RESEARCH ARTICLE

The role of late adolescents' emotion regulation in the experience of COVID-19 lockdown: A longitudinal study

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Abstract

The COVID-19 pandemic may be considered a unique mass-trauma experience. This study examined the relations between Italian late adolescents' emotion regulation strategies, their anxiety states, and their experience of the lockdown (in terms of discomfort related to restrictions, capacities to create new functional daily routines, and to find positive changes in one's own life) during the first wave of this pandemic. We analysed how participants' reports of cognitive reappraisal and expressive suppression were associated with anxiety states during the 2020 Italian COVID-19 lockdown (large scale physical distancing and movement restrictions) and one month after the lockdown restrictions had been removed. We also examined how cognitive reappraisal, expressive suppression, and anxiety states were linked to late adolescents' experience of lockdown. The participants were 497 Italian adolescents, aged from 17 to 24 years (M_{age} = 21.11, SD = 1.83). A longitudinal structural equation modelling showed that emotion regulation strategies and anxiety states were not associated across time. Cognitive reappraisal was positively associated with routine reorganization and positive changes. In contrast, participants' expressive suppression was negatively related to their discomfort related to restrictions, ability to functionally reorganise their daily routine, and ability to find positive changes related to the COVID-19 emergency. Anxiety was positively linked to discomfort related to restrictions. The findings are discussed in light of the current literature related to emotion regulation and anxiety. Limitations and implications for practice are presented.

KEYWORDS
adolescence, anxiety, Covid-19, emotion regulation, lockdown

1 | INTRODUCTION

All pandemics, including the one due to the coronavirus disease 2019 (COVID-19), may be conceived as real *disasters* and unique *mass-trauma experiences* characterised on the one hand by unprecedented social, educational, economic and employment challenges, and on the other hand by high unpredictability (Horesh & Brown, 2020). In particular, the traumatic nature of the COVID-19 pandemic was linked not only to risks for physical health, but also to a number of other issues created by control measures used by governments to slow the spread of the virus, such as lockdowns, which forced people into strict social isolation, limiting economic activities, and altering formal schooling experiences.

The COVID-19 pandemic may have impacted people differently depending on their age (Carbone et al., 2021). In this regard, an age group potentially at risk was that of late adolescents who are in a pivotal stage of their bio-psycho-social development. Typically, late adolescents are involved in a series of developmental tasks such as the exploration of their identity, the construction of a system of personal values, and the development of autonomy and relatedness by redefining their relations with parents and strengthening bonds with peers. However, the COVID-19 pandemic and related lockdowns have forced late adolescents to radically change their lifestyle, interrupting or restricting their normal activities (including meeting friends, attending school or university and studying with peers, exercising outdoors, leisure activities), imposing on them a new time and daily routine, new learning methods, new ways of relating to people (both those with whom they had to spent whole days (i.e., parents and siblings) and those they could not meet physically (i.e., friends and peers), while being forced to face the uncertainty of the future.

Such restrictive conditions have been associated with an array of psychological consequences. Several studies have shown an increase in late adolescents' generalised emotional distress in terms of anxiety, depression, and loneliness from the onset of the pandemic and during lockdowns (e.g., Panda et al., 2021) as well as intense feelings of discomfort linked to the restrictions on leaving home and meeting people (Ravens-Sieberer et al., 2022). Nonetheless, there is empirical evidence that some late adolescents were able to cope with the stressful situation created by lockdowns by finding new daily routines and adjusting to the changes imposed by the COVID-19 pandemic in order to face loneliness and anxiety (e.g., Dvorsky et al., 2020; Pigaiani et al., 2020). For instance, Dvorsky et al. (2020) argued that in some cases, home confinement may have provided youth with more time and opportunities to discover new passions or talents, enhancing their sense of control and meaning in life. Accordingly, Pigaiani et al. (2020) found that during the first lockdown in Italy (from 9 March 2020, to 3 May 2020), many adolescents reported being more organised and purposeful in their use of time than before, engaging in more structured activities, and developing new interests. Understanding how late adolescents' personal characteristics may modulate or mitigate the psychological impact of negative experiences may be helpful to develop richer insight about what psychological resources could be promoted to enhance late adolescents' capacity to face the negative effects of future disasters and mass-trauma experiences (Masten & Motti-Stefanidi, 2020).

1.1 | Emotion regulation strategies, anxiety, and the experience of lockdown

Among late adolescents' personal resources that can potentially be involved in modulating reactions to stressful and emotionally challenging events is their ability to regulate emotions (e.g., Paschke et al., 2021). Emotion regulation refers to the strategies by which individuals exert control over their emotions, influencing what emotions they have, when they have them, how they experience them, and how they express them (Gross & Cassidy, 2019). The emotion regulation research has typically focused on two primary strategies: cognitive reappraisal and expressive suppression. Cognitive reappraisal is a form of cognitive change that involves construing a potentially emotion-eliciting situation in a way that modifies its emotional impact, while expressive suppression is a form of response modulation that involves inhibiting ongoing emotion-expressive behaviours (e.g., Garnefski & Kraaij, 2006).

Individuals differ in their use of cognitive reappraisal and expressive suppression, and these differences have implications for their psychological well-being. In general, cognitive reappraisal is typically considered adaptive in that it helps downregulating negative emotions quickly, whereas expressive suppression is considered a maladaptive regulation strategy because it may prolong or even deepen felt negative emotions (Garnefski & Kraaij, 2006; Gross & Cassidy, 2019). Research has shown that the habitual use of cognitive reappraisal seems to be related to late adolescents' greater psychological well-being and reduced emotional distress (e.g., Gross & Cassidy, 2019). On the contrary, expressive suppression seems to be associated with increased emotional distress and lower psychological well-being (e.g., Schäfer et al., 2017).

In particular, there are several lines of research linking emotional regulation to the onset of anxiety disorders in children and adolescents (e.g., Schäfer et al., 2017), underlining that the maladaptive use of emotion regulation strategies, like expressive suppression, is associated with higher levels of anxiety, whereas constructive emotion regulation strategies, like cognitive reappraisal, are associated with lower levels of anxiety. These studies have not yet provided an explanation of the path specifically linking adolescents' use of expressive suppression to anxiety disorders. However, evidence suggests that in a developmental period like adolescence, in which there is a need for adaptive emotion regulation strategies to face novel and intense emotions, adolescents' efforts to suppress emotions may interfere with cognitive and social processes that are necessary for building social interactions, leading to different negative outcomes, such as anxiety (Eastabrook et al., 2014).

Focussing on emotion regulation strategies may be useful to understand the different reactions of adolescents to psychological stress related to the COVID-19 emergency (Koole &

Rothermund, 2022). In the context of the COVID-19 lockdown, cognitive reappraisal may have beneficial effects on late adolescents' psychological well-being by allowing them to down-regulate their negative emotions, to refocus on the positive aspects of the new situation, or to focus on finding a solution for a specific problem, coming to cognitively reorganise daily events in more adaptive ways, suffering less emotional distress, and experiencing the lockdown experience as less traumatic. On the contrary, expressive suppression may be associated with detrimental effects on late adolescents' psychological well-being because inhibition and concealment of negative emotions may lead to personal distress and to experience the restrictions and the consequences of the pandemic (e.g., lockdown) in a more maladaptive, sometimes traumatic, way (Panayiotou et al., 2021; Paschke et al., 2021).

There is initial evidence supporting these expectations. During the lockdown, late adolescents who employed more adaptive strategies of emotion regulation, such as cognitive reappraisal, reported lower levels of anxiety states and a better experience of lockdown in terms of less psychological distress related to COVID-19 restriction measures as well as better capacity to engage in enjoyable activities and to build new daily routines (e.g., Panayiotou et al., 2021). These earlier studies have also shown that late adolescents who used more maladaptive emotion regulation strategies, like expressive suppression, reported higher levels of anxiety and negative moods and they were not able to build new daily routines in order to use their time in a more organised and purposeful way (e.g., Gubler et al., 2021).

However, to our knowledge there are few studies to date analysing the associations between emotion regulation strategies, anxiety, and adolescents' experience of lockdown (e.g., Kuhlman et al., 2021), and most of them have employed cross-sectional designs at a single time point. Longitudinal studies are needed to elucidate how these relationships unfold over time because cross-sectional studies do not allow researchers to draw conclusions about the direction of causality among the variables.

2 | THE PRESENT STUDY

As mentioned above, the relation between emotion regulation and anxiety seems to be well established in the literature. However, the COVID-19 pandemic represented a novel context to assess, in a natural macro-systemic environment, in real time, at periodic intervals, and using digital technologies, late adolescents' particular experiences related to this mass-trauma event. In other words, the COVID-19 pandemic offered a unique occasion for studying the association between emotion regulation and anxiety while maximising ecological validity and also allowing the study of relevant micro-processes in real-world contexts (e.g., experiences of lockdown measures). Thus, the COVID-19 event and the lockdown actions, permitted us to observe the set of results obtained from the previous literature in a more ecologically valid way.

This is a particularly relevant perspective to take for advancing both research and our understanding of the processes linking

emotion regulation and anxiety situationally. In fact, some studies have suggested that emotion regulation strategies may work differently in reducing anxiety levels when individuals are exposed to ongoing stressors like the COVID-19 pandemic. For instance, Brehl et al. (2021) found that social withdrawal, which is usually considered a maladaptive emotion regulation strategy, could be effective in reducing emerging adults' state anxiety during the COVID-19 pandemic because this particular time point required social distancing. However, the association between emotion regulation strategies and anxiety in adolescents and emerging adults during the COVID-19 pandemic was mainly investigated in vulnerable or at-risk population (e.g., adolescents with ADHD; Breaux et al., 2021) and few studies focused on late adolescents with typical development. Furthermore, within the ecological and situational perspective just outlined, it becomes interesting to understand if and how, in the presence of particularly stressful events such as the COVID-19 pandemic, the adaptation processes that refer to emotional regulation have associations not only with psychological dimensions such as anxiety, but also with experiences related to the concrete context of lifestyle changes as a result of the lockdown actions (i.e., experience of lockdown).

In the light of previous considerations, the general aim of this study was to investigate the relations between Italian late adolescents' emotion regulation strategies, their anxiety states, and their experience of the first strictest lockdown in Italy (as mentioned, established from 9 March 2020 to 3 May 2020). More specifically, the study was aimed at examining how cognitive reappraisal and expressive suppression were associated with anxiety states during lockdown and again starting 1 month after the lockdown (from 3 June 2020). Furthermore, the study investigated how cognitive reappraisal, expressive suppression, and anxiety states were linked to late adolescents' experience of lockdown, in terms of discomfort related to restrictions on leaving home and meeting people physically, the ability to create a functional daily routine, and to find positive changes in one's own life.

We used a longitudinal design assessing emotion regulation strategies and anxiety states during the first lockdown in Italy (T1) and again after its end (T2); during the second time point, we also assessed late adolescents' experience of lockdown. We have chosen to detect this dimension starting from 1 month after the end of the lockdown to obtain a more removed perception of this experience. More generally, we identified this temporal distance as the minimum for the re-administration of the survey to balance three needs: (a) the effects of the lockdown still had to unfold, but with a lower emotional intensity, so as to guarantee a greater variability of the responses (the very emotionally intense dimension of the lockdown risked flattening the responses of the participants if collected around the final days of the measures of containment of the virus); (b) among the effects of the lockdown, we wanted to observe whether the post-lockdown anxiety levels had changed in the medium term, considering that measures related to containment may have produced anxiety, such as limiting social contacts or practicing hygiene carefully. At the same time, we were interested

in understanding how this eventual change was influenced by emotion regulation abilities initially shown during the lockdown; and (c) re-administration of the survey in too close temporal proximity could be subject to an influence of memory effects. One month time between completion of the surveys was deemed appropriate to minimise this bias.

We hypothesised that higher levels of cognitive reappraisal and lower levels of expressive suppression would be associated with lower levels of anxiety states both at T1 and T2. We also hypothesised that higher levels of cognitive reappraisal and lower levels of expressive suppression would predict a more positive experience of lockdown, in terms of a greater ability to reorganise the daily routine in a functional way, the perception of positive changes in one's own life linked to the emergency, and low discomfort associated to restrictions. Moreover, we hypothesised that lower levels of anxiety would predict a more positive experience of lockdown. Finally, to control the potential effects of gender on the study variables, gender was included in the analysis as a control variable. Indeed, the literature on emotion regulation (Gross & Cassidy, 2019) and anxiety have found gender differences (McLean & Anderson, 2009), with females reporting higher levels of cognitive reappraisal and anxiety, and lower levels of expressive suppression than males.

3 | METHOD

3.1 | Participants

Participants were drawn from an Italian multi-site dataset of late adolescents (N = 2420) contacted by an online survey during the first lockdown in Italy, which was the strictest of the Italian lockdowns. This sample was selected by a snowball sampling approach, involving university students attending psychology or social science courses (80% of these courses were in Southern and 20% in Northern Italy). About 29% of these participants declared on the first page of the survey (therefore before filling in) that they did not want to be contacted again for a second administration, largely due (91%) to the number of survey requests to which they were subjected at that time. To conserve time resources and make the new contact more effective and focused, only 50% of the remaining 1725 participants (i.e., 863) were randomly re-contacted at T2 via text message or email, starting from 1 month after the end of the lockdown. The attrition rate between T1 and T2 from those re-contacted was 42%, in line with other surveys administered during the COVID-19 pandemic (e.g., Yu et al., 2022). As a result, the final sample for this study included a total of 497 late adolescent respondents participating in both time waves, aged 17–24 years (baseline M_{age} = 21.11, SD = 1.84; 80.3% females), and from Southern (79.3%), Central (2.4%) and Northern (18.3%) Italy. In Italy, psychology and social science university courses attract more women than men (more than 80%, see AlmaLaurea, 2017), which explains the obtained gender distribution. Because a small number

of respondents rush through online surveys and show a clear response pattern, we followed Meade and Craig's (2012) and Niessen et al. (2016) suggestions. Specifically, we screened for extremely short response times to identify unrealistically fast respondents (we established a significant cut-off of 50% less time than the average of the entire sample), used maximum longstrings to identify extreme cases of consecutive responses (10 or more consecutive responses, considering the larger survey within which the measures of this study were located), and performed the Mahalanobis distance as a multivariate outlier statistic (see Barbaranelli & D'Olimpio, 2006). Through these screening tools, we detected nine potential problematic participants. However, after performing the subsequent analyses without or with these cases, we found no effect on the pattern of results. Thus, we retained these nine cases in the final sample.

3.2 | Procedure

The Institutional Review Board of the University of Messina, Italy, approved the current study (protocol code 32215, 25 March 2020), which was conducted following the guidelines for the ethical treatment of human participants of the Italian Association of Psychology (2015). Participation in the study was voluntary and anonymous, and participants received no compensation. All participants received written information about the study, and they provided informed consent to participate. An online survey, using the *Qualtrics* web-based platform (http://www.qualtrics.com), was conducted from 31 March 2020, to 30 April 2020 (T1), and again starting from 1 month later from 3 June 2020, to 20 June 2020 (T2). To match up the T1 with the T2 responses, we asked the participants to provide us with an identification code corresponding mainly to a mobile phone number or alternatively to an email which, however, did not provide clues about personal data (e.g., no email in the form *name.surname@domain.com*). In this way, all T1 respondents were easily traceable to T2, guaranteeing anonymity. After the second administration, the identification codes were paired for subsequent analyses.

3.3 | Measures

To minimise the burden on respondents, promoting responsiveness in a period (such the COVID-19 pandemic) of great demand for completing online surveys among the young population given the easy accessibility of digital tools, we shortened the number of items of the chosen instruments (specifically, the emotion regulation and anxiety measures). To support this choice, we initially conducted a pilot study with 50 late adolescents, not included in the final sample, to select the best items capturing the dimensions of interest in the COVID-19 pandemic period. Exploratory analyses using this initial pilot sample as well as subsequent confirmatory analyses in this study (see below) supported our decision.

3.3.1 | Emotion regulation

We assessed emotion regulation at T1 and T2 by using six items derived from two subscales of the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003): (a) Cognitive Reappraisal (CR; three items, e.g. "When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm"), and (b) Expressive Suppression (ES; three items, e.g., "I control my emotions by not expressing them"). Participants were asked to rate these items on a five-point Likert scale from *never true for me* (1) to *always true for me* (5), after thinking about their personal experience in the last few weeks. Reliability and validity for the ERQ have been provided in several studies, also including Italian samples (e.g., see Balzarotti et al., 2010). To test the factorial validity of the brief version used in this study we conducted a confirmatory factor analysis (CFA; see the "Data Analysis Plan" section for model fit criteria) based on a maximum likelihood estimation procedure that supported a two-factor structure both at T1, χ^2 (8) = 8.60, p = 0.38, CFI = 0.999, RMSEA = 0.012, SRMR = 0.026, and T2, χ^2 (8) = 6.07, p = 0.64, CFI = 1.00, RMSEA = 0.000, SRMR = 0.021. Across the two waves, the factor determinacy scores for both CR and ES were good (>0.84) and the Cronbach's α coefficients ranged from 0.70 to 0.81. In terms of convergent validity, the average variance extracted (AVE; see Hair et al., 2021) was greater than 0.50 (the minimum value to be considered adequate) only for CR (0.55) and ES (0.58) at T2, while it was 0.43 for CR and 0.49 for ES at T1. However, the composite reliability (that is the extent to which indicators measuring the same construct are associated with each other) was 0.69 for CR and 0.74 for ES at T1, higher than the minimum cut-off of 0.60 considered adequate unlike when the convergent validity of AVE is less than 0.50 (Fornell & Larcker, 1981). Hence, we used this two-factor measurement model of emotion regulation (see below Figure 2 for factor loadings) in the subsequent analyses.

3.3.2 | Anxiety

We assessed anxiety at T1 and T2 by using three items from the Generalised Anxiety Disorder-7 Scale (GAD-7; Spitzer et al., 2006). Participants were asked to answer how often they were bothered by the following problems over the previous last few weeks: "Feeling nervous, anxious or on edge" (item 1), "Worrying too much about different things" (item 2), and "Feeling afraid as if something awful might happen" (item 3). These items were rated on a four-point Likert scale from *never* (0) to *almost every day* (3). The Italian version of the GAD-7 demonstrated good internal consistency reliability in previous studies (e.g., Arena et al., 2021; Graziano et al., 2020; Rossi et al., 2021). To test the factorial validity of the brief version used in this study, we conducted a CFA based on a maximum likelihood estimation procedure (we constrained factor loadings for items 1 and 3 to be equal to guarantee model estimation) that supported a one-factor structure, both at T1, χ^2 (1) = 0.01, p = 0.95, CFI = 1.00, RMSEA = 0.000, SRMR = 0.001, and T2, χ^2 (1) = 2.25, p = 0.14,

CFI = 0.996, RMSEA = 0.050, SRMR = 0.031. The factor determinacy scores were good (0.88 at T1 and 0.92 at T2) and the Cronbach's α coefficients were 0.76 at T1 and 0.81 at T2. AVE was 0.52 at T1 and 0.60 at T2, supporting adequate convergent validity. Hence, we used this measurement model of anxiety (see below Figure 2 for factor loadings) in the subsequent analyses.

3.3.3 | Experience of lockdown

We assessed three aspects of experience of lockdown at T2: (a) discomfort related to restrictions, (b) ability to functionally reorganise the daily routine, and (c) ability to find positive changes related to the COVID-19 emergency. *Discomfort related to restrictions* was assessed by four items: "During the lockdown, how stressful were the restrictions for you with respect to leaving home?" (item 1), "During the lockdown, how difficult was it for you to follow the provisions relating to social distancing from other people?" (item 2), "During the lockdown, how stressful were the changes in the possibilities of contacting and/or meeting friends for you?" (item 3), and "During the lockdown, did you feel lonely?" (item 4). Respondents answered on a five-point Likert scale from *not at all* (1) to *completely* (5). To test the factorial validity of this measure, we conducted a CFA based on a maximum likelihood estimation procedure (we constrained factor loadings for items 1 and 3 and for items 2 and 4 to be equal to guarantee a higher number of degrees of freedom) that supported a one-factor structure, χ^2 (4) = 7.33, p = 0.12, CFI = 0.990, RMSEA = 0.041, SRMR = 0.028. The factor determinacy score was good (0.88), and the Cronbach's α coefficient was 0.72. AVE was 0.43, but composite reliability was 0.72, supporting adequate convergent validity. Hence, we used this measurement model of discomfort related to restrictions (see below Figure 2 for factor loadings) in the subsequent analyses. *Routine reorganization* was assessed by the following item: "During the lockdown, were you able to reorganise your daily routine in a functional way?". Respondents answered on a five-point Likert scale from *not at all* (1) to *completely* (5). *Positive changes related to COVID-19 emergency* were assessed by the following item: "Has the emergency linked to COVID-19 led to any positive changes in your life?". Respondents answered on a three-point Likert scale from *no positive changes* (1) to *some positive changes* (3).

3.4 | Data analysis plan

As a preliminary step, we checked for missingness and attrition analyses. We expected few missing data because all respondents were reminded not leave any items unanswered. Little's Missing Completely at Random (MCAR) test was carried out. To test for attrition effects, we compared the 497 participants with data at both T1 an T2 with those who participated at T1 only (366). We conducted a one-way multivariate analysis of variance (MANOVA) including the main study variable scores at T1 (composite variables of cognitive

reappraisal, expressive suppression, and anxiety) as the dependent variables and the "retention versus drop-out" variable as the independent one. Further attrition analyses were performed to investigate the associations of missingness with gender, age, and geographic residence. We computed means, standard deviations, skewness, and kurtosis for cognitive reappraisal, expressive suppression, anxiety, and discomfort related to restrictions, routine reorganization, and positive changes related to COVID-19.

For the central step, we computed cross-lagged analyses for emotion regulation and anxiety variables. The three latent constructs of CR, ES, and anxiety were modelled by three indicators each at T1 and T2 and correlation coefficients for these latent variables and gender were calculated. We checked for longitudinal measurement invariance by comparing the configural (baseline) model with the metric model, in which factor loadings were constrained to be equal across the two time points. We then tested two-competing cross-lagged models: a fully cross-lagged model (Model 1; Figure 1a) and a cross-lagged correlational model (Model 2; Figure 1b). In the fully cross-lagged model, we tested all the cross-lagged paths between the latent constructs. In the cross-lagged correlational model, we tested a model in which all cross-lagged paths were constrained to zero.

For the final step, discomfort related to restrictions was modelled as a four-indicator latent variable, while routine reorganization and positive changes related to the COVID-19 emergency were modelled as observed variables. Correlation coefficients for these variables, the three latent constructs of CR, ES, and anxiety, and gender were computed. Based on the previous preferable cross-lagged model, we then tested a new model including experience of lockdown variables. We permitted paths from CR, ES, and Anxiety measured at T1 and gender to Discomfort related to restrictions, Routine reorganization, and Positive changes related to COVID-19 measured at T2. This model was then compared to a more restrictive model in which paths from CR, ES and Anxiety at T1 to experience of lockdown variables were constrained to zero.

By acknowledging the potential limitation of the chi-square test (χ^2 should be non-significant with $p > 0.05$), due to its tendency to reject the null hypothesis with large sample sizes and complex models, we relied on well-known goodness-of-fit indices and their associated cut-offs to evaluate model fit (e.g., Kline, 2015): CFI ≥ 0.90 for acceptable and ≥ 0.95 for good fit, RMSEA ≤ 0.08 for acceptable and ≤ 0.05 for good fit, and SRMR ≤ 0.10 for acceptable and ≤ 0.05 for good fit. To ascertain significant differences between nested models (the more vs. less restrictive model), at least two of these three criteria had to be satisfied: $\Delta\chi^2$ significant at $p < 0.05$, ΔCFI ≤ -0.010, and ΔRMSEA ≥ 0.015 (Chen, 2007).

4 | RESULTS

4.1 | Preliminary analyses

Only small amounts of missing data for individual items were noted (less than 0.1%) involving 2 cases at T1 and 16 distinct cases at T2. Little's MCAR test were found to be nonsignificant, χ^2 (23) = 27.78, $p = 0.22$. Missing values were managed by the Full Information Maximum Likelihood (FIML) method in the structural equation modelling (SEM) analyses both to maximise statistical power by maintaining as many cases as possible and because FIML is indicated by the literature as a more effective way of handling missing data than traditional procedures in longitudinal studies (for a similar approach, see Endres, 2001; Jose et al., 2012).

As for attrition analyses, the one-way MANOVA showed no significant differences between participants who were retained and those who dropped out on key study variables, Wilks's $\lambda = 0.997$, F (3, 859) = 0.80, $p = 0.50$, $\eta^2 = 0.003$. Further attrition analyses revealed no significant differences when considering the associations of missingness with geographic residence, χ^2 (2) = 3.49, $p = 0.17$, or age ($r = 0.03$, $p = 0.36$). However, we found associations between missingness and gender, χ^2 (1) = 19.81, $p < 0.001$, with a higher number of male (55%) than female (38%) participants dropped out at T2.

Table 1 summarises means, standard deviations, skewness, and kurtosis for the composite and observed study variables. The composite mean scores for CR at T1 and T2 showed no difference across time points, t (495) = −1.61, $p = 0.11$. The composite mean scores for both ES and anxiety revealed increased values for both variables at T2, respectively t (495) = −4.37, $p < 0.001$ and t (495) = −4.07, $p < 0.001$. Although skewness and kurtosis values
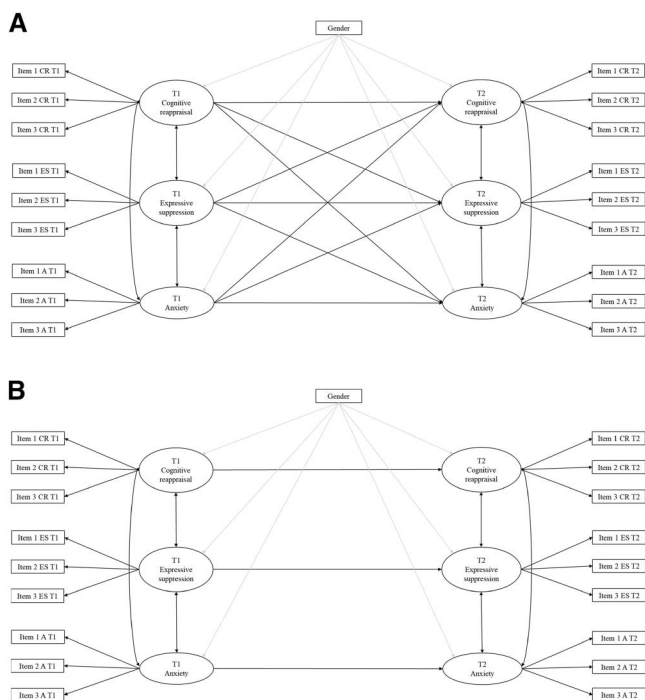

FIGURE 1 Schematisation of the two-competing cross-lagged models. (a) The fully cross-lagged model. (b) The cross-lagged correlational model. Residuals are not reported. Gender code, 0 = male, 1 = female. The key study variables and their related paths and covariances are presented in black. Control variable and their related paths are presented in grey.

were generally ≈ |1.00|, indicating acceptable univariate normal distributions for all the observed variables (Kline, 2015), Mardia's multivariate kurtosis coefficient was 731.61 versus the critical value of 675 (see Barbaranelli & D'Olimpio, 2006) and thus multivariate non-normality was evidenced. This suggested we should use robust estimation methods in the subsequent analyses.

To explore whether gender and geographic residence were associated with the main study variables over time, we conducted two MANOVAs using T1 and T2 main variables as dependent ones and gender or geographic residence as independent variables. Results showed significant multivariate effects for gender at T1, Wilks' Lambda = 0.96, F (3, 493) = 7.12, $p < 0.001$, $\eta^2 = 0.04$, and T2, Wilks' Lambda = 0.92, F (6, 485) = 6.72, $p < 0.001$, $\eta^2 = 0.08$. No significant Pearson correlations were evidenced between age and T1 and T2 main variables. Thus, as mentioned in the aims of this study, we continued to consider gender as a relevant control variable to be included in the subsequent analyses.

4.2 | Estimation of the cross-lagged models

Table 2 displays correlations among the latent variables of CR, ES, anxiety, and gender at T1 and T2. We initially tested for longitudinal measurement invariance. The configural model fitted the data adequately, χ^2 (113) = 183.24, $p < 0.001$, CFI = 0.975, RMSEA = 0.035, SRMR = 0.044. We then tested the metric model. No significant differences were found in fit, χ^2 (118) = 208.47, $p < 0.001$, CFI = 0.968, RMSEA = 0.039, SRMR = 0.050, $\Delta\chi^2$ (5) = 26.5, $p < 0.001$, ΔCFI = −0.007, and ΔRMSEA = 0.005. Over the two measurement occurrences, stabilities for the domains of CR, ES, and anxiety were moderately high (ranging from 0.61 to 0.82; see Figure 2). Starting from the retained metric model, we estimated the fully cross-lagged model. It had good fit, χ^2 (130) = 224.79, $p < 0.001$, CFI = 0.967, RMSEA = 0.038, SRMR = 0.049. Paths from gender to the latent constructs of ES ($\beta = −0.19$, $p < 0.001$) and anxiety ($\beta = 0.11$, $p < 0.05$) at T1 were significant. However, no cross-lagged path was significant. Indeed, when comparing the fully cross-lagged versus the cross-lagged correlation models, no significant differences were found, χ^2 (136) = 225.98, $p < 0.001$, CFI = 0.969, RMSEA = 0.036, SRMR = 0.049, $\Delta\chi^2$ (6) = 1.78, $p = 0.94$, ΔCFI = 0.002, and ΔRMSEA = −0.002.

4.3 | Estimation of the longitudinal SEM

We included the experience of lockdown variables in the most parsimonious cross-lagged correlation model and regressed these variables on CR, ES, and anxiety measured at T1 and gender. Additionally, we permitted covariances among all the observed and latent variables at T2 (Table 2 displays Pearson correlations among all the variables in this model). This new model had a satisfactory fit, χ^2 (242) = 431.70, $p < 0.001$, CFI = 0.947, RMSEA = 0.040, SRMR = 0.053. When comparing it to the more restrictive model, a

TABLE 1 Means (M), standard deviations (SD), skewness (S), and kurtosis (K) of study variables (items and composite mean scores).

Variables	M	SD	S	K	Range
T1 cognitive reappraisal (composite mean score)	3.50	0.72	−0.05	−0.17	1–5
Item 1	3.54	0.90	−0.23	−0.30	1–5
Item 2	3.69	0.91	−0.39	−0.40	1–5
Item 3	3.26	0.94	−0.05	−0.20	1–5
T2 cognitive reappraisal (composite mean score)	3.55	0.81	−0.18	−0.12	1–5
Item 1	3.69	0.96	−0.28	−0.40	1–5
Item 2	3.54	0.98	−0.25	−0.41	1–5
Item 3	3.41	0.96	−0.02	−0.45	1–5
T1 expressive suppression (composite mean score)	2.73	0.84	0.12	−0.39	1–5
Item 1	3.48	1.07	−0.33	−0.58	1–5
Item 2	1.94	0.95	1.05	0.93	1–5
Item 3	2.75	1.15	0.19	−0.74	1–5
T2 expressive suppression (composite mean score)	2.87	0.95	0.22	−0.45	1–5
Item 1	3.43	1.05	−0.18	−0.38	1–5
Item 2	2.32	1.11	0.55	−0.43	1–5
Item 3	2.83	1.17	0.12	−0.68	1–5
T1 anxiety (composite mean score)	1.19	0.77	0.69	−0.23	0–3
Item 1	1.41	0.88	0.50	−0.53	0–3
Item 2	1.34	1.00	0.33	−0.94	0–3
Item 3	0.81	0.94	1.01	0.06	0–3
T2 anxiety (composite mean score)	1.33	0.84	0.39	−0.76	0–3
Item 1	1.49	0.97	0.28	−0.95	0–3
Item 2	1.58	1.00	0.08	−1.11	0–3
Item 3	0.93	1.01	0.81	−0.49	0–3
T2 discomfort related to restrictions (composite mean score)	2.93	0.86	−0.03	−0.60	1–5
Item 1	3.25	1.10	−0.11	−0.56	1–5
Item 2	2.43	1.13	0.33	−0.85	1–5
Item 3	3.45	1.14	−0.41	−0.63	1–5
Item 4	2.59	1.26	0.40	−0.91	1–5
T2 routine reorganization (1 item)	3.48	1.14	−0.74	−0.12	1–5
T2 positive changes related to COVID-19 emergency	2.11	0.75	−0.19	−1.22	1–3
Gender[a]	0.80	0.40	−1.53	0.33	0–1

[a]0 = male and 1 = female.

TABLE 2 Bivariate correlations among study variables.

	1	2	3	4	5	6	7	8	9	10
1. T1 cognitive reappraisal (latent variable)	-									
2. T2 cognitive reappraisal (latent variable)	0.74***	-								
3. T1 expressive suppression (latent variable)	0.10	0.03	-							
4. T2 expressive suppression (latent variable)	0.09	0.18**	0.82***	-						
5. T1 anxiety (latent variable)	−0.25***	−0.21**	0.09	0.05	-					
6. T2 anxiety (latent variable)	−0.16**	−0.19***	0.01	0.09	0.62***	-				
7. T2 discomfort related to restrictions (latent variable)	−0.12	−0.06	−0.12*	−0.16**	0.35***	0.39***	-			
8. T2 routine reorganization (1 item)	0.14*	0.15**	−0.12*	−0.04	−0.15**	−0.14**	−0.13*	-		
9. T2 positive changes related to COVID-19 emergency (1 item)	0.12*	0.12*	−0.14*	−0.13**	0.02	−0.07	−0.06	0.17***	-	
10. Gender[a]	−0.04	0.04	−0.18**	−0.20***	−0.11*	−0.12*	0.19***	0.03	0.05	-

[a]0 = male and 1 = female.
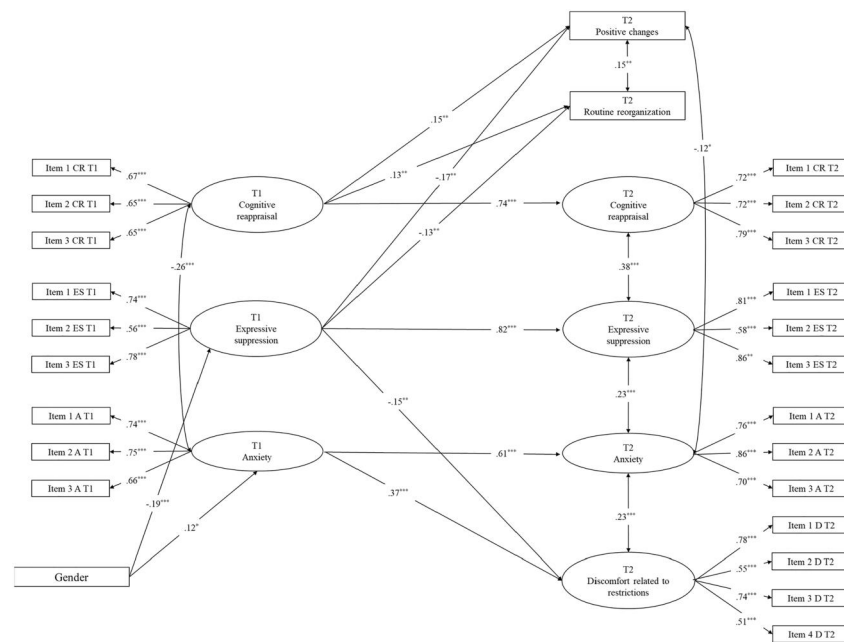*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

FIGURE 2 Standardized robust maximum likelihood estimates for the final longitudinal structural equation model. All cross-lagged paths from T1 variables and gender to the experience of lockdown variables at T2 (positive changes, routine reorganization, and discomfort related to restriction) as well as covariances among all the observed and latent variables at T2 were permitted. However, for the sake of clarity, only significant paths are reported as well as residuals were omitted. Covariances between error terms of the same item indicators of latent constructs collected at Time 1 and Time 2 were permitted but not presented for reasons of parsimony. Gender code, 0 = male, 1 = female. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

significantly deteriorated fit was evidenced, χ^2 (251) = 500.26, $p < 0.001$, CFI = 0.930, RMSEA = 0.045, SRMR = 0.071, $\Delta\chi^2$ (9) = 68.56, $p < 0.001$, ΔCFI = −0.017, and ΔRMSEA = 0.005. Thus, the first model between the two was considered the final model. Figure 2 shows that within-time correlations were significant between: (a) CR and anxiety at T1 ($r = -0.26$, $p < 0.001$), (b) CR and ES at T2 ($r = 0.38$, $p < 0.001$), (c) ES and anxiety at T2 ($r = 0.23$,

$p < 0.001$), (d) anxiety and discomfort related to restrictions at T2 ($r = 0.23$, $p < 0.001$), (e) positive changes and routine reorganization at T2 ($r = 0.15$, $p < 0.01$), and (f) anxiety and positive changes related to COVID-19 at T2 ($r = -0.12$, $p < 0.05$). More interestingly, participants with higher levels of discomfort related to restrictions at T2 had lower levels of ES ($\beta = -0.15$, $p < 0.01$) and higher levels of anxiety ($\beta = 0.37$, $p < 0.001$) at T1. Furthermore, higher levels of

routine reorganization and positive changes related to COVID-19 at T2 were both associated with higher levels of CR (respectively, $\beta = 0.13$, $p < 0.05$ and $\beta = 0.15$, $p < 0.01$) and lower levels of ES (respectively, $\beta = -0.13$, $p < 0.05$ and $\beta = -0.17$, $p < 0.01$) at T1. Additionally, females showed lower levels of ES ($\beta = -0.19$, $p < 0.001$) and higher levels of anxiety ($\beta = 0.12$, $p < 0.05$) at T1 than males.

5 | DISCUSSION

With its unpredictability and sudden lifestyle changes, the COVID-19 pandemic provided a unique occasion for studying the association between emotion regulation, anxiety, and experiences of containment measures during the transitional stage of late adolescence. In particular, it allowed us to observe in an ecologically valid fashion whether emotional regulation strategies may capture the ability to think in novel ways and to find new ways to cope with such stressful events (Brehl et al., 2021; Horesh & Brown, 2020; Panayiotou et al., 2021). This issue is relevant and needs to be examined in depth, because understanding better the role played by late adolescents' personal resources, such as emotion regulation strategies in perceiving and reacting to real-life stressful events may help us to design more effective interventions aimed at improving their coping ability and, in this way, promote resilience in youth (Masten & Motti-Stefanidi, 2020).

Accordingly, the present study aimed at investigating the relations between late adolescents' emotion regulation strategies—in terms of cognitive reappraisal and expressive suppression—their anxiety states, and their experience of lockdown, in terms of discomfort related to restrictions, the capacities to create a functional daily routine, and to find positive changes in one's own life linked to the COVID-19 emergency. A longitudinal design was used to elucidate how these relations unfold over time by assessing late adolescents' emotion regulation strategies and their anxiety states during the first lockdown in Italy, which was the strictest of the lockdowns, and again starting from 1 month after its end.

With regard to the relation between emotion regulation strategies and late adolescents' anxiety states, our initial hypotheses were not confirmed. We only found a negative and significant correlation between cognitive reappraisal and anxiety at T1 during the lockdown, whereas the association between expressive suppression and anxiety in the same period was not significant. Moreover, neither cognitive reappraisal nor expressive suppression at T1 predicted anxiety at T2. These results are not in line with the main findings of some meta-analyses (e.g., Schäfer et al., 2017) showing that positive emotion regulation strategies are negatively associated with anxiety symptoms, while negative emotion regulation strategies are positively associated with anxiety. The lack of significant associations may be due to a number of both theoretical and methodological reasons. Emotion regulation strategies may work a certain way in normal times, but differently when being exposed to a severe global and ongoing stressor such as the COVID-19 pandemic (Brehl et al., 2021).

For instance, while at normal times ES may be considered as a maladaptive regulation strategy leading to personal distress and anxiety, during the pandemic it may have been more adaptive because people, including late adolescents, were limited in their ability to actively change their situation. These opposing processes could have produced zero-sum paths with non-significant results. This may suggest that emotion regulation strategies are unlikely to be universally adaptive or maladaptive, but situationally dependent (Troy et al., 2013). Another potential explanation is related to the differences between the mean levels of the variables in question at T1 and T2 that, although significant as in the case of ES and anxiety, were small. Consequently, in our longitudinal model the variability at T2 seemed to be explained by the stability paths of the measures used. The choice of the time span of the data collection could have influenced this. Given that we chose to collect data starting 1 month after the end of the lockdown, we were able to see more medium-term rather than short-term effects, when anxiety levels were more likely to be higher and more likely associated with emotion regulation strategies that were activated during the lockdown. Furthermore, the sample had relatively low anxiety severity scores at T1 and T2. The positive adjustment effects of emotion regulation processes on anxiety may be particular important when anxiety scores are significantly high (see Mennin et al., 2002), while they may not contribute significantly when anxiety levels are quite low, as among the participants of this study. The same could be true for the inverse link, in the path from anxiety levels to emotional regulation processes: only higher levels of anxiety could have negative effects on emotional regulation processes. Thus, replicating our findings using a sample from a young population with more acute anxiety levels under conditions of traumatic events, such as the COVID-19 pandemic, could be useful for future research.

Our hypotheses concerning the relations between emotion regulation strategies and late adolescents' experience of lockdown, were only partly confirmed. In line with our predictions, findings highlighted that the capacity to create a functional daily routine and to find positive changes in one's own life led by the COVID-19 emergency are positively and significantly predicted by late adolescents' levels of cognitive reappraisal at T1. However, contrary to our hypothesis, cognitive reappraisal at T1 did not negatively predict the discomfort associated with restrictions.

Because it is a more adaptive strategy, cognitive reappraisal seems to be more effective in supporting late adolescents in the management of such a difficult period by allowing them to cognitively reorganise daily events in more adaptive ways, and to refocus on the positive aspects of the new situation related to lockdown. In this regard, many young people stated that the pandemic situation provided them with the opportunity to have more time for their personal needs and for their family, to save money, to take better care of themselves and their intimate relationships. This finding is in line with other studies showing that cognitive reappraisal could mitigate the impact of stress related to COVID-19 emergency by promoting positive daily experiences and decreasing fear associated with this situation (e.g., Kuhlman et al., 2021). However, the use of cognitive

reappraisal did not appear to help late adolescents to reduce their sense of discomfort due to the restrictions imposed by lockdown. Thus, a mechanism seems to become evident by which the cognitive reappraisal supports a positive refocusing of the stressful situation, although this is not associated with a lowering of the perception of stress of the same situation.

Regarding expressive suppression, as hypothesised, we found that it negatively and significantly predicted the capacity to create a functional daily routine and to find positive changes in one's own life led by COVID-19 emergency. In contrast to the hypotheses, expressive suppression predicted negatively and significantly discomfort associated with restrictions. Thus, in line with the literature on emotion regulation, expressive suppression seems to have detrimental effects on late adolescents' life during the COVID-19 pandemic (e.g., Parolin et al., 2021) not allowing them to reorganise their daily routine in a functional way or to find opportunities for personal growth even during the lockdown period. Notwithstanding, in our sample the inhibition and concealing of negative emotions seem to be also functional to reduce the discomfort related to restrictions to leaving home and meeting people physically. While the denial of emotions could have somehow prevented young people from grasping the opportunities for personal growth linked to the pandemic, it appeared to have helped them not be overwhelmed by loneliness from separation, stress from not being able to leave one's home, social distancing from others, and to the curtailing of meeting friends.

Furthermore, looking at the findings regarding the relations between variables over time, it is interesting to note the role of anxiety at T1 in predicting late adolescents' experience of lockdown and anxiety states at T2. In particular, anxiety at T1 seems to predict positively and significantly the discomfort due to the restrictions imposed by lockdown. It is possible that anxiety states experienced by late adolescents at the beginning of the lockdown may have exacerbated their sense of discomfort and distress associated with the restrictions in their lives. This is in line with other studies that showed how anxiety could be an obstacle to the use of constructive coping during the COVID-19 pandemic because it reduces individuals' cognitive control of the stressful situation (Freyhofer et al., 2021). Moreover, adolescents' anxiety states on average increased from T1 to T2. This finding is consistent with recent studies in which adolescents reported more anxious symptoms in response to COVID-19 and that anxiety states tended to worsen during lockdown (e.g., Mlawer et al., 2022). For many late adolescents, the social restrictions accompanying COVID-19 likely have been partially responsible for this increase in anxious states along with other factors such as health or economic stress.

Additionally, it is worth noting the associations between the emotion regulation strategies over time. The results highlighted a substantial independence between cognitive reappraisal and expressive suppression during the lockdown and over time, that is the reappraisal levels reported by late adolescents during the lockdown did not predict those of suppression at the end of the lockdown (and vice versa). However, during the second time point, we found a positive and significant correlation between the two strategies, that is individuals who reported a greater tendency to cognitive reappraisal

also tended to report a greater propensity for suppression. Previous studies have found conflicting results about the correlation between these two strategies: while some have highlighted a substantial independence (Gross & Cassidy, 2019; Sebri et al., 2021), others have found they were positively and significantly associated with each other (e.g., Goldberg et al., 2016). In our case, these findings can be contextually explained in light of the need of late adolescents to activate as many emotion regulation strategies as possible to face the emotional charge experienced after the lockdown ending, when returning to schools/universities, workplaces and social events was permitted, but containment measures, such as social distance and thorough hygiene, were still highly recommended. This might have triggered stressful situations because some people felt safer and less exposed to risks in their own houses, while other people would have immediately wanted more freedom of action. This speculative hypothesis is also supported by two of other our findings, that is the higher mean level of ES and anxiety at T2 than at T1 (although tiny) and their positive and significant association at T2, both expressions of that emotional charge of late adolescents just mentioned. Young people might have made use of both "cognitive-change" strategies, like CR, aimed at regulating the emotional impact of these circumstances by changing the way in which these events were evaluated (e.g., seeing the COVID-19 event and related containment actions as an opportunity to reorganise one's life and relationships, for example through new ways of meeting remotely) and "response-modulation" strategies, like ES, aimed at inhibiting or hiding emotional reactions, such as trying to hide negative emotions triggered by the difficulties and challenges encountered in limiting social gatherings.

With regard to the effects of gender on study variables, findings showed that gender is associated significantly only with expressive suppression (more in males than females) and anxiety (more in females than males). These findings are in line with the literature in gender-related differences about anxiety states (McLean & Anderson, 2009) and emotion regulation (Gross & Cassidy, 2019) and can be explained considering that boys are usually encouraged more than girls to inhibit and control their emotional expression, especially with regard to negative emotions (Hess, 2015).

This study had limitations. Generally, the use of self-reflective surveys creates the potential for self-report bias and culturally sensitive social desirability. Online recruitment may have limited participation to those individuals who were current Internet users and who were more likely to be familiar with online health and self-management tools. The snowball sampling approach may also have biased the results. Also, we did not examine differences between the subcultures of Northern, Central, and Southern Italy, and between urban, rural, and suburban youth. Replication of the study with other more diverse samples is clearly required to ascertain the generalisability of the present findings. Other limitations can also be highlighted. It might that our chosen anxiety measure had limited sensitivity in capturing more situation anxiety forms (e.g., health or social anxiety), while the COVID-19 pandemic may have prompted these specific forms of anxiety. Therefore, the emotion regulation processes measured at T1 might have had a significant impact in the management of such specific forms of anxiety at T2, while this effect

might have been diluted by considering a more generalised form of anxiety, as in this study. Thus, our findings await further investigation with more nuanced measures including richer information on situationally specific anxiety forms. Also, our study, although longitudinal, collected data from only two time points, hindering our ability to detect mediation effects. For example, our findings (see Figure 2) suggest that in time of serious global and ongoing stressors, higher levels of cognitive reappraisal may be associated with lower levels of anxiety by the mediation role of third variables such as the ability to find positive changes related to the COVID-19 emergency. This idea needs to be studied in future research by a true mediation model with at least three time points. Finally, due to the correlational and not experimental nature of our study, we did not implement any procedures to change emotional regulation scores, while changes in our emotion regulation measures were very small. This implies that, given the referenced literature, emotional regulation may impact anxiety levels, but emotional regulation intervention research is needed to more properly elucidate any causal effects.

Despite these shortcomings, the current study represents one attempt to understand how emotion regulation strategies predict anxiety and the experience of lockdown in late adolescents during a global health crisis that is marked by drastic public life restrictions, stress, and worries for many people around the world. Indeed, the COVID-19 pandemic has provided a unique context to test how emotion regulation strategies are associated with the subjective feeling of anxiety during a time in which "normal" life was disrupted for most people due to imposed social and public life restrictions. The present study attempts to contribute to advance this knowledge using a longitudinal perspective.

Given its potential to inform our understanding of the role of adolescents' psychological resources in facing the stress related to the COVID-19 pandemic, the current study may be relevant for the field of developmental psychopathology and prevention science, underlying that even though pandemic implies multiple threats to the psychosocial adjustment of young people, it could also offer opportunities for personal growth. In particular, our findings suggest that practitioners working in the field of mental health should try to carry out interventions aimed at improving adolescents' cognitive reappraisal, because it is an important personal resource that could help youths to reorganise their daily routine in a functional way or to find opportunities for personal growth even during periods characterised by drastic limitations and worries for their personal health.

CONFLICT OF INTEREST STATEMENT
The authors report no conflicts of interest.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available on https://figshare.com/s/c7a59843513b53e6495a.

ETHICS STATEMENT
The authors complied with the American Psychological Association's ethical standards in the treatment of participants for this work. This research has been approved by the local institutional research ethics committee.

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