reported. This finding is in line with an interview study noting an increased sense of community during the pandemic (Sandbakken & Moss, 2021), but in opposition with a representative study concluding that social cohesion declined in comparison to the pre-pandemic period (Borkowska & Laurence, 2021). It is likely that the perception of cohesion varies depending on the way it is operationalized, on the pandemic phase, the sample composition, or the interplay of sociopolitical factors at the time of data assessment.

A further frequently emphasized benefit was family bonding amidst the pandemic. In Australia, a qualitative study came to a similar conclusion: not all families encountered mental health difficulties in response to COVID-19; strengthening of family relationships through shared experiences was also possible (Evans et al., 2020).

4.2.4. Other noteworthy themes

Many Greek and Polish participants did not mention anything positive about the pandemic. This may be related to the high death rates and the imposed lockdown in Greece during the data collection, which possibly led to a high percentage of people spending more time at home. The pandemic situation in Poland was relatively stable during the period of data assessment. However, many restrictions were still in place or had only recently been lifted. At that time, restrictions related to public life were perceived by Poles as the greatest burden (Dragan, Grajewski, & Lotzin, in press). Moreover, the percentage of participants who had daily virtual contact with loved ones was lowest in Poland, suggesting less social support and joint activities via the internet. These particularities may have affected the perception of positive pandemic consequences.

A possible explanation for the rather low frequency of virtual contact in Poland could lie within the theme *Digitalization*. Benefits of online tools were among the five most frequent themes in all countries, except for Poland, which might be related to the evolving Polish online tools market. Moreover, only the Polish sample was representative, with a higher percentage of people living in smaller cities and rural areas, which may have resulted in a more realistic picture of the availability and popularity of online tools.

Reduction in traffic and travel (Khan et al., 2021) and a decrease in pollution (Lal et al., 2020) are frequently reported positive consequences of the pandemic. Surprisingly, in our study, *Environmental effects* was a major theme only in Austria. This might be related to the political situation in the country, with the Green Party being part of Austria's ruling coalition. Furthermore, among the six countries, Austria is the one with the greatest confidence in environmental organizations, which might have influenced the perception of environmental effects of COVID-19 (Haerpfer et al., 2021).

4.3. Recommendations for coping with the pandemic

In all six countries, participants recommended diverse coping strategies, with either behavioural or cognitive elements. In addition, participants recommended socializing within the allowed limits, echoing current scientific literature (Valero Cedeño, Vélez Cuenca, Duran Mojica, & Torres Portillo, 2020) and experts' recommendations regarding mental health during the pandemic (e.g. WHO, 2020).

4.3.1. Beneficial behavioural adjustment

Out of the numerous behavioural modifications, adherence to containment measures was the most common one. General and specific recommendations to find a daily routine and to take care of oneself, by strengthening the immune system, practising self-care, and being active, were also frequent. The relevance of these activities is well documented in the scientific literature (Branquinho, Kelly, Arevalo, Santos, & Gaspar de Matos, 2020; Gori, Topino, & Di Fabio, 2020).

Furthermore, participants recommended moderately consuming reliable sources of information and using common sense; this was essential considering the large amount of COVID-19-related content circulating. The participants' advice is in line with existing studies on the importance of adequate informing for mental health (Lotzin et al., 2021).

4.3.2. Beneficial cognitive–emotional strategies

This theme primarily involved recommendations to maintain a positive, resilience-promoting attitude, e.g. by staying calm, and being grateful, hopeful, and mindful. Both qualitative and quantitative studies have provided evidence for these recommendations, showing their buffering effect against pandemic-related adversities (Branquinho et al., 2020; Budimir et al., 2021; Vazquez et al., 2021; Waselewski et al., 2020). Cognitive–emotional strategies, e.g. being positive and grateful, were slightly more prominent in Austria and Greece, whereas behavioural strategies, e.g. wearing a mask and doing sports, were more often observed in Croatia, Georgia, and Portugal. In Poland, both themes occurred with almost equal frequency. These differences could reflect the mosaic of country-specific challenges, or the predominance of emotional or health-related burden.

4.3.3. Social support

Recommendations to maintain contact with loved ones, via digital tools if necessary, were common. Considering the multiple burdens, it seemed important to share worries and use social support as much as possible. Moreover, participants highlighted the importance of checking in on loved ones and offering support, but also accepting support when challenges become overwhelming. Notably, other studies identified seeking support as the most rarely used coping strategy (Baloch et al., 2021), associated with increased depression and anxiety symptoms (Okafor et al., 2022). In contrast, perceived social support is an important protective factor in the context of COVID-19 and beyond (Dong et al., 2020; Ye et al., 2020).

Combined, the three recommendation themes resemble the promising concept of meaning-centred coping, which aims to promote meaning in life by integrating cognitive, emotional, and behavioural elements. Meaning-centred coping appears to be a stronger predictor of physical and mental health than emotion- and problem-focused strategies alone (Eisenbeck et al., 2022). Which strategy to apply may depend on situational demands; this would corroborate the idea of psychological flexibility as a key to long-term adjustment to the pandemic (Chen & Bonanno, 2020; Dawson & Golijani-Moghaddam, 2020). Longitudinal studies are required to test this assumption.

4.4. Strengths and limitations

To the best of our knowledge, this is the first qualitative study examining pandemic-related experiences across multiple countries. An important strength of the study is the high number of answers, given that non-response on open-ended questions is a common problem for questionnaires. This speaks for the relevance of the topic and people's need to share their view on this global matter. The different questions

and the diversity of the participants have allowed us to illustrate a breadth of people's experiences, ranging from traumatic events to opportunities for growth. Close communication, frequent exchange between national teams, and a transparent analytical procedure have further contributed to the quality of our research.

Limitations include the use of a convenience sample, resulting in a high number of women and well-educated participants. Poland was the only country with a representative sample, which may have limited the comparability of the data. The chosen approach did not allow us to closely examine the differences between the first two questions, which yielded distinct responses, but could be grouped into similar categories. Another limitation concerns the timing of data assessment. Although all data were collected in early pandemic stages, not all countries started at the same time, and some countries collected data for longer than others (see Supplement 2). This is particularly unfortunate given that the pandemic circumstances rapidly change, thus shaping people's perceptions and experiences (Jetten et al., 2021). For instance, some countries collected data in the summer, when the pandemic situation was relatively stable, whereas others started in autumn, which was characterized by an increase in infections and stricter containment measures. Combining the qualitative accounts with additional sociodemographic and quantitative data may have yielded more differentiated results. However, this was outside the scope of our study, which aimed to capture the voices of people across Europe in the early phase of the COVID-19 pandemic.

4.5. Conclusions

This cross-country qualitative study has enhanced the understanding of people's responses to COVID-19 by providing novel insights into individual challenges. Our research has also revealed various positive aspects of the pandemic and several population-informed recommendations on how to cope with it. These silver linings should be more strongly emphasized in research and practice on mental health amidst COVID-19. Furthermore, the interplay of universal (e.g. importance of social support, clear communication), individual (e.g. health status, life events during the pandemic), and country-specific factors (e.g. available financial support, healthcare system, cultural values) needs to be acknowledged when providing psychosocial support during and after the COVID-19 pandemic.

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Authors' contributions

IZN conceptualized the study and developed the preliminary coding scheme in close cooperation with LV and BLS. BLS supervised the process of data analysis and contributed to the preparation of the manuscript. All authors except for AL were included in the data coding and subsequent discussions. As principal investigator of the ESTSS ADJUST study, AL formulated the open-ended questions. IZN drafted the manuscript. All authors revised the draft and approved the final version of the manuscript.

Data availability

The detailed sociodemographic information protects the pseudonymity of the participants; however, the full quotations do not completely protect the anonymity of the participants. Hence, the entire dataset of the six countries cannot be made publicly available. Excerpts of the data can be provided by the first author upon reasonable request and if approved by all co-authors.

ORCID

Irina Zrnić Novaković http://orcid.org/0000-0002-8583-7234
Brigitte Lueger-Schuster http://orcid.org/0000-0003-0784-8437
Helena Bakić http://orcid.org/0000-0002-0726-8267
Dean Ajduković http://orcid.org/0000-0001-9223-360X
Margarida Figueiredo-Braga http://orcid.org/0000-0003-2374-4371
Małgorzata Dragan http://orcid.org/0000-0001-8221-2012

Xenia Anastassiou-Hadjicharalambous http://orcid.org/0000-0002-3993-8229
Annett Lotzin http://orcid.org/0000-0002-2834-8047

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Two Years of COVID-19 in Austria—Exploratory Longitudinal Study of Mental Health Outcomes and Coping Behaviors in the General Population

Brigitte Lueger-Schuster [1,*,†], Irina Zrnić Novaković [1,2,†] and Annett Lotzin [3,4]

[1] Department of Clinical and Health Psychology, Faculty of Psychology, University of Vienna, 1010 Vienna, Austria; irina.zrnic@univie.ac.at
[2] Vienna Doctoral School in Cognition, Behavior and Neuroscience, University of Vienna, 1030 Vienna, Austria
[3] Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, 20246 Hamburg, Germany; a.lotzin@uke.de
[4] Department of Psychology, MSH Medical School Hamburg, 20457 Hamburg, Germany
* Correspondence: brigitte.lueger-schuster@univie.ac.at
† The authors contributed equally to this work.

Abstract: Since the long-term mental health impact of COVID-19 is not yet fully understood, the present study explored changes in mental health outcomes and pandemic-related coping behaviors across four pandemic stages. The main objective was to gain insights into the dynamics of mental health and coping, considering different pandemic features at different assessment waves. The final sample consisted of N = 243 adults from the Austrian general population. Data were collected at four timepoints (between June 2020 and December 2021) via *LimeSurvey*, an open-source online survey tool. Symptoms of posttraumatic stress disorder (PTSD), adjustment disorder (AD), anxiety, and depression were assessed using validated instruments: Primary Care PTSD Screen for DSM-5 (PC-PTSD-5), AD-New Module 8 (ADNM-8), and Patient Health Questionnaire (PHQ4). We also administered the Pandemic Coping Scale (PCS) to address pandemic-related coping behaviors. Cochran's Q test and repeated measures ANOVAs were applied to assess changes over time. The results indicated that prevalence rates of AD ($\chi^2(2) = 16.88$, $p = 0.001$), depression ($\chi^2(3) = 18.69$, $p < 0.001$), and anxiety ($\chi^2(3) = 19.10$, $p < 0.001$) significantly changed across four assessment waves. Changes in mean scores of the assessed mental health outcomes were also observed. For pandemic-related coping, we found differences in the subscales: healthy lifestyle: $F(3, 651) = 5.11$, prevention adherence: $F(2.73, 592.35) = 21.88$, and joyful activities: $F(3, 651) = 5.03$. Taken together, our study showed a higher mental health burden in wintertime than in summertime, indicating an increased need for psychosocial support in times of stricter measures, higher incidences, and higher death rates. Furthermore, the observed decrease in adaptive coping behaviors suggests that easy-to-implement coping strategies should be actively promoted in order to maintain mental health during and in the aftermath of pandemics.

Keywords: mental health; COVID-19; pandemic; coping; adjustment disorder; posttraumatic stress disorder; anxiety; depression; longitudinal study

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1. Introduction

While Austria was not considered as one of the countries most severely affected by COVID-19 (i.e., infectious disease caused by the SARS-CoV-2 virus), it found itself in the spotlight of the pandemic early on following an outbreak in an Austrian ski resort, which contributed to the rapid spread of the virus in Europe [1]. Since March 2020, four hard nationwide lockdowns have been implemented, along with multiple strict regulations on the regional level, gravely impacting the daily lives of Austrian citizens (see Table 1). Specifically, in December 2021, Austria was the only country in Europe that was in a full

lockdown. Given that preventive measures have been very strict not only at the beginning, but also at later pandemic stages, increased symptoms of mental health disorders could be expected.

Table 1. COVID-19 situation at four timepoints of data collection.

	T1	T2	T3	T4 [a]
Recruitment period	27 June 2020–22 September 2020	14 January 2021–29 March 2021	13 July 2021–8 October 2021	26 November 2021–13 December 2021
Duration of data collection	88 days ≈ 13 weeks	75 days ≈ 11 weeks	88 days ≈ 13 weeks	18 days [a] ≈ 3 weeks
Stringency index				
First week of assessment	50	82.41	49.07	64.81
Last week of assessment	37.04	73.15	51.85	64.81
Stringency index mean	38.59	77.58	53.63	67.13
Stringency index median	37.96	75.93	51.85	67.59
Incidence				
First week of assessment	4.06/1 M	229.54/1 M	17.71/1 M	1482.74/1 M
Last week of assessment	78.95/1 M	362.96/1 M	200.80/1 M	459.72/1 M
Deaths				
First week of assessment	0.19/1 M	5.58/1 M	0.10/1 M	5.26/1 M
Last week of assessment	0.22/1 M	2.94/1 M	1.11/1 M	5.91/1 M
Case fatality rate				
First week of assessment	3.98%	1.78%	1.65%	1.10%
Last week of assessment	1.96%	1.72%	1.46%	1.07%

Note: All data are based on COVID-19 dataset provided by *Our World in Data* (https://github.com/owid/covid-19-data/tree/master/public/data, accessed on 9 May 2022). Stringency index: a composite measure of nine response metrics that records the strictness of government measures (from 0 to 100; i.e., 100 = strictest response). Case fatality rate (CFR): ratio between confirmed deaths and confirmed cases. M = million. 7-day rolling average was used for incidence (i.e., confirmed cases) and deaths. Cumulative values were used for the CFR. [a] The shorter period of data collection (compared to T1–T3) was reflecting the lockdown period, since the aim was to assess mental health during the lockdown. Furthermore, the then new Omicron-variant was already ante portas.

During the first lockdown, increased levels of depression and anxiety symptoms were found in the Austrian general population [2]. A longitudinal study conducted from April to October 2020 revealed different patterns for different mental health outcomes: whereas suicidal ideation remained stable, and depressive and anxiety symptoms started increasing only shortly before the second lockdown, an immediate increase in domestic violence was observed following both lockdowns [3]. In Vienna, the capital of Austria, a significant increase in anxiety, depression, fatigue, and loneliness has been evident in the first pandemic year, with 46% of the participants representative of the Viennese population reporting mental health deterioration [4]. However, since prospective studies covering later stages of the pandemic are lacking, little is known about long-term trajectories of mental health in the Austrian population. For several other countries, longitudinal data on the mental health effects of the pandemic are more readily available, but with mostly short assessment periods. In the USA, Breslau et al. [5] applied a longitudinal design with two timepoints, showing higher psychological distress during the pandemic (May 2020) than before the pandemic (February 2019). In Spain, distinct patterns were present for symptoms of depression, anxiety, and posttraumatic stress disorder (PTSD): whereas anxiety and PTSD symptomatology showed a downward trend over three timepoints (at the beginning of the confinement, after a month, and after two months), depressive symptoms decreased only at the last assessment [6]. In the UK, a study conducted during the first 6 weeks of lockdown [7] noted increases in suicidal ideation, decreases in anxiety symptoms, and, remarkably, no significant changes in loneliness levels or depressive symptoms. In a German study covering a period of three months (May–June 2020) symptoms of mental health disorders were highest at the beginning, then remained stable or decreased only

marginally, pointing toward the presence of a habituation mechanism evolving over time [8]. Similarly, a prospective English study observed a rapid decline in mental health problems during the first weeks of lockdown, with symptoms plateauing as lockdown measures were progressively eased [9].

While the loosening of preventive measures represents a plausible explanation for the observed changes in mental health over time in relation to COVID-19, other factors might also account for these changes. For instance, daily COVID-19 infection rates and decreased human mobility have been associated with significant increases in the prevalence of anxiety and depression [10]. A positive link has also been found between mental health problems and cumulative stress, resulting from co-occurring pandemic-related stressors [11]. On the other hand, becoming accustomed to the "COVID-19 way of life" might lead to an improvement in mental health as pandemic progresses. Previous research has shown that people have the capacity to successfully adapt and even flourish following large-scale stressful events [12,13]. Psychological adjustment is likely to be shaped by distinct individual characteristics, but also by the socio-political context in different pandemic stages [14,15]. This highlights the need to consider country-specific factors when investigating and interpreting the mental health effects of the pandemic.

In light of the multiple pandemic stages, each bearing different challenges, coping behaviors of the general population are likely to change and evolve. Being flexible, i.e., paying attention to changing situational demands and responding to them by using varying cognitive, emotional, and behavioral strategies may become essential for maintaining stable mental health [16,17]. An Italian longitudinal study conducted between March and May 2020 found lower levels of avoidant coping behaviors at baseline than at the final assessment [18]. Another Italian study launched only a month later noted an increased utilization of adaptive coping strategies at later timepoints [19]. Further longitudinal analyses of coping behaviors are urgently needed to better understand the mechanisms underlying psychological adjustments to COVID-19. Additionally, pandemic-related coping behaviors (e.g., adherence to containment measures; [20]) should be explored further.

Taken together, several international studies have investigated trajectories of mental health, but only a few have explored changes in coping behaviors. Most longitudinal studies have covered rather short intervals, e.g., several weeks [21] or a few months [8]. Studies that include almost the entire period of the pandemic up to this point and consider other mental health disorders are thus still lacking. Longitudinal analysis using data collected in several waves for a longer period would be particularly beneficial, considering the dynamics of the pandemic with regard to seasonal aspects, rates of infections, morbidity, and levels of restrictions, all of which may impact mental health and lead to potential habituation or (failed) adjustment mechanisms. For Austria, only a few studies on mental health during COVID-19 pandemic exist so far, and there are no studies on mental health and coping in later stages of the pandemic. Moreover, there are very little data on adjustment disorders (AD) in the Austrian general population.

The present study aims to address these research gaps by exploring the trajectories of various mental health outcomes and pandemic-related coping behaviors over 18 months of the pandemic in Austria. The main objective is to better understand the dynamics of mental health and coping, with specific aims to:

1. Determine the point prevalence of AD, PTSD, depression, and anxiety in the general population of Austria in four pandemic stages;
2. Compare the prevalence rates across the four stages;
3. Examine pandemic-related coping behaviors employed by the general population of Austria; and
4. Examine the differences in the use of coping behaviors across four pandemic stages.

2. Materials and Methods

The present study is part of an overarching project investigating the mental health impact of the COVID-19 pandemic across 11 European countries (ADJUST study; [22,23]). The study

was preregistered in the OSF registry (https://doi.org/10.17605/OSF.IO/8XHYG). Each of the contributing countries collected data, with small modifications according to the local situation. Since Austria was the only country with a lockdown from November to December 2021, a fourth wave of data collection was administered in Austria, in addition to three waves conducted in all participating countries. The data reported in this paper stem from the general population sample of Austrian adults. The participants were assessed repeatedly at up to four assessment waves between June 2020 and December 2021 using open-source online survey tool *LimeSurvey*. Table 1 illustrates the COVID-19 situation in Austria during the four waves. Ethical approval was granted by the Ethics Committee of the University of Vienna, Reference Number: 00554. All participants provided informed consent prior to survey beginning.

2.1. Sampling

To increase the sample's variability, participants of the first wave (baseline; T1) were recruited using different strategies. We distributed flyers in public spaces, shared our study link via social media, and contacted relevant stakeholders (e.g., universities, psychosocial support services), professional organizations (e.g., companies, theatres), as well as leisure and interest groups (e.g., gyms, clubs for senior citizens), asking them to distribute our study invitation to their staff or members. Interested individuals could access the survey by a website link or a QR code. After reading study information and providing consent on the first survey page, they could start answering our survey questions.

Inclusion criteria were: (1) age 18 or over, (2) sufficient skills in German language, and (3) willingness to participate. Participants who agreed to take part in the subsequent waves (n = 525) provided their e-mail and were re-contacted after approximately 6, 12, and 16 months (T2, T3 and T4, respectively).

2.2. Measures

The instruments relevant for the study are presented in the following section. The core set of instruments within the ADJUST study is described elsewhere [22].

The Adjustment Disorder New Module-8 (ADNM-8) is a brief measure of AD symptoms according to the ICD-11 [24]. It has demonstrated good reliability, convergent and factorial validity [24,25].

The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5) is a 5-item screening measure for PTSD according to the DSM-5 criteria [26]. It has shown excellent diagnostic accuracy, high acceptability and good performance characteristics [27–29].

The 4-item Patient Health Questionnaire (PHQ-4) is an ultra-brief screening tool for depression and anxiety [30]. It consists of two subscales measuring depression (PHQ-2) and anxiety (GAD-2). Evidence for good psychometric properties and high applicability of PHQ-4 across different contexts has been provided [31].

The *Pandemic Coping Scale* (PCS) is a 13-item measure of coping behaviors specific for a pandemic [32]. The scale was constructed by a group of professionals in the field of traumatic stress, based on existing recommendations and studies on coping during a pandemic. It has shown sufficient factor validity and reliability [32].

The measures were assessed in all four waves. Internal consistency was determined using Cronbach's α for all measures and all waves of assessment (for details see Table 2).

Table 2. Internal consistency of the included measures across four assessment waves.

	T1	T2	T3	T4
	Cronbach's α (*n*)	**Cronbach's α (*n*)**	**Cronbach's α (*n*)**	**Cronbach's α (*n*)**
ADNM-8 [a]	0.92 (902)	0.92 (374)	0.93 (341)	0.92 (258)
Preoccupation	0.89 [b]	0.89	0.91	0.90
Failure to adapt	0.85	0.84	0.85	0.84
PHQ-4 [a]	0.83 (809)	0.86 (373)	0.89 (339)	0.88 (256)
Depression	0.75	0.81	0.83	0.83
Anxiety	0.76	0.80	0.84	0.84
PCS [a]	0.82 (827)	0.81 (370)	0.83 (335)	0.81 (255)
Healthy lifestyle	0.80	0.78	0.81	0.78
Daily structure	0.86	0.83	0.86	0.89
Prevention adherence	0.45	0.47	0.53	0.33
Joyful activities	0.65	0.62	0.67	0.63
PC-PTSD	0.79 (866)	0.65 (59)	0.71 (64)	0.83 (54)

Note: ADNM-8 = Adjustment Disorder New Module-8; PHQ-4 = 4-item Patient Health Questionnaire; PC-PTSD = Primary Care PTSD Screen for DSM-5; PCS = Pandemic Coping Scale. The PHQ-4 has two subscales: depression (PHQ-2) and anxiety (GAD-2) subscale. The PCS has four subscales: healthy lifestyle, daily structure, prevention adherence and joyful activities. [a] Since the same number of participants was included in the calculation of Cronbach's α for the total scale and its subscales, *n* is indicated only once per timepoint. [b] *n* = 903.

2.3. Data Analysis

Using the established cut-offs, we calculated prevalence rates of probable self-reported AD (ADNM-8 > 22), PTSD (PC-PTSD-5 > 3), depression (PHQ-2 > 2), and anxiety (GAD-2 > 2) for each timepoint. We then compared the differences in prevalence rates of AD, PTSD, depression, and anxiety between four timepoints using Cochran's Q, followed by a post-hoc analysis. We then conducted one-way repeated measures ANOVAs to compare mean scores of all mental health outcomes and coping behaviors across four assessment waves. Finally, a two-way mixed ANOVA was used to test for gender differences in mental health outcomes and coping strategies.

As assessed by Normal Q-Q Plot, the variables mostly followed a normal distribution. The distributions of PHQ-4 and one PCS subscale were slightly left-skewed, which was not considered problematic, given the large sample size and application of analyses that are robust to violations of normality [33]. We applied the Bonferroni correction [34] to account for multiple tests in the post hoc analyses, and the Greenhouse-Geisser correction if the assumption of sphericity was violated (as assessed by the Mauchly's test of sphericity).

Complete case analysis was used in order to avoid additional layer of measurement error in the data [35]. To rule out a possible bias introduced by the exclusion of incomplete cases, we performed multiple imputation using Fully Conditional Specifications [36,37] as sensitivity analysis. The analysis with estimated missing values in the mental health outcomes (n = 1001) revealed comparable results, as illustrated in the Appendix A.

Partial eta squared (η^2) was applied as a measure of effect size, with $\eta^2 = 0.01$, $\eta^2 = 0.06$, and $\eta^2 = 0.14$ reflecting a small, medium, and large effect, respectively [38]. All analyses were performed with SPSS Statistics Version 26 (IBM, Armonk, NY, USA).

3. Results

3.1. Sample Characteristics

After exclusion of participants not living in Austria at the time of the study or not completing any of the primary outcome measures, the original T1 sample included N = 1001 participants, of which 767 did not provide data on all relevant measures on all occasions. The final sample consisted of N = 234 participants, aged between 21 and 81 years (M = 48.75, SD = 15.03), responding to the four waves from all federal states of Austria. Their sociodemographic characteristics are shown in Table 3. Regarding health-related characteristics, the vast majority of participants described their health as "very good" (45.7%, n = 107) or

"good" (32.9%, $n = 77$). One-fifth of the sample (19.7%, $n = 46$) indicated to be at risk for severe or life-threatening symptoms of the coronavirus disease, with old age and pre-existing conditions being the most frequently mentioned reasons for being at risk.

Table 3. Sociodemographic characteristics of the final sample ($N = 234$).

Characteristic	*n*	%
Gender		
Male	75	32.1
Female	158	67.5
Other	1	0.4
Education		
<10 years of schooling	1	0.4
≥10 years of schooling	31	13.2
Vocational studies	54	23.1
University degree	148	63.2
Income [a]		
Very low	22	10.4
Low	70	33.0
Medium	20	9.4
High	100	47.2
Work area		
Health care	60	25.6
Public security	2	0.9
Retail/services	6	2.6
Maintenance/repair/construction	2	0.9
Education (e.g., teacher, lecturer)	28	12.0
Other	92	39.3
Not working	44	18.8
Community		
Large city	160	68.4
Suburb near a large city	16	6.8
Small city or town	39	16.7
Rural area	19	8.1
Relationship status		
Single	58	24.8
Temporary relationship(s)	6	2.6
Stable relationship, living separately	30	12.8
Stable relationship, living together	140	59.8
Children		
Yes	139	59.4
No	95	40.6

Note: [a] $n = 212$.

An independent-samples *t*-test was run to determine if there were differences in mean age and education between participants who responded to all waves and those who did not. Inspection of boxplots indicated there were no outliers in the data. Normal Q-Q Plot showed a normally distributed age in both samples. There was homogeneity of variances, as assessed by Levene's test ($p = 0.102$ for age; $p = 0.119$ for education). The respondents were statistically significantly older ($M = 48.75$, $SD = 15.03$) than non-respondents ($M = 44.59$, $SD = 13.83$), $t(999) = 3.95$, $p < 0.001$. The respondents were also slightly better educated ($M = 3.49$, $SD = 0.74$) than non-responders ($M = 3.30$, $SD = 0.80$), $t(999) = 3.32$, $p = 0.001$. Respondents and non-respondents did not differ in terms of gender, as assessed by Fisher's exact test, $p = 0.771$.

3.2. Longitudinal Changes in Mental Health Outcomes

The estimated prevalence rates of the assessed mental health outcomes at four timepoints are depicted in Table 4. The prevalence rates of self-reported probable AD differed significantly across four waves, $\chi^2(2) = 16.88$, $p = 0.001$ ($n = 221$). Pairwise comparison using Dunn's test with a Bonferroni correction indicated that the prevalence rates statistically significantly changed between T1 and T2 ($p = 0.001$), and between T2 and T3 ($p = 0.009$). Regarding probable depression and anxiety disorder, the percentage of participants at risk

was also statistically significantly different at the different time points, with $\chi^2(3) = 18.69$ for depression and $\chi^2(3) = 19.10$ for anxiety disorder ($p < 0.001$; $n = 220$). According to the Dunn's test, statistically significant increase in the percentage of participants at risk for probable depression was detected between T1 and T4 ($p = 0.02$), and T3 and T4 ($p = 0.001$), whereas a significant decrease was detected between T2 and T3 ($p = 0.02$). Similarly, prevalence of probable anxiety disorder significantly increased between T1 and T4 ($p = 0.01$), and T3 and T4 ($p < 0.001$). The observed decrease between T2 and T3 was nearly significant, with $p = 0.055$.

Table 4. Prevalence rates of probable mental health disorders at four timepoints.

	T1		T2		T3		T4	
	n	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Adjustment disorder (ADNM-8) [a]	29	13.1	50	22.6	32	14.5	41	18.6
Posttraumatic stress disorder (PC-PTSD-5) [a]	17	7.7	1	0.5	5	2.3	10	4.5
Depressive and anxiety disorders (PHQ-4) [b]:								
Depression subscale (PHQ-2)	30	13.6	44	20.0	24	10.9	50	22.7
Anxiety subscale (GAD-2)	28	12.7	38	17.3	23	10.5	46	20.9

Note: ADNM-8 = Adjustment Disorder New Module-8; PC-PTSD = Primary Care PTSD Screen for DSM-5; PHQ-4 = 4-item Patient Health Questionnaire; PHQ-2 = Depression subscale of PHQ-4; GAD-2 = Anxiety subscale of PHQ. The calculation of prevalence rates was based on the established cut-off scores: ADNM-8 > 22, PC-PTSD-5 > 3, PHQ-2 > 2 and GAD-2 > 2. [a] $n = 221$. [b] $n = 220$.

After establishing the prevalence rates, we explored changes in mean scores of the assessed mental health outcomes. The AD, depression, and anxiety scores significantly changed across four assessment waves, with highest values at T2 and T4. Table 5 provides the results on the main effect of time, including post hoc analyses.

Table 5. Means, standard deviations, and repeated measures ANOVA statistics for mental health outcomes.

	T1	T2	T3	T4	ANOVA		Post Hoc Analysis	
	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**	***F* Ratio**	**Partial η^2**	**Group Comparison**	**Mean Difference**
Adjustment disorder (ADNM-8) [a]	14.86 (5.68)	16.65 (6.41)	15.13 (6.12)	16.31 (6.33)	$F(2.86, 628.33) = 11.99$ ***	0.05	T1 vs. T2 T1 vs. T3 T1 vs. T4 T2 vs. T3 T2 vs. T4 T3 vs. T4	1.79 *** 0.27 1.45 ** −1.53 *** −0.34 1.18 **
Depression subscale (PHQ-2) [b]	1.29 (1.39)	1.66 (1.46)	1.16 (1.36)	1.66 (1.56)	$F(3, 657) = 14.62$ ***	0.06	T1 vs. T2 T1 vs. T3 T1 vs. T4 T2 vs. T3 T2 vs. T4 T3 vs. T4	0.38 ** −0.13 0.37 ** −0.51 *** 0.01 0.50 ***
Anxiety subscale (GAD-2) [b]	1.13 (1.39)	1.43 (1.57)	1.10 (1.38)	1.47 (1.61)	$F(2.86, 625.50) = 10.23$ ***	0.05	T1 vs. T2 T1 vs. T3 T1 vs. T4 T2 vs. T3 T2 vs. T4 T3 vs. T4	0.30 ** 0.04 0.34 ** −0.34 *** 0.04 0.34 ***
Posttraumatic stress disorder (PC-PTSD-5)	0.94 (1.37) [a]	1.37 (1.24) [c]	1.30 (1.47) [d]	1.57 (1.81) [d]				

Note: As adjustment for multiple comparisons, post hoc tests were performed with a Bonferroni correction. [a] $n = 221$. [b] $n = 220$. [c] $n = 35$. [d] $n = 46$. ** $p < 0.01$. *** $p < 0.001$.

As shown in Table 6, the interaction effect between gender and time (GxT) on the assessed mental health outcomes was not statistically significant. Therefore, an analysis of the main effect for gender was performed, indicating significantly higher scores for female participants than male participants on all mental health outcomes across all timepoints, with the largest effect observed for anxiety symptoms. On average, females' scores were 1.911 points (95% CI [0.45, 3.38]) higher for ADNM-8, 0.36 points (95% CI [0.03, 0.69]) higher for PHQ-2, and 0.62 points (95% CI [0.27, 0.98]) higher for GAD-2. All details regarding gender differences are depicted in Table 6.

Table 6. Descriptive statistics and two-way ANOVA statistics of mental health outcomes for males and females.

	Male		Female		ANOVA		
	M	*SD*	*M*	*SD*	Effect	*F* Ratio	Partial η^2
ADNM-8 [a]							
T1	13.14	4.54	15.63	5.99	GxT	$F(2.86, 623.36) = 0.63$	0.003
T2	15.27	6.33	17.25	6.37			
T3	14.09	5.36	15.57	6.41	G	$F(1, 218) = 6.6$ *	0.029
T4	15.13	5.74	16.82	6.54			
PHQ-2 [b]							
T1	1.09	1.17	1.36	1.46	GxT	$F(3, 651) = 1.39$	0.006
T2	1.35	1.15	1.81	1.57			
T3	0.78	0.97	1.33	1.49	G	$F(1, 217) = 4.74$ *	0.021
T4	1.54	1.54	1.71	1.58			
GAD-2 [b]							
T1	0.81	1.05	1.28	1.51	GxT	$F(2.85, 618.72) = 0.92$	0.004
T2	1.03	1.03	1.61	1.75			
T3	0.57	0.81	1.33	1.51	G	$F(1, 217) = 1.88$ ***	0.052
T4	1.01	1.31	1.68	1.69			
PC-PTSD-5							
T1 [a]	0.53	0.88	1.12	1.52			
T2 [c]	1.09	1.14	1.50	1.29			
T3 [d]	1.06	1.00	1.43	1.68			
T4 [e]	1.29	1.64	1.65	1.91			

Note: ADNM-8 = Adjustment Disorder New Module-8; PC-PTSD = Primary Care PTSD Screen for DSM-5; PHQ-4 = 4-item Patient Health Questionnaire; PHQ-2 = Depression subscale of PHQ-4; GAD-2 = Anxiety subscale of PHQ. The main effects of time for all mental health outcomes are presented in Table 5. [a] $n = 220$. [b] $n = 219$. [c] $n = 35$. [d] $n = 46$. [e] $n = 45$. * $p < 0.05$. *** $p < 0.001$.

Due to an extremely low number of participants who completed PC-PTSD-5 at all timepoints ($n = 13$), ANOVA could not be conducted for this measure. Thus, only mean values of PC-PTSD-5 at each timepoint are reported.

3.3. Longitudinal Changes in Pandemic-Related Coping Behaviors

One-way repeated measures ANOVA showed a significant decrease in the total score of PCS over time, $F(2.89, 626.12) = 6.54$, $p < 0.001$, partial $\eta^2 = 0.03$. The highest mean score was observed at T1 (27.27 ± 6.33) and the lowest at T4 (25.86 ± 6.30), with T2 and T3 means in between (26.36 ± 6.44 and 26.34 ± 6.49). Changes on the PCS subscales between the four timepoints are presented in Table 7. As shown in Table 8, the interaction effect between gender and time (GxT) on the assessed coping behaviors was not statistically significant. Therefore, we conducted an analysis of the main effect for gender. Significantly higher scores for female participants were found on subscales "Healthy lifestyle" and "Daily structure".

Table 7. Means, standard deviations, and repeated measures ANOVA statistics for pandemic-related coping behaviors.

	T1	T2	T3	T4	ANOVA		Post Hoc Analysis	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* Ratio	Partial η^2	Group Comparison	Mean Difference
Healthy lifestyle	9.13 (3.59)	8.84 (3.58)	8.57 (3.73)	8.50 (3.38)	$F(3, 651) = 5.11$ **	0.02	T1 vs. T2 T1 vs. T3 T1 vs. T4 T2 vs. T3 T2 vs. T4 T3 vs. T4	−0.29 −0.56 * −0.63 ** −0.27 −0.34 −0.07
Daily structure	4.48 (1.69)	4.51 (1.56)	4.43 (1.74)	4.48 (1.69)	$F(2.85, 617.29) = 0.16$	0.00	*not conducted since ANOVA was not significant*	
Prevention adherence	5.61 (0.72)	5.48 (0.88)	5.39 (1.01)	5.15 (1.11)	$F(2.73, 592.35) = 21.88$ ***	0.09	T1 vs. T2 T1 vs. T3 T1 vs. T4 T2 vs. T3 T2 vs. T4 T3 vs. T4	−0.12 −0.22 ** −0.50 *** −0.10 −0.34 *** −0.24 **
Joyful activities	8.06 (2.50)	7.53 (2.51)	7.95 (2.45)	7.74 (2.44)	$F(3, 651) = 5.03$ **	0.02	T1 vs. T2 T1 vs. T3 T1 vs. T4 T2 vs. T3 T2 vs. T4 T3 vs. T4	−0.52 ** −0.10 −0.32 0.42 * 0.21 −0.22

Note: $n = 218$. As adjustment for multiple comparisons, post hoc tests were performed with a Bonferroni correction. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 8. Descriptive statistics and two-way ANOVA statistics of pandemic-related coping for males and females.

	Male		Female		ANOVA		
	M	*SD*	*M*	*SD*	Effect	*F* Ratio	Partial η^2
Healthy lifestyle							
T1	8.54	3.66	9.40	3.55	GxT	$F(3, 645) = 1.00$	0.01
T2	7.88	3.87	9.28	3.37			
T3	7.68	3.73	8.97	3.67	G	$F(1, 215) = 5.83$ *	0.03
T4	7.90	3.58	8.79	3.27			
Daily structure							
T1	4.23	1.78	4.62	1.62	GxT	$F(2.85, 611.90) = 2.52$	0.01
T2	3.96	1.87	4.76	1.33			
T3	3.77	1.90	4.76	1.56	G	$F(1, 215) = 15.42$ ***	0.07
T4	3.91	1.82	4.74	1.57			
Prevention adherence							
T1	5.57	0.70	5.63	0.73	GxT	$F(2.74, 587.98) = 0.25$	0.00
T2	5.41	0.88	5.52	0.88			
T3	5.28	1.04	5.45	0.99	G	$F(1, 215) = 0.99$	0.01
T4	5.07	1.10	5.18	1.11			
Joyful activities							
T1	8.04	2.60	8.07	2.46	GxT	$F(3, 645) = 1.16$	0.01
T2	7.22	2.81	7.68	2.36			
T3	7.58	2.70	8.12	2.32	G	$F(1, 215) = 1.62$	0.01
T4	7.38	2.61	7.91	2.36			

Note: $n = 217$. Data from one participant identifying as "other" were not included in the analysis, given the very small subsample size ($n = 1$). * $p < 0.05$. *** $p < 0.001$.

4. Discussion

The present study focused on adjustment disorder (AD) acknowledging that the dynamics of the pandemic has challenged the population's adjustment capacity. Overall, we did not assess the pandemic as a traumatic experience because it is not life-threatening for the majority of the population. However, for some people, the pandemic includes life-threatening and traumatic aspects which our study also addressed. Moreover, we included depression and anxiety symptoms as common reactions to chronic stress. Thus, our longitudinal design could foster the planning of mental health services especially for the part of population that suffers from failed adjustment or a limited capacity to adjust to the pandemic. For this planning, the changes in coping over time in response to environmental factors, such as the stringency of preventive measures, might also be of relevance.

Specifically, this study compared pandemic-related coping behaviors and symptoms of AD, PTSD, depression, and anxiety during the 18 months of COVID-19 in Austria. Across the four assessment waves, we found rather high point prevalence rates and mean scores for all mental health outcomes. This held true for the complete-case analysis as well as the analysis using imputed missing values. The highest values for anxiety and depression were identified at T4 (December 2021), when Austria was under strict lockdown conditions. For all disorders we screened for, we observed lower prevalence and mean scores in summertime (T1 and T3), than in wintertime (T2 and T4), the latter being characterized by stricter regulations, higher incidence and death rates. In wintertime, the participants did not engage in as many joyful activities, indicating that pandemic fatigue or resignation in periods with stricter regulations might hinder adaptive coping behaviors. Furthermore, a gradual decrease in healthy lifestyle and prevention adherence suggests that even well-educated, older individuals did not fully comply with the pandemic regime for a longer period of time. This contradicts studies reporting more adaptive coping behaviors in later assessment waves [18], possibly due to the different timepoints implemented in our study. Maintaining daily structure, which had a positive effect on mental health in earlier COVID-19 studies [39] seemed to be equally relevant at all four timepoints.

With regards to gender differences, we observed higher values in women on all mental health outcomes at all timepoints. This finding is in line with the existing literature [10,23]. Although the trajectories of mental health slightly differed between male and female participants (e.g., depression score being highest at T2 in women, and at T4 in men), they followed the same pattern as in the overall sample, with fewer symptoms of mental health disorders reported in summertime than in wintertime. Regarding coping, women were more likely to use all pandemic-related coping behaviors at all timepoints. These gender differences have been observed in previous studies, with different coping behaviors being more common among female participants [17,40]. Further work is required to examine whether and how these differences in coping behaviors are related to mental health.

Overall, our results suggest that changes in the general population during COVID-19 pandemic depend on multiple factors. Both changes in mental health and in coping behaviors might be attributed to the changing pandemic situation, e.g., different incidence and containment measures, but might also depend on the season. Thus, our findings add to the studies covering shorter assessment intervals (e.g., [8]), by indicating that mental health and coping patterns change even in the later stages of the pandemic. Over time, individuals tend to adopt less healthy coping behaviors and manifest greater psychopathological symptoms. In order to provide adequate psychosocial support, the varying mental health challenges and needs of the general population need to be acknowledged.

Taken together, our study shows that the pandemic-related restrictions have left their mark on the people of Austria. Hence, it cannot be expected that everyone can successfully adjust to the changes caused by COVID-19. This highlights the need for a broad mental health campaign in order to address mental health needs and foster psychological adjustment in the general population, e.g., focusing on healthy behaviors and adaptive coping in periods of more restrictive measures. In addition, large mental health campaigns might deliver psychoeducation or inform the population how, where, and when to seek

help. Finally, our findings on different mental health problems and coping behaviors might help to optimize psychosocial services all over Austria.

Strengths and Limitations

To the best of our knowledge, this is the first longitudinal study on the mental health impact of COVID-19 covering almost all pandemic stages so far, with rather large intervals between the assessment waves. Apart from previously investigated trajectories of depression, anxiety, and PTSD (e.g., [3,6]), we also assessed changes in symptoms of AD. This is particularly relevant given that AD might be the most important, widespread mental health outcome of the pandemic [41]. It develops in response to stressors such as illness, relationship problems, financial or work-related issues, which are all relevant in this context [23,42]. Moreover, we provided some initial reports of pandemic-related coping behaviors adopted by the general population in different pandemic stages. Considering the long assessment period, another strength of the study is the relatively high number of participants who responded to all waves (45% of those who agreed to be re-contacted). Furthermore, the sample was well-distributed in terms of income and age.

An important limitation was that the participants were highly educated and predominantly female, which hampers the generalizability of the results. Although we have covered four distinct pandemic stages, we did not collect data in the very first months of the pandemic, which was declared to have begun in March 2020 [43]. Furthermore, while the internal consistency was satisfactory for most measures, low and unstable values were observed for some of the PCS subscales. Given the early stage, exploratory character of the study, we neither formulated hypotheses nor found it feasible to analyze possible predictors and groups at-risk. Associations between trajectories of mental health outcomes, coping behaviors, and sociodemographic characteristics other than gender should also be examined in future studies. Finally, our findings could not be contrasted with mental health trajectories before the pandemic, as, to our knowledge, no comparable epidemiological studies which included AD existed in Austria.

5. Conclusions

The present study paves the way for future research to explore the longitudinal impact of COVID-19 on mental health. Our findings highlight the need to consider governmental restrictions and the differing pandemic-related situations when investigating mental health trajectories. Importantly, findings of the present study also underline the importance of promoting easy-to-implement coping strategies (e.g., joyful activities) to foster healthy peri- and post-adjustment. Even in times of improving pandemic situation, the psychological burden of COVID-19 should be acknowledged and adequately addressed.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of the University of Vienna (reference number: 00554; date of approval: 29 May 2020).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The entire dataset cannot be made publicly available since the analysis is still in progress. After the completion of the ongoing work, excerpts of the data can be obtained from the first authors upon reasonable request.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A.

Appendix A.1. Multiple Imputation as Sensitivity Analysis

Complete case analysis was used for data analysis, in order to avoid additional layer of measurement error in the data [35]. To rule out a possible bias introduced by the exclusion of incomplete cases, we performed multiple imputation using Fully Conditional Specifications (FCS; [36,37]) as sensitivity analysis. FSC was chosen because this method is suitable for categorical as well as continuous predictors. The number of imputed data sets corresponded to the percentage of incomplete cases, namely: m = 80 for ADNM-8, PHQ-2, GAD-2, and pandemic-related coping strategies, and m = 90 for PC-PTSD-5. All variables of the respective data analysis were included in the imputation model. Additional variables, i.e., auxiliary variables, were selected for the imputation model based on their correlation with the incomplete variables in the present and earlier studies (e.g., [23]). Thus, an inclusive approach of multiple imputation was applied.

As illustrated in the charts below, the analysis with estimated missing values in the mental health outcomes (n = 1001) revealed comparable results. The mean scores of the mental health outcomes in the imputed dataset were slightly higher, but followed the same pattern as in the original, non-imputed dataset. Slightly higher values stemming from the imputed dataset might indicate that participants with less mental health problems were more likely to respond to all waves. With regard to pandemic-related coping behaviors, the scores stemming from the imputed data dataset were slightly lower, suggesting that participants who employed more coping behaviors were also more likely to respond to all waves. However, these assumptions would need to be tested in a more rigorous matter in order to draw reliable conclusions.

Appendix A.1.1. Changes in Mental Health Outcomes

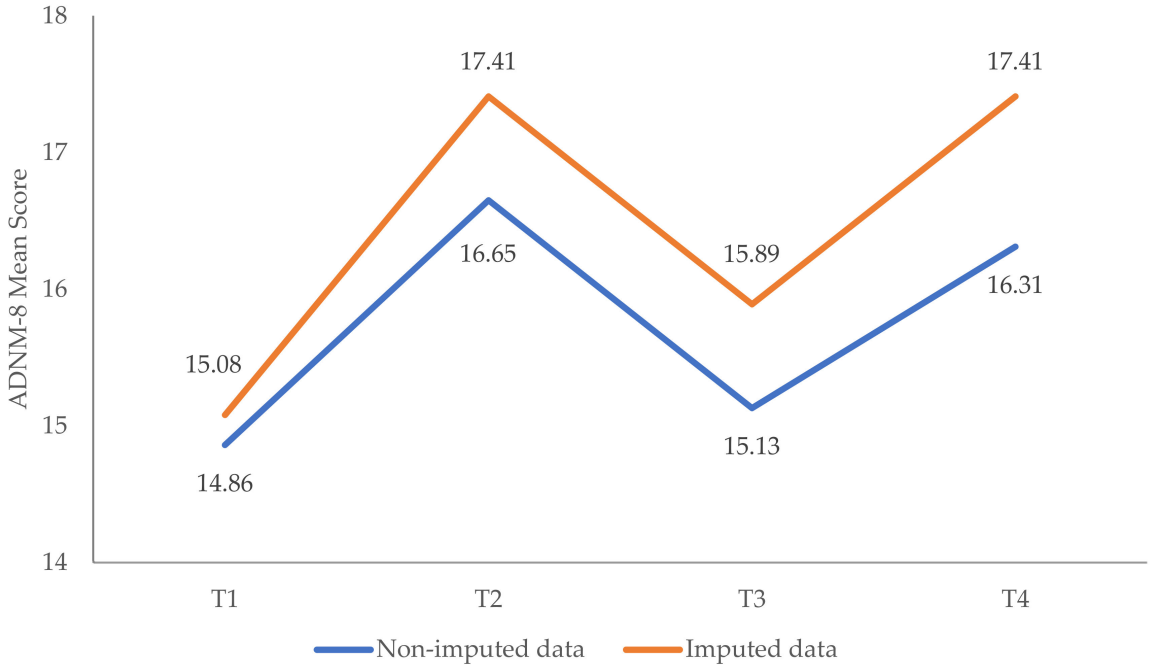

Figure A1. Changes in symptoms of adjustment disorder (ADNM-8) over time: imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 221.

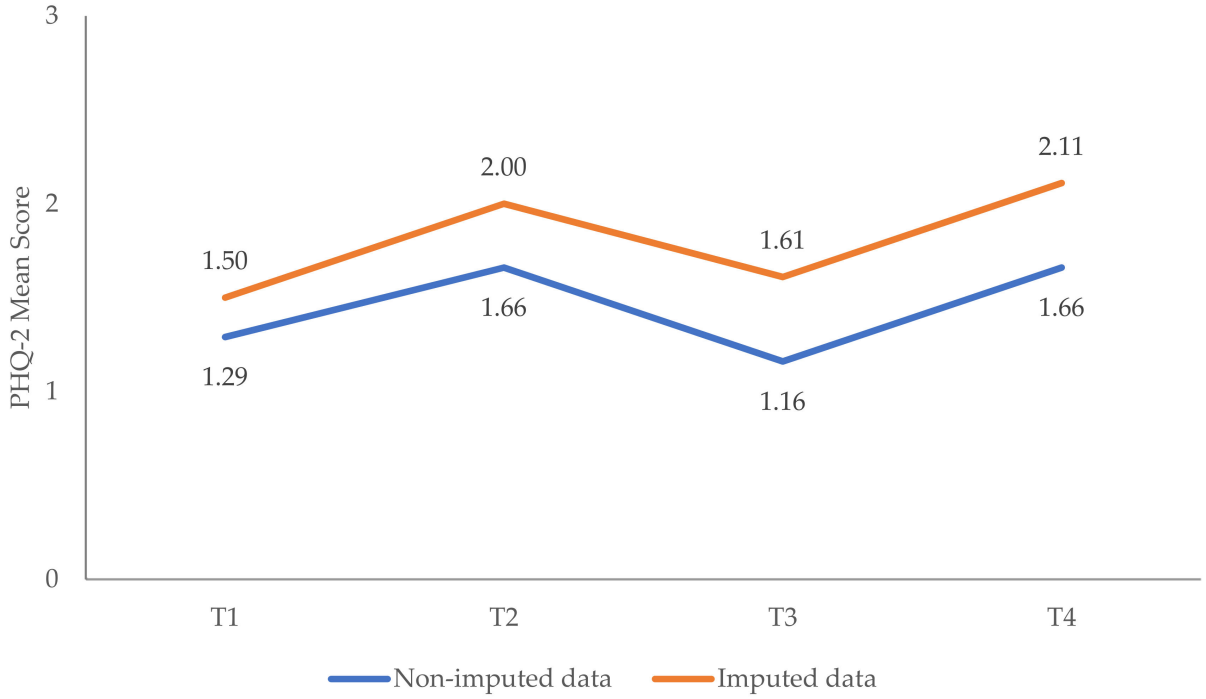

Figure A2. Changes in symptoms of depression (PHQ-2) over time: imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 220.

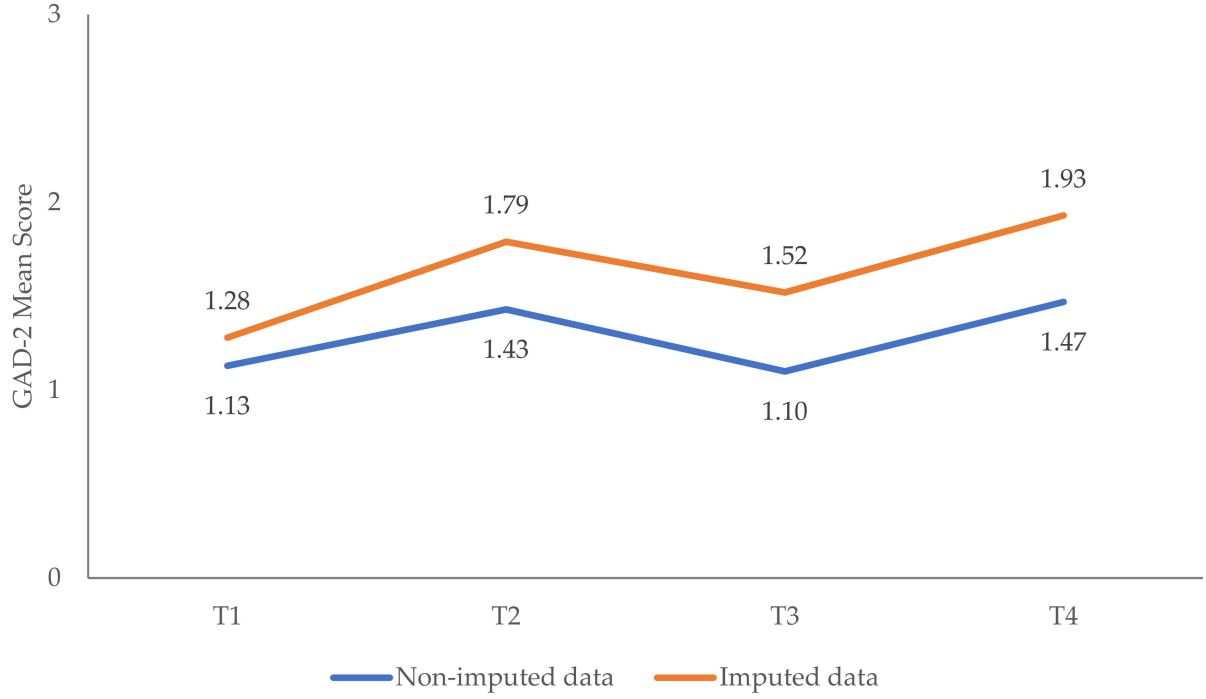

Figure A3. Changes in symptoms of anxiety (GAD-2) over time: imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 220.

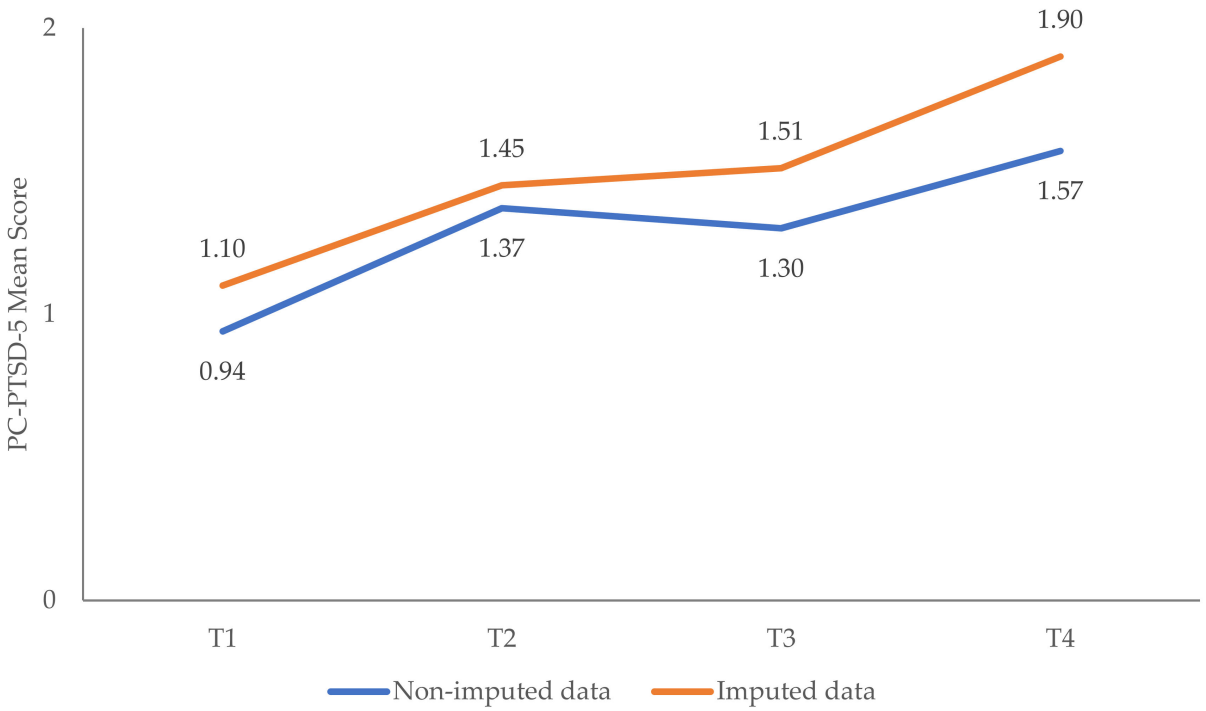

Figure A4. Changes in symptoms of PTSD (PC-PTSD-5) over time: imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n_{t1} = 221. $n_{t2,3}$ = 35. n_{t4} = 46.

Appendix A.1.2. Changes in Pandemic-Related Coping Behaviors

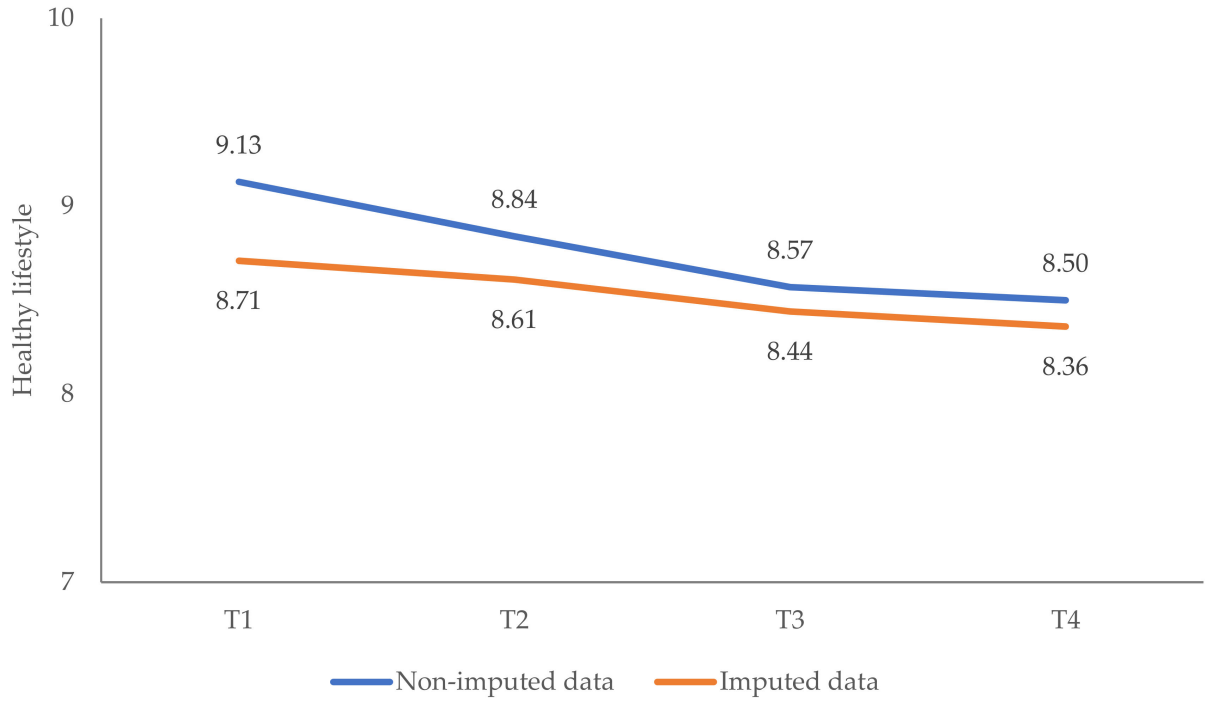

Figure A5. Changes over time in the subscale "Healthy lifestyle": imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 218.

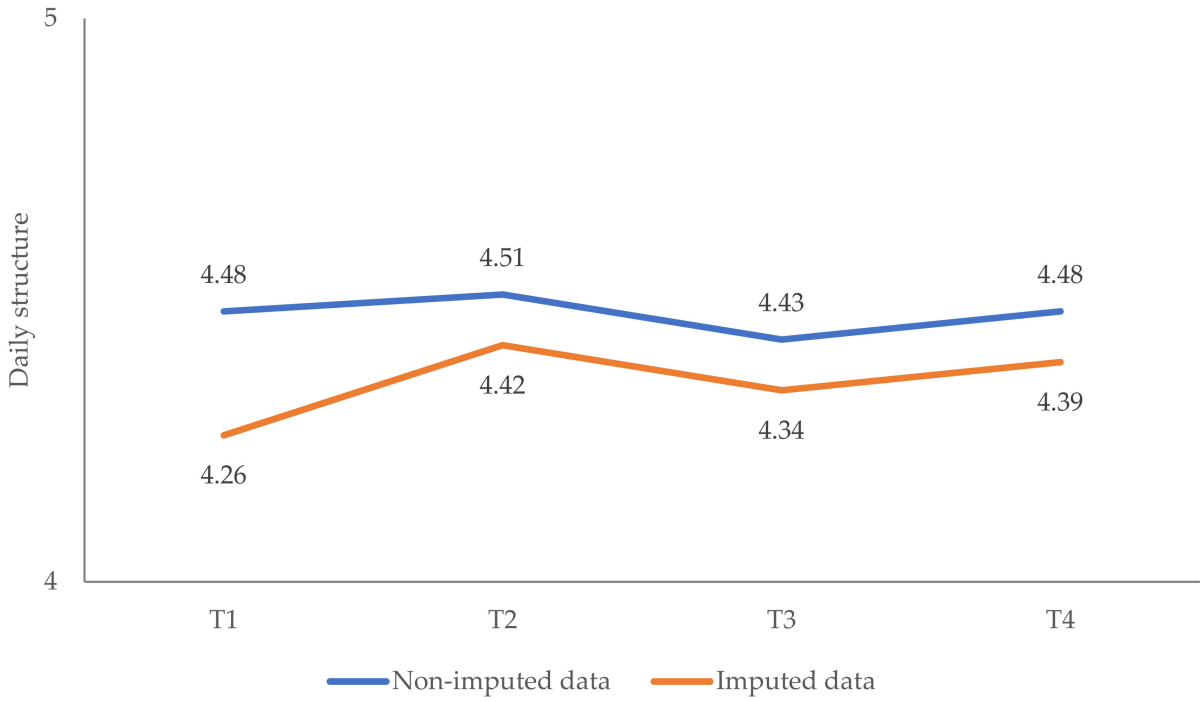

Figure A6. Changes over time in the subscale "Daily structure": imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 218.

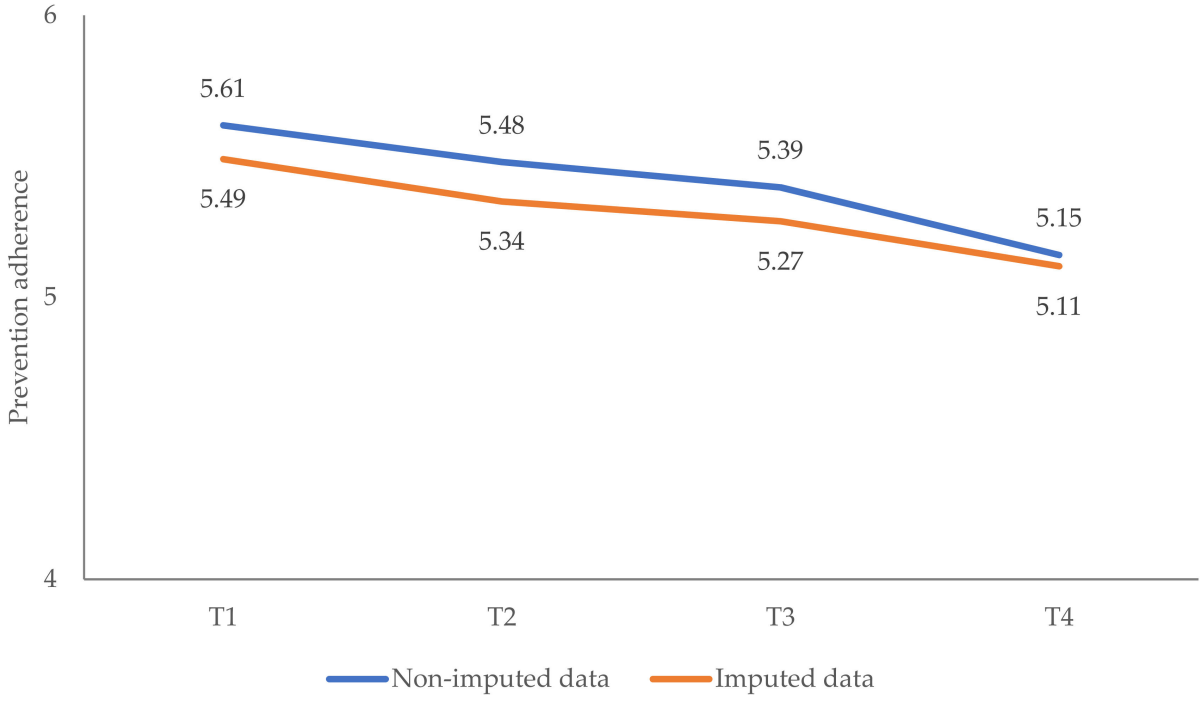

Figure A7. Changes over time in the subscale "Prevention adherence": imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 218.

Figure A8. Changes over time in the subscale "Joyful activities": imputed vs. non-imputed results. Note: Imputed dataset: n = 1001. Non-imputed dataset: n = 218.

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RESEARCH ARTICLE

Shaped by the COVID-19 pandemic: Psychological responses from a subjective perspective–A longitudinal mixed-methods study across five European countries

Irina Zrnić Novaković[1,2]*, Dean Ajduković[3], Helena Bakić[3], Camila Borges[4], Margarida Figueiredo-Braga[4,5], Annett Lotzin[6,7], Xenia Anastassiou-Hadjicharalambous[8], Chrysanthi Lioupi[8], Jana Darejan Javakhishvili[9], Lela Tsiskarishvili[10], Brigitte Lueger-Schuster[1]

1 Department of Clinical and Health Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria, **2** Vienna Doctoral School in Cognition, Behaviour and Neuroscience, University of Vienna, Vienna, Austria, **3** Department of Psychology, Faculty of Humanities and Social Sciences, University of Zagreb, Zagreb, Croatia, **4** Trauma Observatory, Centre for Social Studies (CES) of the University of Coimbra, Coimbra, Portugal, **5** Department of Clinical Neurosciences and Mental Health, Faculty of Medicine, University of Porto, Porto, Portugal, **6** Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, **7** Department of Psychology, MSH Medical School Hamburg, Hamburg, Germany, **8** Department of Social Sciences, School of Humanities, Social Sciences and Law, University of Nicosia, Nicosia, Cyprus, **9** Institute of Addiction Studies, School of Arts and Sciences, Ilia State University, Tbilisi, Georgia, **10** School of Arts and Sciences, Ilia State University, Tbilisi, Georgia

* irina.zrnic@univie.ac.at

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Abstract

Background

Contextual factors are essential for understanding long-term adjustment to the COVID-19 pandemic. Therefore, the present study investigated changes in mental health outcomes and subjective pandemic-related experiences over time and across countries. The main objective was to explore how psychological responses vary in relation to individual and environmental factors.

Methods

The sample consisted of $N = 1070$ participants from the general population of Austria, Croatia, Georgia, Greece, and Portugal. We applied a longitudinal mixed-methods approach, with baseline assessment in summer and autumn 2020 (T1) and follow-up assessment 12 months later (T2). Qualitative content analysis by Mayring was used to analyse open-ended questions about stressful events, positive and negative aspects of the pandemic, and recommendations on how to cope. Mental health outcomes were assessed with the Adjustment Disorder–New Module 8 (ADNM-8), the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5), the Patient Health Questionnaire-2 (PHQ-2), and the 5-item World Health Organization Well-Being Index (WHO-5). The analyses were performed with SPSS Statistics Version 26 and MAXQDA 2022.

relevant excerpts of the qualitative analysis can be found in the OSF repository under this link: https://osf.io/p9jx2/.

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Results

The mental health outcomes significantly differed over time and across countries, with e.g. Greek participants showing decrease in adjustment disorder symptoms ($p = .007$) between T1 and T2. Compared with other countries, we found better mental health outcomes in the Austrian and the Croatian sample at both timepoints ($p < .05$). Regarding qualitative data, some themes were equally represented at both timepoints (e.g. *Restrictions and changes in daily life*), while others were more prominent at T1 (e.g. *Work and finances*) or T2 (e.g. *Vaccination issues*).

Conclusions

Our findings indicate that people's reactions to the pandemic are largely shaped by the shifting context of the pandemic, country-specific factors, and individual characteristics and circumstances. Resource-oriented interventions focusing on psychological flexibility might promote resilience and mental health amidst the COVID-19 pandemic and other global crises.

Introduction

The COVID-19 pandemic has hugely challenged humans' ability to adjust. Whereas the mental health consequences of the pandemic have been studied intensively, little is known about how people perceive different pandemic phases and which factors shape their subjective experiences. Therefore, the present study investigates how personal perceptions change over time, and which factors underlie these changes, across five European countries.

Longitudinal changes in mental health during the COVID-19 pandemic

The coronavirus disease 2019 (COVID-19) has been impacting our lives since March 2020, when the World Health Organization (WHO) declared it a global pandemic [1]. There is now a considerable amount of literature on the detrimental impacts of the pandemic on mental health [2], with numerous studies [3, 4] reporting high prevalences of anxiety, depression, and posttraumatic stress disorder (PTSD). Moreover, though not yet extensively investigated, symptoms of adjustment disorder (AD) appear to be on the rise [5, 6].

With regard to mental health trajectories over the course of the pandemic, research has yielded mixed findings. While several studies found that mental health has deteriorated over the duration of the pandemic [7, 8], there is also evidence to suggest resilience and improvements in mental health [9]. For instance, a study examining women living in the United States reported a decrease in stress and loneliness over 13 months of the pandemic [10].

Notably, different trajectories have been demonstrated for different mental disorders. For depression, an Italian study covering 10 months of the pandemic found a quadratic growth, with an initial rise followed by a decrease with the easing of the first lockdown and a subsequent increase during the second lockdown [11]. When compared with pre-pandemic data, a study in Germany reported an increase in anxiety and depressive symptoms during the first wave of COVID-19 (spring 2020) but a decrease during the second wave (January-February 2021; [12]). This stabilisation of anxiety and depressive symptoms was also reported in the USA [13]. By contrast, a recent Swiss study found that the prevalence of anxiety and depression almost doubled between August 2020 and May 2021 [14].

With regard to PTSD, a downward trend was observed in the first months of the pandemic in Spain [15] and in the second year of the pandemic in Germany, Israel, Poland, and Slovenia [16]. An Italian study [17] also described a decrease in posttraumatic symptoms between March and May 2020. Notably, the same study observed a significant increase in November 2020, when the second wave of infection started, and new restrictions were introduced in Italy.

In terms of AD, an Austrian study covering two years of the pandemic detected higher mean scores and prevalence in wintertime, characterised by stricter regulations, higher incidence and higher death rates compared with summertime [18]. For *preoccupation* and *failure to adapt* as core symptoms of AD, a significant linear decrease was observed in a Canadian study conducted over the spring of 2020 [19].

Changes in well-being have also been reported. For instance, studies conducted over the first year of pandemic reported a decline in well-being over time [20, 21]. When comparing well-being in spring 2020 and spring 2021, different patterns were found in different countries, with slightly more participants showing improved rather than deteriorated well-being [22].

In sum, fluctuations in mental health seem to depend on the investigated outcomes, but also on the characteristics of the sample. Certain groups have experienced more difficulties in adapting to the pandemic, reporting more mental health problems as the pandemic has progressed. For example, younger people have shown poorer mental health over the course of the pandemic [23, 24]. The restrictions of social and leisure activities as well as disruptions to education and the job market have severely impacted this age group, resulting in lower life satisfaction, more loneliness, and greater anxiety and depressive symptoms [12].

Besides younger people, women and individuals with lower income are particularly burdened during COVID-19. The pandemic seems to have exacerbated gender inequalities, e.g. regarding the division of housework and childcare, putting women at higher risk of developing persisting mental health problems [25, 26]. Furthermore, the pandemic has impacted the global economy, leading to numerous job and income losses [27]. Not only at the beginning of the pandemic [28], but also in later phases, financial difficulties and female gender have been associated with a greater mental health burden [8, 29].

Taken together, psychological reactions to the pandemic over time are impacted by different factors. The fluctuations in mental health seem to correspond to the containment measures in place at the time of assessment [17], especially social restrictions [30], but might also be related to seasonal effects [18]. Moreover, international studies have shown that mental health outcomes are country-dependent [31]. In addition to environmental factors, personal characteristics (e.g. trait boredom) might also be responsible for changes in mental health [19].

Mechanisms underlying changes in mental health

According to the WHO framework for the conceptual determinants of health [32], an unfavourable combination of environmental factors, and personal and sociodemographic characteristics might increase an individual's vulnerability to develop mental health problems (for a framework of health in the context of COVID-19, see [33]). Notably, individuals who have suffered pandemic-related resource losses (e.g. people who have lost their income, young people who have lost social connections, women who have lost family stability due to a work-family imbalance) are particularly vulnerable to mental health problems and loss spirals, as proposed by the *conservation of resources (COR) theory* [34, 35].

The mental health impact of COVID-19 is also associated with how people perceive the pandemic and cope with pandemic-related stressors [36, 37]. Perceiving more stress in later waves than in the initial wave of the pandemic was associated with lower well-being and life satisfaction and higher anxiety [38]. On the other hand, acknowledging and accepting distress,

and engaging in actions that are in line with one's own values despite the distress, were linked to better mental health outcomes [11]. This type of psychological response falls under the concept of *psychological flexibility*, i.e. humans' ability to adjust their behaviour in response to changing situational demands [39, 40].

Aims and research questions of the present study

Overall, the interplay of subjective perceptions, coping behaviours, and individual and environmental factors might be essential for explaining psychological adjustment to the pandemic [41]. To better understand the mechanisms underlying varying mental health trajectories, the present study focused on how the COVID-19 pandemic has impacted different target groups in different phases of the pandemic. The overarching aim was to shed light on pandemic-related experiences over time and across countries, and to examine whether these experiences vary as a function of different personal and environmental factors. The specific aims were as follows:

1. Explore differences in mental health outcomes (symptoms of AD, PTSD and depression) across five European countries over 12 months of the COVID-19 pandemic.
2. Examine whether and how pandemic-related experiences have changed over time, specifically:

○ How has the experience of stressful events during the pandemic changed over time?

○ How have positive and negative aspects of the pandemic changed over time?

○ How have population-informed recommendations for dealing with the pandemic changed over time?

3. Examine whether pandemic-related experiences have differed between different groups (e.g. different countries, different age groups), specifically:

○ Have pandemic-related experiences differed depending on: age, gender, health-related characteristics (health status, being infected with COVID-19, being at risk of a severe course of COVID-19, history of mental health problems), social factors (face-to-face and virtual contact with loved ones, time spent at home, living situation), financial situation (pandemic-related income loss, financial support) and country of residence (Austria, Croatia, Georgia, Greece, Portugal)?

First, we hypothesised that mental health outcomes would follow different trajectories in different countries, depending on different contextual factors (e.g. socioeconomic situation in the respective country, containment measures in place). We further assumed that pandemic-related experiences would change over time, echoing the changing circumstances of the pandemic (e.g. differing stringency of containment measures). Finally, in view of the country-specific factors (e.g. availability of financial support from the government) and individual characteristics (e.g. health status), we hypothesised that pandemic-related experiences would differ between groups. For instance, we assumed that men and women would report different stressful events experienced during the pandemic.

Methods

The present study applied a convergent design in a multistage mixed-methods framework [42]. In particular, we collected and analysed quantitative and qualitative data during a similar timeframe, at two stages of data assessment.

Research context

The data used in this paper stem from the ADJUST study–a longitudinal pan-European study investigating stressors and risk and protective factors for AD amid COVID-19 [5, 33]. Before its start, the ADJUST study was registered in a study registry (https://osf.io/8xhyg). For the secondary analysis described here, we applied a mixed-methods design to compare the data collected in Austria, Croatia, Georgia, Greece, and Portugal in the first (15/06/2020–14/12/2020) and third (21/06/2021–14/12/2021) wave of the ADJUST study. The third wave will hereinafter be referred to as T2, as it represents the second measurement point of the present analysis. S1 Appendix provides more details on the COVID-19 situation in each country during the data assessment.

Both assessments were conducted as online surveys. After receiving information about the study aims, data management, confidentiality, and right to withdraw, all participants provided written informed consent. Ethical approval was obtained in all participating countries:

Austria: Ethics Committee of the University of Vienna, Reference Number: 00554

Croatia: Ethics Committee of the Department of Psychology, Faculty of Humanities and Social Sciences, University of Zagreb: 21/05/2020

Georgia: Ilia State University, Faculty of Arts and Science, Research Ethics Committee: 12/06/2020

Greece: Social Sciences Ethics Review Board (SSERB), University of Nicosia: SSERB 00109

Portugal: Ethics Committee of the Medical Faculty, University of Porto and Centro Hospitalar São João, Porto, Portugal: CE 201–20

Participants and procedure

For T1, participants were recruited from the general population of Austria, Croatia, Georgia, Greece, and Portugal. We promoted the study via social media and approached several professional and hobby associations, psychosocial services, and large companies, asking them to share the study information including the survey link among their employees (see [5] for more information on the recruitment). Participants who completed the baseline assessment and agreed to be re-contacted for further assessments received two invitations for follow-up at intervals of approximately six months. This secondary analysis encompassed the baseline assessment (T1) and the 12-month follow-up assessment (T2).

Eligibility criteria for the present study included: (a) age $\geq$18 years, (b) living in one of the participating countries, (c) ability to read and write in the respective language, (d) willingness to participate, and (e) having responded to all relevant measures (i.e. closed- and open-ended questions) at the baseline and follow-up assessment.

The final sample consisted of N = 1,070 participants. At baseline, the mean age was 42.9 years (SD = 13.5) and the majority of the sample was female (74.4%, n = 796). Sociodemographic characteristics are detailed in Table 1.

Measures

The measures included several well-known questionnaires, a series of self-constructed items, and four open-ended questions. In the following, only the measures necessary for the present secondary analysis are described. An exhaustive overview of variables collected within the ADJUST study is provided elsewhere [5, 33].

Quantitative data assessment. To provide context for the longitudinal subgroup analysis, personal and environmental factors were assessed. In addition to sociodemographic characteristics (Table 1) and country of residence (Austria, Croatia, Georgia, Greece, and Portugal),

Table 1. Overview of participants' sociodemographic characteristics at baseline (T1).

	Austria *n* = 333	Croatia *n* = 414	Georgia *n* = 113	Greece *n* = 122	Portugal *n* = 88
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Age	46.7 (14.8)	42.8 (12.1)	36.1 (13.3)	37.5 (11.0)	45.7 (11.6)
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Gender					
Male	106 (31.8)	86 (20.8)	19 (16.8)	39 (32.0)	22 (25.0)
Female	225 (67.6)	328 (79.2)	94 (83.2)	83 (68.0)	66 (75.0)
Other	2 (0.6)	0 (0)	0 (0)	0 (0)	0 (0)
Living situation [a]					
Living alone	109 (32.7)	94 (22.7)	20 (17.7)	33 (27.0)	28 (31.8)
Living with parents	10 (3.0)	75 (18.1)	59 (52.2)	24 (19.7)	8 (9.1)
Living with partner	106 (31.8)	89 (21.5)	11 (9.7)	36 (29.5)	20 (22.7)
Living with partner and children	78 (23.4)	148 (35.7)	30 (26.5)	27 (22.1)	24 (27.3)
Living with children	19 (5.7)	32 (7.7)	3 (2.7)	4 (3.3)	2 (2.3)
Living with colleagues/ fellow students	5 (1.5)	4 (1.0)	5 (4.4)	1 (0.8)	3 (3.4)
Other	19 (5.7)	27 (6.5)	0 (0)	13 (10.7)	9 (10.2)
Relationship status					
Single	78 (23.4)	90 (21.7)	47 (41.6)	27 (22.1)	21 (23.9)
Short-term relationship(s)	11 (3.3)	4 (1.0)	3 (2.7)	2 (1.6)	1 (1.1)
Stable relationship -living separately	45 (13.5)	46 (11.1)	15 (13.3)	19 (15.6)	4 (4.5)
Stable relationship—living together	199 (59.8)	274 (66.2)	48 (42.5)	74 (60.7)	62 (70.5)
Children					
Yes	190 (57.1)	256 (61.8)	44 (38.9)	50 (41.0)	48 (54.5)
No	143(42.9)	158 (38.2)	69 (61.1)	72 (59.0)	40 (45.5)

[a] Percentages sum to more than 100 as multiple responses were possible.

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health-related characteristics, social factors and financial situation were assessed using self-constructed items, as detailed in the S2 Table in S1 Appendix.

To explore the differences in mental health outcomes (Aim 1), we used established self-report questionnaires at both time points:

The Adjustment Disorder New Module—8 (ADNM-8; [43]) was used to measure symptoms of AD. It consists of eight items rated on a 4-point Likert scale (1 = *never* to 4 = *often*) and has shown good reliability and convergent and factorial validity [44]. In the present study, the ADNM-8 showed very high internal consistency, with Cronbach's α = .91 at baseline and .92 at follow-up.

The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5) is a widely used screening tool for PTSD [45, 46]. It contains five items assessing the presence of posttraumatic stress symptoms according to the DSM-5 with a dichotomous response format. In the present study, we included in the analysis only the PC-PTSD-5 scores of the participants who reported a traumatic event during the pandemic. Cronbach's α of the PC-PTSD-5 was acceptable at both time points of our study (.74 and .76).

The Patient Health Questionnaire-2 (PHQ-2;) is a two-item depression screener with good psychometric properties [47, 48]. It assesses the most common symptoms of depression on a 4-point Likert scale ranging from 0 = n*ot at all* to 3 = *nearly every day*. In the present study, the PHQ-2 showed high internal consistency (Cronbach's α = .80 at T1 and .86 at T2).

The 5-item World Health Organization Well-Being Index (WHO-5; [49]) measures well-being over the last two weeks using a 5-point Likert scale (0 = *at no time* to 5 = *all of the time*).

It has shown high validity and applicability across various contexts [50]. Internal consistency of the WHO-5 in our study was very high, with Cronbach's α = .90 at baseline and .91 at follow-up.

Qualitative data assessment. To assess subjective pandemic-related experiences in different pandemic stages (Aim 2), the following open-ended questions were asked at T1 and T2:

1. What has been the most stressful event(s) during the coronavirus pandemic?
2. Overall, what do you find most negative about the coronavirus pandemic?
3. Overall, what do you find most positive about the coronavirus pandemic?
4. What recommendations would you give to other people on how to deal with the current situation?

Data analysis

For the data analysis, we chose a longitudinal mixed-methods approach, enabling us to investigate mental health trajectories and evolving pandemic-related experiences from multiple perspectives. This approach is widely accepted and well suited to analyse experiences of change and stability shaped by contextual factors [51, 52], as is the case in our study. A complete case analysis was performed given that both quantitative and qualitative data had to be analysed longitudinally and it is impossible to circumvent missing qualitative data, e.g. using imputation. Thus, all qualitative data could be integrated with the corresponding quantitative data to yield triangulated findings, increasing the validity of the study and offering deeper insights into how and why mental health changes in relation to personal and environmental factors.

Quantitative data analysis. First, all independent variables and mental health outcomes were analysed descriptively to provide a differentiated picture of the sample, in view of the importance of contextual information in longitudinal mixed-methods research. To analyse mean or median differences in independent variables over time, we performed *t*-tests, McNemar tests [53] with continuity correction [54], or Wilcoxon signed-rank tests, as appropriate. Normal Q-Q Plots were inspected to check for normality as the sample size was greater than 50.

For Aim 1, the purpose of the analysis was to provide a general understanding of the development of mental health symptoms during the pandemic and of possible differences between the participating countries. Differences in AD, PTSD, depression, and well-being scores between T1 and T2 were analysed for each country using paired-samples *t*-tests or Wilcoxon signed-rank tests, and the estimated prevalence rates were compared using a McNemar test. In addition, one-way analysis of variance (ANOVA) with Tukey post hoc test was used for each time point to test the differences in mental health outcomes between the participating countries at T1 and T2, respectively. Welch's ANOVAs and Games-Howell post hoc tests were applied if the assumption of homogeneity of variances was violated, as assessed with the Levene's test. Depending on the analysis, different measures of effect size (Cohen's *d*, Odds ratio [OR], Rosenthal's *r*, Omega squared [ω^2]) were reported [55]. All analyses were conducted using SPSS Statistics Version 26 [56].

Qualitative data analysis. For Aims 2 and 3, qualitative content analysis (QCA) was used to analyse the four open-ended questions [57, 58]. This method follows strict procedural rules and is recommended for large samples. QCA also includes the use of frequencies (i.e. semi-quantification), which can highlight the relevance of the identified themes and categories and are essential in a mixed-methods analysis [59, 60]. QCA thus allows for a juxtaposition of answers provided by different target groups (e.g. participants from different countries) at T1

and T2, which is necessary to identify differences and recognise patterns. All analyses involving qualitative data were performed using MAXQDA 2022 [61].

In a first step, we analysed participants' answers collected at T1. The Austrian study team, which initiated the study, developed a preliminary coding scheme based on randomly selected answers of n = 180 Austrian participants (i.e. using an inductive approach). Next, the remaining countries applied this coding scheme to code their data (i.e. using a deductive approach in their respective languages). The coding system was finalised in an iterative process of category revision, and final categories and themes (i.e. main categories) were developed. Further procedural details can be found in another paper of the research group [62] and in the respective OSF storage (https://osf.io/6njdu/).

The data collected at T2 were analysed in a deductive manner. All countries applied the existing T1 coding scheme to their data collected at T2 to ensure consistency in the analysis and to enable the data to be compared over time. However, additional categories could be added after discussion in the research group if segments were identified which did not correspond to any of the existing categories. After the coding was finished, the categories were grouped into themes, in accordance with the procedure at T1. For the purpose of reporting the results, selected quotes were translated into English only after the coding process was finalised.

Inter- and intrarater agreement were calculated based on the answers of 10% randomly selected participants, resulting in a high level of agreement in all countries at both timepoints (for details, see S1 Appendix).

Mixed-methods analysis. In a final step (Aim 3), the T1 and T2 data were merged into one common MAXQDA project. Relevant quantitative data (i.e. health-related characteristics, social factors, financial situation; detailed in S1 Appendix) were then imported into the common project. The themes identified at T1 and T2 were quantitatively and qualitatively compared using the respective MAXQDA functions. For instance, *crosstabs* were used to compare frequencies of the identified themes at T1 and T2. In addition, themes were examined with regard to statistical characteristics using *joint displays* (e.g. to determine the mean age of participants reporting emotional distress as a negative aspect of the pandemic).

Throughout the research process, we followed the existing guidelines for cross-country and longitudinal mixed-methods research [63–66]. We integrated the data (1) at the *study design level* by applying a convergent, multistage design; (2) at the *methods level* by merging the qualitative and quantitative data for analysis and comparison; and (3) at the *interpretation level* through narratives, data transformation (e.g. semi-quantification of qualitative data) and joint displays (see Material and methods) to enhance the quality and value of our research [42]. Regular meetings were held to reflect on the coding process and jointly discuss the coding scheme, definitions of the categories, and development of themes.

Results

A total of N = 5,405 participants from Austria (AUT), Croatia (CRO), Georgia (GEO), Greece (GR), and Portugal (PT) responded to all relevant closed- and open-ended questions at baseline. We excluded participants who were either unwilling to participate in the follow-up or who did not respond to some of the relevant measures at follow-up. The final sample consisted of N = 1,070 participants.

Sample characteristics

At baseline, the majority of participants reported being in a relationship (75.4%; n = 807) and having children (55%; n = 588). Across the countries, around a quarter of participants indicated living alone (26.5%, n = 284), with the highest percentage in Austria (32.7%, n = 109)

and the lowest in Georgia (17.7%, $n = 20$). Sociodemographic characteristics for each country are shown in Table 1.

Health-related characteristics. Participants described their current health as better at baseline ($M = 1.92$, $SD = 0.83$) than at follow-up ($M = 2.04$, $SD = 0.86$), $t(1069) = -4.83$, $p < .001$, $d = 0.148$. Besides, more participants described their health as *very good* at baseline (35.2%, $n = 377$) than at follow-up (28.9%, $n = 309$)

With regard to the diagnosis of a mental disorder, there was no significant median difference between T1 and T2 ($z = -1.07$, $p = .29$, $r = -.03$). At T1, 83.6% of participants ($n = 894$) reported not having a diagnosed mental disorder, whereas this was true for 82.5% of participants at T2 ($n = 883$).

The proportion of participants who had been infected with COVID-19 significantly increased over time ($\chi^2(1) = 166.05$, $p < .001$, OR = 171), as shown by a McNemar test. While only six participants (0.6%) reported a COVID-19 infection at T1, $n = 176$ participants did so at T2 (16.4%).

Participants also evaluated their risk of severe symptoms of COVID-19 differently between T1 and T2 ($\chi^2(1) = 18.45$, $p < .001$, OR = 0.49). At baseline, 19.9% ($n = 213$) reported being at risk of severe symptoms of COVID-19, as opposed to 14.7% ($n = 157$) at follow-up.

Participants' health-related characteristics per time point, divided by country, are depicted in S4 Table in S1 Appendix.

Social factors. At follow-up, $n = 312$ (29.2%) reported not spending more time at home, compared to $n = 117$ (10.9%) at baseline. This change was mainly a consequence of 247 people (23.1%) spending more time at home at baseline but not at follow-up. The difference was statistically significant, as demonstrated by a McNemar test, $\chi^2(1) = 125.87$, $p < .001$, OR = 4.75.

The participants tended to have more face-to-face contact with loved ones at follow-up than at baseline, with the median being significantly higher at follow-up according to a Wilcoxon test, $z = -11.38$, $p < .001$, $r = -.35$. On the other hand, the amount of virtual contact was significantly lower at follow-up than at baseline, $z = -9.15$, $p < .001$, $r = -.28$. S5 Table in S1 Appendix presents cross-country differences in contact with loved ones and time spent at home at T1 and T2.

Financial situation. At T1, 34.6% of participants ($n = 370$) reported a pandemic-related income loss, whereas this was the case for only 22.8% ($n = 244$) at T2, a statistically significant difference $\chi^2(1) = 65.65$, $p < .001$, OR = 0.31. This reduction resulted from 182 people (17%) reporting an income loss only at T1 and 56 people (5.2%) reporting an income loss only at T2.

Of $n = 370$ participants who reported a pandemic-related income loss at baseline, only $n = 45$ (12.2%) received financial support from the government. At follow-up, the percentage of affected people receiving financial support decreased to 9% ($n = 22$); this difference was not statistically significant: $\chi^2(1) = 3.45$, $p = .06$, OR = 0.45. Details on pandemic-related income reduction and financial support can be found in S6 Table in S1 Appendix.

Quantitative results

Mental health changes over time. Paired-samples *t*-tests on the total sample showed a significant decrease in symptoms of depression over time but no significant difference in symptoms of AD, PTSD, and well-being (for details, see Table 2). At the country level, symptoms of depression decreased in Croatia and Greece while symptoms of AD increased in Georgia and decreased in Greece. Due to a very low number of participants with trauma exposure per country, *t*-tests could not be conducted for the PC-PTSD-5. Therefore, only mean values on this scale for each country were calculated.

Mental health changes across countries. At baseline, symptoms of AD differed significantly between countries, Welch's $F(4, 296.499) = 18.712$, $p < .001$, est. $\omega^2 = .53$, with Georgia,

Table 2. Means, standard deviations, and *t*-test statistics for mental health outcomes.

	T1	T2			
	M (*SD*)	*M* (*SD*)	*t*(*df*)	*p*	Cohen's *d*
	ADNM-8				
Austria	14.88 (5.78)	14.83 (6.14)	0.16 (332)	.873	0.009
Croatia	13.80 (4.82)	14.02 (4.91)	-1.06 (413)	.292	0.052
Georgia	18.53 (6.84)	19.69 (7.21)	-2.13 (112)	**.035**	0.200
Greece	16.85 (6.20)	15.47 (5.96)	2.75 (121)	**.007**	0.249
Portugal	17.15 (6.64)	16.53 (6.24)	1.10 (87)	.274	0.117
Total sample	15.26 (5.90)	15.24 (6.04)	0.11 (1069)	.911	0.004
	PHQ-2				
Austria	1.29 (1.41)	1.20 (1.42)	1.11 (332)	.267	0.061
Croatia	1.27 (1.43)	1.12 (1.50)	2.16 (413)	**.032**	0.106
Georgia	1.72 (1.78)	1.62 (1.93)	0.52 (112)	.604	0.049
Greece	1.61 (1.47)	1.11 (1.34)	3.49 (121)	**.001**	0.316
Portugal	1.80 (1.90)	1.70 (1.68)	0.51 (87)	.614	0.054
Total sample	1.40 (1.52)	1.24 (1.54)	3.41 (1069)	**.001**	0.104
	WHO-5				
Austria	58.21 (22.23)	56.60 (23.35)	1.59 (332)	.113	0.087
Croatia	58.63 (20.73)	57.64 (20.44)	1.19 (413)	.235	0.058
Georgia	49.95 (22.22)	46.65 (22.00)	1.44 (112)	.144	0.135
Greece	52.49 (20.11)	54.43 (19.35)	-1.13 (121)	.262	0.102
Portugal	53.82 (20.46)	53.82 (21.88)	0.00 (87)	.999	0.000
Total sample	56.49 (21.47)	55.48 (21.76)	1.77 (1069)	.077	0.054
	PC-PTSD-5 [a]				
Austria [b]	1.38 (1.26)	1.38 (1.49)			
Croatia [c]	1.74 (1.51)	1.37 (1.54)			
Georgia [d]	2.83 (2.04)	3.00 (1.86)			
Greece [e]	1.50 (1.08)	1.00 (1.29)			
Portugal [f]	2.50 (0.70)	2.67 (1.94)			
Total sample [g]	1.85 (1.54)	1.59 (1.52)	1.93 (94)	.057	0.198

ADNM-8 = Adjustment Disorder New Module-8; PC-PTSD = Primary Care PTSD Screen for DSM-5; PHQ-2 = Patient Health Questionnaire-2; WHO-5 = 5-item World Health Organization Well-Being Index. Significant differences are written in bold. Austria: $n = 333$. Croatia: $n = 414$. Georgia: $n = 113$. Greece: $n = 122$. Portugal: $n = 88$.

[a] Only participants who reported having experienced a traumatic event during the pandemic were included in the analysis.

[b] T1: $n = 13$; T2: $n = 64$.

[c] T1: $n = 143$; T2: $n = 130$.

[d] T1: $n = 6$; T2: $n = 16$.

[e] T1: $n = 10$; T2: $n = 19$.

[f] T1: $n = 2$; T2: $n = 9$.

[g] $n = 95$.

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Greece, and Portugal having higher ADNM-8 scores than Austria ($p \leq .033$) and Croatia ($p < .001$). Depressive symptoms also differed between the countries, Welch's $F(4, 300.714) = 3.760$, $p = .005$, est. $\omega^2 = .53$, though no significant pairwise comparisons were found. Differences between the five countries were also found on the WHO-5, $F(4, 1065) = 5.683$, $p < .001$, $\omega^2 = .02$. Tukey post hoc analysis revealed significantly lower well-being in Georgia than in Austria ($p = .003$) and Croatia ($p = .001$), and lower well-being in Greece than in Croatia ($p = .042$).

At follow-up, rates of AD symptoms remained significantly different between the countries, Welch's $F(4, 299.216) = 17.469$, $p < .001$, est. $\omega^2 = .53$. The post hoc analysis revealed higher ADNM-8 scores in Georgia than in all other countries ($p \leq .001$) and significantly higher scores in Portugal than in Croatia ($p = .005$). Scores for depression also differed significantly at follow-up, Welch's $F(4, 305.864) = 3.751$, $p = .005$, est. $\omega^2 = .53$, with higher PHQ-2 scores in Portugal than in Croatia ($p = .024$) and Greece ($p = .048$). Moreover, the WHO-5 scores differed significantly between the countries at T2, Welch's $F(4, 312.703) = 6.075$, $p < .001$, est. $\omega^2 = .02$. Again, lower well-being was found in Georgia compared to Austria ($p = .007$) and Croatia ($p = .002$), and in Greece compared to Croatia ($p = .003$). No ANOVA was conducted for the PC-PTSD-5 due to small and unequal subsample sizes.

Prevalence rates of probable mental health disorders. In the total sample, the percentage of people at risk for developing AD or PTSD did not change over time. However, the prevalence rates of self-reported probable depression decreased significantly from T1 to T2 ($p = .027$). All results, including within country comparisons, are depicted in Table 3. For PTSD, only descriptive statistics are shown due to low number of participants reporting a traumatic event during the pandemic (Austria: $n_{t1} = 13$, $n_{t2} = 64$; Croatia: $n_{t1} = 143$, $n_{t2} = 130$; Georgia: $n_{t1} = 6$, $n_{t2} = 16$; Greece: $n_{t1} = 10$, $n_{t2} = 19$; Portugal: $n_{t1} = 2$, $n_{t2} = 9$).

Qualitative results

The themes identified at T1 proved to be well-suited for coding the participants' answers at T2. However, for each of the four questions, one additional theme regarding vaccination emerged. The final list of themes and categories, including definitions and anchor examples, is presented in S2 Appendix. Figs 1–4 illustrate the differences in the frequency of themes over time and across countries (for exact values, see S3 Appendix).

In the following, we touch upon the most prominent differences, thereby using semi-quantification (i.e. simple counts; see Table 4). We also present selected quotes from T2 (with reference to gender, age, and country of residence), which reflect the diversity of the sample, strong patterns found in the data, and country-specific characteristics. An extensive overview of themes and quotes identified at T1 is provided elsewhere [62].

The most stressful event. *Restrictions and changes in daily life* was one of three most prominent themes in all countries at both time points, and comprised different challenges experienced by the participants:

> *"My grandson was born in Germany. Now he's six months old and we still haven't touched each other." (CRO, male, 55)*

> *"The population does not have the basic opportunity to use public transport. All public institutions are working except transport and I think it's dumb to restrict transport at this time." (GEO, female, 19)*

> *"Not being able to have a normal life." (PT, male, 67)*

Over time, the frequency of answers related to restrictions and changes decreased in Austria and Georgia. Meanwhile, answers pertaining to the theme *COVID-19 and other health issues* increased in all countries, with COVID-19-related deaths and (long-term) symptoms being commonly reported:

> *"Disease, I mean having COVID-19, or better said, the symptoms of the disease, especially the high temperature for 12 days!" (CRO, male, 45)*

Table 3. Prevalence rates of probable mental disorders at T1 and T2.

	T1	T2			
	n (%)	*n* (%)	$\chi^2(1)$	*p*	OR
ADNM-8					
Austria	46 (13.8)	45 (13.5)	0.00	.999	0.96
Croatia	24 (5.8)	33 (8.0)	1.94	.164	1.75
Georgia	30 (26.5)	40 (35.4)	- [a]	.052	2.66
Greece	24 (19.7)	15 (12.3)	2.37	.124	0.50
Portugal	24 (27.3)	18 (20.5)	- [b]	.238	0.50
Total sample	148 (13.8)	151 (14.1)	0.03	.871	1.04
PC-PTSD-5 [e]					
Austria	0 (0.0)	7 (10.9)			
Croatia	23 (16.1)	15 (11.5)			
Georgia	2 (33.3)	9 (56.3)			
Greece	0 (0.0)	1 (5.3)			
Portugal	0 (0.0)	5 (55.6)			
Total sample	25 (14.4)	37 (15.5)			
PHQ-2					
Austria	48 (14.4)	41 (12.3)	0.66	.418	0.77
Croatia	63 (15.2)	56 (13.5)	0.52	.470	0.82
Georgia	26 (23.0)	25 (22.1)	- [c]	.999	0.92
Greece	28 (23.0)	15 (12.3)	5.33	**.021**	0.35
Portugal	23 (26.1)	19 (21.6)	- [d]	.503	0.66
Total sample	188 (17.6)	156 (14.6)	4.90	**.027**	0.72

OR = Odds ratio; ADNM-8 = Adjustment Disorder New Module-8; PC-PTSD = Primary Care PTSD Screen for DSM-5; PHQ-2 = Patient Health Questionnaire-2. The calculation of prevalence rates was based on the established cut-off scores: ADNM-8 > 22, PC-PTSD-5 > 3, and PHQ-2 > 2. Significant differences are written in bold. Binomial distribution was used if the sum of the observed counts (i.e., discordant pairs) was $n < 26$:

[a] $n = 22$.

[b] $n = 18$.

[c] $n = 25$.

[d] $n = 20$.

[e] Only persons who reported a traumatic event during the pandemic were included in the analysis (T1: $n = 174$, T2: $n = 238$).

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"Death of my brother and several good friends due to corona" (AT, female, 54)

"Being on sick leave frequently because of self-isolation and post-covid symptoms, and the recovery from COVID (long-term emotional sensitivity and migraines)" (CRO, female, 42)

Emotional distress was frequently mentioned at both time points. However, a marginal decrease in the frequency of this theme was observed at T2 in all countries. As illustrated by the quotes below, fear and uncertainty were common stressors:

"Fear of losing my job. Fear that I will lose all the people I love. Fear that my life will never again be good and meaningful. Fear that I will not know how to run a private company and that I will become poor. I am afraid of poverty, although I have no objective reasons for that–at least not for now." (CRO, female, 52)

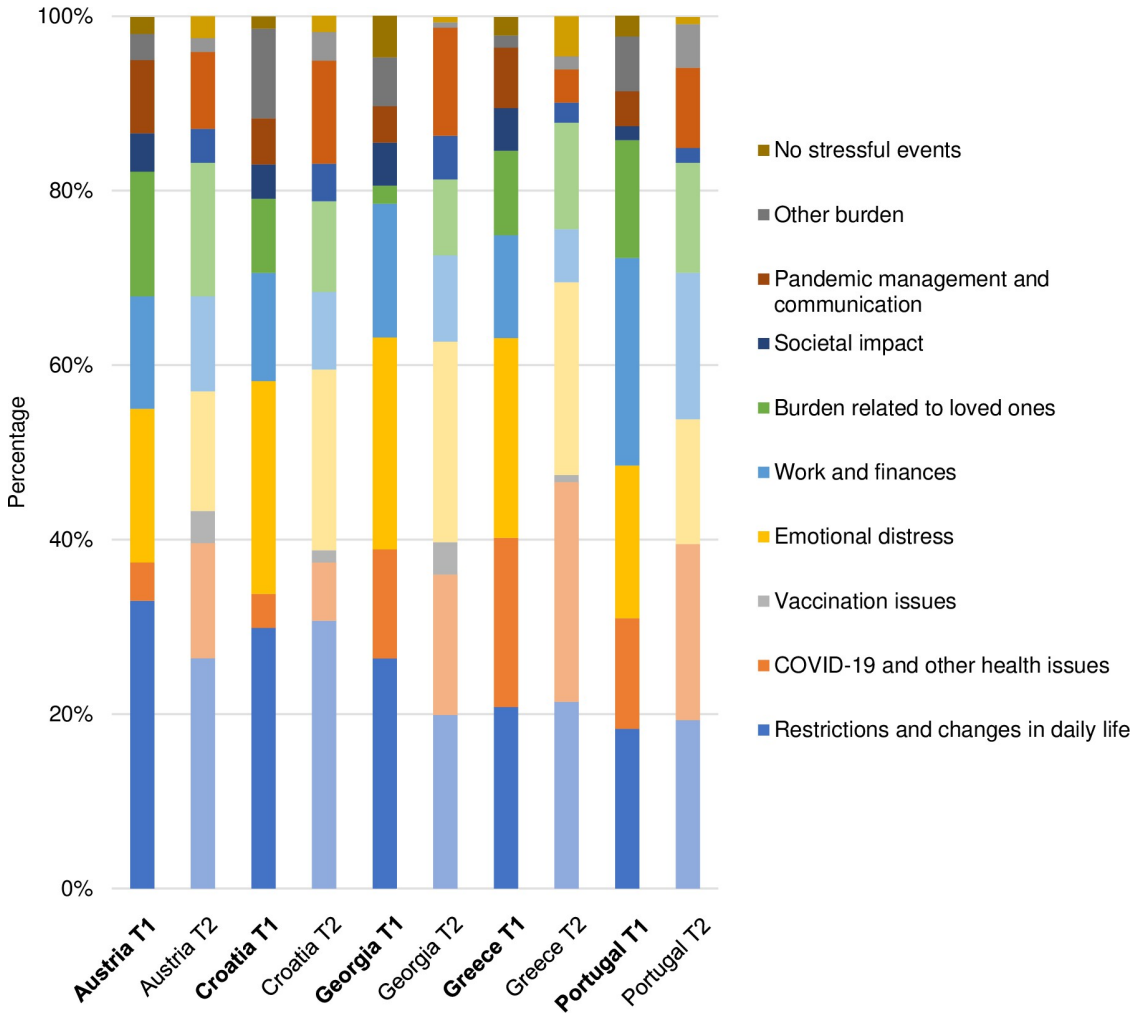

Fig 1. Themes related to stressful events during the pandemic.

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"The unpredictability of the future was very worrying. Dealing with the fear of other people (family members and co-workers) was also stressful" (PT, female, 32)

"The openings in June 2020. Neither vaccinated nor recovered, I felt very uncomfortable participating in social activities again and I largely withdrew. Not necessarily out of fear of getting infected myself but of infecting someone else." (AT, male, 29)

The theme *Work and finances*, which showed a downward trend over time in all countries, included answers about high workload, job losses, and unemployment. Financial burden was particularly pronounced in Portugal, for instance:

"Being forced to work overtime hours and it takes months to pay them, and I still don't know if I'm going to get paid in full; being located far from my place of work and residence and not being paid for travel. I am still at a loss and the situation is still ongoing and will continue." (PT, female, 52)

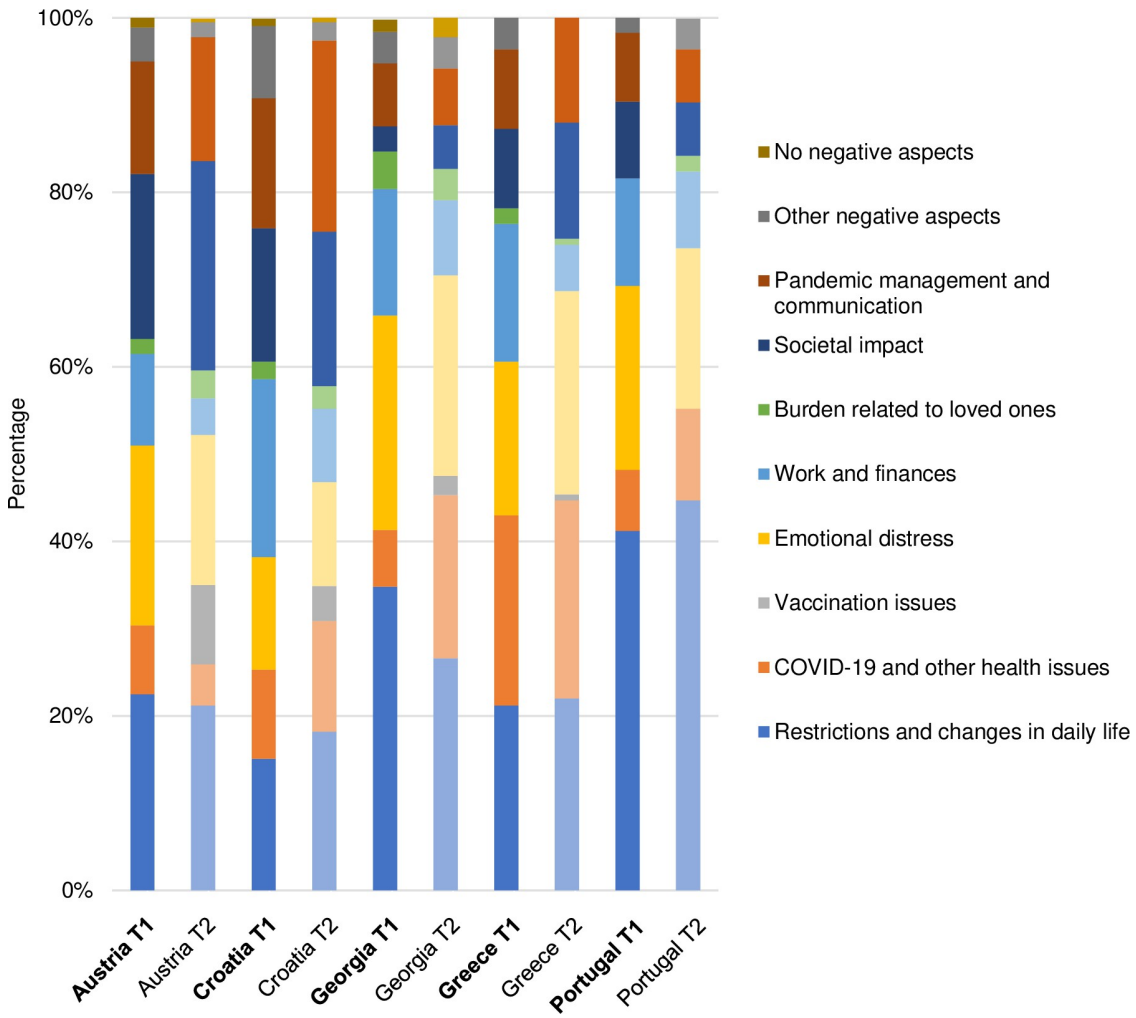

Fig 2. Themes related to negative aspects of the pandemic.

https://doi.org/10.1371/journal.pone.0285078.g002

For the theme *Burden related to loved ones*, a small increase between T1 and T2 was observed in all countries except for Portugal. Common answers included the death of loved ones and problems with childcare, e.g.:

"My husband's grandfather died and we had not seen him for a year because of the pandemic." (CRO, female, 34)

"Childcare, at the same time learning [home-schooling] with two children (aged 11 and 14) on days off and then going back to work in health care (shift work)." (AT, male, 44)

For the theme *Pandemic management and communication*, different patterns of change were observed between the countries. Whereas the frequency of this theme increased in Croatia, Georgia, and Portugal, it decreased in Greece. For Austria, no notable differences were found.

"Lack of reassuring information from the sovereign bodies to the public." (PT, female, 55)

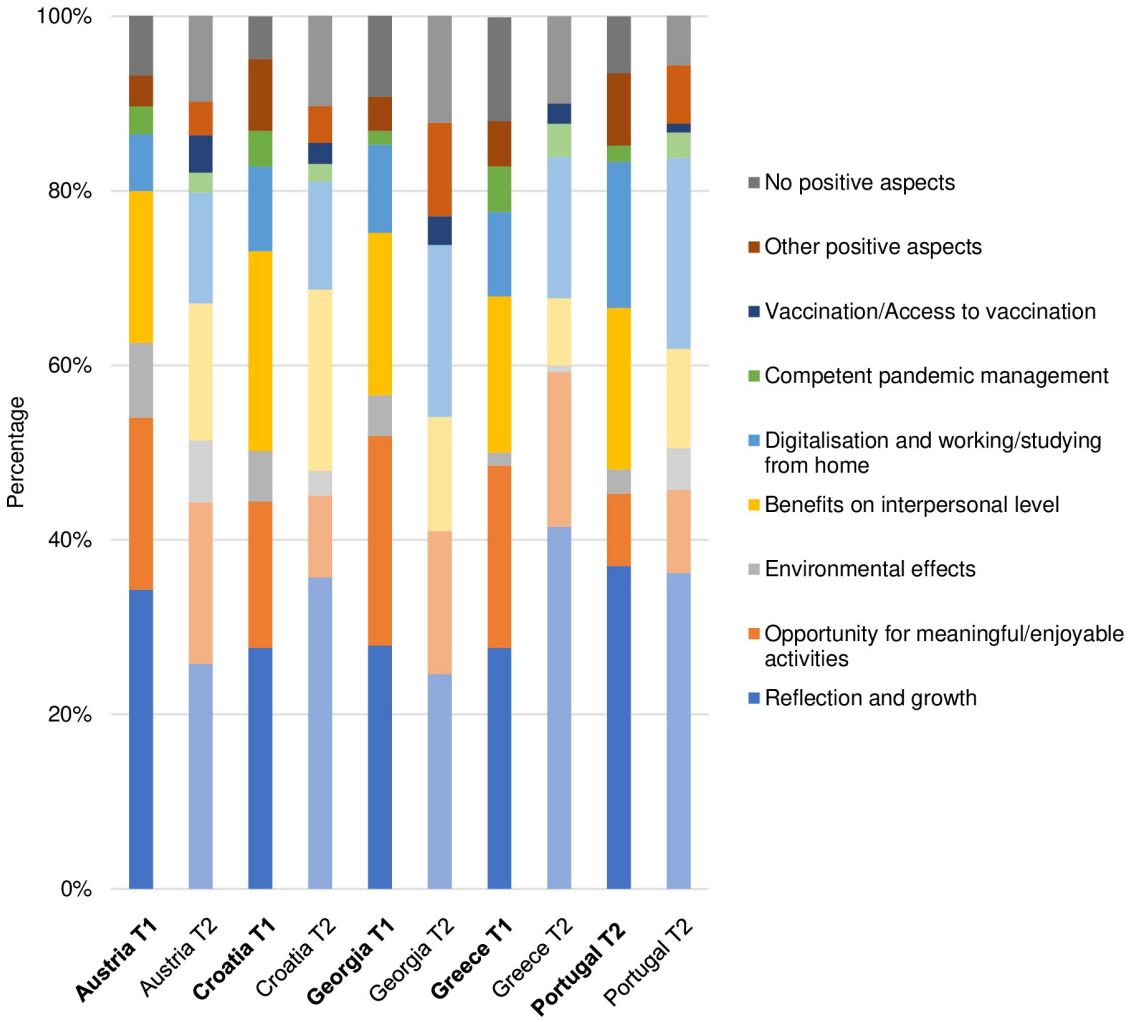

Fig 3. Themes related to positive aspects of the pandemic.

https://doi.org/10.1371/journal.pone.0285078.g003

"Contradictory information from the authorities, idiocy of local governments and particularly contradictory decisions of the authorities." (CRO, male, 48)

Vaccination issues were identified as a theme only at T2. This theme was most often reported in Austria and Georgia (3.7%) and was not mentioned in Portugal.

"There is vaccination, and many don't go [to get vaccinated]." (AT, male, 36)

"Myths about vaccination. My relatives whined that I won't be able to have kids [after being vaccinated]." (GEO, female, 24)

At times, multiple stressful events co-occurred, resulting in a significant burden for the participants, as illustrated below:

"My dad could not have an urgent surgery because he got infected during a medical exam in hospital. Due to postponing the surgery, his symptoms severely deteriorated. He has been in

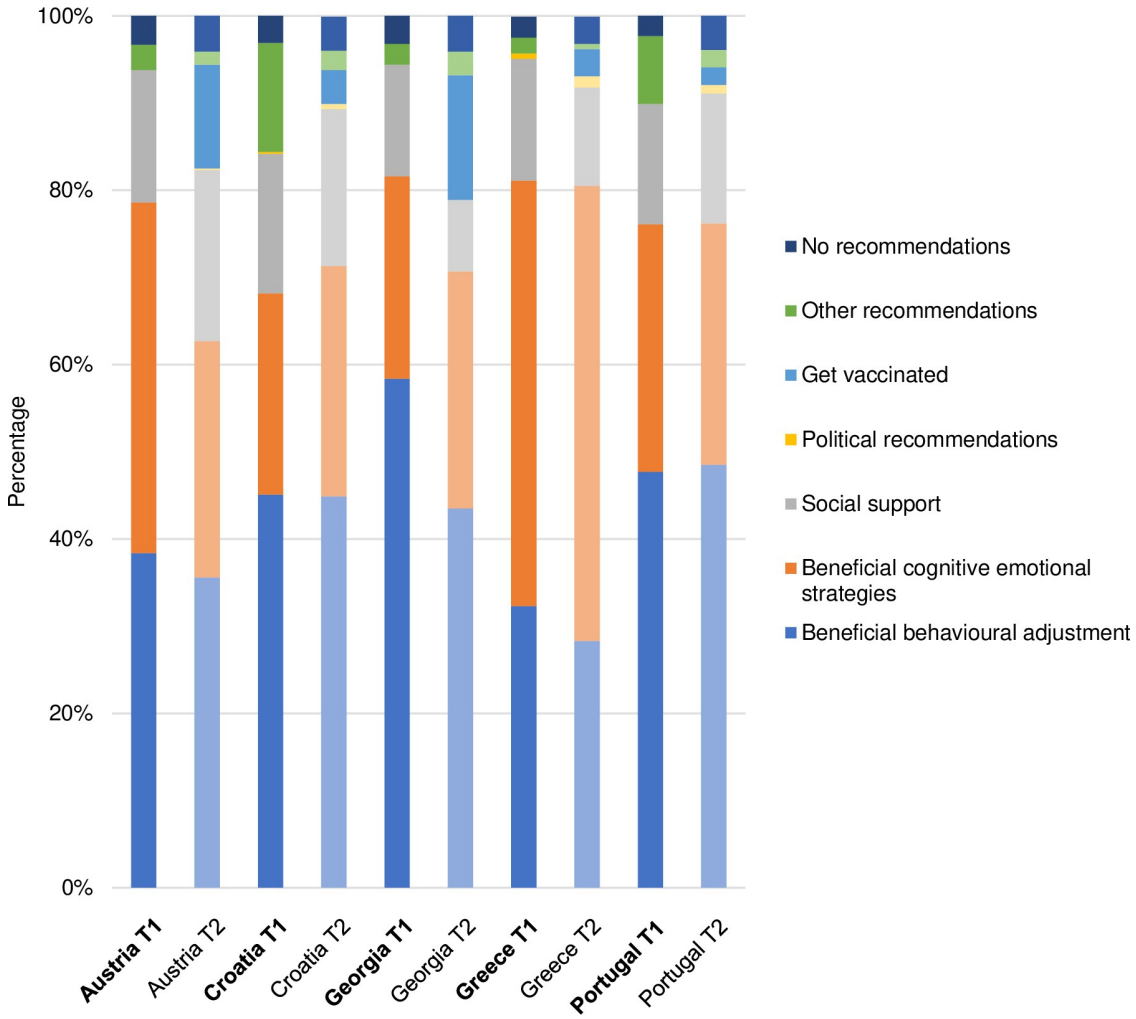

Fig 4. Themes related to recommendations how to cope with the pandemic.

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hospital for six months, he cannot move anymore, because of the tracheostomy we could not even communicate with him over the phone. And because of the measures we cannot visit him. Medical doctors are overworked, it is hard to get the information you need. Being on the phone with the hospital and uncertainty are a huge mental health burden for all of us. Mom is in a different city, alone, after living with dad for 50 years. And her life has changed. And I am really worried every day because of their future, which will be completely different than before." (CRO, female, 47)

Negative aspects of the pandemic. Similar to the first question, *Restrictions and changes in daily life* also proved to be a common theme in response to the second question about negative aspects of the pandemic, both at T1 and T2. Between the two time points, a clear downward trend was observed in Georgia. In other countries, the frequencies barely changed over time, with Portuguese participants most often describing restrictions and pandemic-related changes as negative:

Table 4. Identified themes and their frequencies at baseline and follow-up.

Theme	T1	T2
The most stressful event		
Restrictions and changes in daily life	51.6%	48.4%
COVID-19 and other health issues	36.5%	63.5%
Vaccination issues	0	100.0%
Emotional distress	53.5%	46.5%
Work and finances	57.6%	42.4%
Burden related to loved ones	45.4%	54.6%
Societal impact	50.9%	49.1%
Pandemic management and communication	37.8%	62.2%
Other burden	71.8%	28.2%
No stressful events	49.2%	50.8%
Negative aspects of the pandemic		
Restrictions and changes in daily life	49.5%	50.5%
COVID-19 and other health issues	46.7%	53.3%
Vaccination issues	0	100.0%
Emotional distress	51.8%	48.2%
Work and finances	69.4%	30.6%
Burden related to loved ones	42.6%	57.4%
Societal impact	44.9%	55.1%
Pandemic management and communication	43.8%	56.3%
Other negative aspects	72.7%	27.3%
No negative aspects	60.0%	40.0%
Positive aspects of the pandemic		
Reflection and growth	50.4%	49.6%
Opportunity for meaningful/enjoyable activities	58.4%	41.6%
Environmental effects	62.2%	37.8%
Benefits on interpersonal level	56.6%	43.4%
Digitalisation and working/studying from home	40.8%	59.2%
Competent pandemic management	63.5%	36.5%
Vaccination/Access to vaccination	0	100.0%
Other positive aspects	58.8%	41.2%
No positive aspects	42.1%	57.9%
Recommendations for dealing with the pandemic		
Beneficial behavioural adjustment	51.5%	48.5%
Beneficial cognitive-emotional strategies	51.7%	48.3%
Social support	47.4%	52.6%
Political recommendations	22.2%	77.8%
Get vaccinated	0	100.0%
Other recommendations	78.7%	21.3%
No recommendations	43.9%	56.1%

https://doi.org/10.1371/journal.pone.0285078.t004

"The loss of routine and opportunities derived from regular contact with colleagues and superiors at work." (PT, male, 35)

"Loss of social skills due to mandatory isolation; loss of physical contact with people beyond the immediate household—spontaneous hugs, for example." (PT, female, 59)

For the theme *COVID-19 and other health issues*, several differences were observed across countries and between time points. The frequency of this theme was rather low in Austria, Croatia, and Portugal, with only marginal changes between T1 and T2. In Georgia and Greece, approximately one in five participants commented on deaths and health issues related to COVID-19, for instance:

"People are dying and in my country their lives are not important." (GEO, female, 34)

"Loss of sense of taste and smell for a long time (about 1 month) during infection." (GEO, male, 22)

"Too many people perished too quickly and painfully" (GR, female, 40)

The theme *Emotional distress* was also represented differently depending on the country. Over time, the number of answers pertaining to this theme decreased in Austria and Portugal. At follow-up, a high number of emotional difficulties was still evident in Greece and Georgia, mostly involving the widespread uncertainty and anxiety:

"Constant uncertainty about the future." (GEO, female, 19)

"Anxiety about the next minute." (GR, female, 40)

In all countries, the theme *Work and finances* showed a downward trend between T1 and T2, with the sharpest decrease in Croatia. At follow-up, this theme was most prominent in Portugal and Georgia.

"*The destruction of so many jobs and the economy in general" (PT, female, 52)*

"In the long run, I am concerned about the economic costs of the pandemic and its reflection on our country's situation" (PT, female, 54)

"Losing my job. I . . . worked [in a school] for only 2 months, then Corona began and I could not do anything, so I lost my job. I have a grandmother with breast cancer operation, I have 5000 loan in bank and many other loans. . . . I'm paying these loans every day and can't find a job. If the lockdown begins again, we'll stay hungry, we don't even have any gold to take it to pawnshop." (GEO, female, 29)

The theme *Societal impact* was more prominent at T2 than T1 in all countries except for Portugal. Particularly high number of participants commenting on the reactions of the population and societal changes was observed in Austria and Croatia, e.g.:

"The impossibility for children and adolescents to be allowed to live their lives in a manner appropriate for their age, to know they are on safe paths, and to be able to make joyful plans for the future." (AT, female, 73)

"The fact that once again the part of society that is marginalised, poor and in the lowest social classes suffered the most damage, while the rich became even richer." (CRO, female, 25)

"Increased segregation in coping with the pandemic between rich countries and those at a lower level of development." (CRO, male, 25)

For the theme *Pandemic management and communication*, rather small changes were observed over time. This was true for all countries except Croatia, where a notable increase was found, as illustrated below:

"In the media, the spread of lies, hatred, stupidity, corruption, malicious reinterpretation, shortening and changing of the statements of doctors and other experts and politicians." (CRO, male, 45)

"The role of the media. The way the leading structures talk about the pandemic in the media, spreading fear, fuelling anxiety. Inconsistent ways of controlling the pandemic (unequal measures and conditions for everyone, illogical nature of measures). Not focusing on mental health (until it's (too) late)." (CRO, female, 32)

Burden related to loved ones was rarely reported, with only negligible differences between baseline and follow-up in all countries.

Vaccination issues emerged as a theme at follow-up in all countries except for Portugal. Statements regarding (mandatory) vaccination, including population's reactions towards it, were most common in Austria, followed by Croatia.

"Mandatory vaccination through the so-called back door with the regulations. I strongly refuse compulsory vaccination, especially for children and young people." (AT, male, 71)

"The fact that despite the population's great willingness to be vaccinated, there are still very many anti-vaxxers." (AT, female, 72)

"Even those who do not belong to any vulnerable group (or have even recovered from Covid) get vaccinated and are ready to vaccinate their own children with an experimental genetic preparation . . . Apart from the possible negative health consequences, all this can easily turn into a path towards a totalitarian society." (CRO, male, 39)

"Pressure on people to get vaccinated, threats from the government about what will happen if we don't get vaccinated. . ." (CRO, female, 55)

Positive aspects of the pandemic. *Reflection and growth* constituted the most prominent positive theme in all countries at both time points. Over time, the number of people reporting individual and community growth (e.g. better awareness of certain topics, reprioritisation and lessons from COVID-19) decreased substantially in Austria, remained largely unchanged in Portugal and Georgia, and increased in Croatia and Greece. Responses regarding reflection and growth included:

"Learning about the fragility of human existence, facing the fact that despite scientific advances we are not omnipotent, facing limitations that we must learn to deal with and be aware of." (CRO, male, 79)

"Changing the perspective on life. A situation that encouraged many to think about priorities and wishes." (CRO, female, 32)

"The rethinking of the values in our lives and that we were shaken up about the things we took for granted, like being alive and having a job." (GR, male, 41)

"The appreciation of health and how important the people we love are, and we might lose them overnight." (GR, female, 31)

Opportunity for meaningful/enjoyable activities was another common theme. However, over time, the frequency of this theme tended to decrease in all countries except for Portugal, where a negligible increase was observed. Answers relating to having more time and doing

pleasurable activities were particularly widespread among Austrian and Greek participants, for instance:

"That it became quieter at times on the streets, but also in everyday life (fewer appointments)." (AT, female, 40)

"More time for yourself. Deceleration: -)" (AT, male, 55)

"Time with myself for myself" (GR, female, 53)

"More time with my family" (GR, female, 29)

At baseline, *Benefits on the interpersonal level* represented a recurrent theme in all countries, with a large number of people positively evaluating family bonding and social cohesion during the pandemic. Notably, in all countries, the frequency of this theme tended to decline over time. At follow-up, benefits on the interpersonal level were mainly reported by participants from Austria and Croatia, e.g.:

"That many people found each other again, and that family bonding was strengthened." (AT, male, 81)

"People have started to socialise at home again, instead of in cafes. The pressure to participate in social activities and to be constantly active and visible has decreased." (CRO, female, 40)

"I also find the reduced amount of contact to be a positive thing because it seems to me that the relationships with irrelevant people partly or completely disappeared, whereas the relationships with loved ones/close friends have deepened because we spent more time together." (CRO, female, 23)

In contrast to the themes described above, the theme *Digitalisation and working/studying from home* was more prominent at T2 than at T1. The frequencies were constantly highest in Portugal, whereas the sharpest increase between T1 and T2 was noted in Georgia.

"Opportunity to study online, I'm glad that I don't waste time on transport anymore, I have a lecture when I want, [. . .] I can attend from where I want to." (GEO, female, 24)

"Working from home." (GEO, male, 22)

"Better organisation of almost all services, public or private (e.g. restaurants), including greater provision of delivery services." (PT, male, 35)

"The rise of telework as a topic on the agenda in social issues, and how important it can be for the positive performance of the worker, if correctly applied." (PT, male, 38)

Positive aspects pertaining to *Competent pandemic management* (e.g. competence of health workers) and *Environmental effects* (e.g. less pollution) were less prominent, with a downward trend over time in all countries except for Portugal. Remarkably, the number of people who did not identify anything positive about the pandemic increased over time in Austria, Croatia, and Georgia.

Recommendations for dealing with the pandemic. *Beneficial behavioural adjustment* was the most prominent theme across countries and at both time points. Recommendations to adhere to preventive measures, engage in pleasant activities, and inform oneself adequately were almost equally represented at T1 and T2. Over time, a notable decrease in frequency of

this theme was observed only in Georgia. Some of the participants' recommendations were as follows:

"Stay informed via official channels, follow the recommendations of professional services." (CRO, male, 45)

"Be careful, follow the measures, but do not adhere to them blindly. Find some time and space for what makes you happy, even if it is a short bike ride or a documentary film about a foreign country or animals." (CRO, female, 47)

"Stay active, interested in living everyday life as normally as possible." (PT, female, 55)

"Physical activity, activities that promote well-being and relaxation, adequate rest time, etc." (PT, male, 39)

Beneficial cognitive-emotional strategies represented the second most prominent theme and showed different patterns of change across the countries. The frequency of this theme substantially decreased in Austria and slightly increased in Croatia, Georgia, and Greece, while being constantly high in Portugal. Recommendations pertaining to this theme included:

"Stay calm and be patient and everything will get better." (GR, female, 22)

"Know that no matter how difficult this whole situation has been or still is for them, it will end and normality will return." (GR, male, 41)

"Calm down, take a deep breath, accept the reality." (PT, female, 54)

"Focus on things that make you happy, think positively, set goals and never give up." (GEO, female, 20)

Recommendations referring to the theme of *Social support* included keeping in contact with other people and seeking support when needed. Whereas such recommendations were more common at T2 than at T1 in Austria, Croatia, and Portugal, the opposite was true in Greece and Georgia.

"Pay attention to fellow human beings and refrain from selfishness." (AT, male, 44)

"Seek any form of help (physician, psychologist, psychiatrist. . .) in good time." (CRO, male, 52)

"Surround yourselves with people you can talk to, even if only online." (PT, female, 31)

A newly emerging recommendation theme at follow-up was *Get vaccinated*. This theme came up in all countries, but was particularly prevalent in Austria and Georgia, e.g.:

"Get vaccinated on time." (GEO, female, 55)

"Get vaccinated so that we can get the pandemic under control." (AT, female, 68)

The themes *Political recommendations* and *No recommendations* were rarely reported at either time point but showed an upward trend over time. Specifically, there was an increase in the number of participants providing recommendations of a political nature (e.g. "Go vote and oust this government") and participants not providing any recommendations (e.g. "I don't have any recommendations because I don't even know how to help myself").

Pandemic-related experiences by group

In the following, the most important results of the mixed-methods analysis are described. (S5-S12 Tables in S3 Appendix) contains comprehensive comparisons of themes based on sociodemographic and health-related characteristics, social factors, and financial situation of the participants.

The integration of qualitative and quantitative data using revealed that *Restrictions and changes in daily life* were more often reported as stressful and negative by people who were single and people living alone. Women and people with children more frequently expressed *Burden related to loved ones*, whereas men were more likely to report *Pandemic management and communication* as stressful and were less likely to report any negative aspect of the pandemic. Notably, participants with better self-reported health tended to perceive *Vaccination issues* as stressful and negative, whereas those with less face-to-face contact with loved ones at baseline tended to indicate *Emotional distress* and *Work and finances* as stressful.

With respect to positive aspects of the pandemic, *Benefits on the interpersonal level* were more often reported by female participants, by participants in a relationship, and by those with children. On the contrary, participants without children predominantly reported *Opportunity for meaningful/enjoyable activities*. Furthermore, participants with less face-to-face contact were more likely to perceive *Digitalisation and working/studying from home* as positive, while those with more face-to-face contact were more likely to report *Environmental effects* as a positive aspect of the pandemic.

Notably, women and participants without children mainly provided recommendations pertaining to the theme of *Social support*. Participants who did not provide any recommendations had, on average, slightly worse self-reported health, less face-to-face contact with loved ones, and often experienced a pandemic-related income loss.

In terms of age differences, we found a higher mean age for participants whose responses to the question about negative aspects included the themes *COVID-19 and other health issues* (M_{age} = 49.0) and for participants whose answers to the question about stressful events included the themes *Pandemic management and communication* (M_{age} = 46.6) and *No stressful events* (M_{age} = 46.3). *Opportunity for meaningful/enjoyable activities* was a common positive aspect of the pandemic for somewhat younger participants (M_{age} = 39.6) while *Competent pandemic management* (M_{age} = 50.1) and *Vaccination/Access to vaccination* (M_{age} = 55.5) were commonly reported by older participants. Concerning recommendations, *Get vaccinated* was mostly recommended by older participants (M_{age} = 49.8) and *Political recommendations* were articulated mainly by younger participants (M_{age} = 39.4).

Discussion

The present study investigated subjective pandemic-related experiences over time and across countries. Using a mixed-methods approach, we aimed to gain a better understanding of the factors underlying changes in mental health between the first and second year of the COVID-19 pandemic. Our analyses revealed significantly different mental health outcomes in Austria, Croatia, Georgia, Greece, and Portugal at both time points. Furthermore, we identified changes in subjective experiences which mirrored the shifting context of the pandemic. By and large, our findings indicate that people's reactions to the pandemic vary considerably, highlighting the role of individual and country-specific factors in mental health research and practice peri- and post-COVID-19.

Mental health differences over time and across countries

In line with our hypothesis and the current literature, different mental health outcomes showed different trajectories over time. At the cross-country level (i.e. overall sample),

depressive symptoms decreased between T1 (i.e. summer and autumn 2020) and T2 (i.e. summer and autumn 2021), thus corroborating the results found in the USA in a similar period [13]. We did not find any significant differences regarding AD, PTSD, and well-being scores in the overall sample.

At the country level, significant decreases in depressive symptoms were observed in Croatia and Greece. These two countries had the highest percentages of people without a current or previous diagnosis of a mental disorder, potentially indicating a generally better mental health status than in the other three countries. This may have fostered a better adjustment to the pandemic and a faster recovery. The observed reduction of depressive symptoms in Croatia might also be attributed to the very high percentage of parents in this subsample, as a strengthening of family relationships and more time spent with family members are commonly reported positive consequences of the pandemic for parents [67], which may in turn protect their mental health.

In Greece, we observed a decrease in AD symptoms. Even though Greece has been hit hard by the pandemic and government measures were stricter than in other countries (as illustrated in S1 Appendix), people seem to have found a way to accept the situation and adjust to it over time. This difference between Greece and the other countries might be related to mental toughness, which was shown to be higher in Greece than in some other European countries [68]. Mentally tough individuals tend to perceive challenge as an opportunity for personal growth and respond adaptively to stressors [69]. As can be seen in the qualitative data, a large proportion of Greek participants described gratitude and appreciation, as well as a restructuring of values and priorities, as positive aspects of the pandemic. They also repeatedly emphasised the importance of calmness, patience, and optimism for coping with the pandemic. Many of these aspects (i.e. values clarification, gratitude, positive thinking) have been identified as protective against mental health problems [36, 70]. They have also shown promising effects in interventions addressing COVID-19-related distress by targeting psychological flexibility [71]. Furthermore, psychological flexibility might be essential for explaining psychological adjustment to the pandemic [39].

Notably, symptoms of AD increased significantly in Georgia. In this country, we also found a higher prevalence of self-reported AD at T2 (35.4%) than at T1 (26.5%). Though being only nearly significant, this finding, along with the observed increase in symptoms, suggests difficulties in adjusting to the pandemic among the Georgian population. This might be explained by the fact that the Georgian subsample was the youngest and had the highest proportion of female participants. Pandemic-related income loss was also highest in Georgia, with 40.7% and 50.4% of participants being affected at T2 and T1, respectively. It is known that young people, women, and people with pre-existing financial difficulties have been particularly burdened by the pandemic [8, 12], and all three of these groups were overrepresented in the Georgian subsample. Moreover, Georgia had the lowest COVID-19 vaccination rate and the highest incidence and death rate of the five countries at follow-up, which may also have impeded their adjustment to the pandemic. The increase in the frequency of themes related to COVID-19 and pandemic management further supports this assumption. Many Georgian participants indicated being burdened by COVID-related deaths, vaccination issues, and inadequate healthcare in their country.

In Austria and Portugal, none of the assessed mental health outcomes changed significantly over time. These two countries showed similarities regarding living situation and relationship status and also had a higher mean age than the other countries. The latter might have helped them to maintain stable mental health over time, as older people have been shown to adapt better to containment measures [72]. Another protective factor might be the comparably low percentage of participants reporting a pandemic-related income loss in these two countries.

The relatively stable financial situation might have protected Austrian and Portuguese participants from further loss spirals and associated negative effects on mental health, as proposed by the COR theory [35]. It is also noteworthy that Austria and Portugal have the highest GDP per capita among the participating countries [73] and that more favourable outcomes in these two countries were already demonstrated in an earlier international study [31]. Thus, it seems plausible that both pre-existing advantages and national responses to the pandemic contribute to cross-country differences in mental health.

With regard to the symptoms of PTSD, only descriptive analysis could be conducted due to low and unequal sample sizes. Nevertheless, in all countries except from Croatia, we observed an increase in the number of people who experienced a traumatic event during the pandemic. In Croatia, two major earthquakes happened in 2020, leading to a double adversity and an increase in demand for mental health services [74]. This might explain a higher number of Croatian participants reporting trauma exposure at T1 than at T2. The increase of traumatic events in the remaining countries underlines the need for future research on posttraumatic symptoms in individuals exposed to trauma during COVID-19.

When interpreting the changes over time, it is important to consider that all mental health outcomes differed significantly between the five countries at both time points. In fact, over 50% of the total variance in adjustment and depression scores was attributable to country, highlighting the role of country-specific factors in understanding the mental health impact of COVID-19. Multiple studies have already reported cross-country differences in mental health amidst the pandemic [22]. These differences seem to be associated with the strictness of governmental restrictions [75] and variations in vaccine acceptance [76], but also with standard of living [77] and quality of healthcare [78]. All of these aspects are likely to have impacted our results, considering the variety of socioeconomic and cultural factors across the countries examined.

Pandemic-related experiences

In accordance with our assumptions, pandemic-related experiences changed over time. In the following, we touch on the main differences in participants' experiences over time and across countries.

Stressful events and negative aspects of the pandemic. In the questions about stressful events and negative aspects of the pandemic, one new theme relating to vaccination emerged: Participants expressed concerns about side effects of the vaccination and dissatisfaction regarding the pressure to get vaccinated and about possible mandatory vaccination. Vaccine hesitancy and misconceptions about vaccines were also mentioned. Notably, concerns regarding vaccination were more common among participants who reported better health. Personal health concerns and trust in scientists and authorities have previously been identified as important predictors of COVID-19 vaccine acceptance [76]. Thus, the emergence of the theme *Vaccination issues* is not surprising considering the overall good health status and inadequacy of pandemic management indicated by our participants. To increase vaccine acceptance, it therefore appears to be necessary to improve health communication.

Rather alarmingly, we found an increase in the frequency of themes related to deaths and health problems due to COVID-19. The pandemic has brought about a greater confrontation with the theme of death and dying, and this presented a significant burden for some participants. Participants whose family members or friends had died due to COVID-19 reported this event to be particularly stressful. According to the literature, people who have lost a loved one due to COVID-19 represent an at-risk group for the development of mental health problems, as they had to witness a life-threatening disease and were often denied the opportunity to say

their farewell [79, 80]. Our findings underline the importance of continuing to address the challenges and needs of people who have lost a loved one, even in the later phases of the pandemic. Lastly, some of the participants were burdened by their own COVID-19 infection or post-COVID symptoms involving physical but also emotional difficulties. An increased mental health burden has been observed in people with long COVID [81] and further studies are needed to examine this group in greater depth.

Whereas the themes described above were more prominent at T2, others were more frequently mentioned at T1. Of particular note is the decrease in reported financial and work-related burden, which was also evident in the quantitative responses. In the first year of the pandemic, job and income losses, and the consequent impact on mental health, were extensively discussed [27, 82], and largely shaped participants' responses at T1. Over time, the global economic situation has improved but the hardships have remained in economically vulnerable groups [83]. This was also evident in the qualitative part of our study: Although fewer participants indicated work and finances as stressful or negative, those who did reported a significant burden resulting from a co-occurrence of multiple job and work-related stressors such as loans, unemployment, unexpected expenses, etc. Thus, people with substantial losses are likely to remain disproportionately affected throughout the pandemic and in its aftermath, as proposed by the COR theory [35]. Especially in view of recent economic developments (e.g. energy crises), close attention should be paid to economically vulnerable groups to prevent a further deterioration of mental health.

Positive aspects of the pandemic. *Reflection and growth* was the most prominent positive theme at both time points. Participants positively evaluated the increased appreciation for life and the opportunity to rethink their priorities. Such new perspectives on life have often been discussed in the context of posttraumatic growth (i.e. positive psychological changes following an adverse life event; [84]). There is some evidence suggesting that perceptions of growth could reflect coping efforts during the COVID-19 pandemic [85]. Although perceived growth might signalise resilience, it might also signalise greater posttraumatic stress symptoms [86, 87], which supports the idea of high variability in individual responses to stressful events. Regarding variability in our study, a lower number of people reported individual or community growth at T2 than at T1 in Austria. The number of Austrian participants recommending cognitive-emotional strategies also decreased, suggesting a tendency towards behaviour-oriented coping in a later phase of the pandemic in Austria. In general, different mentalities and cultural values might also account for different perception of positive aspects across countries.

The themes *Opportunities for meaningful/enjoyable activities* and *Benefits on the interpersonal level* were more common at baseline than at the one-year follow-up. At the beginning of the pandemic, schools were closed and working from home was routine for many. People also travelled less and numerous leisure and work-related activities outside of the home were cancelled. At that time, participants often positively evaluated the increased time resources (e.g. having more time for oneself) and the opportunity to practise hobbies (e.g. reading, gardening). Over time, working and studying from home have become much rarer and almost all activities have gradually been reintroduced into everyday life. Accordingly, at T2, participants likely had less time, and the positive aspects were no longer as pronounced. This assumption is further supported by the higher number of participants who did not report anything positive about the pandemic at T2.

One positive aspect which became more important was digitalisation, with participants appreciating the technological advances during the pandemic and enjoying the opportunity to study and work online. Additionally, some participants at follow-up positively evaluated the possibility of vaccination.

Population-informed recommendations for dealing with the pandemic. A new vaccination-related theme also emerged for the question about recommendations. Predominantly older participants recommended vaccination as a strategy to deal with the pandemic. Given that age and comorbidities are the most important risk factors for severe COVID-19, it is plausible that older people appreciated vaccine availability more than younger ones and perceived it as a solution to end the pandemic, as stated by a woman from Austria: *"Get vaccinated so that we can get the pandemic under control."*

Apart from the vaccination theme, recommendations for dealing with the pandemic did not change much between the two time points. Participants often recommended being physically active, doing enjoyable things, and relaxing regularly. Recommendations to adhere to preventive measures were often combined with comments about trying to live as normally as possible. The latter is likely to promote well-being, as strict adherence to COVID-19 regulations was associated with higher worry and anxiety symptoms [88]. Given the long duration of the pandemic and possible further crises, cultivating personal resources (e.g. by engaging in personally meaningful and pleasant activities) might be essential for maintaining mental health. Additionally, as emphasised by our sample, accepting the situation without losing hope, and trying to find a silver lining, might foster psychological adjustment. Recent literature adds credibility to this idea [89].

Clinical relevance

Overall, our findings were in line with the concept of psychological flexibility [39] and with the COR theory [35]. Psychological flexibility is an underlying mechanism of the well-established *acceptance and commitment therapy* (ACT; [90]), whereas COR theory promotes the preservation and pursuit of resources to stop loss spirals. Thus, mental health campaigns with elements of ACT and focusing on cultivating resources could boost resilience on a large scale. Such campaigns are strongly recommended given the current global crises and the challenges they pose for the general population.

According to our findings, sources of burden and coping strategies differ across groups (e.g. women vs. men, older vs. younger people, parents vs. non-parents). To provide adequate psychosocial support amidst the pandemic, a close examination of clients' experiences and coping strategies is essential. For example, male participants in our study were more burdened by inadequate pandemic management and communication. Psychoeducation about negative effects of excessive consumption of COVID-related news, and healthy ways to consume media, might increase well-being in this group.

Finally, the observed changes in mental health outcomes, along with the diversity of participants' perceptions and experiences, suggest that psychological adjustment to the pandemic strongly depends on an individual's unique context and resources. Therefore, country-related factors, different challenges in different pandemic phases, as well as personal characteristics and circumstances (e.g. financial resources) need to be equally acknowledged when addressing mental health problems in clinical practice.

Strengths and limitations

A major strength of this study lies in its longitudinal, mixed-methods design. We used established self-report measures to assess mental health outcomes and combined them with open-ended questions to increase validity. The triangulation of qualitative and quantitative data has allowed us to provide a more nuanced understanding of factors that shape people's perceptions and reactions during the COVID-19 pandemic. Moreover, the study quality was increased by the integration of data on the levels of study design, methods, and interpretation, and the

inclusion of two measurement time points in two different phases of the pandemic. The one-year follow-up enabled us to capture significant changes in participants' pandemic-related experiences, which is not possible in longitudinal studies covering shorter intervals. The diversity of our participants in terms of cultural backgrounds and socioeconomic characteristics further enriched our findings. By comparing five countries, we broadened the knowledge about how and why mental health changes in relation to personal and environmental factors.

However, several limitations need to be acknowledged. First, the generalisability of the findings is limited by the convenience sampling. Future studies using similar methodology in a representative sample could provide important insights. In all countries, the first assessment took place in 2020 and the second in 2021. However, in both waves, some countries (e.g. Croatia) began data collection earlier than others (e.g. Greece), which limits the comparability of the data, especially given the rapidly changing course of the pandemic. Furthermore, due to the lack of pre-pandemic data, it was impossible to assess the causal impact of COVID-19 on mental health. Finally, our findings are limited by the different sample sizes in the countries. The Austrian and Croatian subsamples were considerably larger than the other subsamples, which might have biased the results. Presumably, larger sample sizes would have also allowed for a closer investigation of people with trauma exposure. This remains a subject for future research.

Conclusion

The present mixed-methods study has enhanced the understanding of psychological responses to the pandemic around Europe. Our findings strongly suggest that adjustment to the pandemic is a dynamic process influenced by an interplay of individual characteristics and circumstances, country-related factors, and the course of the pandemic. For research and clinical practice related to COVID-19 and other crises, we advise adopting a context-sensitive perspective in order to optimally address the mental health needs of the general population and at-risk groups.

Supporting information

S1 Appendix. Detailed information on the methodology and participants' characteristics.
(PDF)

S2 Appendix. Themes and categories (T1 and T2).
(PDF)

S3 Appendix. Detailed results of the mixed-methods analysis.
(PDF)

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Author Contributions

Conceptualization: Irina Zrnić Novaković, Brigitte Lueger-Schuster.

Formal analysis: Irina Zrnić Novaković.

Investigation: Irina Zrnić Novaković, Dean Ajduković, Helena Bakić, Camila Borges, Margarida Figueiredo-Braga, Xenia Anastassiou-Hadjicharalambous, Chrysanthi Lioupi, Jana Darejan Javakhishvili, Lela Tsiskarishvili.

Methodology: Irina Zrnić Novaković, Dean Ajduković.

Project administration: Irina Zrnić Novaković, Annett Lotzin, Brigitte Lueger-Schuster.

Supervision: Annett Lotzin, Brigitte Lueger-Schuster.

Visualization: Irina Zrnić Novaković.

Writing – original draft: Irina Zrnić Novaković.

Writing – review & editing: Irina Zrnić Novaković, Dean Ajduković, Helena Bakić, Camila Borges, Margarida Figueiredo-Braga, Annett Lotzin, Xenia Anastassiou-Hadjicharalambous, Chrysanthi Lioupi, Jana Darejan Javakhishvili, Lela Tsiskarishvili, Brigitte Lueger-Schuster.

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Trajectories of Adjustment Disorder and Well-Being in Austria and Croatia during 20 Months of the COVID-19 Pandemic

Irina Zrnić Novaković [1,*], Alina Streicher [1], Dean Ajduković [2], Marina Ajduković [3], Jana Kiralj Lacković [2], Annett Lotzin [4,5] and Brigitte Lueger-Schuster [1]

1 Department of Clinical and Health Psychology, Faculty of Psychology, University of Vienna, 1010 Vienna, Austria; alina.streicher@univie.ac.at (A.S.); brigitte.lueger-schuster@univie.ac.at (B.L.-S.)
2 Department of Psychology, Faculty of Humanities and Social Sciences, University of Zagreb, 10000 Zagreb, Croatia; dean.ajdukovic@ffzg.hr (D.A.); jana.kiralj@gmail.com (J.K.L.)
3 Department of Social Work, Faculty of Law, University of Zagreb, 10000 Zagreb, Croatia; majdukov@pravo.hr
4 Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, 20246 Hamburg, Germany; a.lotzin@uke.de
5 Department of Psychology, MSH Medical School Hamburg, 20457 Hamburg, Germany
* Correspondence: irina.zrnic@univie.ac.at

Abstract: The present study aimed to investigate the trajectories of adjustment disorder (AD) symptoms and well-being over 20 months of the COVID-19 pandemic in Austria and Croatia. Further objectives of this study were to examine whether sociodemographic characteristics and the symptoms of anxiety and depression could predict these trajectories. As part of the pan-European ESTSS ADJUST study, $N = 1144$ individuals were recruited using convenience sampling and assessed four times between June 2020 and January 2022 through an online survey. Latent growth curve modelling was applied to estimate the trajectories of AD symptoms and well-being. Over time, the prevalence of probable AD varied between 9.8% and 15.1%. The symptoms of AD tended to increase, whereas well-being tended to decrease. According to the majority of the models tested, women, participants from Austria and those with lower income had higher initial AD symptoms, whereas older participants and those from Croatia had higher initial well-being. In all models and at all timepoints, anxiety and depression significantly predicted AD and well-being scores. Overall, our study points to several predictors of AD and well-being and indicates high variability in people's reactions to the pandemic. Psychosocial support for the general population is needed during pandemics and similar crises, with a special focus on vulnerable groups.

Keywords: adjustment disorder; well-being; COVID-19; pandemic; mental health; latent growth curve modelling; LGCM

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1. Introduction

The past three years have been marked by the COVID-19 pandemic and its repercussions. Compromised mental and physical health, disrupted routines and changed social dynamics, along with financial losses and work-related challenges, are just some of the stressors people have been repeatedly exposed to (for an overview of stressors related to the COVID-19 pandemic, see [1]). Due to its long-lasting and potentially traumatic impact [2], COVID-19 has been described as "continuous traumatic stress" [3]. According to the literature, adjustment disorder (AD) can best capture a maladaptive reaction to pandemic-related stress or trauma [4,5]. However, longitudinal studies on changes in AD symptoms over time are scarce, and potential cross-country differences amidst COVID-19 are still poorly understood. Acknowledging that AD symptoms are likely to develop in response to pandemics but also to other global challenges (e.g., the climate crisis, inflation, wars and refugee crises), the present study aims to better understand their trajectories and underlying factors in Austria and Croatia. Despite their geographical proximity, historical

ties and cultural and economic exchanges [6], these two European Union countries differ in terms of their socioeconomic situations and degrees of life satisfaction [7,8], as well as their responses to the COVID-19 pandemic. For context, Croatia implemented stricter measures at the beginning of the pandemic, whereas government measures in Austria were stricter in the later stages of the pandemic [9].

1.1. Adjustment Disorder Amidst COVID-19

AD can be defined as a maladjustment to a stressful event or severe changes in life, such as job loss, financial strain or the illness of a loved one [10,11]. It is characterised by a preoccupation with the stressor and a failure to adapt which severely impacts one's functioning. According to the World Health Organisation [12], the symptoms of AD usually resolve within six months. However, the symptoms might last longer if the stressor persists longer [13], which was the case for the COVID-19 pandemic and its consequences.

During the pandemic, international studies researching different samples reported prevalence rates of AD ranging from 8.2% to 61.3% [14,15]. In older people, diagnoses of AD were more often documented before (2017–2019) than during the pandemic (2020 [16]). Gender differences were also found, with 40.7% of women compared to 31% of men scoring above cut-off for probable AD in a large sample of Georgian participants [17].

Apart from the above-mentioned sociodemographic characteristics, adjustment difficulties have been linked to COVID-related stressors, such as social restrictions, governmental pandemic management, work and financial difficulties [18]. Notably, the mental health impact of these stressors varied between countries, with countries having had more experience with stress and trauma showing better outcomes [19]. Different pandemic loads in terms of the stringency index and incidence and death rates could also explain cross-country differences in some mental health outcomes, e.g., anxiety, depression and post-traumatic stress disorders [20,21]. However, associations between pandemic load and AD symptoms have not yet been investigated.

In general, some findings on factors associated with AD symptoms are inconsistent, whereas others are more robust. For instance, older participants were found to be at risk for developing AD in some studies [18], while a protective role of older age was proposed in other studies [22]. In contrast, a large body of research has shown that AD symptoms are associated with different emotional responses to the pandemic, including the fear of infection [23], COVID-19 concerns [17] and depression symptoms [24].

1.2. Trajectories of Adjustment Disorder Amidst COVID-19

To date, only a small number of studies have investigated changes in AD symptoms over the course of the COVID-19 pandemic. There is evidence that the symptoms of AD consolidated in autumn 2020 [25], although a German study comparing AD symptoms in the spring and autumn of 2020 found no significant differences [26].

A representative study conducted in Israel in the summer of 2020 (before the second lockdown) and in late autumn in 2020 (after the second lockdown) detected four trajectories of AD symptoms, suggesting different patterns of adjustment to the pandemic [27]. Remarkably, there is only limited knowledge of positive psychological adjustments to the pandemic over time since the indicators of positive mental health, such as well-being, have not yet been included in the research on AD amidst COVID-19. Thus far, scientific attention has mainly been directed toward vulnerable groups and risk factors for probable AD (e.g., [23,28]).

Shifting the focus toward indicators of positive mental health and the course of AD symptoms in the later phases of COVID-19 could yield a more differentiated picture of the psychological adjustment to the pandemic. Longitudinal studies over a longer period of time are particularly beneficial given that some individuals may experience adjustment difficulties only in the later phases of the pandemic [28]. Moreover, the changing context of the pandemic in terms of the strictness of COVID-19 restrictions and the incidence and

death rates might foster an understanding of changes in both adjustment and well-being, yet these interrelations have not been explored.

1.3. Current Study

In summary, the existing research on AD amidst COVID-19 has some limitations. Firstly, given that the majority of studies were conducted in the first months of the pandemic and covered intervals of several weeks or a few months, little is known about the trajectories of AD symptoms over a longer period and in later phases of the pandemic. Secondly, the co-development of well-being and AD symptoms during the pandemic is still poorly understood. The inclusion of sociodemographic characteristics (e.g., income and education) and mental health indicators (e.g., anxiety symptoms) might increase knowledge about this co-development [29–31]. Finally, a significant amount of uncertainty still exists with respect to cross-country differences, and a closer examination of the course of the pandemic in different countries might help to explain the development and severity of adjustment difficulties.

To address these research gaps, the present study examined the trajectories of AD symptoms in Austria and Croatia over 20 months of the COVID-19 pandemic. Both countries are part of the pan-European ADJUST study on stressors, coping and the symptoms of AD [18,32]. In addition to the three waves of assessments conducted in all ADJUST member countries, a fourth wave was launched in Austria and Croatia in December 2021–January 2022. The aim was to assess psychological reactions to the pandemic one year after the large spike in COVID-19 cases and deaths over the winter months of 2020/2021 [33,34].

Several factors provide a basis for comparing Austrian and Croatian participants. Firstly, life satisfaction and quality of life have been higher in Austria than in Croatia in previous years, which could largely be explained by the higher gross domestic product (GDP) per capita among Austrians [35,36]. Secondly, the countries differ in terms of mental health, with Austrian citizens experiencing a higher mental health burden [37]. Thirdly, Austria and Croatia have been affected by COVID-19 to different extents, with, e.g., higher numbers of confirmed deaths being reported in Croatia in the second year of the pandemic [38]. Government policies for managing COVID-19 also differed between the countries [34]. For these reasons, a comparison of Croatian and Austrian data might shed light on the effects of a variety of socioeconomic and contextual factors on adjustment trajectories.

1.4. Aims and Research Questions

The present study set out to explore the trajectories of AD and well-being in the first two years of the COVID-19 pandemic using latent growth curve modelling. Our main aims were to answer the following research questions:

1. How do the trajectories of AD symptoms and well-being develop over time in Austria and Croatia?
2. To what extent can sociodemographic characteristics (country, age, gender, income and education) predict the trajectories of AD and well-being?
3. To what extent can the symptoms of anxiety and depression predict the trajectories of AD and well-being?

Acknowledging that people are capable of coping with stressful situations and adapting to changing situational demands [39,40], we hypothesised that the symptoms of AD would decrease, whereas well-being would increase over time. Based on the existing evidence, we further hypothesised that sociodemographic characteristics and the symptoms of anxiety and depression would predict the trajectories of AD and well-being.

2. Materials and Methods

The present study is part of the international ADJUST COVID-19 study involving 11 European countries [32]. For further information, please see the study's website: https:

//estss.org/adjust/ (accessed on 26 September 2023) and the corresponding OSF registry where the study was preregistered: https://doi.org/10.17605/OSF.IO/8XHYG (accessed on 26 September 2023). The data used for the secondary analysis described in this paper were collected from the general populations of Austria and Croatia at four measurement timepoints. As described in the introduction, only these two countries launched a fourth assessment wave in the course of the ADJUST study. Though they are closely related, e.g., in terms of cultural and economic exchanges [6], Austria and Croatia differ in several aspects [35,38], thus forming an interesting basis for comparison. The periods of data collection and information about the COVID-19 situation in both countries at each timepoint are presented in Table 1.

2.1. Procedure and Participants

Over the course of the ADJUST study (i.e., the primary analysis), all assessment waves were conducted as online surveys using *LimeSurvey*, an online tool for creating anonymous surveys and questionnaires in line with the General Data Protection Regulation (GDPR; www.limesurvey.org, accessed on 31 August 2023). We used several strategies to recruit participants for the first assessment wave (T1). For instance, our study invitation was distributed among the staff of major companies and professional associations, as well as among members of numerous leisure and interest groups. We also shared the study link on social media and distributed flyers in public spaces. A detailed overview of the recruitment strategies can be found at www.ncbi.nlm.nih.gov/pmc/articles/PMC8725769/bin/ZEPT_A_1964197_SM8752.docx (see Supplement 2, accessed on 26 September 2023). The survey was accessible via a website link or a QR code. On the first page of the survey, potential participants could read important information about the study (the aims of the study, data management and the right to withdraw) and, if interested, provide their informed consent.

To participate in the present study (i.e., the secondary analysis), the following criteria were required: (1) the participants needed to be at least 18 years old, (2) have good command of the German or Croatian language, (3) live in Austria or Croatia, (4) agree to participate in the study, and (5) respond to at least two assessment waves. In Austria, ethical approval for the study was granted by the Ethics Committee of the University of Vienna (date of approval: 29 May 2020, reference number: 00554), whereas the Ethics Committee of the Department of Psychology in the Faculty of Humanities and Social Sciences at the University of Zagreb granted ethical approval in Croatia (date of approval: 21 May 2020). Prior to the initiation of the survey, informed consent was obtained online from all participants.

At baseline (T1), N = 1001 valid cases were obtained in Austria and N = 1787 were obtained in Croatia, out of which 52.5% Austrian participants (n = 525) and 57.8% Croatian participants (n = 1032) agreed to take part in the following waves. These participants were re-contacted after approximately 6, 12 and 18 months and asked to participate in further study waves (T2, T3 or T4, respectively).

In total, N = 1144 participants (M_{age} = 44.0, SD_{age} = 13.5), who were predominantly female (73.5%) met the inclusion criteria and were included in the present analysis. Table 2 shows important characteristics of the study participants.

Table 1. The COVID-19 situation in Austria and Croatia at four data collection timepoints.

	T1		T2		T3		T4	
	Austria	**Croatia**	**Austria**	**Croatia**	**Austria**	**Croatia**	**Austria**	**Croatia**
Recruitment period	27 June 2020– 22 September 2020	15 June 2020– 16 August 2020	14 January 2021– 29 March 2021	30 November 2020– 7 January 2021	13 July 2021– 8 October 2021	21 June 2021– 26 July 2021	26 November 2021– 13 December 2021 [a]	8 December 2021– 11 January 2022
Duration of data collection	88 days ≈ 13 weeks	63 days ≈ 9 weeks	75 days ≈ 11 weeks	39 days ≈ 6 weeks	88 days ≈ 13 weeks	36 days ≈ 5 weeks	18 days ≈ 3 weeks	35 days ≈ 5 weeks
Stringency index								
M (*SD*)	38.59	44.98	77.58	58.57	50.11	35.19	51.70	36.97
Range	36.11–50.00	35.19–54.63	73.15–82.41	47.22–67.59	46.23–55.05	30.49–41.67	49.30–52.06	33.26–38.08
Incidence								
M (*SD*)	24.73 (20.42)	14.55 (7.20)	214.75 (67.75)	639.83 (243.16)	126.58 (72.32)	22.81 (5.40)	413.46 (418.22)	613.41 (350.14)
Range	4.25–83.34	0.18–31.09	142.82–351.49	276.26–905.02	17.45–232.98	16.91–36.37	0.00–1257.42	0.00–981.76
Deaths								
M (*SD*)	0.19 (0.06)	0.22 (0.19)	4.57 (1.38)	16.35 (1.92)	0.59 (0.43)	0.59 (0.29)	7.50 (0.34)	12.15 (1.88)
Range	0.06–0.37	0.00–0.60	3.02–7.34	12.73–19.57	0.16–1.37	0.25–1.49	6.76–7.86	9.39–15.24

Note: The stringency index is a composite measure of government policies, with higher scores indicating a stricter response (i.e., 100 = strictest response [9]). Data on incidence are defined as new confirmed cases of COVID-19 per one million people. Data on death rates are defined as new deaths attributed to COVID-19 per one million people. The values reported in the table are the averages of the daily values recorded during the respective recruitment periods. All data are based on the dataset provided by *Our World in Data* (last accessed on 23 March 2023 [34]). [a] This data collection period was shorter than the others in order to reflect the duration of the lockdown implemented in Austria in the winter of 2021.

Table 2. Participants' characteristics at T1.

	Total Sample ***N* = 1144**	**Austria** ***n* = 415**	**Croatia** ***n* = 729**
Age	*M* = 44.0 *SD* = 13.5	*M* = 46.5 *SD* = 14.7	*M* = 42.7 *SD* = 12.6
	n (%)	*n* (%)	*n* (%)
Gender [a]			
Male	300 (26.2)	128 (30.8)	172 (23.6)
Female	841 (73.6)	285 (68.7)	556 (76.4)
Other	2 (0.2)	2 (0.5)	0 (0.0)
Education			
Low	6 (0.5)	5 (1.2)	1 (0.1)
Middle	306 (26.7)	166 (40.0)	140 (19.2)
High	832 (72.7)	244 (58.8)	588 (80.7)
Income [b]			
Very low	126 (11.3)	43 (11.2)	83 (11.4)
Low	346 (31.1)	140 (36.5)	206 (28.3)
Medium	344 (30.9)	31 (8.1)	313 (43.0)
High	296 (26.6)	170 (44.3)	126 (17.3)
Relationship status			
Single	269 (23.5)	102 (24.6)	167 (22.9)
In a relationship	875 (76.5)	313 (75.4)	562 (77.1)
Employment status [c]			
Training/Study	124 (25.5)	52 (12.5)	72 (9.9)
Employed part-time	154 (34.5)	122 (29.4)	32 (4.4)
Employed full-time	742 (77.0)	193 (46.5)	549 (75.3)
Self-employed	68 (15.2)	36 (8.7)	32 (4.4)
Retired	84 (19.0)	57 (13.7)	27 (3.7)
Job-seeking	57 (12.3)	8 (1.9)	49 (6.7)
Other	26 (6.0)	10 (2.4)	16 (2.2)
Diagnosis of a mental disorder			
Yes	167 (14.6)	96 (23.1)	71 (9.7)
No	977 (85.4)	319 (76.9)	658 (90.3)

Note: [a] $N = 1143$ ($n_{Austria} = 415$; $n_{Croatia} = 728$). [b] $N = 1112$ ($n_{Austria} = 384$; $n_{Croatia} = 728$). [c] Percentages sum to more than 100 as multiple responses were possible.

2.2. Measures

An overview of the measures included in the ADJUST study can be found in the respective study protocol [32]. For the present analysis, the following measures were used in the German and Croatian language, respectively.

The 8-item Adjustment Disorder New Module (ADNM-8 [41]) screens for life stressors and AD symptoms according to the 11th version of the International Classification of Diseases (ICD-11 [12]). It consists of four items on preoccupation and four items on adjustment difficulties; each are scored on a 4-point Likert scale ranging from 1 (*never*) to 4 (*often*). Higher scores indicate more intense AD symptoms, and a score of >22 represents a cut-off for probable AD. The ADNM-8 has shown good psychometric properties [41,42] and has been used to assess AD symptoms during the pandemic [28,43].

The 5-item World Health Organization Well-Being Index (WHO-5 [44]) measures subjective well-being on a 6-point Likert scale ranging from 0 (*at no time*) to 5 (*all of the time*). The total raw score, with possible values between 0 and 25, is multiplied by 4, resulting in a final score between 0 and 100, with the latter representing the highest degree of well-being. A score below 51 suggests poor well-being and might be indicative of depressive symptomatology [45,46]. The high validity and applicability of the WHO-5 have been demonstrated across different countries and study samples [46], and the scale has been widely used in the pandemic context [20,47].

The 4-item Patient Health Questionnaire (PHQ-4 [48]) measures the core symptoms of depression and anxiety on a 4-point Likert scale (ranging from 0 = *not at all* to 4 = *more than half the days*). It comprises a 2-item depression scale (the 2-item Patient Health Questionnaire (PHQ-2)) and a 2-item anxiety scale (the 2-item Generalized Anxiety Disorder Scale (GAD-2)). A score of >2 on one of these scales is used as cut-off point for possible depression or anxiety. All three scales (i.e., the PHQ-4, PHQ-2 and GAD-2) have shown good reliability and validity [49] and have been applied in various COVID-19 studies [50].

In the present study, each scale had a high level of internal consistency across all measurement timepoints, ranging from 0.81 to 0.92 (for details, please see the Supplementary Materials, Table S1). Depending on the measurement, Cronbach's α or the Spearman–Brown coefficient was used, as appropriate [51]. In addition to the described scales, self-constructed items were used to assess the sociodemographic characteristics of the participants. Gender, age, education and income were included in the main analysis as these variables were found to be predictive of AD and/or well-being in previous studies [18,52–54] and might explain the differences between mental health outcomes in Austria and Croatia.

2.3. Data Analysis

The analyses were conducted using IBM SPSS Statistics (version 27 [55]) and RStudio (version 2022.12.0.353 [56]). After performing descriptive and missing data analyses (using the Mann–Whitney *U* test and the Welch *t*-test), measurement invariance was assessed. Cochran's Q test, followed by a post hoc analysis using Dunn's procedure, was conducted to explore whether the percentage of participants at risk for AD, depression and anxiety was different at the different timepoints. The complete dataset without missing values was used for this analysis (n = 531). In addition, we conducted a linear regression analysis to check whether the anxiety and depression scores attained at T1 could predict AD symptoms and well-being scores at T4. With this exploratory analysis, we wanted to indirectly account for the possible predictive value of pre-existing mental health symptoms since no reliable pre-pandemic data were available in the study.

Following these preparatory steps, latent growth curve models (LGCMs) of different levels of complexity were tested. General rules for evaluating model fit were used for all analyses [57,58].

2.3.1. Measurement Invariance

Measurement invariance considers the psychometric equivalence of a construct over time or across different groups [59]. The assessment of invariance is an important step prior to testing group differences (e.g., cross-country differences, as in this study) or comparing different measurement occasions (e.g., changes over time, as in this study). Therefore, we assessed *invariance over populations* by comparing the Austrian and Croatian samples, and we assessed *longitudinal measurement invariance* by comparing the data collected at each of the four measurement timepoints.

We tested measurement invariance in the structural equation modelling (SEM) framework using a confirmatory factor analysis (CFA [60]) for all relevant measures (i.e., the ADNM-8, WHO-5, PHQ-2 and GAD-2). Following the general guidelines regarding estimation methods [60,61], we used the weighted least square mean and variance adjusted (WLSMV) estimator for testing the invariance of measures with four or fewer answering options (i.e., the ADNM-8, PHQ-2 and GAD-2) and the robust maximum likelihood (MLR) as an estimator for testing the invariance of measures with more than four answering options (i.e., the WHO-5). To handle missing data, listwise deletion was used in combination with the WLSMV, and the Full Information Maximum Likelihood (FIML) in combination with the MLR [60]. Parcelling was applied for the analysis of the ADNM-8 as it was the only measure with more than five items.

Given that all measures used in the study are well-established, we assumed psychometric equivalence across groups and over time. Therefore, we applied the *model-building approach* (also known as the *constrained baseline approach*) to assess measurement invariance,

using the most restricted model (i.e., strong invariance) as the baseline [60]. This analysis was performed using lavaan, an open source R package (version 0.6.12 [62]).

2.3.2. Latent Growth Modelling

Latent growth curve (LGC) modelling is a statistical method through which within-person changes (i.e., intra-individual patterns of change) and between-person differences (i.e., inter-individual variability) over time can be estimated [63–65]. Thus, LGC modelling allows one to examine individual differences in a longitudinal design (i.e., individual latent trajectories), which is not feasible using conventional methods, such as an ANOVA. Another advantage of LGC modelling is its ability to handle missing data effectively [66].

The essential elements of all LGCMs are *fixed* and *random effects*. Fixed effects are factors estimated from the data, namely the *mean intercept* (i.e., starting point) and the *mean slope* (i.e., the increment or rate of change). Jointly, these factors define the average latent trajectory for the entire sample. On the other hand, random effects capture the variance around the average trajectory, i.e., the differences in the starting point and the rate of change across individuals. Taken together, the fixed and random effects allow for the description of the general characteristics of the growth curve (i.e., trajectory) for the entire sample and the subgroups within this sample [63,64].

In the present study, LGC modelling was performed within the SEM framework [67], using lavaan (version 0.6.15 [62]). Given that a linear change was hypothesised and the four timepoints were approximately equally spaced, the following coding scheme was used to represent the slope: 0, 1, 2, 3. For the intercept, the factor loadings for four measurement timepoints were set to 1 (i.e., 1, 1, 1, 1). In line with the current recommendations [64,68], the MLR was the preferred estimator for all analyses. A state-of-the-art method of handling missing data, FIML, was used to deal with partially missing data [69].

A series of LGCMs were used to assess changes in AD symptoms (determined via the ADNM-8) and well-being (determined via the WHO-5) over time:

1. **Univariate models**: Firstly, univariate unconditional models were estimated to explore changes over time in AD and well-being separately. Next, the *time-invariant covariates* (TICs [64]) age, gender, country, education and income were included as predictors of the variability in the intercept and slope in two conditional models for AD symptoms and well-being, respectively. In a third step, depression (determined via the PHQ-2) and anxiety (determined via the GAD-2) scores were added as *time-varying covariates* (TVCs [64]).
2. **Multivariate models**: The same procedure was repeated for multivariate models (i.e., joint models for AD symptoms and well-being) to investigate how AD symptoms and well-being simultaneously unfold over time [65]. The final model included all TICs and TVCs to explore whether these can explain the residual variance in the joint model. Moreover, the covariance between the intercept and slope was estimated for each primary outcome. Residuals between the primary outcomes were allowed to correlate within one timepoint. Figure 1 shows the proposed multivariate model of AD symptoms and well-being with all predictors and covariances.
3. **Multivariate models by country:** In the last step, the final model was executed in the Austrian and Croatian samples separately in order to explore possible differences in the growth trajectory and predictors between the two countries. For this final analysis, the predictor "country" was obsolete; thus, it was excluded from the analysis. The other model specifications remained unchanged.

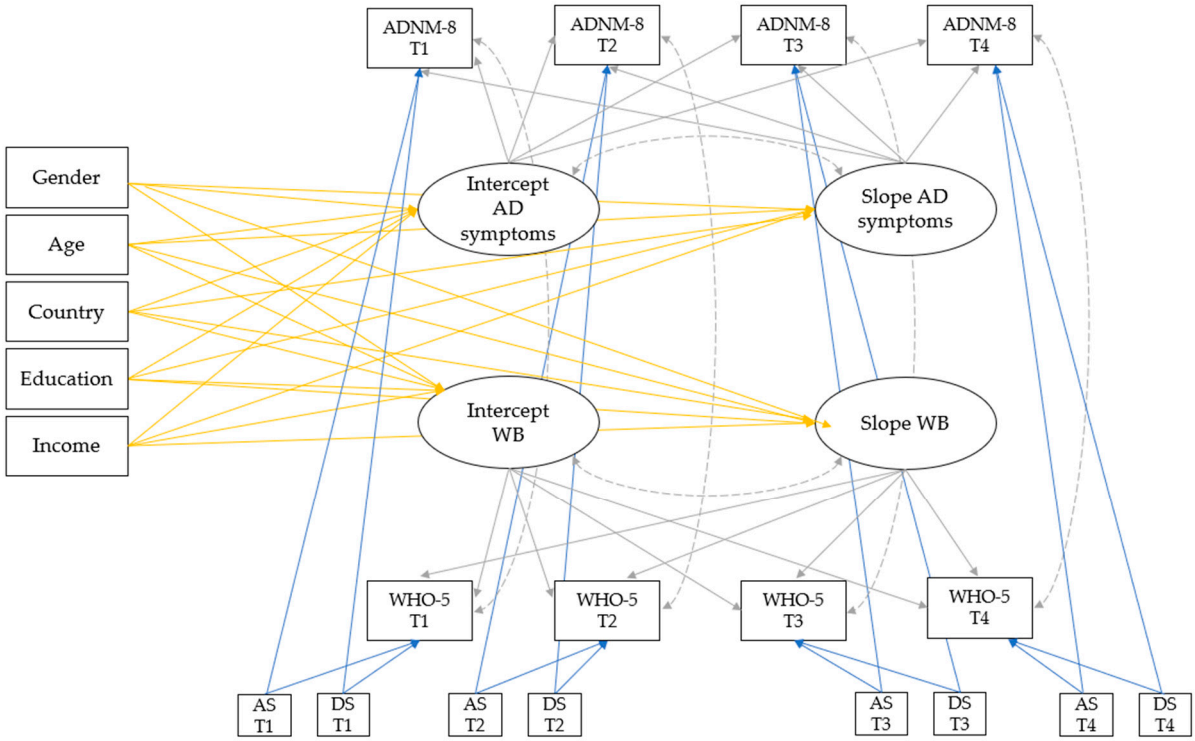

Figure 1. Conceptional model of AD symptoms and well-being with covariances, time-invariant covariates (TICs; yellow lines) and time-varying covariates (TVCs; blue lines). The solid grey lines represent the factor loadings, and the dashed grey lines represent the covariances. Note: ADNM-8 = 8-item Adjustment Disorder New Module; AD = adjustment disorder; WB = well-being; AS = anxiety scores (PHQ-2 = 2-item Patient Health Questionnaire); DS = depression score (GAD-2 = 2-item Generalized Anxiety Disorder Scale).

3. Results

3.1. Participant Flow and Missing Data

Participants who did not meet the inclusion criteria and those who did not provide answers for the primary outcome measures were excluded from the analysis, resulting in a total of $N = 1144$ participants ($n_{Austria} = 415$; $n_{Croatia} = 729$). Detailed information about participant flow is provided in the Supplementary Materials (Table S2).

An analysis of missing data was conducted by comparing the participants who responded to all the assessment waves ($n = 531$) with those who had missing data for one or more assessment waves ($n = 613$). The two groups did not differ in terms of gender, $p = 0.493$. However, the participants who responded to all four assessment waves were significantly older ($M = 45.01$; $SD = 13.97$) than those who responded to two or three waves ($M = 43.20$; $SD = 13.05$); $t(1142) = -2.27$ and $p = 0.023$. According to a Mann–Whitney U test, the participants who responded to all waves were slightly better educated (mean rank = 597.48) than the non-respondents (mean rank = 550.87); $U = 176{,}013.50$, $z = 3.08$ and $p = 0.002$. Moreover, the average monthly household income was higher in respondents (mean rank = 577.13) than in non-respondents (mean rank = 539.09); $U = 163{,}964.50$, $z = 2.052$ and $p = 0.040$. Please note that complete cases were used for the descriptive analyses, whereas the FIML was used for the LGCMs.

3.2. Cross-Country Differences and Measurement Invariance

Due to a violation of the homoscedasticity assumption, a Welch t-test was run to determine whether there were differences in the mean ages of the Austrian and Croatian participants. The Austrian participants were significantly older than the Croatian participants ($M = 3.78$, 95% CI [2.09, 5.47], $t(755.11) = 4.40$, $p < 0.001$). The difference in

the proportions of male and female participants in the two countries was also significant ($p = 0.007$). Furthermore, the participants from Croatia reported higher levels of educational attainment ($U = 184606.50$, $z = 8.04$, $p < 0.001$), whereas the participants from Austria reported higher income ($U = 124867.00$, $z = -3.05$, $p = 0.002$).

Regarding measurement invariance, the model fit was satisfactory in the most restricted model for all measures tested (see the Supplementary Materials, Table S3), suggesting strong invariance for the ADNM-8, WHO-5, PHQ-2 and GAD-2. Thus, the results show that all the measures included in the analysis measured the same constructs over different timepoints and different groups (i.e., the Austrian and Croatian samples).

3.3. Mental Health Outcomes over Time

At T1, one in ten participants reported clinically relevant AD symptoms, and approximately 15% met the criteria for probable depression or an anxiety disorder. All mental health outcomes assessed in the study showed changes over time, with the highest AD and depression scores at T2 and the highest anxiety scores at baseline. At each timepoint, a considerable number of participants reported reduced well-being, with percentages ranging from 33.7% to 45.1%. Descriptive statistics of all relevant measures at each timepoint are shown in Table 3. The observed individual trajectories of the ANDM-8 and WHO-5 scores are provided in the Supplementary Materials (Figures S1–S4).

Table 3. Average scores of the assessed mental health outcomes and self-reported prevalence rates (i.e., the percentage of participants above the cut-off) of mental health disorders at four timepoints.

Timepoint	ADNM-8		PHQ-2		GAD-2		WHO-5 [a]	
	M (*SD*)	% (*n*)	*M* (*SD*)	% (*n*)	*M* (*SD*)	% (*n*)	*M* (*SD*)	% (*n*)
T1 $n = 1144$	14.3 (5.3)	9.8 (112)	1.3 (1.5)	15.4 (176)	1.4 (1.3)	15.8 (181)	58.0 (21.4)	33.7 (386)
T2 $n = 993$	15.8 (5.7)	15.1 (150)	1.5 (1.5)	16.2 (161)	1.3 (1.5)	15.5 (154)	51.5 (22.1)	45.1 (448)
T3 $n = 837$	14.3 (5.4)	9.9 (83)	1.2 (1.4)	12.9 (108)	1.1 (1.4)	11.6 (97)	57.3 (21.6)	34.5 (289)
T4 $n = 674$	15.0 (5.6)	11.7 (79)	1.3 (1.6)	16.2 (109)	1.3 (1.5)	14.5 (98)	53.8 (22.7)	40.8 (275)

Note: ADNM-8 = 8-item Adjustment Disorder New Module; WHO-5 = 5-item World Health Organization Well-Being Index; PHQ-2 = 2-item Patient Health Questionnaire; GAD-2 = 2-item Generalized Anxiety Disorder Scale. The prevalence rates were calculated based on the following established cut-off scores: ADNM-8 > 22, PHQ-2 > 2. GAD-2 > 2 and WHO-5 $\leq$ 50. [a] The percentages suggest suboptimal well-being and likely depression [46].

The percentages of self-reported AD differed significantly over time ($\chi^2(3) = 22.71$; $p < 0.001$). The highest percentage of participants at risk of developing AD was at T2 (15.4%; $n = 82$), which was significantly more than at T1 (9.2%; $n = 49$), T3 (10.4%; $n = 55$) and T4 (11.5%; $n = 61$), $p < 0.001$, $p = 0.002$ and $p = 0.027$, respectively.

A significant difference regarding probable depression was also found ($\chi^2(3) = 8.80$; $p = 0.032$). The percentage of participants at risk for probable depression was equally high at T2 and T4 (16.0%; $n = 85$), followed by T1 (13.9%; $n = 74$) and T3 (11.5%; $n = 61$), though Dunn's procedure with a Bonferroni correction could not detect where the differences in proportions lay ($p \geq 0.065$). The percentage of participants at risk for probable anxiety changed over time ($\chi^2(3) = 11.38$; $p = 0.010$), with the highest prevalence rates found at T1 and T4 (14.9%; $n = 76$). These estimated prevalence rates were significantly different from those found at T3 (9.6%; $n = 51$), $p = 0.023$, but not from those found at T2 (13.4%; $n = 71$), $p > 0.050$.

Linear regression analyses showed that both depression and anxiety scores at baseline could predict AD scores at the last timepoint ($F(1, 672) = 110.72$; $p < 0.001$ and $F(1, 672) = 122.13$; $p < 0.001$, respectively). The adjusted R^2 was 14.0% for depression and 15.3% for anxiety, both indicating a moderate effect size according to Cohen [70].

The depression and anxiety scores at baseline were also predictive of the WHO-5 scores at the last timepoint ($F(1, 672) = 165.20$; $p < 0.001$ and $F(1, 672) = 150.66$; $p < 0.001$, respectively). The effect size was moderate, with $R^2 = 19.7\%$ for depression and $R^2 = 18.3\%$ for anxiety [70].

3.4. Univariate LGCMs

The model fit indices for the univariate LGCMs showed mixed results. While the Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI) mostly indicated an acceptable fit, the Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR) occasionally indicated a poor fit. All fit indices and parameter estimates are presented in Table 4.

Table 4. Comparison of fit indices and parameter estimates in univariate models.

	Univariate Unconditional Model		**Univariate Conditional Model with TICs**		**Univariate Conditional Model with TVCs**		**Univariate Model with TICs and TVCs**	
	AD	**WB**	**AD**	**WB**	**AD**	**WB**	**AD**	**WB**
Fit indices								
X^2 (*df*)	105.89 *** (5)	136.80 *** (5)	131.84 *** (15)	158.36 *** (15)	148.70 *** (29)	140.68 *** (29)	169.82 *** (39)	147.65 *** (39)
CFI	0.933	0.925	0.929	0.924	0.925	0.940	0.919	0.941
TLI	0.919	0.910	0.876	0.869	0.901	0.921	0.879	0.912
RMSEA [90% CI]	0.165 [0.136, 0.196]	0.182 [0.153, 0.213]	0.101 [0.084, 0.119]	0.107 [0.091, 0.125]	0.097 [0.082, 0.113]	0.091 [0.076, 0.107]	0.089 [0.075, 0.103]	0.078 [0.065, 0.092]
SRMR	0.063	0.068	0.034	0.037	0.119	0.106	0.085	0.070
Parameter estimates (*SE*)								
Intercept	14.57 *** (0.16)	56.77 *** (0.64)	16.34 *** (1.28)	39.88 *** (4.70)	11.73 *** (0.22)	69.32 *** (0.85)	10.78 *** (1.34)	61.49 *** (5.17)
Slope	0.15 * (0.06)	−1.10 *** (0.22)	0.17 (0.47)	−2.76 (1.67)	0.24 ** (0.09)	−1.34 *** (0.30)	−0.33 (0.56)	−0.76 (1.84)
Covariances (*SE*)								
i ~~ s	−0.78 (0.51)	8.31 (6.71)	−0.97 † (0.50)	5.98 (6.86)	0.17 (0.37)	4.04 (5.05)	0.07 (0.37)	2.85 (5.10)
Variances (*SE*)								
Intercept	18.87 *** (1.38)	286.64 *** (19.74)	18.31 *** (1.36)	274.99 *** (20.02)	7.13 *** (1.11)	114.14 *** (14.58)	6.52 *** (1.16)	115.11 *** (14.53)
Slope	1.24 *** (0.30)	3.66 (3.80)	1.30 *** (0.29)	3.78 (3.82)	0.59* (0.23)	0.83 (2.88)	0.58 * (0.23)	1.47 (2.94)
TICs (*SE*)								
Gender	-	-	i: 1.25 ** (0.37) s: 0.04 (0.13)	−1.55 (1.48) −0.52 (0.49)	-	-	1.10 ** (0.39) 0.04 (0.15)	−0.88 (1.60) −0.09 (0.51)
Age	-	-	i: −0.00 (0.01) s: 0.01 (0.00)	0.22 *** (0.05) −0.00 (0.02)	-	-	0.04 ** (0.01) 0.01 (0.01)	0.11 * (0.05) −0.01 (0.02)
Country	-	-	i: −1.12 ** (0.35) s: −0.09 (0.14)	4.04 ** (1.36) 0.93 † (0.47)	-	-	−0.81 * (0.38) −0.00 (0.15)	2.75 † (1.40) −0.42 (0.50)
Education	-	-	i: −0.64 (0.39) s: −0.08 (0.16)	−0.01 (1.52) 0.57 (0.56)	-	-	−0.42 (0.44) 0.05 (0.18)	0.51 (1.76) 0.34 (0.58)
Income	-	-	i: −0.51 ** (0.17) s: −0.01 (0.07)	1.86 ** (0.67) 0.08 (0.23)	-	-	−0.36 † (0.19) 0.03 (0.08)	−0.57 (0.70) 0.14 (0.25)

Table 4. *Cont.*

		Univariate Unconditional Model		Univariate Conditional Model with TICs		Univariate Conditional Model with TVCs		Univariate Model with TICs and TVCs	
		AD	**WB**	**AD**	**WB**	**AD**	**WB**	**AD**	**WB**
TVCs (*SE*)									
T1	Depression	-	-	-	-	1.00 *** (0.17)	−5.28 *** (0.52)	0.98 *** (0.17)	−4.99 *** (0.53)
	Anxiety					1.01 *** (0.17)	−3.25 *** (0.48)	1.00 *** (0.18)	−3.42 *** (0.48)
T2	Depression	-	-	-	-	1.29 *** (0.17)	−6.31 *** (0.54)	1.26 *** (0.18)	−6.30 *** (0.55)
	Anxiety					1.31 *** (0.18)	−4.54 *** (0.53)	1.32 *** (0.18)	−4.46 *** (0.55)
T3	Depression	-	-	-	-	0.85 *** (0.17)	−5.63 *** (0.62)	0.94 *** (0.17)	−5.39 *** (0.64)
	Anxiety					1.27 *** (0.17)	−2.97 *** (0.67)	1.16 *** (0.17)	−3.23 *** (0.68)
T4	Depression	-	-	-	-	0.94 *** (0.14)	−6.03 *** (0.58)	0.96 *** (0.15)	−5.92 *** (0.62)
	Anxiety					1.01 *** (0.15)	−3.23 *** (0.59)	1.04 *** (0.16)	−3.36 *** (0.62)

Note: TICs = time-invariant covariates; TVCs = time-varying covariates; AD = adjustment disorder; WB = well-being; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardised Root Mean Square Residual; SE = Standard Error; i = intercept. s = slope. The robust CFI, TLI and RMSEA, along with the scaled SRMR, are reported. The literature suggests considering a lower CI limit CI when interpreting the RMSEA [60,65]; conventionally, values of 0.05–0.08 indicate an acceptable fit, and values ≤ 0.05 indicate a very good fit [58]. † $p = 0.05$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

In all models, the intercept was significant, whereas the slope was significant only in the unconditional model and the model with TVCs. According to these two models, AD symptoms increased, whereas well-being scores decreased over time. The covariance between the slope and intercept did not reach statistical significance in any of the models tested. The same was true for the predictors of the slope, with only country being a nearly significant predictor of the change in well-being over time in the second model (Table 4).

On the other hand, several intercept predictors were found. Women, participants from Austria and those with lower income showed, on average, higher baseline scores on the ADNM-8, whereas older participants, participants from Croatia and those with higher income showed higher levels of well-being at baseline.

Regarding the time-varying predictors, both the depression and anxiety scores were predictive at all timepoints, with slightly higher estimates for anxiety in AD models and higher estimates for depression in well-being models. From the empirical–practical perspective, the partially poor fit indices and the significant variances were sufficient to justify testing additional models.

Figure 2 shows the estimated trajectories of AD and well-being based on the unconditional LGCM. For better clarity, individual trajectories are depicted only for a randomly selected subsample; the remaining individual trajectories are provided in the Supplementary Materials (Figures S5–S8).

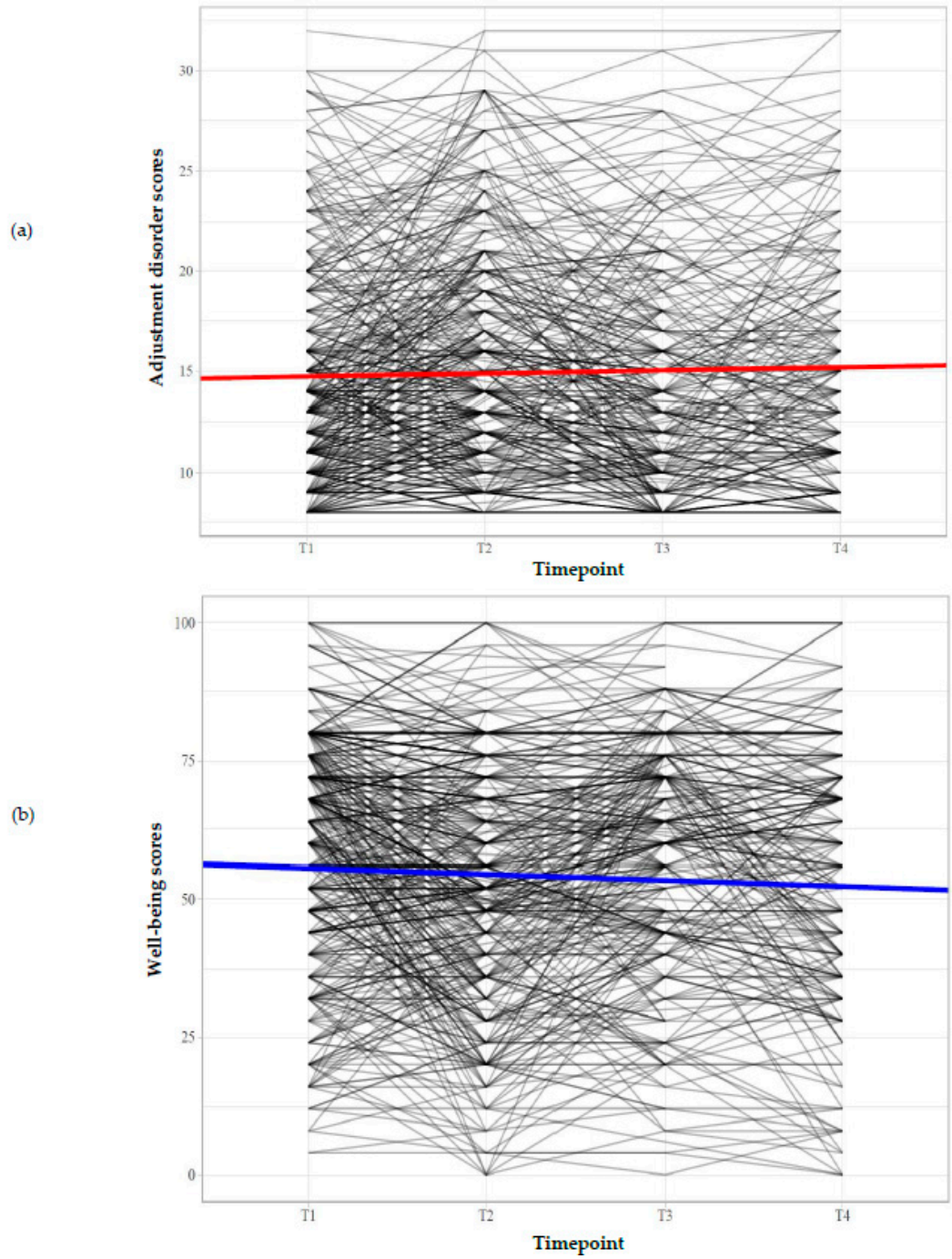

Figure 2. The estimated growth trajectories based on the unconditional univariate models. (**a**) Adjustment disorder trajectory. (**b**) Well-being trajectory.

3.5. Multivariate LGCMs

The multivariate models achieved a better fit with the data than the univariate models. The intercepts for both AD and well-being reached statistical significance in the unconditional and conditional model, as presented in Table 5. The covariance between the intercepts of both constructs was significant in both models, indicating that on average, participants with higher initial AD symptoms showed lower initial levels of well-being and vice versa. The significant covariance between the slopes of both constructs suggests a negative association between the rate of change in AD symptoms and the rate of change in well-being. However, this covariance was only significant in the unconditional model. The covariances of the residuals were significant at each timepoint ($p < 0.001$).

Table 5. Comparison of fit indices and parameter estimates in the multivariate models.

	Multivariate Unconditional Model [a]		Multivariate Conditional Model (All Predictors)	
Fit indices				
X^2 (*df*)	188.49 *** (21)		310.69 *** (89)	
CFI	0.978		0.937	
TLI	0.971		0.906	
RMSEA [90% CI]	0.081 [0.071, 0.092]		0.075 [0.066, 0.084]	
SRMR	0.060		0.103	
Parameter estimates (*SE*)				
Intercept	adnm_i: 14.58 *** (0.22)	well_i: 57.33 *** (0.86)	adnm_i: 10.86 *** (1.36)	well_i: 61.39 *** (5.21)
Slope	adnm_s: 0.10 (0.07)	well_s: −1.03 *** (0.25)	adnm_s: −0.35 (0.56)	well_s: −0.92 (1.83)
Covariances (*SE*)				
adnm_i ~~ adnm_s	−0.85 (0.55)		0.09 (0.37)	
well_i ~~ well_s	9.08 (6.69)		3.02 (5.04)	
adnm_i ~~ well_i	−52.34 *** (5.45)		−7.41 * (3.10)	
adnm_s ~~ well_s	−1.19 * (0.55)		0.04 (0.38)	
Variances (*SE*)				
Intercept	adnm: 20.18 *** (1.94)	well: 277.56 *** (24.23)	adnm: 6.65 *** (1.18)	well: 116.78 *** (14.73)
Slope	adnm: 1.33 *** (0.35)	well: 4.66 (3.99)	adnm: 0.52 * (0.23)	well: 0.98 (2.88)
Time-invariant covariates (*SE*)				
Gender	-	-	adnm_i: 1.13 ** (0.40) adnm_s: 0.03 (0.15)	well_i: −0.94 (1.60) well_s: −0.07 (0.52)
Age	-	-	adnm_i: 0.04 ** (0.01) adnm_s: 0.01 (0.01)	well_i: 0.11 * (0.05) well_s: −0.01 (0.02)
Country	-	-	adnm_i: −0.82 * (0.38) adnm_s: 0.01 (0.15)	well_i: 2.74 † (1.40) well_s: −0.39 (0.50)
Education	-	-	adnm_i: −0.43 (0.44) adnm_s: 0.05 (0.18)	well_i: 0.54 (1.76) well_s: 0.32 (0.58)
Income	-	-	adnm_i: −0.37 † (0.19) adnm_s: 0.03 (0.08)	well_i: −0.56 (0.71) well_s: 0.16 (0.25)
Time-varying covariates (*SE*)			Adjustment disorder	Well-being
T1	Depression		0.96 *** (0.18)	−4.95 *** (0.53)
	Anxiety		0.98 *** (0.18)	−3.37 *** (0.49)

Table 5. *Cont.*

		Multivariate Unconditional Model [a]	Multivariate Conditional Model (All Predictors)	
T2	Depression		1.24 *** (0.18)	−6.26 *** (0.56)
	Anxiety		1.30 *** (0.18)	−4.38 *** (0.56)
T3	Depression		0.93 *** (0.17)	−5.31 *** (0.63)
	Anxiety		1.15 *** (0.17)	−3.15 *** (0.68)
T4	Depression		0.94 *** (0.15)	−5.86 *** (0.61)
	Anxiety		1.04 *** (0.16)	−3.22 *** (0.61)

Note: CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardised Root Mean Square Residual; SE = Standard Error; i = intercept; s = slope. The robust CFI, TLI and RMSEA, along with the scaled SRMR, are reported. The literature suggests considering a lower CI limit CI when interpreting the RMSEA [60,65]; conventionally, values of 0.05–0.08 indicate an acceptable fit, and values ≤ 0.05 indicate a very good fit [58]. [a] Since some estimated variances were negative in the model using the MLR as an estimator, the WLSMV was used as an alternative estimator. † $p = 0.05$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Several significant predictors were detected in the final conditional model with all TVCs and TICs (see Table 5 for details). Higher symptoms of AD at baseline were found in women, older participants, those coming from Austria and those with higher income, with the last one being only nearly significant. Initial well-being scores were found to be higher in older participants and those coming from Croatia. None of the slope estimates reached statistical significance. Regarding the TVCs, both anxiety and depression scores could predict AD and well-being scores at all timepoints. Again, the predictive power of the anxiety scores was higher in the case of AD, whereas the predictive power of the depression scores was higher in the case of well-being. The intercepts of both measures and the slope of AD showed significant variance in both multivariate models but were lower in the conditional model.

3.6. Multivariate LGCMs by Country

The proposed linear model showed no convergence issues in Austria. However, when estimating the model in the Croatian sample, a negative residual variance for the well-being slope was detected. This is not plausible, given that computation of residual variances requires squaring values which are always positive [71]. We addressed the problem by freeing two initially fixed well-being parameters as follows: 0, a, b, 1 (instead of: 0, 1, 2, 3).

The model fit was acceptable for the Austrian and the Croatian data, as shown in Table 6. The intercept for the AD scores was slightly higher in Austria, whereas the intercept for the well-being score was higher in Croatia. The slope for the AD score was positive in the Austrian model, indicating an increase over time, while the negative slope in the Croatian model indicates a decrease over time. A decrease in the level of well-being was found in both models. The intercepts of AD and well-being were significantly negatively correlated in the Austrian model, suggesting a negative association between the ANDM-8 and WHO-5 scores at baseline. None of the tested covariances were significant in the Croatian model.

While age and income were significant predictors of the AD intercept in the Austrian model, gender was the only intercept predictor in the Croatian model. None of the TICs were significant predictors of the change over time regarding neither AD nor well-being.

Again, depression and anxiety were shown to be predictive of AD and well-being scores. Regarding AD, higher estimates for depression were found at T2 and T4 and higher estimates for anxiety were found at T1 and T3 in the model with Austrian participants. The opposite was found in the model with Croatian participants. Regarding well-being, the depression scores had a higher predictive power in both countries at all timepoints.

Table 6. Comparison of multivariate models by country.

		Austria		**Croatia** [a]	
Fit indices					
X^2 (*df*)		185.19 *** (85)		229.42 *** (84)	
CFI		0.932		0.938	
TLI		0.901		0.908	
RMSEA [90% CI]		0.081 [0.064, 0.097]		0.076 [0.064, 0.088]	
SRMR		0.109		0.112	
Parameter estimates (*SE*)					
Intercept		adnm_i: 9.93 *** (2.00)	well_i: 61.37 *** (7.59)	adnm_i: 9.44 *** (1.50)	well_i: 76.33 *** (6.85)
Slope		adnm_s: 0.12 (0.91)	well_s: −3.28 (2.49)	adnm_s: −0.84 (0.57)	well_s: −7.05 (4.81)
Covariances (*SE*)					
adnm_i ~~ adnm_s		−0.13 (0.71)		0.10 (0.39)	
well_i ~~ well_s		−2.82 (10.05)		−3.90 (29.67)	
adnm_i ~~ well_i		−13.05 * (6.59)		−2.72 (3.10)	
adnm_s ~~ well_s		0.40 (0.77)		−0.72 (1.53)	
Variances (*SE*)					
Intercept		adnm: 6.93 ** (2.17)	well: 156.40 *** (28.84)	adnm: 6.46 *** (1.27)	well: 100.84 ** (34.12)
Slope		adnm: 0.85 † (0.45)	well: 3.37 (5.56)	adnm: 0.36 (0.21)	well: 16.97 (34.22)
Time-invariant covariates (*SE*)					
Gender		adnm_i: 0.98 (0.66) adnm_s: −0.14 (0.27)	well_i: 2.27 (2.49) well_s: 1.25 (0.83)	adnm_i: 1.09 * (0.48) adnm_s: 0.23 (0.16)	well_i: −4.37 (2.38) well_s: −1.08 (1.87)
Age		adnm_i: 0.06 ** (0.02) adnm_s: 0.00 (0.01)	well_i: 0.08 (0.08) well_s: −0.02 (0.02)	adnm_i: 0.03 (0.02) adnm_s: 0.01 (0.01)	well_i: 0.07 (0.07) well_s: 0.04 (0.05)
Education		adnm_i: −0.62 (0.63) adnm_s: −0.01 (0.30)	well_i: 0.82 (2.43) well_s: 0.13 (0.80)	adnm_i: −0.35 (0.62) adnm_s: 0.14 (0.21)	well_i: 0.90 (2.62) well_s: −0.12 (1.92)
Income		adnm_i: −0.64 * (0.28) adnm_s: 0.08 (0.12)	well_i: −0.14 (1.02) well_s: 0.07 (0.33)	adnm_i: −0.08 (0.25) adnm_s: −0.05 (0.09)	well_i: −1.31 (1.06) well_s: 1.25 (0.91)
Time-varying covariates (*SE*)		Adjustment disorder	Well-being	Adjustment disorder	Well-being
T1	Depression	0.90 ** (0.31)	−5.36 *** (0.83)	0.93 *** (0.21)	−5.00 *** (0.68)
	Anxiety	1.54 *** (0.31)	−5.09 *** (0.85)	0.75 *** (0.19)	−3.42 *** (0.61)
T2	Depression	1.61 *** (0.26)	−7.72 *** (0.85)	0.92 *** (0.23)	−4.24 *** (0.70)
	Anxiety	1.18 *** (0.26)	−4.33 *** (0.84)	1.45 *** (0.25)	−3.55 *** (0.74)
T3	Depression	0.75 * (0.29)	−5.21 *** (0.82)	1.10 *** (0.20)	−5.55 *** (0.88)
	Anxiety	1.70 *** (0.25)	−4.57 *** (1.01)	0.69 ** (0.21)	−2.07 ** (0.94)
T4	Depression	1.37 *** (0.26)	−6.59 *** (1.02)	0.53 ** (0.19)	−5.24 *** (0.73)
	Anxiety	1.11 *** (0.27)	−3.27 *** (0.94)	1.03 *** (0.20)	−3.59 *** (0.78)

Note: CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardised Root Mean Square Residual; SE = Standard Error; i = intercept; s = slope. The robust CFI, TLI and RMSEA, along with the scaled SRMR, are reported. The literature suggests considering a lower CI limit CI when interpreting the RMSEA [60,65]; conventionally, values of 0.05–0.08 indicate an acceptable fit, and values ≤ 0.05 indicate a very good fit [58]. Since some estimated variances were negative in the model utilizing the MLR as an estimator, the WLSMV was used as an alternative estimator. [a] A free-loading model was tested, with the following loadings for the slope: 0, a, b, 1. † $p = 0.06$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

4. Discussion

The present study is the first study to investigate the trajectories of AD symptoms and well-being during nearly two years of the COVID-19 pandemic. We found an association between the starting point of the two trajectories, sociodemographic characteristics and the symptoms of depression and anxiety. Furthermore, the comparison between Austrian and Croatian data allowed us to identify country-specific predictors and differences in mental health trajectories.

4.1. Mental Health Outcomes over Time

Approximately one in ten participants met the criteria for probable AD at T1, T3 and T4. The prevalence was higher (15.1%) at the second timepoint, which was characterised by a notable increase in the number of cases (compared to T1) and stricter government measures than at other timepoints (see Table 1 for details). The intensity of the pandemic and associated restrictions have already been linked to mental health problems [20,47] but not specifically to AD. Previous studies conducted during COVID-19 reported prevalence rates of AD ranging from 8.2% [15] and 18.8% [72] to 61.3% [14]. However, these rates are only partly comparable with our results since the data were collected in the initial stages of the pandemic (spring of 2020), whereas our study started in the summer of 2020.

The prevalence rates of self-reported anxiety and depression ranged between 11.9% and 16.2%. This is relatively low compared to the pooled prevalence rates found in a recent umbrella review [21], which might be explained by the timing of the study. Namely, as shown in the review, prevalence rates were generally higher in studies conducted in the earlier stages of the pandemic, and the present study covered later stages of the pandemic.

The WHO-5 scores, which point to poor well-being and the presence of depressive symptoms in more than one-third of the participants at all timepoints, are rather alarming. This might indicate subtle mental health difficulties related to COVID-19 which do not necessarily lead to a diagnosis of a mental disorder but might impact a person's mood and challenge their ability to cope. Moreover, several studies found a link between well-being and COVID-19 [31,47].

4.2. Trajectories of Adjustment and Well-Being

In the first step of the analysis, univariate models were tested to estimate the trajectories of AD and well-being separately. Contrary to our expectations, three univariate models for AD (i.e., the independent trajectories of AD) showed a minor increase in symptoms over time. Only one model showed a decrease; however, this result was not significant. The current literature on adjustment during COVID-19 is scarce and limited to the initial stages of the pandemic. For instance, a German study found a minor, non-significant decrease in AD scores in the first year of the pandemic [26]. The literature on AD outside the context of COVID-19 suggests that AD symptoms can persist for longer than six months if the stressor persists longer [13]. It is thus plausible that the duration and the changing course of the pandemic, with the varying number of infections and different restrictions being imposed at different times, repeatedly challenged people's adaptational capacities, hindering successful adjustment.

The results regarding the trajectories of well-being support this assumption. According to the negative slopes in all the well-being models, well-being decreased over time, emphasising the difficulties in maintaining mental health over almost two years of the pandemic. Acknowledging the human ability to cope with and adapt to stressful situations [39], we hypothesised an improvement in mental health over time. However, COVID-19 posed numerous challenges in different areas of life [1], recurrently forcing people to deploy additional resources to cope and further exacerbating their mental fragility. This might explain the deterioration of mental health found in our study. A study including a post-pandemic follow-up would help to better understand adjustment in the aftermath of the COVID-19 pandemic.

The results of the multivariate models (i.e., the joint trajectories of AD and well-being) were only partially in accordance with those of above-described univariate models. The

simultaneous estimation of the trajectories of AD and well-being confirmed a decrease in well-being over time. However, the slope of AD did not reach statistical significance, suggesting a flat trajectory. This is contradictory to the rising trajectory identified in the univariate models. At this point, it must be mentioned that all the slope means in the univariate models were rather low, indicating that the estimated trajectories were only slightly steep. It is possible that the slope means in the multivariate models were not any more significant due to the increasing complexity of the models (e.g., due to the additional covariances included in the models). Future studies should also test models of different complexities but with some additional predictors to better understand the factors underlying the joint trajectories of AD and well-being.

One noteworthy result of the multivariate models is the significant negative relationship between the initial symptoms of AD and the initial well-being scores. Thus, people with adjustment difficulties were more likely to have poor well-being at baseline, echoing the results of previous studies [43]. In addition, the slopes of well-being and AD were correlated in the unconditional model (i.e., the model without predictors), indicating that an increase in AD is linked with a decrease in well-being. However, this relationship should be treated with caution because it was not significant in the conditional model.

Finally, the significant variances of the intercepts in all models tested suggest considerable individual variabilities in the initial levels of AD and well-being. This heterogeneity might be attributed to a combination of sociodemographic characteristics, different impacts of the pandemic at the individual level (e.g., losing a loved one or having had COVID-19) or prior mental health difficulties [73–75]. The fluctuations in AD symptoms also differed significantly across individuals. This is in line with a recent study which identified four distinct trajectories of AD [54], highlighting the high variability in people's reactions to the pandemic, as demonstrated earlier [76,77].

4.3. Predictors of Adjustment and Well-Being Trajectories

In our univariate conditional models, several sociodemographic variables could significantly predict the starting points of the trajectories of AD and well-being. Higher initial AD symptoms were identified in female participants, participants from Austria and those with lower income. On the other hand, the initial well-being scores were higher in older participants, participants from Croatia and those with higher income. These results are in line with previous COVID-19 studies which reported higher risks for AD for women and people with financial difficulties [17,18]. Notably, both gender and income could predict only the starting point but not how the symptoms of AD and well-being would change over time. For this reason, it can be assumed that women and people with low income were at risk even before the pandemic, and this risk remained throughout the pandemic. This idea is supported by a recent meta-analysis which showed that female gender and low income are reliable predictors of AD in different contexts [78]. Thus, these factors cannot only be considered pandemic-specific but rather universal, pointing to the importance of providing regular, low-threshold psychosocial support for women and other vulnerable groups, such as people with low income.

In the present study, older participants tended to have higher levels of well-being but also higher AD scores at baseline. This is contrary to a Spanish study which found that the elderly adapted better to COVID-19-related restrictions but also had more worries [79]. This discrepancy could be attributed to the timing of the two studies: while the Spanish study investigated the immediate psychological impact of the first Spanish lockdown, our study started several weeks after the end of the first lockdown in Austria and Croatia. It is therefore conceivable that the role of age varies depending on the stage of the pandemic. Considering the inconsistencies in the COVID-19 literature regarding the effects of age, future studies should more closely examine age differences in adapting to new environments and possible mechanisms behind, such as emotion regulation [22].

The estimation of the joint trajectories of AD and well-being revealed results comparable to those of the independent trajectories. Age and country were related to the initial

levels of both AD and well-being, while gender and income were related only to the initial AD score. Sociodemographic characteristics thus seemed to influence the mental health of the participants at baseline but not the trajectories of their mental health over time.

It should be noted that education level was not a significant predictor in any of the models tested. Previous research delivered mixed results on the effect of education on AD [78]. Regarding well-being, a Danish study found a greater decline in well-being in highly educated people [31], whereas a lower level of education was associated with greater psychological distress in a German study [52]. To disentangle the relationship between education and mental health, samples in forthcoming studies should accurately represent the levels of education in the studied population.

As expected, the included time-dependent covariates, namely, the anxiety and depression scores, could significantly predict both AD and well-being scores at all timepoints in the univariate and multivariate models. While the anxiety and depression scores were positively correlated with the symptoms of AD, they were negatively correlated with well-being. These relationships are not surprising given that the symptoms of anxiety and depression were common emotional responses during past epidemics and natural disasters [80] and were repeatedly associated with AD symptoms during COVID-19 [18,23,24]. Moreover, depression and anxiety symptoms were among the most common indicators of well-being in longitudinal COVID-19 studies [30].

Notably, when predicting AD symptoms, higher estimates were observed for anxiety, whereas higher estimates for depression were observed when predicting well-being. According to some sources, anxiety is a normal reaction to the novel and unpredictable pandemic situation and is thus expected during the adjustment process [26,75]. Therefore, it can be assumed that AD with anxiety was the most frequent subtype of AD during COVID-19, which might explain the higher estimates for anxiety when predicting AD. On the other hand, well-being and depression are highly correlated and sometimes even perceived as opposite poles of the same continuum [45], which was possibly reflected in the stronger association between well-being and depression scores. Further research during pandemics and similar crises should assess AD subtypes and investigate the relationship between well-being and depression in a systematic way.

4.4. Cross-Country Differences in Adjustment and Well-Being Trajectories

Our study demonstrated several cross-country differences. On average, the Austrian participants had higher initial levels of AD and lower well-being. This finding is consistent with a large-scale international study which showed a greater mental health burden in Austria than in Croatia [37]. In the pandemic context, there are several possible explanations for the observed differences between the two countries. Firstly, COVID-19 severely impacted the global economy and job market [81] and, for many, achieving financial or professional goals was more difficult than prior to the pandemic. This is relevant as financial and work-related problems are commonly associated with AD [10,11]. The reduced possibility to achieve goals might have impacted the mental health of the Austrian participants more strongly given that satisfaction with life achievements was found to be the strongest predictor of well-being among Austrians [82]. Secondly, the incidence of COVID-19 was higher in Austria than in Croatia during the first assessment timepoint, which might have had an effect on the participants' well-being and their adjustment to the pandemic at the baseline assessment. Thirdly, a large pan-European study reported that Austria was among the countries which experienced significant growth in their vulnerability levels, suggesting a greater mental health impact of COVID-19 on their population compared to some other European countries [83]. Finally, there is evidence that countries with histories of stress and trauma showed better mental health outcomes during the pandemic [19]. It can therefore be assumed that the pandemic was perceived less adversely than previous crises in Croatia (e.g., the Homeland War, 1991–1995, and major earthquakes in 2020 [84–86]), which might have facilitated psychological adjustment to the pandemic situation.

When comparing the multivariate models by country, no significant change in AD and well-being over time could be found. This was not anticipated given the significant rates of change observed in previous models. This discrepancy can be attributed to the smaller sizes of the national subsamples in comparison to the overall sample which was used in the previous models. On a descriptive level, the level of well-being tended to decline over time in both countries, whereas the symptoms of AD tended to increase over time in Austria and decrease in Croatia. It is thus conceivable that not only were the Austrian participants at a higher risk for AD at baseline but they were also more likely to develop AD symptoms as the pandemic progressed. However, a note of caution is due here since the effect was not significant. Interestingly, a slightly greater variability in terms of the fluctuations in AD symptoms was observed among the Austrian participants. One plausible reason for this might lie in the stringency index [34], which varied more strongly in Austria (ranging between 38.59 and 77.58) than in Croatia (ranging between 35.19 and 58.57). It has already been suggested that the intensity of the pandemic might account for mental health differences over time [20,21].

In Austria, older age and lower income were related to higher initial AD symptoms, whereas female gender was related to higher initial AD symptoms in Croatia. This finding is important as it implies that the predictors of mental health amidst pandemics might be country-dependent. Another peculiar finding was that anxiety and depression had different predictive powers depending on the timepoint of assessment. Compared to depression, anxiety scores were a stronger predictor of AD at T1 and T3 in Austria and at T2 and T4 in Croatia, with the respective timepoints corresponding to higher COVID-19 incidence rates. By way of illustration, the average incidence was higher in Austria than in Croatia at T1, and at this timepoint, the estimated value for anxiety was higher than the estimated value for depression in Austria and also higher than the estimated value in Croatia. This might be due to the presence of a greater fear of infection at times of higher infection rates, resulting in higher anxiety scores. This idea is supported by several studies which demonstrated the relationship between the fear of infection and AD symptoms [18,23]. In conclusion, the observed differences between Austria and Croatia highlight the importance of national studies which would consider country-related factors, e.g., cultural values and the pandemic situation. Such studies might provide a more complete picture of the psychological adjustment to the COVID-19 pandemic, as well as to other similar crises.

4.5. Strengths and Limitations

To the best of our knowledge, this is the first study to address changes in AD symptoms and well-being which was conducted in the later stages of the pandemic and in two countries. The lack of longitudinal studies is considered to be an important gap in AD research [13] which was addressed in this paper. The inclusion of both time-invariant and time-varying predictors and the examination of the co-development of AD and well-being trajectories via sophisticated methodology, was also innovative. Moreover, the present study had a longer assessment period than most COVID-19 studies, thus providing novel insights into the mental health impact of COVID-19. Another strength of our work is the investigation of AD and well-being in two countries that have rarely been jointly investigated in the past. This cross-country comparison is particularly relevant in COVID- 19 research since it adds to a better understanding of different responses to the pandemic in different contexts. Finally, a total of $N = 531$ participants responded to all four assessment waves, which is surprisingly good considering the length of the questionnaire and the long period of data collection.

However, the generalisability of our results is subject to certain limitations. First, convenience sampling was used in both countries, and the assessment waves were conducted at slightly different times (see Table 1). Second, the Austrian and Croatian samples were not of the same size, and they differed in sociodemographic characteristics, which might have biased the results. Third, the model fit was only satisfactory for some of the models tested, with the best model fit being found for the unconditional multivariate model.

Future studies should include different covariates to assess their predictive power and check whether this could improve the model fit. Fourth, the Heywood case, one common problem of LGCMs, occurred when testing the final model in the Croatian sample. We managed to resolve the problem by freeing some of the previously fixed parameters in the Croatian model only, which might have limited its comparability with the Austrian model. Furthermore, pre-pandemic data and the data collected during the very first stage of the pandemic would have provided additional insights into the development of AD symptoms, but these data were not available for the countries investigated. Since the exploration of different subgroups using a Latent Class Analysis or Latent Profile Analysis was beyond the scope of our study, this might be an interesting topic for future research. Lastly, timestamps for individual survey responses were not available in our surveys, which is why it was not possible to consider the values of the stringency index and the incidence and death rates for all the dates during the data assessment period. This approach could be used in forthcoming investigations.

5. Conclusions

The present study sought to examine the trajectories of AD and well-being across Austria and Croatia and the factors underlying these trajectories. By focusing on mental health and well-being, our study makes a modest but meaningful contribution to achieving the third goal of the 2030 Agenda for Sustainable Development [87]. We found gender, age and income, as well as anxiety and depression scores, to be predictive of AD and the level of well-being during the COVID-19 pandemic, with the predictive powers of these covariates varying in the two countries. According to our results, mental health did not improve over time, highlighting the importance of psychosocial support during pandemics and similar global crises. In times of social restrictions, therapist-assisted computerised interventions might be particularly helpful [88,89]. Importantly, our results reveal a great variability in people's responses to the pandemic, supporting the context-sensitive perspective in mental health research and clinical practice. Special attention should be paid to vulnerable groups, such as women and people with financial difficulties, to avoid further loss spirals and the development of full-blown mental disorders.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/ijerph20196861/s1, Table S1: Internal consistency of all measures across four assessment waves; Table S2: Flow of participants across four measurement timepoints; Table S3: Fit indices in models using strong measurement invariance as baseline; Figure S1: Austrian ANDM-8 scores over all four measurement times (n = 415); Figure S2: Croatian ANDM-8 scores over all four measurement times (n = 729); Figure S3: Austrian WHO-5 scores over all four measurement times (n = 415). Figure S4: Croatian WHO-5 scores over all four measurement times (n = 729); Figure S5: Adjustment disorder trajectories (Subsample 2); Figure S6: Adjustment disorder trajectories (Subsample 3); Figure S7: Well-being trajectories (Subsample 2); Figure S8: Well-being trajectories (Subsample 3).

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study and the R codes for the main analysis are available upon request from the corresponding author. The data are not publicly available since an additional assessment wave is planned. As long as data collection and analysis are in process, excerpts of the data can only be shared upon reasonable request and if all authors agree.

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