

# The impact of COVID-19 lockdown on perceived stress: The role of defence mechanisms and coping strategies

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## Funding information

None

## Abstract

The COVID-19 pandemic represents a unique global challenge. To deter its spread, several countries have put lockdown and physical distancing measures in place that could have potentially harmful consequences on people's mental health. Therefore, the aim of this study is to explore the relationship between anxiety and perceived stress in individuals who were experiencing the COVID-19 lockdown measures, while also analyzing the impact of coping strategies interacting with defence mechanisms. A sample of 1408 individuals ( $M_{\text{age}} = 34.69$ ;  $SD = 11.87$ ) completed the Ten Item Perceived Stress Scale, State-Trait Anxiety Inventory–Form X3, Coping Orientation to Problems Experienced and Forty-Item Defense Style Questionnaire, after providing written informed consent. Results highlighted the significant impact of state anxiety levels on perceived stress, both directly and indirectly. The indirect pathways have been explored by performing three mixed serial-parallel mediation analyses, where significant associations between coping strategies (Social Support, Avoidance Strategies, Positive Attitude, Problem-solving and Turning to Religion) and mature, neurotic, or immature defences have been found. These findings may contribute to orientate prevention and intervention activity during the several management phases of COVID-19.

## KEYWORDS

COVID-19, mental health, psychological outcomes

## 1 | INTRODUCTION

COVID-19, the disease caused by the new Coronavirus SARS-CoV-2 (He et al., 2020), has virally expanded throughout China and the world since its appearance in Wuhan in late December 2019. The virus represents a unique global challenge because of its contagiousness and the severity of respiratory diseases it can cause, sometimes lethal (Guan et al., 2020). On 11 March 2020, the director-general of the World Health Organization classified the COVID-19 epidemic as a global pandemic (term deriving from the

Greek word '*pandemos*' wherein '*pan*' means 'all' and '*demos*' means 'people') (World Health Organization, 2020a). In the absence of a vaccine, preventive measures with social (i.e., physical) distancing and lockdowns have been implemented by several countries during the early stages of the pandemic, with the aim of mitigating and flattening the epidemic curves. The unfolding of the pandemic, combined with the social isolation and financial insecurity resulting from the lockdown, could have potentially harmful consequences on people's mental health, as demonstrated by the vast scientific literature on community-wide disasters (Bonanno et al., 2007; Norris et al., 2002).

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## 1.1 | Theoretical framework

Consistent with the literature relating to the effects of previous epidemics on mental health (e.g., Mak et al., 2009), the nationwide existing evidence relating to the COVID-19 pandemic showed that the disease and associated measures to deal with it may be sources of psychological distress (Helmy et al., 2020; Rossi et al., 2020; Torales et al., 2020; Xiong et al., 2020). This data underlines the importance of research on the mental health consequences of the pandemic (Bendau et al., 2021; O'Connor et al., 2020). Specifically, not only the danger and the fear of contagion (Li et al., 2020), but also the multiple changes in habits due to measures of self-isolation and social distancing (Brooks et al., 2020) may influence people's mental state (Flesia et al., 2020). Even those who are not ill, in fact, have lost part of their own freedom, undergoing an interruption of their own routines at various levels (Bao et al., 2020; Duan & Zhu, 2020; Xiang et al., 2020); engaging in an abrupt change in everyday life inevitably leads people to experience a sense of personal and social uncertainty, which can reduce perceptions of control and increase psychological disorders and posttraumatic symptoms (Almgren et al., 2017; Brooks et al., 2020; Tucci et al., 2017). In this regard, early studies on immediate psychological responses to lockdown in China found moderate to severe psychological impact in more than half of respondents (Wang et al., 2020). Subsequent research further highlighted the negative effects of lockdown on mental health, with a particular focus on high levels of fear, posttraumatic symptoms (Gori & Topino, 2021), sleep disorders (Kokou-Kpolou et al., 2020), perception of powerlessness (Kunzler et al., 2021), depression and suicidal thoughts (Fountoulakis et al., 2021), loneliness, psychosocial distress and lower levels of life-satisfaction (Benke et al., 2020). Furthermore, numerous studies reported that all these factors linked to COVID-19 are associated with high levels of anxiety, closely related to the sense of isolation, fear, uncertainty, as well as misinformation or excessive exposure to death reports (e.g., Gori, Topino, Craparo, et al., 2021; Odriozola-González et al., 2020; Qiu et al., 2020; Ren et al., 2020; Rosen et al., 2020; Wang et al., 2020). Indeed, the coverage by the media initially minimized the problem, but then became a source of constant updating of the growing number of cases and deaths (Sood, 2020), further fuelling the fear of disease and the perception of threat. This was often also increased by the overabundance of false information circulating on social media (Dong & Bouey, 2020). Overall, given its global reach, this condition could have a broad, substantial and lasting impact on psychological wellbeing (Rosen et al., 2020); therefore, in light of the possible clinical utility (e.g., Muller et al., 2020), a large line of research has focused on the risk/protective factors for mental health during the pandemic. For example, attachment styles or levels of alexithymia, which have previously been highlighted as key variables for mental health (Cacioppo et al., 2019; Caretti et al., 2018; Craparo et al., 2018; Giannini et al., 2011; Pellerone et al., 2017), confirmed an important role in influencing the psychological outcomes during the pandemic (Moccia et al., 2020; Osimo et al., 2021). Or further, some investigations have found that low income (Pieh et al., 2020), specific concerns related to COVID-19 (e.g., fear of one's own health, fear of infecting others, fear of mass panic, etc.) (Bitan et al., 2020), neuroticism (Osimo et al., 2021), family conflicts (Magson et al., 2021) and unhealthy

habits (Bendau et al., 2021) may be associated with a greater distress. On the contrary, higher levels of mindfulness, optimism, resilience (Vos et al., 2021), agreeableness, conscientiousness, self-control (Flesia et al., 2020) and self-efficacy (Bendau et al., 2021) highlighted their protective effect on mental health during the pandemic.

## 1.2 | The present study

In line with the presented evidence, the present study is proposed in the body of literature concerning the effects of the preventive measures due to the pandemic on psychological outcomes, providing further richness to the existing framework on protective/risk factors for mental health. More specifically, the present research aimed to deepen and investigating the role of several variables in contributing to subjective distress, with particular focus on the impact of coping strategies and defence mechanisms in catalyzing or hindering the relationship between anxiety and perceived stress in individuals who are experiencing the COVID-19 lockdown in Italy. Indeed, Italy was the first European country with reported cases of COVID-19, with a consequential lockdown of which lasted almost 2 months, from 10 March to 3 May 2020 (Berardi et al., 2020).

All individuals can experience anxiety intermittently in difficult times; however, it is heavy and clinically considerable the sustain high levels of anxiety for extended periods (Tanner, 2012). These prolonged states, indeed, predict high levels of perceived stress (Ng et al., 2017), which is frequently reported during lockdown (Bai et al., 2004; DiGiovanni et al., 2004; Limcaoco et al., 2020). Perceived stress, in turn, is associated with short and long-term psychophysical impairment (McEwen, 2008), such as weakened immune responses (Kemeny, 2003), post-traumatic stress and depression (Lee et al., 2007). Therefore, it is important to identify vulnerability or protective factors against stress, to promote prevention or effective treatments to limit negative psychological outcomes (Flesia et al., 2020). Coping strategies and defence mechanisms deserve special attention in this regard, given their function in protecting individuals from the emotional consequences of adversity (Cramer, 1998). However, the specific lockdown measures put in place in some countries in response to the spread of COVID-19 have led to unusual situations which could make many functional stress-response modes impractical or ineffective (e.g., M. Taylor et al., 2010). Indeed, several studies show that a prolonged state of distress increases in health-compromising negative coping mechanisms (Bird et al., 2020; de Kloet & Joëls, 2020; Glodosky & Cuttler, 2020) and normal defensive mechanisms, which are put in place when coping is exceeded (Vaillant, 2000), could become pathological if over-used or if inadequate for age or situation (Cramer, 1998).

### 1.2.1 | Objectives and hypothesis

Given the new and indefinite circumstances that the diffusion of COVID-19 is generating inherent in its nature of invisible and palpable adversity, in the current exploratory study the role of coping strategies and defence mechanisms in mediating the relationship

between anxiety and perceived stress was investigated in the Italian context. Therefore, three mixed-serial mediations models have been implemented.

More specifically, the first aim was to explore the role of anxiety, coping strategies (social support, avoidance strategies, positive attitude, problem-solving and turning to religion) and mature defences in contributing to perceived stress, in who were experiencing the lockdown due to the COVID-19 pandemic in Italy. Therefore, the first mixed-serial mediations model was elaborated by hypothesizing that:

- anxiety was associated with perceived stress;
- the coping strategies, placed parallel to each other, were the first mediators of the series in the relationship between anxiety and perceived stress;
- mature defence style was the subsequent serial mediator in the relationship between anxiety and perceived stress.

The second aim was to explore the role of anxiety, coping strategies (social support, avoidance strategies, positive attitude, problem-solving and turning to religion) and neurotic defences in contributing to perceived stress, in individuals who were experiencing the lockdown due to the COVID-19 pandemic in Italy. Therefore, the second mixed-serial mediations model was elaborated by hypothesizing that:

- anxiety was associated with perceived stress;
- the coping strategies, placed parallel to each other, were the first mediators of the series in the relationship between anxiety and perceived stress;
- neurotic defence style was the subsequent serial mediator in the relationship between anxiety and perceived stress.

The third aim was to explore the role of anxiety, coping strategies (social support, avoidance strategies, positive attitude, problem-solving and turning to religion) and immature defences in contributing to perceived stress, in individuals who were experiencing the lockdown due to the COVID-19 pandemic in Italy. Therefore, the third mixed-serial mediations model was elaborated by hypothesizing that:

- anxiety was associated with perceived stress;
- the coping strategies, placed parallel to each other, were the first mediators of the series in the relationship between anxiety and perceived stress;
- immature defence style was the subsequent serial mediator in the relationship between anxiety and perceived stress.

## 2 | METHOD

### 2.1 | Participants and procedure

The study involved 1408 Italian individuals (423 males and 985 females), with ages ranging from 18 to 88 ( $M = 34.69$ ;  $SD = 11.87$ ). They

were recruited on the Internet through spreading an anonymous link with a snowball-like procedure, completing an online survey using the Google Form platform. The administration of the survey took between 20 and 25 min to complete. All participants were informed of the objectives of the study and provided informed consent electronically before starting. Procedures were carried out according to current ethical guidelines and were approved by the Ethics Committee for Scientific Research (CERS) of LUMSA University. Respondents were free to stop and leave the survey at any time and they did not receive any compensation for their involvement in the study. Privacy and anonymity were guaranteed. The survey was launched on 15 March 2020 and remained open until March 30 (a period corresponding to 16 days in the pandemic).

## 2.2 | Measures

### 2.2.1 | Ten-Item Perceived Stress Scale (PSS-10)

PSS-10 (Cohen & Williamson, 1988) is a self-report instrument measuring the degree to which situations in one's life are appraised as stressful. In this study, the Italian translation of Fossati (2010) was used and showed a good internal consistency ( $\alpha = .87$ ). It consists of 10 items scored on a 5-point Likert scale, from 0 (=‘never’) to 4 (=‘very often’). The total score is obtained by summing all the items and the greater the score the higher the perceived stress.

### 2.2.2 | State-Trait Anxiety Inventory—Form X3 (STAI-X3)

STAI-X (Spielberger et al., 1970) is a self-report measure assessing the level of trait and state anxiety. In this study, the short Italian version of Vidotto and Bertolotti (1991) was used. It consists of 10 items evaluating state anxiety on a 4-point Likert scale, from 1 (=‘not at all’) to 4 (=‘very much so’). The total score is obtained by summing all the items and the greater the score the higher the state anxiety. In the present sample, the scale showed good internal consistency with a Cronbach's  $\alpha = .93$ .

### 2.2.3 | Coping Orientation to Problems Experienced—New Italian Version (COPE-NVI)

The Coping Orientations to Problems Experienced (COPE; Carver et al., 1989) is a self-report questionnaire that assesses coping strategies. In this study, the Coping Orientation to Problems Experienced—New Italian Version (COPE-NVI; Sica et al., 2008) was used and showed good internal consistency. It contains 60 items rated on a 4-point scale, ranging from 1 (=‘I don't usually do this at all’) to 4 (=‘I usually do this a lot’) that measure five different coping styles: (1) Social Support (12 items,  $\alpha = .90$ ), which indicates turning to social support for emotional (e.g., emotional outburst or search for

**TABLE 1** Mean, standard deviations and correlations between the variables

	1	2	3	4	5	6	7	8	9	10
1. STAI-X3	1									
2. PSS	<b>.668*</b>	1								
3. COPE-NVI (1)	<b>.149*</b>	<b>.187*</b>	1							
4. COPE-NVI (2)	<b>.346*</b>	<b>.386*</b>	<b>.127*</b>	1						
5. COPE-NVI (3)	<b>-.162*</b>	<b>-.174*</b>	<b>.263*</b>	-.002	1					
6. COPE-NVI (4)	<b>-.136*</b>	<b>-.148*</b>	<b>.329*</b>	<b>-.088*</b>	<b>.771*</b>	1				
7. COPE-NVI (5)	<b>.135*</b>	<b>.134*</b>	<b>.106*</b>	<b>-.083*</b>	-.040	-.045	1			
8. DSQ40 (1)	<b>-.157*</b>	<b>-.172*</b>	.034	<b>.074*</b>	<b>.393*</b>	<b>.340*</b>	<b>-.174*</b>	1		
9. DSQ40 (2)	<b>.238*</b>	<b>.302*</b>	<b>.227*</b>	<b>.282*</b>	<b>.164*</b>	<b>.098*</b>	<b>.146*</b>	<b>.309*</b>	1	
10. DSQ40 (3)	<b>.289*</b>	<b>.378*</b>	-.024	<b>.511*</b>	.011	-.007	-.008	<b>.274*</b>	<b>.519*</b>	1
M	20.99	30.62	25.99	30.64	30.62	18.94	18.99	43.41	43.04	95.46
SD	7.66	8.00	6.27	5.36	6.33	5.10	7.58	9.15	9.86	25.84

Note: Bold values indicate  $p$  within the criteria of significance.

Abbreviations: COPE-NVI (1), social support; COPE-NVI (2), avoidance strategies; COPE-NVI (3), positive attitude; COPE-NVI (4), problem-solving; COPE-NVI (5), Turning To Religion; DSQ40 (1), mature defences; DSQ40 (2), neurotic defences; DSQ40 (3), immature defences; PSS, Italian PSS total score; STAI-X3, Italian STAI-X3 total score.

\*Correlation is significant at the 0.01 level (2-tailed).

understanding) or instrumental reasons (e.g., search for information); (2) Avoidance Strategies (16 items,  $\alpha = .80$ ), such as denial, behavioural and mental disengagement; (3) Positive Attitude (12 items, e.g.,  $\alpha = .79$ ), consisting of positive reinterpretation, acceptance and restraint; (4) Problem-solving (12 items, e.g.,  $\alpha = .85$ ), including active coping, planning and suppression of competing activities; (5) Turning to Religion (eight items,  $\alpha = .83$ ), indicating the tendency to see religion as a source of emotional support or a vehicle for positive reinterpretation and growth. The total score of each scale is obtained by summing all the corresponding items and the greater the scores the higher the tendency to use Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion to deal with difficulties.

### 2.2.4 | Forty Item Defence Style Questionnaire (DSQ-40)

DSQ-40 (Andrews et al., 1993) is a self-report instrument for the assessment of defence mechanisms. In the present study, the Italian version of Farma and Cortinovis (2000) was used; the acceptable internal consistency shown by the authors was confirmed. It consists of 40 items scored on a 9-point Likert scale (from 1 = 'Strongly disagree' to 9 = 'Strongly agree') that define scores for 20 defence mechanisms, two items for each, grouped into three subscales: (1) Mature defence style (eight items,  $\alpha = .60$ ), including sublimation, humour, anticipation and suppression; (2) Neurotic defence style (eight items,  $\alpha = .60$ ), including undoing, pseudo-altruism, idealization and reaction formation; (3) Immature defence style (24 items,  $\alpha = .82$ ), including projection, acting out,

isolation, devaluation, autistic fantasy, denial, passive-aggressiveness, displacement, disassociation, splitting, rationalization and somatization. The total score of each scale or type of defence is obtained by summing all the corresponding items and the greater the scores the higher the tendency to use mature, neurotic or immature defences or a particular type of mechanism.

### 2.3 | Data analysis

All the statistical analyses were performed using SPSS software (IBM-SPSS 25.0 version; IBM) for Windows. Descriptive statistics for all the measures were calculated and Pearson's correlation coefficient was used to test the associations between the variables. Mediation analysis was undertaken to explore direct and indirect paths in the relationship between anxiety and perceived stress using macro-program PROCESS 3.4 (Hayes, 2018). Thus, three mixed serial-parallel mediations (model 80) were carried out to analyze the mediation role of coping strategies and mature, neurotic or immature defences. Finally, indirect effects were estimated using bootstrapping procedure with a 95.0% confidence interval at 5000 samples; when the confidence interval does not include zero, the indirect effect may be considered significant.

## 3 | RESULTS

Means, standard deviations and correlations between all the interested variables are presented in Table 1. State anxiety was significantly and positively associated with Perceived stress ( $r = .668$ ,

$p < .01$ ), Social Support ( $r = .149, p < .01$ ), Avoidance Strategies ( $r = .346, p < .01$ ), Turning to Religion ( $r = .135, p < .01$ ), Neurotic defences ( $r = .238, p < .01$ ) and Immature defences ( $r = .289, p < .01$ ), while significant and negative correlations were found with Positive Attitude ( $r = -.162, p < .01$ ), Problem-solving ( $r = -.136, p < .01$ ) and Mature defences ( $r = -.157, p < .01$ ). Perceived stress was also significantly and positively associated with Social Support ( $r = .187, p < .01$ ), Avoidance Strategies ( $r = .386, p < .01$ ), Turning to Religion ( $r = .134, p < .01$ ), Neurotic defences ( $r = .302, p < .01$ ) and immature defences ( $r = .378, p < .01$ ), while significant and negative correlations were found with Positive Attitude ( $r = -.174, p < .01$ ), Problem-solving ( $r = -.148, p < .01$ ) and Mature defences ( $r = .172, p < .01$ ). The use of Mature defences was significantly and positively associated with Avoidance Strategies ( $r = .074, p < .01$ ), Positive Attitude ( $r = .393, p < .01$ ), Problem-solving ( $r = .340, p < .01$ ), while a significant and negative correlation was found with Turning to Religion ( $r = -.174, p < .01$ ). The use of Neurotic defences was significantly and positively associated with Social Support ( $r = .227, p < .01$ ), Avoidance Strategies ( $r = .282, p < .01$ ), Positive Attitude ( $r = .164, p < .01$ ), Problem-solving ( $r = .098, p < .01$ ) and Turning to Religion ( $r = .146, p < .01$ ). Immature defences significantly and positively correlated with Avoidance Strategies ( $r = .511, p < .01$ ).

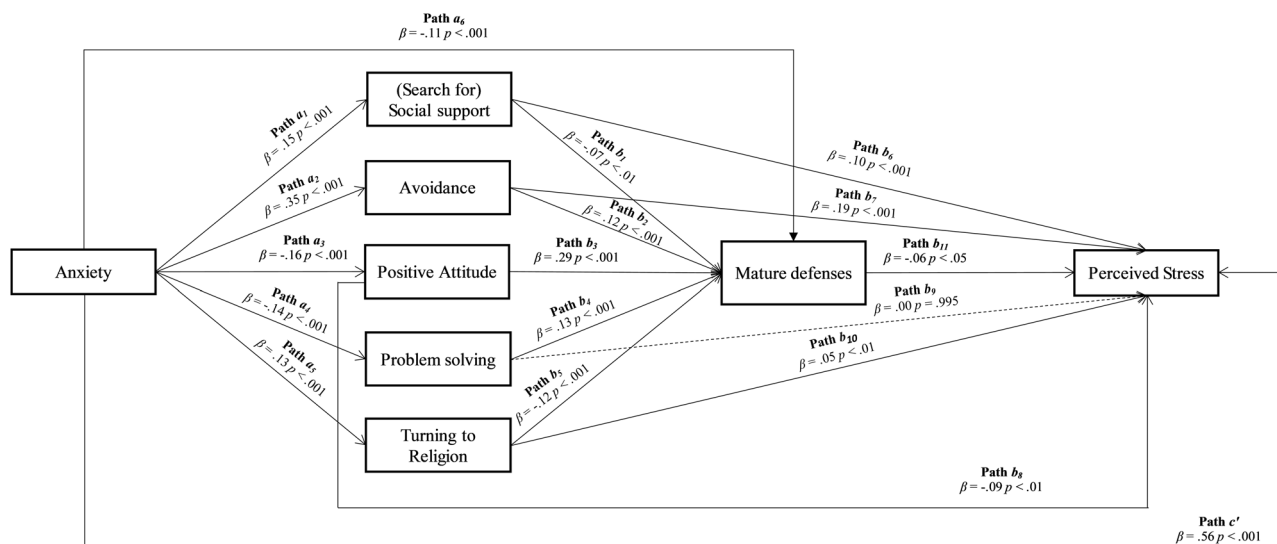
Then, the three mixed serial-parallel mediations were carried out. A significant total effect of anxiety on perceived stress was confirmed ( $\beta = .69, p < .001$ ). The first model included all the coping strategies (Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion) and mature defences as mediator in the relationship between State Anxiety and Perceived stress (see Figure 1).

Anxiety was predictive of both coping strategies (path  $a_1$  for Social Support with  $\beta = .15, p < .001$ ; path  $a_2$  for Avoidance with  $\beta = .35, p < .001$ ; path  $a_3$  for Positive Attitude with  $\beta = -.16, p < .001$ ; path  $a_4$  for Problem solving with  $\beta = -.14, p < .001$ ; path  $a_5$  for

Turning to religion with  $\beta = .13, p < .001$ ) and Mature defences (path  $a_6, \beta = -.11, p < .001$ ). All the Coping strategies were significantly associated to the use of Mature defences (path  $b_1$  for Social Support with  $\beta = -.07, p < .01$ ; path  $b_2$  for Avoidance with  $\beta = .12, p < .001$ ; path  $b_3$  for Positive Attitude with  $\beta = .29, p < .001$ ; path  $b_4$  for Problem solving with  $\beta = .13, p < .001$ ; path  $b_5$  for Turning to Religion with  $\beta = -.12, p < .001$ ), which in turn was significantly and negatively related to Perceived Stress (path  $b_{11}, \beta = -.06, p < .05$ ). Furthermore, Social Support (path  $b_6, \beta = .10, p < .001$ ), Avoidance (path  $b_7, \beta = .19, p < .001$ ), Positive attitude (path  $b_8, \beta = -.09, p < .01$ ) and Turning to religion (path  $b_{10}, \beta = .06, p < .05$ ) showed also significant associations with Perceived Stress, while the relationship of Problem solving (path  $b_9, \beta = .00, p = .995$ ) was not significant. However, the direct effect of anxiety to perceived stress (path  $c', \beta = .56, p < .001$ ) remained significant, suggesting a partial mediation effect after social support, avoidance, positive attitude, problem-solving, turning to religion and mature defences have been controlled ( $R^2 = .496, F_{7,1400} = 197.012, p < .001$ ). Finally, the bootstrapping procedure confirmed the statistical stability of this multichained mediation model and the significance of the indirect effect (Boot LLCI = 0.0862; Boot ULCI = 0.1326).

The second mixed serial-parallel mediation model included all the coping strategies (Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion) and neurotic defences as mediators in the relationship between State Anxiety and Perceived stress (see Figure 2).

Anxiety was predictive of both Coping strategies (path  $a_1$  for Social Support with  $\beta = .15, p < .001$ ; path  $a_2$  for Avoidance with  $\beta = .35, p < .001$ ; path  $a_3$  for Positive Attitude with  $\beta = -.16, p < .001$ ; path  $a_4$  for Problem solving with  $\beta = -.14, p < .001$ ; path  $a_5$  for Turning to Religion with  $\beta = .13, p < .001$ ) and Neurotic defences (path  $a_6, \beta = .12, p < .001$ ). Except for Problem solving (path  $b_4, \beta = -.05, p = .175$ ), the Coping strategies were significantly associated



**FIGURE 1** Model 1: A mixed serial-parallel mediations model involving Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion and mature defences as mediators in the relationship between State Anxiety and Perceived Stress



to the use of Neurotic defences (path  $b_1$  for Social Support with  $\beta = .13, p < .001$ ; path  $b_2$  for Avoidance with  $\beta = .22, p < .001$ ; path  $b_3$  for Positive Attitude with  $\beta = .20, p < .001$ ; path  $b_4$  for Turning to Religion with  $\beta = .14, p < .001$ ), which in turn was significantly and positively related to Perceived Stress (path  $b_{11}\beta = .12, p < .001$ ). Furthermore, Social Support (path  $b_6\beta = .09, p < .001$ ), Avoidance (path  $b_7\beta = .15, p < .001$ ), Positive Attitude (path  $b_8\beta = -.13, p < .001$ ) and Turning to religion (path  $b_{10}\beta = .04, p < .05$ ) showed also significant associations with Perceived stress, while the relationship of Problem solving (path  $b_9\beta = .00, p = .970$ ) was not significant. However, the direct effect of anxiety to perceived stress (path  $c', \beta = .55, p < .001$ ) remained significant, suggesting a partial mediation effect after social support, avoidance, positive attitude, problem -solving, turning to religion and mature defences have been controlled ( $R^2 = .506, F_{7,1400} = 204.878, p < .001$ ). Finally, the bootstrapping procedure confirmed the statistical stability of this multichained mediation model and the significance of the indirect effect (Boot LLCI = 0.0980; Boot ULCI = 0.1447).

The third mixed serial-parallel mediation model included all the coping strategies (Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion) and immature defences as mediators in the relationship between State Anxiety and Perceived stress (see Figure 3).

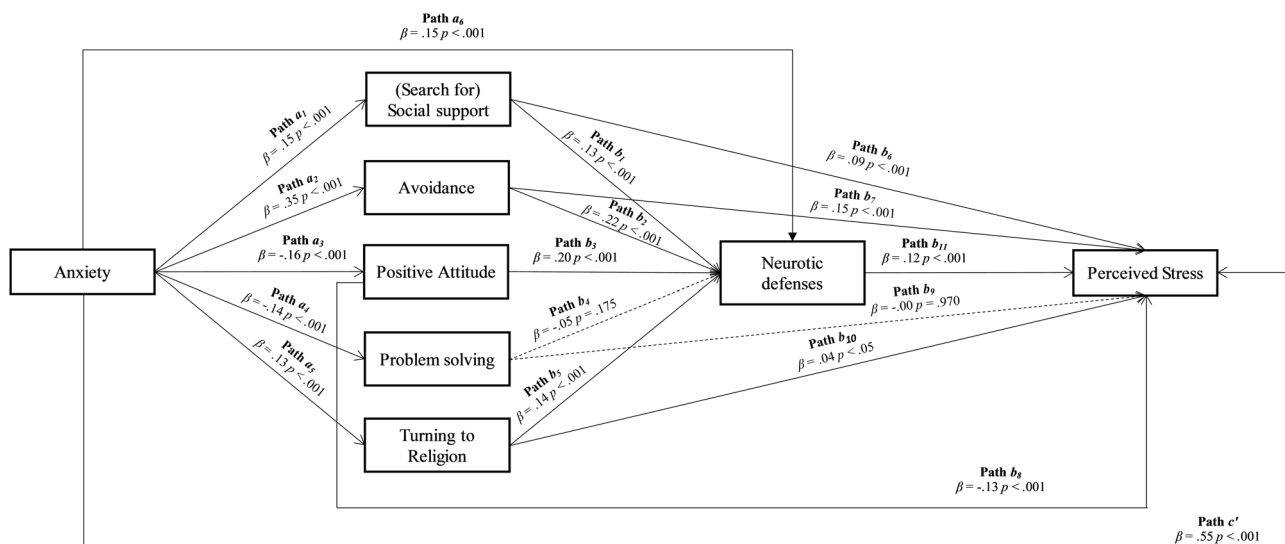
Anxiety was predictive of both Coping strategies (path  $a_1$  for Social Support with  $\beta = .15, p < .001$ ; path  $a_2$  for Avoidance with  $\beta = .35, p < .001$ ; path  $a_3$  for Positive Attitude with  $\beta = -.16, p < .001$ ; path  $a_4$  for Problem-solving with  $\beta = -.14, p < .001$ ; path  $a_5$  for Turning to Religion with  $\beta = .13, p < .001$ ) and Neurotic defences (path  $a_6, \beta = .12, p < .001$ ). Except for Positive Attitude (path  $b_3, \beta = -.01, p = .719$ ) and Turning to religion (path  $b_5, \beta = .03, p = .159$ ), the Coping strategies were significantly associated to the use of Immature defences (path  $b_1$  for Social Support with  $\beta = -.14, p < .001$ ; path  $b_2$  for Avoidance with  $\beta = .49, p < .001$ ; path  $b_4$  for Problem

solving with  $\beta = .12, p < .01$ ), which in turn was significantly and positively related to Perceived Stress (path  $b_{11}\beta = .18, p < .001$ ). Furthermore, Social Support (path  $b_6\beta = .13, p < .001$ ), Avoidance (path  $b_7\beta = .09, p < .001$ ), Positive Attitude (path  $b_8\beta = -.10, p < .001$ ) and Turning to religion (path  $b_{10}\beta = .05, p < .01$ ) showed also significant associations with Perceived stress, while the relationship of Problem solving (path  $b_9\beta = -.03, p = .348$ ) was not significant. However, the direct effect of anxiety to perceived stress (path  $c', \beta = .54, p < .001$ ) remained significant, suggesting a partial mediation effect after social support, avoidance, positive attitude, problem solving, turning to religion and mature defences have been controlled ( $R^2 = .516, F_{7,1400} = 213.007, p < .001$ ). Finally, the bootstrapping procedure confirmed the statistical stability of this multichained mediation model and the significance of the indirect effect (Boot LLCI = 0.1059; Boot ULCI = 0.1541).

In Table 2, model effects indices are summarized.

## 4 | DISCUSSION

The COVID-19 pandemic is a global emergency that may have pervasive and long-lasting consequences, with potential significant direct and indirect impact on public health, including mental health (World Health Organization, 2020b; Xiang et al., 2020). Several studies have reported an increase in psychological problems in association with pandemic and lockdown (Gori & Topino, 2021); among these, sustained high levels of anxiety and mental stress acquire particular relevance in light of their potential for triggering common mental and physical disorders (Bao et al., 2020; Holmes et al., 2020). In this framework, the study of subjective responses to facing these conditions and the analysis of their protective or dysfunctional effects in this peculiar circumstance seems very useful. The present research, thus, explored the role of coping strategies and defence



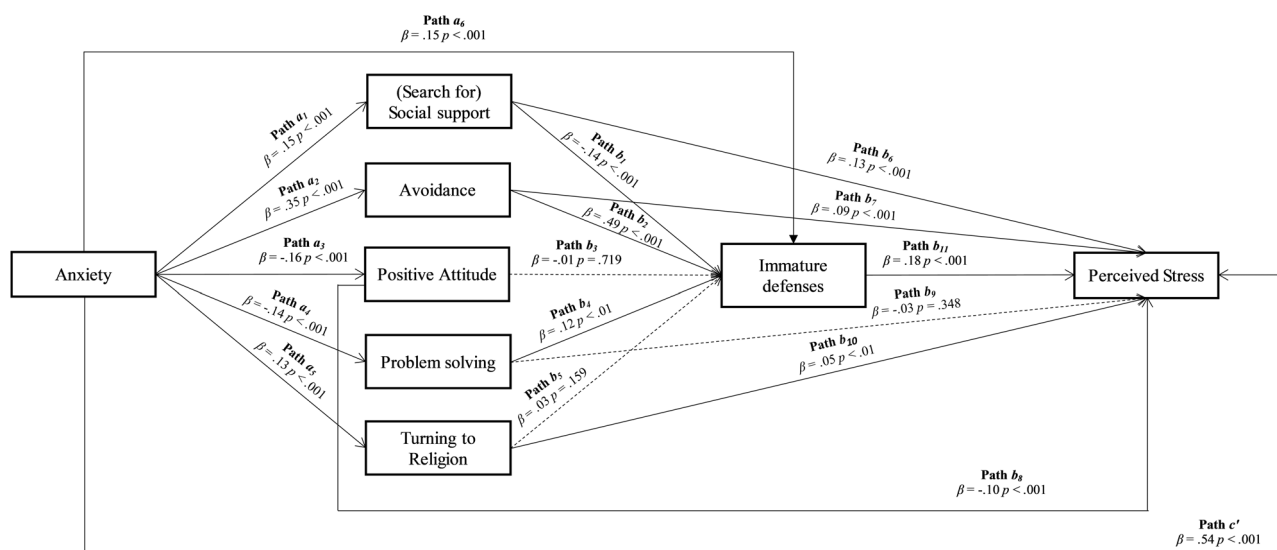
**FIGURE 2** Model 2: A mixed serial-parallel mediations model involving Social Support, Avoidance Strategies, Positive Attitude, Problem solving or Turning to Religion and Neurotic defences as mediators in the relationship between State Anxiety and Perceived Stress

mechanisms in mediating the relationship between anxiety and perceived stress in individuals who are experiencing lockdown due to the COVID-19 pandemic in Italy.

All the hypothesized models were empirically supported by the data. First, the results confirmed the significant impact of state anxiety levels on perceived stress, in line with previous research (e.g., Ng et al., 2017). With regard to defence mechanisms, from the implemented models it emerges that anxiety was negatively associated with the use of mature styles which was in turn related to lower stress, as opposed to neurotic or immature ones. This is in line with previous studies conducted during the lockdown which highlighted the association between mature and neurotic mechanisms with posttraumatic symptoms (Gori et al., 2021) and the negative association between mature defences with psychological symptoms (Di Giuseppe et al., 2020; Gori et al., 2020).

Concerning the effects of Coping strategies, among the various indirect paths of the relationship between Anxiety and Perceived stress, the one involving the searching for social support is particularly relevant from an applicative point of view. Despite being

described in the scientific literature as a factor that is protective against negative mental outcomes following difficult events (see, for a review, Guilaran et al., 2018), among those who are experiencing the COVID-19 lockdown this strategy was increased by anxiety and was found to be maladaptive and responsible for higher levels of perceived stress both directly and partially also through the indirect paths involving defences. Indeed, although it was negatively associated with immature defences, it was also negatively related to the use of the mature ones and positively influence the tendency to a neurotic style. Such data could be read considering the physical distancing measures put in place to counteract the pandemic; in such difficult times, high levels of dependence on the support of others are common (M. Taylor et al., 2010), but the lockdown brought about an interruption of social support networks just when they could have been most needed. Therefore, this coping strategy was ineffective in managing anxiety, as it was rendered impractical by circumstances and because, although negatively associated with immature defensive mechanisms, in this situation it is linked to less use of mature defences and higher levels of neurotic styles, highlighting a failure in



**FIGURE 3** Model 3: A mixed serial-parallel mediations model involving Social Support, Avoidance Strategies, Positive Attitude, Problem solving or Turning to Religion and Immature defences as mediators in the relationship between State Anxiety and Perceived Stress

**TABLE 2** Model effect indices

Model	Total effect	Direct effect	Indirect effect	Partially standardized indirect effect	Completely standardized indirect effect	Bootstrapping 95% confidence interval
Model 1	0.66	0.55	0.11	0.01	0.11	0.086, 0.134
Model 2	0.66	0.54	0.12	0.02	0.12	0.098, 0.145
Model 3	0.66	0.53	0.13	0.02	0.13	0.106, 0.154

Note: Model 1 = A mixed serial-parallel mediations model involving Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion and Mature defences as mediators in the relationship between State Anxiety and Perceived Stress. Model 2 = A mixed serial-parallel mediations model involving Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion and Neurotic defences as mediators in the relationship between State Anxiety and Perceived Stress; Model 3 = A mixed serial-parallel mediations model involving Social Support, Avoidance Strategies, Positive Attitude, Problem-solving or Turning to Religion and Immature defences as mediators in the relationship between State Anxiety and Perceived Stress.

attempts at functional adaptation to lockdown. A further indirect maladaptive path highlighted in the results is the one involving the coping strategy of avoidance, favoured by state anxiety and linked to an increase in perceived stress levels. Furthermore, it was also associated with mature defensive mechanisms, albeit significantly less than with neurotic and immature styles. Indeed, short-term avoidance may circumvent discomfort, but suppression is ineffective in reducing emotion and physiological arousal in the longer term (Gross & Thompson, 2007; John & Gross, 2004). Therefore, these coping modalities may exacerbate perceived stress levels (Elliot et al., 2011; S. E. Taylor & Stanton, 2007), especially in light of the prolonged nature of the fight against COVID-19. This in fact also implies inevitable and pervasive consequences in the lives of individuals who have not contracted the virus and who must tolerate repeated extensions of restriction measures, additional sources of psychological malaise (Brooks et al., 2020). An additional path through which anxiety could increase perceived stress is the one that passes through the suppression of positive attitude, which on the one hand was negatively associated stress, as well as positively related to mature defences and, to a lesser extent, to the neurotic ones. The resilient function of positive attitude deserves to be highlighted, as supported by research underlining the positive effects in limit psychological distress (Cohen, 2002) and in directing towards posttraumatic growth (Fritz et al., 2017), through modalities such as acceptance and positive reassessment of the situation (see, for a review, Conversano et al., 2010). Interestingly, Problem solving was negatively related to anxiety and has not shown a significant effect in influencing stress, except through the positive relationship with mature and immature defences. This may be an expression of the state of 'pause' and waiting that people are experiencing, associated with the awareness of not being able to directly intervene to eliminate the virus. On the one hand, therefore, Problem-solving coping may favour defensive mechanisms such as sublimation, humour, anticipation and suppression, which are not linked to one's way of emotionally facing concrete problems in the new daily management imposed by the situation; on the other hand, however, the association with immature style is also consistent with the scientific literature on large-scale traumatogenic events (e.g., Glass et al., 2009), which highlight problem-focused strategies involving addressing the problem causing distress may be ineffective in uncontrollable situations (Folkman & Moskowitz, 2004).

Finally, the last relevant path involved the search for comfort through the spiritual dimension. Religion can have a strong positive influence on the wellbeing of individuals, helping to reconcile the issues of meaning raised by specific stressful situations with one's overall sense of meaning and purpose in life (Park, 2005). However, data showed that state anxiety positively influence the turning to religion, that was, in turn, positively associated with perceived stress. Furthermore, this coping strategy was also negatively related to Mature defences and positively linked to immature ones. A possible reading of this data can be made in light of the lockdown measures, which led to the ban on going to places of worship to celebrate religious services, hindering the completeness of the experience and its sharing with other faithful. People tend to draw more on religious

resources in times of difficulty (Pargament, 2010): therefore, just as for social coping strategy, measures against the virus determined an interruption of this source of support when they could have been most needed.

This study also has some limitations that should be kept in mind when interpreting the results. First, given the limited resources available due to the pandemic and the lockdown, a snowball sampling strategy was adopted, not permitting random selection and an effective representation of the general population. In addition, this study represents a snapshot of a rapidly changing situation. This allows us to obtain valuable information on states of distress in the exact period corresponding to the pandemic peak in Italy; however, it is also extremely important to monitor the trajectory of similar data in the succession of phases of COVID-19 management. Furthermore, the cross-sectional design of the study does not allow clear inferences about the causal links between the variables and the completeness of the models (Kline, 2015; Thrash et al., 2020). Rigorous experimental or longitudinal research will be needed to confirm and extend our results, overcoming these limitations. It will also be important for future research also to develop analyses from a protective and preventive perspective, identifying variables most related to resiliency skills in this context. Finally, this study did not focus on differences based on gender, culture and socioeconomic level. This could be an important challenge for future research, given the greater anxiety related to the virus found in women (Liu et al., 2020) or the privileges conferred by wealth in facing lockdown and social distancing in a comfortable place, with sufficient food and resources.

Despite these limitations, the study has also some strengths and provides an important contribution toward a better understanding of mental health processes and outcomes during COVID-19 lockdown. Specifically, light has been shed on several pathways that may be responsible for higher levels of perceived stress, pathways involving anxiety, coping strategies and defence mechanisms. The results show important mental health challenges; the population is requested to take on difficult tasks, with compromised possibilities for making use of numerous core protective resources, such as seeking social support. Therefore, these data could have value in guiding responses to deficiencies and needs in prevention and intervention during the several management phases of COVID-19.

## 5 | CONCLUSIONS

The data emerging in this study enriches and expands the research framework linked to the effects of COVID-19 and its consequences on mental health for the general population. Therefore, an integration of our results with existing evidence can provide a useful contribution for more effective management of the emergency and its psychological consequences, as well as physical ones. For example, previous studies highlighted individual differences concerning the use of mature, neurotic, immature defences and their contribution in determining the impact of events during the COVID-19 lockdown (Gori et al., 2021), while others have emphasized the protective effect of life satisfaction in comparisons



of perceived stress (Gori et al., 2020). In other words, these and other research identify risk or protective factors regarding some variables considered in this study, which therefore adds a further piece in this field and can be useful for future research and to provide further knowledge of the psychological consequences of restrictive measures related to COVID-19. Concluding, the data emerging from this study can be kept in mind when developing crisis management policies aimed at protecting physical health, without neglecting mental health.

## ACKNOWLEDGEMENTS

This study did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors. Open Access Funding provided by Università degli Studi di Firenze within the CRUI-CARE Agreement.

## CONFLICT OF INTERESTS

The authors have declared that there are no conflict of interests.

## AUTHOR CONTRIBUTIONS

Alessio Gori conceptualized the study, contributed to defining the theoretical framework and chose the measures to be used in the study. Eleonora Topino and Alessio Gori analyzed the data and wrote the first draft of the manuscript. Alessio Gori and Vincenzo Caretti contributed to the revision of the manuscript and all authors approved its final version.

## DATA AVAILABILITY STATEMENT

Research data are not shared due to privacy restrictions.

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**How to cite this article:** Gori, A., Topino, E., & Caretti, V. (2022). The impact of COVID-19 lockdown on perceived stress: The role of defense mechanisms and coping strategies. *Journal of Contingencies and Crisis Management*, 30, 379–390. <https://doi.org/10.1111/1468-5973.12380>