The effects of the COVID-19 pandemic on perceived stress among Romanian young adults: negative affect and avoidant coping as mediators

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Título: El impacto de la pandemia COVID-19 en el estrés percibido por jóvenes rumanos: los afectos negativos y las estrategias evasivas como mediadores.

Resumen. *Antecedentes y objetivos:* Aunque se consideraba que los jóvenes estaban menos expuestos a contraer una forma severa de la infección, los efectos que ellos más resintieron fueron los psicosociales. El presente artículo se propone comprobar el papel mediador de los afectos negativos y de las estrategias evasivas, primero en la relación entre el impacto de la pandemia COVID-19 y el estrés percibido, y luego entre la amenaza percibida y el estrés. *Diseño:* Se utilizó un diseño transversal. *Métodos:* Se empleó una muestra de 669 estudiantes de grado (18 - 28 años) durante la cuarta oleada de coronavirus, cuando la variante delta era la dominante. *Resultados:* Se observaron asociaciones positivas entre el impacto de la pandemia CO-VID-19 y el estrés percibido ($r = .485$; $p<.001$), por un lado, y entre la amenaza percibida y el estrés ($r = .283$; $p< .001$), por otro lado. Los datos estadísticos demuestran que los afectos negativos y las estrategias evasivas actúan como mediadores seriales (efecto indirecto = .3349, 95% CI, [.2858; .3852] / (efecto indirecto = .2072, 95% CI, [.1515; .2624]). Consecuentemente, el impacto de la pandemia COVID-19 ($\beta = .137$; 95% CI [.0019; .0045]) y la amenaza percibida ($\beta = .069$; 95% CI [.0007; .0046]) aumentan el estrés no sólo de manera directa, sino también indirecta, intensificando los afectos negativos. Esto genera una propensión hacia el uso específico de estrategias evasivas de afrontamiento. *Conclusiones:* El estudio subraya algunos mecanismos explicativos en cuanto a las relaciones entre variables que afectan la salud mental durante la pandemia COVID-19.

Palabras clave: Estrés percibido. Impacto de la pandemia COVID-19. Amenaza percibida. Afectos negativos. Estrategias evasivas.

Abstract. *Background and objectives:* Although young adults were considered to face a lower risk of severe coronavirus infection, they were at higher risk for adverse psychosocial effects. The aim of this study was to test the mediating roles of negative affect and avoidant coping, firstly in the relationship between COVID-19 impact and perceived stress, and then in the relationship between perceived coronavirus threat and perceived stress. *Design:* Cross-sectional design. *Methods:* We conducted the study on a sample of 669 university students (aged between 18-28), during the critical fourth wave, when the delta variant was the dominant strain. *Results:* The results indicate significant positive associations between the impact of COVID-19 and perceived stress ($r = .485$; $p < .001$), and between perceived coronavirus threat and perceived stress ($r = .283$; $p< .001$). Our findings demonstrate that negative affect and avoidant coping serially mediate these relationships (total indirect effect = .3349, 95% CI, [.2858; .3852] / (total indirect effect = .2072, 95% CI, [.1515; .2624]). Thus, the impact of COVID-19 ($\beta = .137$; 95% CI [.0019; .0045]) and perceived coronavirus threat ($\beta = .069$; 95% CI [.0007; .0046]) induce an increase in stress not only directly, but also indirectly, through amplified negative affect, which in turn increases the specific-oriented use of avoidant coping strategies. *Conclusions:* Our results highlighted some new explanatory relationships between variables that affect mental health during the COVID-19 pandemic.

Keywords: Perceived stress. Impact of COVID-19. Perceived coronavirus threat. Negative affect. Avoidant coping.

Introduction

From the beginning of the recent coronavirus pandemic, there have been major shifts in people's lifestyles and daily routines, leading to an array of significant consequences on mental health. As a result, most of the studies addressing the issue reported a higher prevalence of depression, anxiety and psychological distress among the general population (González-Sanguino et al., 2020; Li et al., 2020; Moreno et al., 2020; Qiu et al., 2020; Wang et al., 2020). The results of a meta-analysis that included more than 78,000 participants indicated that the average prevalence of anxiety was 40.3%, followed by psychological distress (with an average prevalence of 37.5%) and depression (34.3%) (Necho et al., 2021). Other studies have shown that the COVID-19 pandemic has negatively impacted sleep quality, increasing sleep disorders such as insomnia, sleep fragmentation, anxiety and depression induced nightmares (Bhat & Chokroverty, 2022). Spe-

cifically, during the lockdown, individuals reported a higher frequency of sleep disorders (Jahrami et al., 2022). People recovering from the SARS-CoV-2 infection experienced post-traumatic stress symptoms, while those with pre-existing psychiatric conditions reported a worsening of their previous symptoms (Vindegaard & Benros, 2020).

The majority of the studies addressed the manner in which the pandemic impacted adults' mental health, while fewer studies suggested that young or emerging adults (aged 18-29) were considerably affected as well (Charles et al., 2021; Kar et al., 2021; Klaiber et al., 2021; Varma et al., 2021). Although young people were considered to face a lower risk of coronavirus infection, they were at higher risk in terms of adverse psychosocial effects, since the pandemic interfered with their academic, occupational, and interpersonal functioning (Holmes et al. 2020; Wu & McGoogan, 2020). Surveys conducted at the beginning of the pandemic showed that patterns of pandemic-related responses similar to those observed in the general population had been manifesting in young adults, consistently reporting poorer well-being, as well as an increase in the stress perceived, in the symptoms related to mood disorders and in the use of alcohol (Charles et al., 2021).

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Previous research revealed some insights into what might be expected in terms of the effects generated by the coronavirus outbreak. As a major psychosocial stressor, the pandemic generated life disruption, loneliness and self-isolation due to social distancing, increasing the risk for several mental disorders (Fiorillo & Gorwood, 2020). A considerably lower number of studies analyzed the explanatory mechanisms of the relationships between the impact of COVID-19 / perceived coronavirus threat and perceived stress. Addressing this literature gap, we aimed to investigate whether negative affect and avoidant coping act as serial mediators between the impact of COVID-19 and perceived stress, and between the perceived coronavirus threat and perceived stress.

The COVID-19 pandemic in Romania

On March 11th, 2020, the World Health Organization established that the SARS-CoV-2 outbreak met the criteria for a worldwide pandemic to be declared (WHO, 2020). In Romania, the first positive case was confirmed on February 26th, 2020. Soon after, the government declared a state of emergency that would last between March 16th and May 14th. Consequently, a series of official preventive measures were implemented by the government. Two years after the onset of the pandemic, in Romania there were 3.043.205 registered cases of COVID-19 infection, of which 65.906 (2.2%) persons died. Despite the previously adopted measures, which proved to be effective in the first three waves, by mid-October 2021 the fourth pandemic wave drastically affected Romania, raising concern among the international community. Romania reported a death rate of 16,6 per 1.000.000 inhabitants, ranking highest in per capita COVID-19 death rates not only in Europe, but also worldwide. At the time, Romania registered approximately 20,000 infections daily and the daily death toll surpassed 500. As a consequence, experts were sent by the WHO in order to assess the ongoing pandemic situation and help with an action plan (Dascalu et al., 2021).

Impact of COVID-19, Perceived Coronavirus Threat, and Stress during the Pandemic

Even though the current pandemic represented a major stressor, not all individuals were equally impacted; research has shown considerable differences regarding the level of perceived stress. The percentage varied from 8.1% up to 81.9% (Xiong et al. 2020), while other authors reported a rate of stress prevalence of 29.6% (Salari et al. 2020).

According to the Transactional Model of Stress and Coping, the stress perceived by individuals occurs as a "transaction between the person and the environment" (Lazarus, 1984). This model focuses on stress appraisal, which implies the evaluation of potential stressors. Stress reactions are fueled by the individuals' cognitive appraisal of the situation. Thus, when individuals are faced with a potential stressor, a double evaluation entails: a primary appraising,

in which the stressor is deemed either harmful, threatening or challenging, and a secondary appraising, which determines how capable an individual feels in dealing with the stressor. In this secondary appraisal, individuals evaluate their resources for coping with the threat (Lazarus, 1984; Yan et al., 2021).

Previous literature states that in the case of emerging infectious diseases, perceived threat is among the first and most immediate reactions to be experienced (Deng & Feng, 2021). Perceived threat consists of a cognitive evaluation of the possibility that a danger might affect an individual and of the assessment of its associated consequences in terms of severity. Having observed the individuals' reactions to prior epidemic outbreaks (SARS in 2003, the Ebola epidemic in 2014 etc.), the perceived threat of the epidemic was conceptually devised as 'disease severity' and 'likelihood of infection' (Brewer et al., 2007). Although it is generally expected for individuals who perceive a higher coronavirus threat while also experiencing a greater impact of the pandemic to be more exposed to the negative consequences of distress, the specific explanatory mechanisms are still to be explored.

The mediating effect of Negative Affect

Negative and positive affect constitute the inclusive notion of general temper or disposition (Watson & Clark, 1984). While positive affect makes us think about feelings of eagerness, passion, vitality, agreeable commitment with circumstances and watchfulness, negative affect highlights suffering, distress, dissatisfaction or unpleasant arousal (Finch et al., 2012). Negative affect is specifically approached as a steady facet of negative stress which comprises negative emotional states (both temporary and/or sustained). These are numerous and among them are sadness, fear, anger, guilt, shame, nervousness, loneliness, disgust (Brown et al., 2021; Watson & Clark, 1984).

Previous studies highlighted the general contribution of unpleasant emotional states to a large number of mental health issues. When the negative feelings experienced are relatively constant, the person runs the risk of experiencing significant distress or even developing symptoms of depression, or in any case, to have significantly reduced levels of well-being (Miller et al., 2009; Watson, 2005; Watson & Clark, 1984). In the case of young people, it was found that when the perceived stress was high on a daily basis, there were low levels of positive affect and elevated levels of negative affect (Jiang, 2020). A possible explanation for this pattern could be that in other crisis situations, compared to young people, adults and older people reported more efficient coping strategies and higher levels of well-being (Jiang, 2020; Klaiber et al., 2021).

The mediating effect of Avoidant Coping

The theory which conceptualizes stress in transactional terms defines coping as "behavioral and cognitive efforts to

reduce or tolerate the internal and external demands that were appraised as exceeding the person's resources" (Lazarus & Folkman, 1984). The multidimensional model of coping, aiming to adequately measure the modalities of managing effective or ineffective stressful life events, organizes strategies of coping into two larger constructs, named *approach* coping style and *avoidant* coping style (Carver & Scheier, 1998).

Confrontational procedures, typical for the *approach* coping style, are firmly oriented towards changing the characteristics of the difficult situation or towards their acceptance. Quite different is the case of avoidant procedures, which are directed more towards dysfunctional actions such as escape, avoidance, behavioral disengagement, self-blaming or substance use (Carver & Scheier, 1998; MacIntyre et al., 2020). While approach coping strategies entails an active confrontation component, heightening an individual's adaptation to stress, avoidant coping, given its passive nature, generates the opposite effect, being considered maladaptive. Although avoidant coping might act as a buffer against overwhelming emotions immediately after the stressful event, in time it proves to be ineffective, preventing adaptive outcomes (Turliuc & Măirean, 2014).

Steps to remove or make stressful stimuli disappear, or rationalization regarding difficult experiences, or even denial of difficult realities are some examples of avoidant coping strategies. Difficulties related to mental health have been shown to be correlated with the chronic use of avoidance as a strategy (Boals et al., 2011; Herman-Stahl et al., 1995; Penley et al., 2002; Wilkinson et al., 2000). For a review of the effects of dysfunctional ruminating and suppression coping in people affected by potentially traumatic events (see, Turliuc et al., 2015).

During the pandemic, adequate use of coping strategies helped run demanding episodes and diminish unpleasant feelings, while an inappropriate selection of coping strategies generated severe stress. Previous results regarding the correspondence between coping mechanisms and stress throughout the pandemic indicated a higher tendency towards avoidant coping strategies among students who had elevated levels of stress (Awoke et al., 2021; Chodkiewicz et al., 2021; Park et al., 2020).

Over time, in psychology, coping was considered a consequence of emotion, but more recent scientific evidence shows that negative emotion and avoidant coping both influence each other (Folkman & Lazarus, 1988; Weiss et al., 2019). Negative affect can lead to avoidant coping through changes in motivation, accelerating or impeding certain actions. These might also modify the person-environment relationship, generating changes regarding the subjective experience of negative affect (i.e., in intensity, duration etc.) (Folkman & Lazarus, 1988). In terms of the impact of avoidant coping on negative emotion, it has been experimentally demonstrated that the regulatory qualities of this type of coping are not as effective compared to other coping mechanisms (Campbell-Sills et al., 2006; Weiss et al., 2019). Even

more, avoidant coping can lead to a resurge of elevated stress levels.

The current study

During the pandemic, young people were considered to face a high risk in terms of adverse psychosocial effects (Varma et al., 2021). Among the factors that predisposed individuals to an increased risk of mental health difficulties were: being younger, single and having student status (Charles et al., 2021; Kar et al., 2021; Xiong et al. 2020). Still, we needed to deepen our understanding of how the stress perceived by young adults varied depending on several factors, such as the impact of COVID-19, perceived coronavirus threat, negative affect and avoidant coping. Previous studies have concluded that the prevalence of psychological distress, anxiety, depression, sleep difficulties and posttraumatic stress disorder has significantly increased following the outbreak of COVID-19 (Gao et al., 2020; Hyland et al., 2020; Salari et al., 2020; Vindegaard & Benros, 2020; Wang et al., 2020; Xiong et al., 2020).

Based on the empirical evidence summarized in the previous sections, we aimed to investigate the role of some explanatory variables in the relationship between the impact of COVID-19 and stress, and between perceived coronavirus threat and stress. Firstly, we hypothesized that the impact of COVID-19 positively predicts perceived stress (H1). Secondly, we anticipated that the relationship between the impact of COVID-19 and perceived stress is mediated by negative affect (H2.1) and avoidant coping (H2.2). Thirdly, we anticipated that the link between the impact of COVID-19 and perceived stress is serially mediated by negative affect and avoidant coping (H3). Moreover, we hypothesized that perceived coronavirus threat is positively associated with perceived stress (H4), and we predicted that the relationship between perceived coronavirus threat and perceived stress is mediated by negative affect (H5.1), and avoidant coping (H5.2). Finally, we hypothesized that the link between perceived coronavirus threat and perceived stress is serially mediated by negative affect and avoidant coping (H6).

Method

Participants

The sample included 669 young adults, who, at the time of recruitment, were attending undergraduate (81.8%) or master's degree studies (18.2%) at a university in the NE region of Romania. 606 of them were women and 63 were men. Due to this unequal gender ratio, the results of the current study are difficult to generalize, especially for other male participants, and should be carefully interpreted. The average age of the participants was 20.7, while the standard deviation was $SD = 2.08$. Of the 669 students, 42.5% were single, 53.8% were in a relationship, 3.4% were married, and 0.3% were divorced. Regarding their socio-economic status, 74.4%

of the participants stated it as being of an average level, 18.5% stated being below average, and 7.1% above average. Also, most participants (90.1%) lived together with at least three other people.

Measures

Perceived Stress. The Perceived Stress Questionnaire (PSQ; Levenstein et al., 1993) is a unidimensional scale that has been used to measure stress. The instrument consists of 30 items, eight of which are reversed (1, 7, 10, 13, 17, 21, 25 and 29). The respondents received instructions to indicate on a four-step Likert scale (ranging from 1–almost never to 4–very often) how often they experienced a series of stress-specific manifestations and emotional reactions. For the current study, we used the instrument's total score, which was calculated after reversing the score for indirect items. Some sample items are: "During the last month, you feel that too many demands are being made on you" (direct item) and "You feel rested" (indirect item). Previous research reported excellent psychometric properties for the PSQ scale (Kocalevent et al., 2007; Østerås et al., 2018) For the current sample, the Alpha Cronbach coefficient was .94, thus the instrument showed very good internal consistency.

Impact of COVID-19. To measure this variable, the short version of the Coronavirus Impact Questionnaire (Conway et al., 2020) was used. It includes three subscales: (1) financial scale, (2) resources scale and (3) psychological scale, each having two items. The six items assess the impact of financial difficulties and of lack of resources, as well as the impact of the psychological consequences of the COVID-19 pandemic. The answers were reported on a seven-point Likert scale (1–not at all true; 7–totally true). The instrument had no reversed items. The total score was computed by adding up the answers to the corresponding items. A sample item is: "The Coronavirus (COVID-19) outbreak has negatively impacted my psychological health". Other studies' results demonstrated adequate psychometric properties for the scale (Ho et al., 2022). For this sample, reliability was also high (the Alpha Cronbach coefficient was .82).

Perceived Coronavirus Threat. We used the short version of the Perceived Coronavirus Threat Questionnaire (Conway et al., 2020). This is a three-item scale (e.g., "Thinking about the coronavirus (COVID-19) makes me feel threatened") designed to measure the global perceptions of the COVID-19 threat. The participants indicated the degree to which they agreed or disagreed with every statement by using a seven-point Likert scale ranging from 7-strongly agree to 1-strongly disagree. The total score was computed by adding up the values of the three corresponding items. The Alpha Cronbach coefficient for this instrument was .88.

Negative Affect. The Negative and Positive Affect Scale was used to assess affects (NAPAS; Mroczek & Kolarz, 1998). The instrument includes two subscales, each having six items, the first evaluating the negative affect, and the second, the positive affect. Only the negative affect subscale

was used in this study. Among negative affects, the authors included sadness, nervousness, restlessness, feeling that everything was an effort, hopelessness and lack of self-worth. The items were rated on a five-point Likert scale (1–almost never; 5–very often). The instrument had no reversed items. We used the total score of the instrument. The psychometric properties of the NAPAS are well-established (Joshanloo, 2017) and reliability was very high in this sample (α =.90).

Avoidant Coping. The Brief-Coping Orientation to Problems Experienced Inventory (Brief-COPE; Carver, 1997) consists of 28 self-report items which are meant to assess different manners of coping with a significant stressor or difficult life events. A four-point Likert scale was used to rate the items (1–almost never; 4–very often). The instrument had no reversed items. A sample item is: "I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping". The short version of the instrument included problem-focused coping, emotion-focused coping, and avoidant coping subscale. Only the avoidant coping subscale was used in this study. To calculate the total score, the values of the corresponding items were summed up. Previous research provided data to support the adequate psychometric properties of the Brief-COPE Inventory, including good internal structure and consistency (García et al., 2018). In the current sample, the Cronbach alpha coefficient was 0.70.

Demographic variables. Each participant filled in the requested information about gender, age, relationship status, level of education, socio-economic status and the number of cohabitants.

Procedure

The study's procedure and the instruments administered were in full compliance with the Declaration of Helsinki and with the University's Code of Ethics. The data were collected between October and December, 2021, while Romania was struggling with the fourth wave of the coronavirus pandemic. Given the severity of the epidemiological situation at that time, the relocation of university courses to online learning platforms was one of the officially implemented government measures. For this reason, the collection of data was also carried out online. All the respondents were briefed on the confidentiality of their answers and informed about what participation in this study entailed. They expressed their agreement by filling in an electronic informed consent form. Their effort and involvement were rewarded by adding a bonus to the final grade in a subject studied during the previous academic semester.

Analytic strategy

The preliminary analyses were conducted using the SPSS 23 software. First, we computed the means, standard deviations, and the Pearson correlations among the study's variables. In order to verify the hypotheses, we proposed and ex-

amined two models of serial mediation using Model 6 from Process version 4.0 with IBM SPSS 23.

We adopted 5000 bootstrap samples by building bootstrap-based confidence intervals in order to estimate 95% confidence intervals (Hayes, 2017). Confidence intervals excluding zero indicate significant effects (Hayes & Scharkow, 2013). The mediation analysis was used to test the mediating role of negative affect (M1), and avoidant coping (M2), firstly in the relationship between the impact of COVID-19 and perceived stress (model I), and then in the relationship between perceived coronavirus threat and perceived stress (model II), controlling for gender, age and relationship status as covariates.

Results

Descriptive statistics and correlational analyses

Table 1 presents the mean, the standard deviation, and the Pearson correlation coefficients for each of the variables. Both the impact of COVID-19 and perceived coronavirus threat were significantly positively correlated with perceived stress, negative affect and avoidant coping. Likewise, individuals who experienced higher impact and higher perceived coronavirus threat reported stronger levels of perceived stress and more negative affect. Moreover, those who primarily used avoidant coping strategies also reported experiencing increased levels of perceived stress.

Table 1
Means, Standard Deviations and Correlations among the study's variables

Variables	Mean	*SD*	1	2	3	4	5
1. Impact of COVID-19	20.1	8.24	1				
2. Perceived Coronavirus Threat	9.7	5.05	.387**	1			
3. Negative affect	17.3	5.86	.475**	.264**	1		
4. Avoidant Coping	12.53	3.51	.377**	.212**	.406**	1	
5. Perceived Stress	.563	0.19	.485**	.283**	.759**	.423**	1

$*p < .05$; $**p < .01$;

Serial mediation analysis of the relationship between the Impact of COVID-19 and Perceived Stress

According to the first aim of the study, we tested the first serial mediation model, presented in Figure 1.

The multiple regression analysis was conducted in order to estimate the component elements of the mediation model. The direct effect was statistically significant, indicating that the impact of COVID-19 positively predicted perceived stress ($\beta = .137$; $p < .001$), confirming our first hypothesis (H1).

Figure 1
First serial mediation model. Path coefficients are standardized estimates
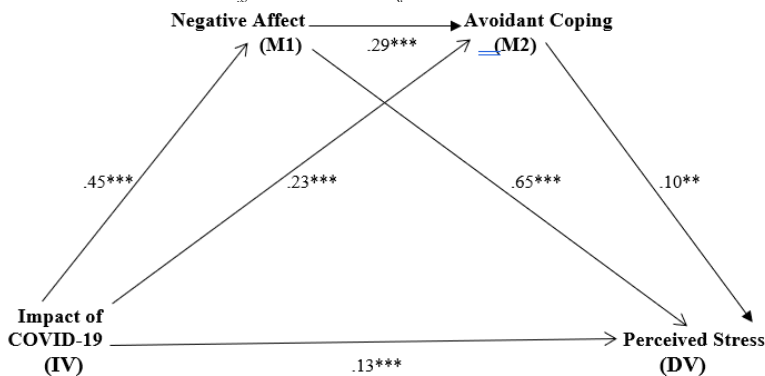
C (total path) = .472; $p < .001$; 95% CI [.0095; .0126]
$*p < .05$; $**p < .01$; $***p < .001$.

Also, the results showed that the impact of COVID-19 positively predicted negative affect ($\beta = .450$; $p < .001$) which in turn positively predicted perceived stress ($\beta = .654$; $p < .001$). Secondly, the impact of COVID-19 positively predicted avoidant coping ($\beta = .235$; $p < .001$) which in turn positively predicted perceived stress ($\beta = .108$; $p = .0001< .050$). Regarding the relationship between the two mediators, statistical results showed that negative affect positively predicted avoidant coping ($\beta = .293$; $p < .001$).

Both the direct effect (c' = .137; 95% CI [.0019; .0045]), the first (a1*b1 = .295; 95% CI [.2494; .3420]), the second (a2*b2 = .025; 95% CI [.0100; .0440]) and the third (a1*d*b2 = .014; 95% CI [.0061, .0237]) indirect effects had been statistically significant. This provided further evidence that negative affect and avoidant coping partially mediated the relationship between impact of COVID-19 and perceived stress, as the direct path was still significant. Therefore, the hypothesis H2.1 and H2.2 were confirmed.

By testing the significance of the total indirect effect (β = .3349, 95% CI, [.2858; .3852]) we observed that negative affect and avoidant coping serially mediated the relationship between the impact of COVID-19 and perceived stress, supporting our H3. The complete results for the first model of serial mediation are summarized in Table 2.

Table 2
Direct, indirect and total effects: Impact of COVID-19 → Perceived stress

	Coefficient	SE	*t*	*p*
Negative affect (M1) as outcome				
Impact of COVID-19 (a1 path)	.450	.024	13.190	.0000
Gender*	.095	.685	2.806	.0052
Age*	-.070	.099	-1.993	.0466
Relationship status*	-.080	.362	-2.284	.0226
Avoidant Coping (M2) as outcome				
Impact of COVID-19 (a2 path)	.235	.016	5.980	.0000
Negative affect (d path)	.293	.023	7.374	.0000
Gender	.004	.424	.124	.9011
Age	-.016	.061	-.451	.6521
Relationship status	.028	.223	.778	.4361
Perceived Stress (DV) as outcome				
Negative affect (b1 path)	.654	.001	22.467	.0000
Avoidant Coping (b2 path)	.108	.001	3.955	.0001
Impact of COVID-19 (c'direct path)	.137	.0007	4.829	.0000
Gender	.030	.016	1.217	.2238
Age*	.069	.002	2.717	.0067
Relationship status	-.006	.008	-.240	.8104
Total effect (C total path)	.4723	.0008	13.799	.0000
Confidence interval 95%			Lower limit	Upper limit
Ind 1: Impact of COVID-19 * Negative affect (indirect a1*b1 path)	.2951		.2494	.3420
Ind 2: Impact of COVID-19 * Avoidant Coping (indirect a2*b2 path)	.0255		.0100	.0440
Ind3: Impact of COVID-19 * Negative affect * Avoidant Coping (indirect a1*d*b2 path)	.0143		.0061	.0237
TOTAL Indirect Effect	.3349		.2858	.3852

A Monte Carlo Power Analysis for Indirect Effects was performed in order to estimate the statistical power. For the first serial mediation model, the results showed that a power of 1.00 (p < .050) was reached for a1*b1 indirect effect, while a power of .97 (p < .050) was reached for a2*b2 and a1*d*b2 indirect effects on a sample of 669 participants. In order to reject a false null hypothesis, required sample sizes were computed and at least .80 probability or above was achieved.

Serial mediation analysis of the relationship between Perceived Coronavirus Threat and Perceived Stress

According to the second aim of the study, we tested whether negative affect and avoidant coping were significant mediators of the relationship between perceived coronavirus threat and perceived stress. The second model of serial mediation is represented in Figure 2.

Statistical results showed that perceived coronavirus threat positively predicted perceived stress (β = .069; p = .007<.050), confirming the hypothesis H4. Also, perceived coronavirus threat positively predicted negative affect (β = .261; p< .001), which in turn positively predicted perceived stress (β = .690; p< .001). Moreover, perceived coronavirus threat positively predicted avoidant coping (β = .111; p = .002< .050), which in turn positively predicted perceived stress (β = .129; p< .001). Consequently, the hypothesis H5.1 and H5.2 were confirmed. Regarding the relationship between the two mediators, statistical results demonstrated that negative affect positively predicted avoidant coping (β = .371; p < .001).

Both the direct effect (c' = .069; 95% CI [.0007; .0046]), the first (a1*b1 = .180; 95% CI [.1285; .2299]), the second (a2*b2 = .014; 95% CI [.0040, .0286]) and the third (a1*d*b2 = .012; 95% CI [.0060, .0204]) indirect effects were statistically significant. Therefore, negative affect and avoidant coping were significant mediators of the relationship between perceived coronavirus threat and perceived stress.

Figure 2
Second serial mediation model. Path coefficients are standardized estimates
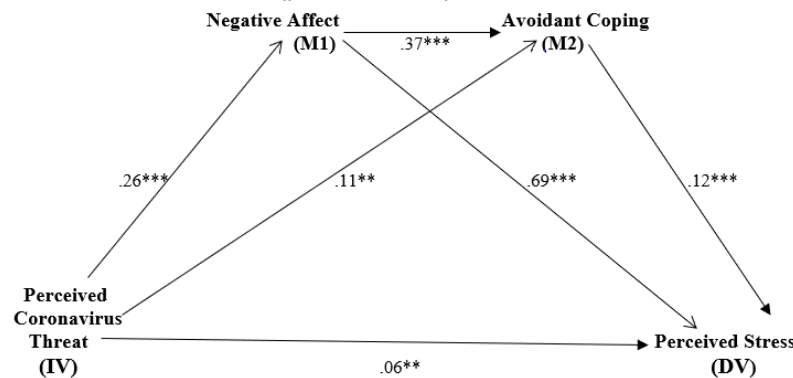
C **(total path)** = .276; p < .001, 95% CI, [.0078; .0133]
*p <.05; ***p* <.01; ****p* <.001.

Table 3
Direct, indirect and total effects: Perceived Coronavirus Threat → Perceived stress

	Coefficient	SE	*t*	*p*
Negative affect (M1) as outcome				
Perceived Coronavirus Threat (a1 path)	.261	.042	7.132	.0000
Gender*	2.740	.737	3.717	.0002
Age*	-.122	.107	-3.217	.0014
Relationship status*	-.092	.392	-2.427	.0155
Avoidant Coping (M2) as outcome				
Perceived Coronavirus Threat (a2 path)	.111	.025	3.046	.0024
Negative affect (d path)	.371	.022	9.912	.0000
Gender	.015	.431	.428	.6682
Age	-.034	.062	-.916	.3598
Relationship status	.029	.228	.791	.4282
Perceived Stress (DV) as outcome				
Negative affect (b1 path)	.690	.001	24.612	.0000
Avoidant Coping (b2 path)	.129	.001	4.771	.0000
Perceived Coronavirus Threat (c'direct path)	.069	.001	2.675	.0076
Gender	.036	.016	1.438	.1509
Age*	.059	.002	2.304	.0215
Relationship status	-.006	.008	-.254	.7995
Total effect (C total path)	.2763	.0014	7.493	.0000
Confidence interval 95%			Lower limit	Upper limit
Ind1: Perceived Coronavirus Threat* Negative affect (indirect a1*b1 path)	.1802		.1285	.2299
Ind 2: Perceived Coronavirus Threat* Avoidant Coping (indirect a2*b2 path)	.0145		.0040	.0286
Ind3: Perceived Coronavirus Threat* Negative affect*Avoidant Coping (indirect a1*d*b2 path)	.0126		.0060	.0204
TOTAL Indirect Effect	.2072		.1515	.2624

Finally, the results showed that the total indirect effect (β = .2072, 95% CI, [.1515; .2624]) was statistically significant, supporting our hypothesis H6. Consequently, negative affect and avoidant coping serially mediated the relationship between perceived coronavirus threat and perceived stress. The mediation was only partial, due to the significant direct effect between perceived coronavirus threat and perceived stress. The complete results for the second serial mediation model are summarized in Table 3.

For the second mediation model, a Monte Carlo Power Analysis for Indirect Effects was performed in order to estimate the statistical power. The results showed a power of 1.00 (p < .050) reached for a1*b1 and a1*d*b2 indirect effects, while a power of 0.86 (p < .050) was reached for a2*b2 indirect effect on a sample of 669 participants. These values are above .80, which is in line with the required conditions in order to reject a false null hypothesis.

Additionally, we tested alternative models with the reversed position of the two mediators, both for the relationship between the impact of COVID-19 and perceived stress, and between perceived coronavirus threat and perceived stress. Avoidant coping predicted less effectively negative affect compared to the reversed pathway [(d1' = .25** < d1 = .29**); (d2' = .34** < d2 = .37**)].

Discussion

The current study examined the exploratory mechanisms explaining the variations in pandemic-related stress responses among Romanian young adults during the critical fourth wave when the delta variant was the dominant strain of COVID-19. During that period, Romania was confronted with the most dramatic consequences of the pandemic, the number of new cases and associated deaths having registered record numbers. Two serial mediation models were proposed to investigate the association between the impact of COVID-19 / perceived coronavirus threat and perceived stress through negative affect and avoidant coping.

Firstly, our results indicated a direct, positive association between the impact of COVID-19 and perceived stress. These results confirm our first hypothesis and support previous research indicating that heightened experience of the impact of the COVID-19 pandemic is significantly correlated to poorer mental health outcomes (Gao et al., 2020; Salari et al., 2020; Vindegaard & Benros, 2020; Wang et al., 2020; Xiong et al., 2020). Moreover, we investigated the association between these variables through the mediation effect of negative affect and avoidant coping. As we anticipated, our results indicate a strong positive association between the impact of COVID-19 and negative affect and also between the impact of COVID-19 and avoidant coping. Consequently, a greater impact was associated with more negative affect and a higher preference for avoidant coping strategies, which in turn generated an elevated level of perceived stress.

Furthermore, negative affect and avoidant coping showed a significant, although partial, serial mediation effect. The partial mediation observed for these variables was due to the significant direct effect between the impact of COVID-19 and perceived stress. These statistical results led to the following conclusions: the impact of COVID-19 increased perceived stress not only directly but also indirectly through amplified negative affect and specific-oriented use of avoidant coping strategies. In accordance with previous research, higher levels of negative affect predispose individuals to experience higher levels of stress. Modulating the impact of negative affect characterized by higher intensity can raise difficulties (Mennin et al., 2005; Weiss et al., 2019). Consequently, individuals might tend to use strategies relying on fewer cognitive resources, such as avoidant coping strategies (Kool et al., 2010; Roth & Cohen, 1986; Weiss et al., 2019).

Similar to the previous model, our results indicated a direct, positive association between perceived coronavirus threat and perceived stress, supporting our fourth hypothesis. Moreover, perceived coronavirus threat positively predicted both negative affect and avoidant coping, which in turn positively predicted perceived stress. Thus, negative affect and avoidant coping significantly mediate the relationship between perceived coronavirus threat and perceived stress. The results of the serial mediation analysis indicated that negative affect and avoidant coping only partially medi-

ate the relationship between these variables since the direct effect of perceived coronavirus threat on stress remains statistically significant.

In both serial mediation models, negative affect and avoidant coping only partially mediated the relationship between the impact of COVID-19/perceived coronavirus threat and perceived stress. It must be considered that for partial mediation, other indirect effects should be examined and empirically tested to thoroughly explain the process by which the independent variable influences the outcome (Rucker et al., 2011).

As anticipated, our results demonstrated that when individuals experience greater financial difficulties, a lack of resources, as well a higher perceived threat associated with the pandemic, their negative affect increases. Consistent with previous research, sustained high levels of negative affect predispose individuals to experience higher levels of stress, acting as a known risk factor for a variety of mental health problems (Miller et al., 2009; Watson & Clark, 1984; Watson, 2005). In line with our expectations, young adults with higher negative affect preferred to use more avoidant coping strategies and therefore, it was more likely for them to constitute a "high-risk" population in terms of mental illness under stress. From this perspective, our results support the traditional conceptualization of coping as a response to emotion (Folkman & Lazarus, 1988; Weiss et al., 2019).

The literature also provides proof that, for young adults, social isolation during quarantine led to an increase in the prevalence of negative affect, intensifying stress and the feeling of threat associated with COVID-19 (Pérez-Fuentes et al., 2020). Our results support these previous findings and also highlight that female gender, young age (being at the lower limit of the 18-29 age interval), student status and being single (vs in a romantic relationship) were associated with increased levels of negative affect (Kar et al, 2021). However, in interpreting these results, a series of social factors and certain characteristics of the participants must be considered. The participants were young students, with an average age of 20.7. Following the transition to online university courses, some of them returned to their hometowns and abandoned previous routines as well as some social and academic endeavours (Awoke et al., 2021). Being in a relationship created a buffer against the negative consequences of social isolation, acting as a protective factor.

The current findings might have significant practical implications, highlighting the importance of developing an adequate intervention for young adults in distress in order to reduce the psychological consequences of overwhelming negative emotions. Communication for increasing people's adherence to preventive behavioural recommendations must be accompanied by interventions for enabling mental wellbeing and minimizing distress, including by strengthening appropriate coping options.

Concerning the methodological and procedural limitations of the study, among the aspects that should be considered are the use of cross-sectional data, resulting in a limita-

tion of the understanding of psychological processes at the individual level, which affects the causal interpretation of the mediation results. Moreover, to address the issue of causality, further longitudinal studies and experimental manipulation are necessary. Secondly, the current study used self-report scales, which might impede the observation of the processes' real manifestation. Thirdly, the results obtained in this convenience students' sample cannot be extrapolated to the general population. Therefore, these results should be interpreted specifically within the context of the sample used. Studies developed on a larger scale, including participants pertaining to diverse population subsets could indicate the degree to which our results could be generalized. As further research directions, the level of perceived stress can be investigated by several age groups in the general population, by applying repeated measurements or testing possible experimental manipulations.

Conclusion

To conclude, this study provided some insights into the literature on the COVID-19 pandemic. The results showed

that negative affect and avoidant coping partially mediate both the relationship between the impact of COVID-19 and perceived stress, and between perceived coronavirus threat and perceived stress. These mediating variables act as critical factors for understanding the relationship between oscillations of perceived stress, as well as the way these fluctuations determine young adults to react and engage in behaviours that have a protective role on health.

Data availability statement: The data that support the findings of this study are available from the corresponding author upon request.

Author's contributions: All authors have contributed equally to the data acquisition, analysis, manuscript drafting, interpretation of the results and critical revision. All authors read and approved the final manuscript.

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