

# Analyzing the role of resilience and life satisfaction as mediators of the impact of COVID-19 worries on mental health

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## Abstract

The aim of this study was to test whether resilience and life satisfaction (two traditional protective factors) mediate between COVID-19 related worries and the development of symptoms of depression, anxiety, and stress in adolescents and young adults. Participants involved 392 adolescents and young adults (70.20% female) aged between 12 and 25 years ( $M = 17.05$  years,  $SD = 3.08$ ). Participants completed the COVID-19 related worries scale, the CD-RISC to analyse resilience, the Satisfaction with Life Scale, and the Depression, Anxiety, and Stress Scales-21 to study emotional symptoms. Descriptive analyses and Pearson correlations were conducted, together with a structural equation modeling testing a mediational model and multigroup invariance. Results show that resilience and life satisfaction play a mediating role in the relation between the COVID-19 related worries and emotional symptoms (depression, anxiety, and stress). This study highlights the role of protective factors on adolescents' and young adults' emotional symptoms during the COVID-19 pandemic.

## KEYWORDS

adolescents, COVID-19, COVID-19-related worries, emotional symptoms, life satisfaction, resilience, youth

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## 1 | INTRODUCTION

The COVID-19 pandemic has become one of the largest public health crises in recent history. We are assisting to an unprecedented event with so far unknown consequences in society (Miller, 2020). This pandemic has taken a devastating toll and victim count is still rising throughout the year 2020 in such rate even experts are unable to predict the further progression (World Health Organization W, 2020). The economical shutdown, the strict lockdown and the fear of contracting the virus and getting sick have increased individuals' difficulty to cope with this situation (Menzies & Menzies, 2020). In Spain, quarantine was established from March 14th to June 20th, with prospects of a new period of isolation in the coming months, which has impacted the country's economy, health and education system, as well as the personal and social life of its citizens (BOE 24/01/2020, 2020).

Research in multiple fields is focused on mental health consequences derived from the COVID-19 pandemic. Traditionally, isolation has been identified as a risk factor that increases psychological distress, due to the negative impact of loneliness on physical and mental health problems (Wang et al., 2020). According to the literature, this emotional distress seems to be increased by the lack of social support, which is considered a key protective factor (Desclaux et al., 2017). The coronavirus-related factors above mentioned, together with the negative effects of isolation and lockdown, may have a compound effect, putting people's mental health at risk (Wang et al., 2020).

Young people are especially vulnerable in this challenging situation. The education system has been one of the most affected public sector in this crisis: adolescents and young adults have struggled to continue their studies despite the closure of schools and universities, which may have impacted their mental state (Sahu, 2020). Adolescence entails important psychological and social changes that have been identified as potential risk factors for youth's mental health (Liang et al., 2020).

### 1.1 | COVID-19 related worries, resilience, and life satisfaction

Mandatory lockdown as well as social distancing measures have been particularly difficult to bear for adolescents and young adults. Furthermore, the current pandemic has added a new source of distress to their habitual stressors: COVID-19 related worries (Horesh et al., 2020). Some authors have reported the association between COVID-19 related worries and psychological distress, which is identified in the literature as "COVID stress syndrome" and refers to a variety of psychological symptoms derived from fears and worries related to the coronavirus pandemic (Mertens et al., 2020; Taylor et al., 2020).

Regarding the theoretical evidence that aims to explain the psychological impact of the COVID-19 pandemic, some authors highlight the Terror management theory (TMT), which posits that individuals display buffering mechanisms to cope with the fear of their own death: cultural worldviews and self-esteem. Research indicates that this theory could be applied to the current health crisis, suggesting that there could be a moderating or mediating effect of socio-psychological variables in the interplay between COVID-19 fears and emotional symptomatology (Boyraz et al., 2020; Menzies & Menzies, 2020).

Depression, anxiety and stress are among the most prevalent symptoms of emotional distress, especially for young people (Salguero et al., 2012). Adolescents and young adults have to cope with multiple challenges associated with their evolutionary stage. These challenges may diminish their ability to successfully adapt to their environment and, therefore, increase the vulnerability to experience mental health problems (Beiter et al., 2015). Recent studies show that isolation policies, uncertainty and instability in their lives as a consequence of the pandemic has put young people more at risk, reporting a higher prevalence of depression, anxiety and stress symptoms in this population (Pappa et al., 2020). Furthermore, adolescents and young adults seek validation, attachment and significant bonds through peer relationships, with socialization becoming a central pivot for the individual's psychological stability, emotional regulation and identity affirmation. Thus, the impact of confinement on adolescent's mental health has been evidenced by the significant increase in emotional symptoms (Pizarro-Ruiz & Ordóñez-Cambor, 2021).

Qualitative data on this phenomenon highlight the important role of protective factors, such as social and financial support and having an adequate work-life balance, while also emphasizing the risk factors that adolescents and young adults associate with mandatory lockdown (Horesh et al., 2020). These studies indicate that youth mental health decreased during the COVID-19 pandemic, especially those who lived in denser households (higher in number of cohabitants and smaller in space) and those with no access to outdoor spaces (Aresta & Salingaros, 2021). According to this line of research, the compound effect of these variables might lead to higher symptoms of anxiety and depression (Waselewski et al., 2020).

There may also be differences in the way these symptoms are triggered by the current health crisis. Depression has traditionally been associated with retrospective rumination and feelings of loss, while anxiety and stress are related to worries about future events and a sensation of threat (Eysenck et al., 2006). Thus, a sudden and unexpected event such as the COVID-19 pandemic could generate different symptomatology depending on the specific moment that is analysed (Debowska et al., 2020). According to recent literature, early stages of the pandemic could be associated with symptoms of anxiety and stress that respond to the feeling of threat and worry about the future, whereas symptoms of depression would appear at later stages when the feelings of grief and loss are more severe (Hollenstein et al., 2021).

Research on the consequences of this health crisis in Spain has revealed similar results, showing higher levels of emotional symptoms in the general population (Ausín et al., 2020), and specifically among adolescents and young adults (Espada et al., 2020; García-Portilla et al., 2020; Ozamiz-Etxebarria et al., 2020; Tamarit et al., 2020). Despite this challenging situation, the literature has identified some key protective factors that may work as mediators with a "buffering effect" of COVID-19 worries on psychological symptoms such as life satisfaction and resilience (Barzilay et al., 2020).

Life satisfaction is a crucial variable in youth's psychological health: it is defined as a global evaluation or judgment of one's own life experience, and it is associated with well-being and psychological stability (Pavot & Diener, 2008). Empirical research has demonstrated the predictive value of life satisfaction over health and longevity, therefore working as a central protective factor against psychological symptoms (Diener & Chan, 2011; Trzebiński et al., 2020). More specifically, life satisfaction has proved to be a significant predictor of depression—high levels of life satisfaction predicted lower depression symptoms—and it is negatively associated with COVID-19 related worries, which suggests that it might have a protecting impact in youth's adaptation to the global pandemic (Mahmoud et al., 2012; Satıcı et al., 2020). These preliminary studies provide an appropriate starting point to assess the relationship among these variables in the context of the COVID-19 public health crisis, specifically with adolescent and young adult population, given that most studies have focused solely on adults (Du et al., 2020; Zacher & Rudolph, 2020).

Life satisfaction is associated with other protective factors in adolescence, being resilience one of the main focus of interest in the literature due to its essential role in youth's adaptation to the health crisis (Beutel et al., 2010). Resilience is considered a process of adaptation to adverse personal and contextual conditions: it comprises maintaining mental health stability during challenging situations, psychological recovering from adversity or growth in psychological and emotional functioning after such adversity (Verdolini et al., 2021). It has traditionally been considered a multidimensional factor, which varies greatly depending on personal, social, contextual and cultural factors, therefore relying significantly on the methodology supporting its measurement (Connor & Davidson, 2003; Jayalakshmi & Magdalin, 2015). Thus, literature on adolescent and young adult psychology emphasizes the complexity of this construct, due to the number of developmental challenges this period entails and the diverse pathways in which resilience can operate (Dvorsky et al., 2021).

Resilience as measured by the Connor & Davidson Scale (CD-RISC, 2003) is based on the model developed by Richardson and colleagues (1990) that conceptualizes resilience as a stress-coping ability. According to this model, internal and external stressors lead to a disruption of the bodily, mental and spiritual balance (described as "homeostasis"). The individual responds by applying coping mechanisms to face this disruption. Resilience, therefore, is considered the successful or effective use of these coping strategies, that are later engrained in the individual's normal functioning (Connor & Davidson, 2003; Notario-Pacheco et al., 2011).

Resilience conceived as a successful adaptation to challenging internal or external stressors predicts future psychological problems, such as depression, anxiety and stress (Connor & Davidson, 2003). The Resiliency Model (Richardson et al., 1990) stresses the difference between the disruptors of psychological balance, or “stressors” and the outcome of maladaptive coping mechanisms, such as symptoms of anxiety, depression and stress-resilience being a significant moderator or buffer between these psychological variables (Liu et al., 2014).

Research on resilience stresses that it is a crucial factor in the study of life crisis or transitions, operating as a potential protective factor against psychological distress (Jayalakshmi & Magdalin, 2015). Current literature addresses this construct as a moderator in psychological processes, and its crucial role as a buffer in the impact of risk factors, such as emotional symptomatology, substance abuse, developmental challenges associated with youth, or contextual factors such as the ongoing pandemic (Dvorsky et al., 2021).

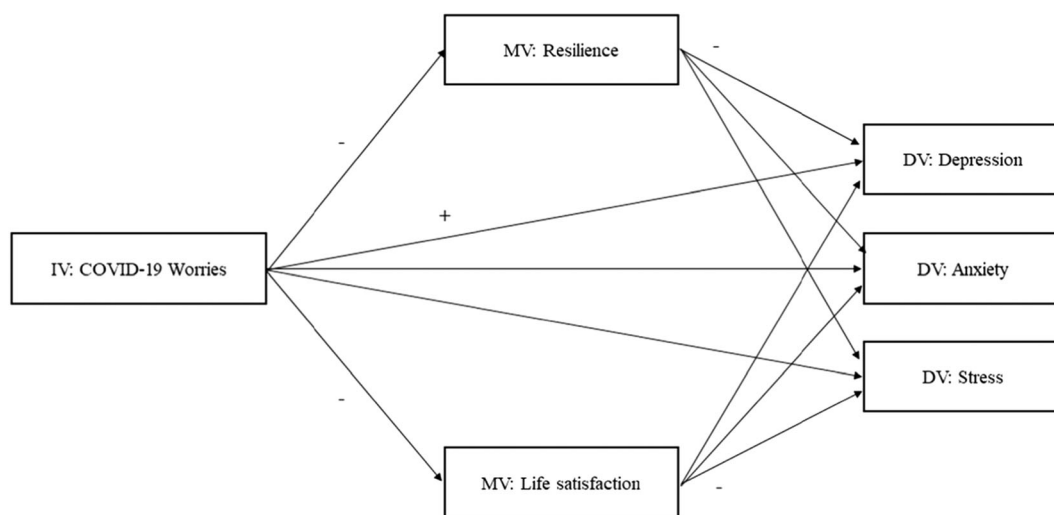
Some authors have stated that resilience may be a key protective factor of coping with COVID-19 related anxiety, being negatively associated with psychological symptoms during this pandemic (Vinkers et al., 2020). Furthermore, resilience seems to be negatively associated with COVID-19 related worries; therefore, it is worth studying whether it plays a mediating role in the association between these worries and psychological symptoms, along with other protective factors such as life satisfaction (Barzilay et al., 2020). The relationship found in literature between these variables, together with theoretical frameworks such as the TMT, suggests resilience and life satisfaction could play a mediating role in the relationship between variables associated with the COVID-19 pandemic (Beutel et al., 2010; Verdolini et al., 2021). These variables have a significant impact on youth mental health—they are associated with a better adjustment to challenging or adverse situations, and they play a crucial role in mental health outcomes (Liu et al., 2014; Pizarro-Ruiz & Ordóñez-Cambor, 2021).

A mediation model could explain the associations displayed above between COVID-19 worries and emotional symptomatology such as depression, anxiety and stress symptoms and the mediating role resilience and life satisfaction could play in this relationship (Barzilay et al., 2020; Beutel et al., 2010; Boyraz et al., 2020). There is an urgent need for research that studies the combined effect of life satisfaction and resilience—two essential protective factors—could have on the relationship between COVID-19 related worries and emotional symptoms, especially in adolescent and young adult population.

## 1.2 | The present study

The aim of this study was to test the accuracy of a mediational model in which resilience and life satisfaction act as a buffer between COVID-19 related worries and the development of symptoms of depression, anxiety, and stress (Figure 1). According to the proposed model, we expect to find a direct positive effect of COVID-19 worries on symptoms of depression, anxiety, and stress reported during the last week, as measured by the Depression, Anxiety, and Stress Scales (DASS-21). Furthermore, our model hypothesized that both resilience and life satisfaction would be, to some degree, negatively affected by COVID-19 worries. The model also hypothesizes a negative direct effect of resilience and life satisfaction on depression, anxiety, and stress (meaning that individuals with higher levels of resilience and life satisfaction would display fewer psychopathological symptoms). Not depicted in Figure 1 but underlying the proposed model, we expect to find an indirect effect of COVID-19 worries on current psychopathological symptomatology mediated through resilience and life satisfaction: i.e., we expect that individuals reporting a high level of COVID-19 worries but showing strong resilience and life satisfaction would experience fewer symptoms of depression, anxiety, and stress than those worried about COVID-19 but showing low levels of resilience and life satisfaction.

A secondary aim of this research was to test whether the proposed mediational model (Figure 1) was equally applicable in both males and females and across different ages. Given that we do not expect that gender and age impact on the proposed relationship between the study measures, we hypothesized that our mediational model would be invariant according to these variables.



**FIGURE 1** Graphic depiction of the mediational model tested in this study. DV, dependent variable; IV, independent variable; MV, mediator variable

## 2 | METHODS

### 2.1 | Participants and procedure

The present study involved 392 adolescents and young people aged between 12 and 25 years ( $M = 17.05$  years,  $SD = 3.08$ ). Most of the participants were female ( $n = 275$ , 70.2%). As for age distribution, 40.8% were aged between 12 and 15 years old, 31.4% between 16 and 18, and 27.8% between 19 and 25. Regarding the conditions in which lockdown took place, participants reported cohabiting with an average number of 3.82 relatives (range between 1 and 7). The majority spent the quarantine in a flat with (51.5%) or without (21.7%) outside zones. At the time the study was conducted, many participants went outside (for shopping, doing exercise, spending time with friends, etc.) on a regular basis (13% once a week; 36.2% 2/3 times a week; 37.2% almost every day). In terms of impact, 13.5% and 6.1% of participants have had relatives testing positive of COVID-19 or experiencing symptoms, and 8.7% have had someone from their families pass away because of COVID-19. However, only 0.5% and 4.3% of participants tested positive of COVID-19 or experienced symptoms.

The inclusion criteria were: (1) aged between 12 and 25 years; and (2) having spent the COVID-19 health crisis and lockdown in Spain. Likewise, participants who incorrectly answered more than 25% of the Oviedo Infrequency Scale (INF-OV) (Fonseca-Pedrero et al., 2011), which detects people who answered randomly to the questionnaires, were removed from the study. Initial data derived from the online platform were screened to avoid duplicitous, inconsistent, and/or unreliable responses. Only those participants who completed 100% of the survey were included (i.e., we did not handle missing data in our dataset).

The present research was approved by the Ethics Commission of the University of Valencia and the data were collected following the standards of the Declaration of Helsinki (World Medical Association, 2013). Following a snowball sampling method, participants aged 16 and older were contacted through internet and social media. For the participation of adolescents under 16, their parents or legal guardians were contacted and they gave permission for the children's participation. All participants were informed of the purpose of the study, the confidentiality of their voluntary participation, and the anonymity of their responses. Before answering the online survey, young people aged 16 and older signed the informed consent to participate. In the case of adolescents under 16 years of age, their parents or legal guardians also had to sign it. In May and June 2020, data were collected through an online

questionnaire on Limesurvey accessible from any electronic device (smartphone, tablet, laptop, etc.). The assessment lasted approximately 25 min.

## 2.2 | Variables and instruments

### 2.2.1 | Participant characteristics

Participants were asked about basic demographic information (gender and age), conditions in which the lockdown took place (number of people cohabiting with during lockdown, characteristics of the place in which participants lived during lockdown, and the frequency in which they went out at the time of assessment), and personal/familiar impact of COVID-19 (whether participants experienced symptoms of COVID-19 or tested positive and whether someone from their family experienced symptoms, tested positive, or died).

### 2.2.2 | COVID-19 related worries

The COVID-19 related worries scale (COVID-19-RWS) is an ad hoc survey designed to assess people's worries during lockdown caused by the COVID-19 pandemic. The scale includes concerns about one's own and others' health status, economic and political circumstances at national and international level, changes in employment and/or academic status, damage to social relations and consequences on psychological health. The scale consists of 19 items which are answered on a 5-point Likert scale (1 = *almost never*, 5 = *almost always*). In this study, the results of the exploratory factor analysis suggest adequate psychometric properties of the one-factor structure of the scale (Bartlett's statistic = 1538.6,  $p \leq 0.001$ ; kaiser-meyer-olkin test = 0.83; comparative fit index [CFI] = 0.91; goodness-of-fit index = 0.94; root mean square error of approximation [RMSEA] = 0.08; standardized root mean square residual [SRMR] = 0.09).

### 2.2.3 | Resilience

Spanish version of the 10-item Connor–Davidson Resilience Scale (CD-RISC) (Notario-Pacheco et al., 2011a). The abbreviated version of the Connor–Davidson Resilience Scale (CD-RISC) consisted of 10 items measuring general resilience (Campbell-Sills & Stein, 2007). Items are scored on a 5-point Likert scale ranging between 0 (“Never”) and 4 (“Almost always”), with a total score ranging between 0 and 40. Higher scores on the CD-RISC indicate a higher level of resilience. The Spanish version of the 10-item CD-RISC confirmed this one-factor solution and obtained an appropriate reliability in a sample of university students ( $\alpha = 0.85$ ) (Notario-Pacheco et al., 2011b) and a sample of adolescents ( $\alpha = 0.75$ ) (Gómez-Ortiz et al., 2015). In our study, the reliability of the CD-RISC was appropriate ( $\alpha = 0.84$ ).

### 2.2.4 | Life satisfaction

Spanish version of the Satisfaction with Life Scale (SWLS) (Vázquez et al., 2013). The SWLS is a 5-item unidimensional measure of life satisfaction (Diener et al., 1985). Specifically, it measures the cognitive component of life satisfaction, rather than focusing on affect (Pavot & Diener, 2008). Items are scored on a 7-point Likert scale ranging between 1 (“Totally disagree”) and 7 (“Totally agree”). Items are summed to generate a life satisfaction overall score ranging from 5 (low satisfaction) to 35 (high satisfaction). The SWLS is one of the

most widely administered scales in the measurement of life satisfaction (Pavot & Diener, 1993), with a large number of studies supporting its reliability, validity, and applicability across cultures (Emerson et al., 2017). Internal consistency of the Spanish version of the SWLS was 0.84 in adolescents (Atienza et al., 2000) and 0.88 in a sample of 2964 individuals aged between 21 and 69 years old (Vázquez et al., 2013). In our study, Cronbach's alpha value was 0.85.

### 2.2.5 | Symptoms of depression, anxiety, and stress

Spanish version of the Depression, Anxiety, and Stress Scales (DASS-21) (Daza et al., 2002). The Depression, Anxiety, and Stress Scales (DASS-21) is a widely used screening tool to assess symptoms of emotional distress (Lovibond & Lovibond, 1995). The DASS-21 comprises three subscales: (a) depression, measuring symptoms typically associated with dysphoric mood; (b) anxiety, assessing symptoms of physical arousal, panic attack, and fear; and (c) stress, measuring symptoms such as tension, irritability, or the tendency to overreact to stressful. Each subscale is composed of 7 items, and respondents are asked to report how much the item applied to them over the past week. Each item is rated on a 4-point Likert scale (0 = "Did not apply to me at all"; 3 = "Applied to me very much, or most of the time"), resulting in a total score ranging from 0 (absence of symptoms) to 21 (severe symptomatology). The three subscales have demonstrated appropriate psychometric properties in large community samples (Henry & Crawford, 2005) and consistency across cultures (Oei et al., 2013) and racial groups (Norton, 2007). The Spanish version of the DASS reported an appropriate reliability when applied in a sample of 98 bilingual Spanish adults ( $\alpha_{\text{depression}} = 0.93$ ;  $\alpha_{\text{anxiety}} = 0.86$ ;  $\alpha_{\text{stress}} = 0.91$ ) (Daza et al., 2002) and 365 Spanish university students ( $\alpha_{\text{depression}} = 0.84$ ;  $\alpha_{\text{anxiety}} = 0.70$ ;  $\alpha_{\text{stress}} = 0.82$ ) (Bados et al., 2005). In our study, Cronbach's alpha values for the depression, anxiety, and stress subscales were 0.90, 0.86, and 0.88 respectively.

## 2.3 | Data analysis

Descriptive analyses (i.e., means and percentages) were first conducted to characterize participants in terms of basic sociodemographic information, COVID-19 lockdown conditions, and impact of COVID-19. Then, descriptive analyses and Pearson correlations were performed between all observed variables. Finally, we used structural equation modeling (SEM) analyses to test the mediational model proposed in Figure 1. The software used to perform this analysis was EQS. 6.4 (Bentler, 2006). Non-normal distribution of the study measures was addressed by applying robust estimation methods (Finney & DiStefano, 2013). Goodness of fit for the SEM model was assessed through the following indices: the relative chi-square ( $\chi^2/df$ ), the RMSEA, the comparative and incremental fit indices (CFI and IFI, respectively), and the SRMR. An excellent model fit was identified when the  $\chi^2/df$  was between 1 and 2, the CFI and the IFI were  $\geq 0.95$ , the RMSEA  $\leq 0.05$ , and the SRMR  $\leq 0.05$  (Bagozzi & Yi, 2011). For the sake of transparency, Satorra-Bentler chi-square ( $\chi^2$ ) and general model significance ( $p$ ) were reported; however, given that  $\chi^2$  is highly sensitive to sample size (Markland, 2007), these indices were not employed to assess the adequacy of the SEM model.

To test the significance of indirect effects, we used an EQS function that implements Sobel's (Sobel, 1987) test of significance of indirect effects. To assess whether the mediational model was valid for their use in both males and females and across ages, multigroup SEMs were conducted. Specifically, we tested one level of measurement invariance: configural invariance. For gender configural invariance, multigroup SEM was performed comparing two groups (i.e., males and females); for age invariance, multigroup SEM was performed comparing three groups (i.e., children between 12 and 15 years old, adolescents between 16 and 18, and young adults between 19 and 25) (Table 1).

**TABLE 1** Participants' characteristics

	% (n) or M (SD)
<b>Demographics</b>	
Gender	
Men	29.6% (n = 116)
Women	70.2% (n = 275)
Other	0.3% (n = 1)
Age (range = 12–25 years old)	
Participants aged between 12 and 15 years old	17.05 (3.08)
Participants aged between 16 and 18 years old	40.8% (n = 160)
Participants aged between 19 and 25 years old	31.4% (n = 123)
	27.8% (n = 109)
<b>COVID-19 Lockdown conditions</b>	
Number of people cohabiting with (range = 1–7)	3.82 (0.91)
<b>Home characteristics</b>	
Flat or apartment without outside zones (balcony, courtyard, etc.)	21.7% (n = 85)
Flat or apartment with outside zones (balcony, courtyard, etc.)	51.5% (n = 202)
House with limited outside zones (e.g., small garden)	20.4% (n = 80)
House with large outside zones (e.g., a chalet in a mountain area)	6.1% (n = 24)
Other	0.3% (n = 1)
<b>Frequency of going out (for buying, doing exercise, social purposes, etc.)</b>	
I have not going out since the beginning of the lockdown	3.6% (n = 14)
Less than 1 time per week	9.9% (n = 39)
Once a week	13% (n = 51)
Two or three times a week	36.2% (n = 142)
Almost every day	37.2% (n = 146)
<b>Impact of COVID-19</b>	
Has someone from your family died of COVID-19?	
No	91.3% (n = 358)
Yes	8.7% (n = 34)
Has someone from your family had symptoms of COVID-19 or tested positive?	
No	71.4% (n = 280)
Has had symptoms but has not been tested	6.1% (n = 24)
Has tested positive of COVID-19	13.5% (n = 53)
I do not know	8.9% (n = 35)
Have you had symptoms of COVID-19 or tested positive?	



**TABLE 1** (Continued)

	% (n) or M (SD)
No	83.2% (n = 326)
I had symptoms but have not been tested	4.3% (n = 17)
I have tested positive of COVID-19	0.5% (n = 2)
I do not know	12% (n = 47)

**TABLE 2** Descriptive statistics and Pearson's correlations between included measures

	Range	M (SD)	1	2	3	4	5	6
COVID-19 related worries (COVID-19-RW)								
1. Total score	19–95	52.21 (12.31)	1	–0.28***	–0.30***	0.47***	0.49***	0.52***
Connor–Davidson Resilience Scale (CD-RISC)								
2. Total score	0–40	25.55 (6.85)		1	0.46***	–0.40***	–0.31***	–0.29***
Satisfaction with Life Scale (SWLS)								
3. Total score	5–35	22.92 (6.48)			1	–0.49***	–0.35***	–0.39***
Depression, Anxiety, and Stress Scales (DASS-21)								
4. Depression	0–21	4.96 (4.99)				1	0.71***	0.73***
5. Anxiety	0–21	3.58 (4.31)					1	0.76***
6. Stress	0–21	6.13 (5.07)						1

Abbreviations: DASS, Depression, Anxiety, and Stress Scales; SWLS, Satisfaction with Life Scale.

\*\*\* $p < 0.001$ .

### 3 | RESULTS

#### 3.1 | Correlations between study measures

As shown in Table 2, total score in the COVID-19 related worries scale was negatively correlated with resilience and life satisfaction ( $r = -0.28$  and  $-0.30$ ), and positively correlated with depression, anxiety, and stress ( $r$  between 0.47 and 0.52). On the contrary, both resilience and life satisfaction negatively correlated with depression ( $r = -0.40$  and  $-0.49$ ), anxiety ( $r = -0.31$  and  $-0.35$ ), and stress ( $r = -0.29$  and  $-0.39$ ). Finally, correlation between resilience and life satisfaction was positive and significant ( $r = 0.46$ ). Range and mean scores on each scale are also depicted in Table 2.

#### 3.2 | SEM and multigroup SEM

The potential mediational effect of resilience and life satisfaction on the relationship between COVID-19 worries and depression, anxiety, and stress (Figure 1) was tested using SEM. As missing data may have a negative impact on this

analysis, 48 participants with missing values in one or more of the model variables were excluded. Therefore, the sample for the estimation of the SEM consisted of 344 participants. Goodness-of-fit indices for the tested model are reported in Table 3: the  $\chi^2/df$  (1.88), RMSEA (0.051), and SRMR (0.060) indicated that the model presented an appropriate adjustment, but the CFI (0.812) and IFI (0.814) were below the threshold of 0.90 to consider the model's fit as satisfactory. Kenny and McCoach (2003) argued that the CFI and the IFI tends to deteriorate in models comprising a large number of indicators and latent variables, such in this study (note that our model comprised 1360 *df*). These authors suggested that models involving low CFI and IFI values give no real cause for concern insofar as the RMSEA presents an appropriate adjustment. In our study, the  $\chi^2/df$ , RMSEA, and SRMR indicated an appropriate adjustment of the tested model.

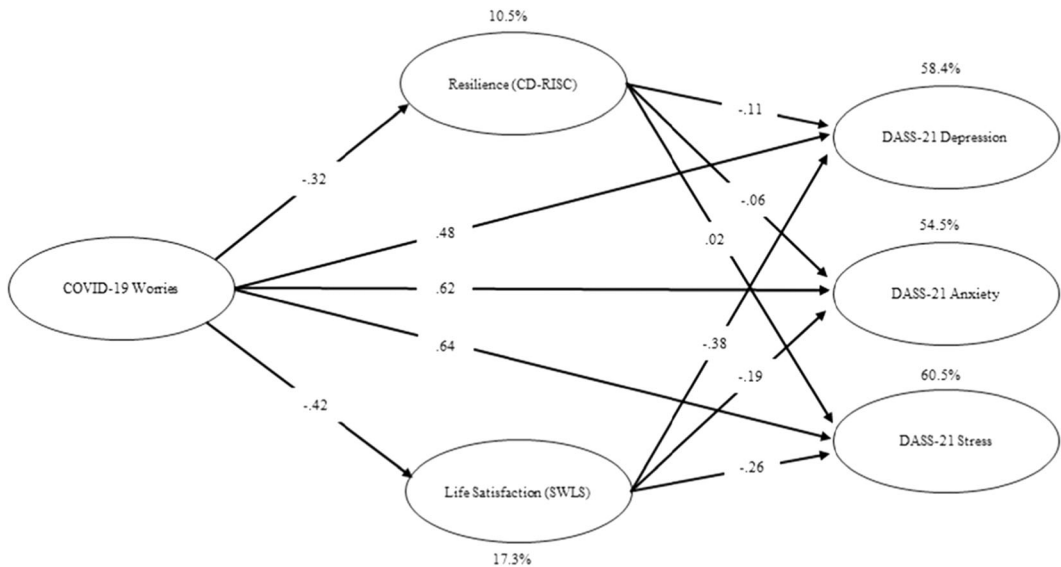
Standardized parameter estimates are presented in Figure 2. COVID-19 worries had a direct negative effect on resilience and life satisfaction, explaining 10.5% and 17.3% of their variance. On the contrary, COVID-19 worries

**TABLE 3** Goodness-of-fit indices for the SEM

	$\chi^2$	<i>df</i>	<i>p</i>	$\chi^2/df$	RMSEA (CI)	SRMR	CFI	IFI
Structural equation model (SEM)	2569.38	1360	<0.001	1.88	0.051 (0.048; 0.054)	0.060	0.812	0.814
Multigroup SEM								
Configural invariance according to gender	4475.24	2720	<0.001	1.64	0.061 (0.058; 0.064)	0.103	0.729	0.735
Configural invariance according to age	6313.97	4080	<0.001	1.54	0.069 (0.066; 0.072)	0.109	0.691	0.700

Note:  $\chi^2$  = Satorra-Bentler Chi-square; *p* = general model significance;  $\chi^2/df$  = normed chi-square.

Abbreviations: CFI, comparative fit index; CI, confidence interval; *df*, degrees of freedom; IFI, incremental fit index; RMSEA, root mean square error of approximation; SEM, structural equation model.



**FIGURE 2** Structural equation model depicting the direct effect of COVID-19 worries on depression, anxiety, and stress (DASS-21), and the indirect effect mediated through resilience (CD-RISC) and life satisfaction (SWLS).  $R^2$  is expressed as a percentage outside the main endogenous variables. Coefficients are reported in standardized format. All parameters are significant. Items comprising each latent variable, as well as error terms, are not included in the figure to facilitate its interpretation

had a direct positive effect on depression, anxiety, and stress ( $\beta$  between 0.48 and 0.64). In turn, resilience and life satisfaction had a direct negative effect on depression ( $\beta = -0.11$  and  $-0.38$ , respectively), anxiety ( $\beta = -0.06$  and  $-0.19$ ), and stress ( $\beta = 0.02$  and  $-0.26$ ). To test the indirect effect of COVID-19 worries through resilience and life satisfaction, we used an EQS function that implements Sobel's (Sobel, 1987) test of significance of indirect effects. The indirect effects of COVID-19 worries on anxiety (parameter estimate = 0.390; standard error = 0.120; Sobel test = 3.23) and stress (parameter estimate = 0.450; standard error = 0.128; Sobel test = 3.52) were significant at  $p < 0.05$ , meaning that high levels of resilience and life satisfaction acted as a buffer against the negative impact of COVID-19 on these psychopathological symptoms. However, the indirect effects of COVID-19 worries on depression were not significant. Altogether, direct and indirect effects predicted a large proportion of the variance of depression (58.4%), anxiety (54.5%), and stress (60.5%).

To test whether this SEM mediational model was equally applicable in both males and females and across different ages, multigroup SEMs according to gender and age were conducted. As displayed in Table 3, goodness-of-fit indices supported both gender ( $\chi^2/df = 1.64$ ; RMSEA = 0.061; SRMR = 0.103) and age ( $\chi^2/df = 1.54$ ; RMSEA = 0.069; SRMR = 0.109) configural invariance. These results suggest that the structure of the proposed model was invariant in both males and females and in children between 12 and 15 years old, adolescents between 16 and 18, and young adults between 19 and 25.

## 4 | DISCUSSION

The psychological impact of the global sanitary crisis caused by the relentless spread of the COVID-19 pandemic has been a major concern for health care professionals, researchers, and public institutions. Young people are especially vulnerable during this difficult situation, which has been conditioned by mandatory lockdown, social distancing measures and the transition to online-learning (Horesh et al., 2020). Thus, the pandemic has added new sources of distress to this already challenging evolutionary stage threatening youth mental health and emotional stability (Liang et al., 2020). A recent line of research has initiated the study of potential protective factors that may have a buffering effect on COVID-19 related stressors, such as life satisfaction and resilience (Barzilay et al., 2020). However, the research regarding the psychological impact of COVID-19 worries on mental health conducted in adolescent and young adult population is rare. Thus, the aim of this study was analyzing a predictive model in which resilience and life satisfaction act as a buffer between COVID-19 related worries and the development of symptoms of depression, anxiety, and stress, which are of special relevance during youth and taking into account gender and age differences. The findings extend our understanding of the psychological protective factors of COVID-19 related stressors during the pandemic in Spain.

First, we expected to find a direct positive effect of COVID-19 worries on symptoms of depression, anxiety, and stress. Our results confirmed this hypothesis, showing that young people who were worried more about COVID-19 experienced more symptoms of depression, and to a greater extent more symptoms of anxiety and stress. This finding is consistent with previous studies reporting that COVID-19-related worries are associated with an increased level of psychopathological symptoms (Barzilay et al., 2020). Adolescents and young adults have been especially concerned about their academic and professional future, due to the uncertainty regarding the terms and conditions in which they could carry on their studies and find a job afterwards (Pizarro-Ruiz & Ordóñez-Cambor, 2021). The COVID-19 pandemic and confinement measures increased the feeling of uncertainty and fear about the future, which is already a well-established stressor in the transition from adolescence to adulthood (Pappa et al., 2020).

Our results also support the hypothesis that both resilience and life satisfaction are negatively affected by COVID-19 worries. Thus, direct effects indicated that adolescents and young adults who report more COVID-19 worries, scored lower on resilience and even lower on life satisfaction. This finding is in line with the theoretical frameworks that indicate that individuals may turn to personal resources to buffer the effect that intense fears have

on their own mental health, especially during the COVID-19 pandemic (Menzies & Menzies, 2020). Moreover, it concurs with previous studies suggesting that even though these variables are somewhat permeable to the impact of contextual environment, the temporary but persistent stressors of the current global health crisis caused by COVID-19 might have a negative impact on young people's capacity of resilience and their life satisfaction judgment (Schwarz & Strack, 1999). Indeed, the exceptional situation during the first months of a restrictive lockdown due to the outbreak of the COVID-19 pandemic, must have caused a mayor disruption in the lives of adolescents and young adults for which they were not prepared. In addition, the lack of social support from peers, the feeling of loneliness and uncertainty may have increased the disruption of bodily, mental and spiritual balance, causing a general dissatisfaction with life in general (Zacher & Rudolph, 2020).

Furthermore, we expected a negative direct effect of resilience and life satisfaction on depression, anxiety, and stress. Our results partially confirm this hypothesis, showing that individuals with higher levels of resilience and life satisfaction reported fewer psychopathological symptoms. According to previous research, both variables have been identified as potential factors that might play a crucial role in youth's adaptation to the global pandemic (Jayalakshmi & Magdalin, 2015; Mahmoud et al., 2012; Satici et al., 2020). However, in this study we observed low direct effects of resilience on emotional symptoms, while the direct effects of life satisfaction on these symptoms were moderate. In line with the literature, life satisfaction appears to be the strong predictor of better mental health. The evidence suggests that life satisfaction is a stable believe about a meaningful life that may alleviate strong emotional reactions and provide a solid basis for the more reflective evaluation of personal possibilities to cope with life challenges such as the pandemic (Trzebiński et al., 2020). On the other hand, resilience has been considered a dynamic process of adapting positively to aversive stressors such as the current health crisis, therefore, enhancing psychological adjustment (Liu et al., 2014). Previous research revealed a cognitive mediation mechanism whereby resilience enhances life satisfaction and, therefore, reduced depression and anxiety. Thus, the direct association between resilience and emotional distress was buffered by the underlying mechanism of life satisfaction. This may explain, the unexpected low direct effect of resilience on symptoms of depression, anxiety and stress in the present study.

Supporting our central hypothesis, results from the SEM analyses partially confirmed the indirect effect of COVID-19 worries on current psychopathological symptomatology mediated trough resilience and life satisfaction. Thus, individuals who reported a high level of COVID-19 worries but showed strong resilience and life satisfaction experienced fewer symptoms of anxiety and stress than those who worried about COVID-19 but showing low levels of resilience and life satisfaction. However, there were no statistical evidence for the indirect effects of COVID-19 worries on depression symptoms. Several explanations may be considered for the fact that we did not find a "buffering effect" for depression, only for anxiety and stress. First, the participants of this study reported a greater increase in anxiety and stress levels due to COVID-19-related worries compared to depression levels, suggesting that there might be other contextual variables that may influence in a depressive, social isolation and the feeling of loneliness for instance (Espada et al., 2020; García-Portilla et al., 2020; Ozamiz-Etxebarria et al., 2020). Second, resilience and life satisfaction have been traditionally more associated with coping strategies that may help individuals to reduce their levels of arousal caused by a disturbing event (the current global health crisis) (Connor & Davidson, 2003; Mahmoud et al., 2012). Third, it is possible that during the phase of the pandemic when the data was collected, and in light of the specific safety measures adopted by the Spanish government to protect the population, participants were especially stressed-out and anxious given the uncertainty of the situation (Ausín et al., 2020). Last, from an etiological point of view, it is important to consider the different antecedents of symptoms depression, anxiety and stress. Thus, unexpected and life threatening events such as the pandemic are more likely to produce symptoms of anxiety and stress, due to the feelings of uncertainty about the future (Debowska et al., 2020). Consistent with previous research, early stages of the pandemic have been associated with symptoms of anxiety and stress that respond to the feeling of threat and worry about the future, whereas symptoms of depression would appear at later stages when the feelings of grief and loss are more severe (Hollenstein et al., 2021).

With regard to the secondary research aim, which consisted in analyzing the impact of gender and age on the proposed relationship between the study measures, our results confirmed the hypothesis that our mediational model would be invariant according to these variables. Thus, the “buffering effect” of resilience and life satisfaction mediating the interplay of COVID-19 worries and psychopathological symptoms was evident in both genders and across different ages, confirming the structural invariance of the proposed model.

## 5 | CONCLUSIONS

In conclusion, our findings indicate that COVID-19 worries are positively associated with symptoms of depression, anxiety, and stress, but negatively related to resilience and life satisfaction in adolescents and young adults. Furthermore, both resilience and life satisfaction are protective factors of psychopathological symptoms, meaning that individuals with higher levels of these variables display fewer symptoms of depression, anxiety and stress. In addition, the positive association between COVID-19 worries and symptoms of anxiety and stress is mediated by resilience and life satisfaction, and this interplay was equally evident in both males and females and across different ages.

This study makes an important contribution to the current COVID-19 literature by shining a spotlight on the potential protective factors that might mitigate the psychological impact of the pandemic crisis on youth. Resilience helps reduce symptoms of anxiety, depression and stress, as well as life satisfaction does. These and other factors of psychological strengths are crucial to promote mental and general health as humanity moves toward the post-COVID-19 pandemic era.

Thus, in light of the above findings, we recommend that specific mental health care programs should be designed and implemented to deal with the emotional distress related to COVID-19 pandemic. These programs should use social media and internet as powerful tools to reach adolescents and young adults more effectively and easily. Particular attention should be paid to enhancing resilience and life satisfaction due to their “buffering effect” on anxiety and stress. Thus, the development of coping strategies to better adapt to the challenges of the current health crisis might have important implications for cognitive mechanisms that restore a positive view towards the self, the world and the future. It is important to further investigate the long-term effects of the psychological impact of the COVID-19 pandemic in adolescence and young people to guarantee a healthy transition to adulthood.

### 5.1 | Limitations and future directions

Several study limitations should be considered: These include the inherent limitation of data collection through online survey regarding the generalization to the general population. Nevertheless, participants received no payment or economic reward, which minimizes the concern that they would respond inaccurately on purpose, as the main reason to complete the survey was to give their opinion. Furthermore, we believe that the use of self-report measures was appropriate for the studied sample given that adolescents and young adults are reliable informants of their internal states. Future research, however, may use mixed methods (qualitative and quantitative data), multiple reports from peers/parents, which would provide more exhaustive information about youth mental health. Finally, cross-sectional design does not allow for casual inferences, which can be addressed in longitudinal studies that evaluate trajectories of mental health conditions and needs following the pandemic outbreak.

### AUTHOR CONTRIBUTIONS

**All authors:** contributed equally to the study design, participants' recruitment, data collection, analysis/interpretation of data, and writing up the study and the paper. All of them read and approved the final manuscript.

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## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

## PEER REVIEW

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