How did Tunisian university students cope with fear of COVID-19? A comparison across schizotypy features

Feten Fekih-Romdhane [a,b,*], Nouha Dissem [a], Majda Cheour [a,b]

[a] *Tunis El Manar University, Faculty of Medicine of Tunis, Tunisia*
[b] *Razi Hospital, Mannouba, Tunisia*

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ABSTRACT

Background: Little consideration has been given to the impact of COVID-19 on people at risk of psychosis despite their particular preexisting vulnerability. We aimed to examine the role of coping strategies in determining the levels of fear in nonclinical students with high levels of self-reported schizotypal personality traits as compared to low-schizotypy controls.
Method: This was a cross-sectional survey. The Schizotypal Personality Questionnaire, the Fear of COVID-19 Scale and The Brief-Coping Orientation to Problems Experienced were used.
Results: High-schizotypy students had significantly higher maladaptive strategies scores and higher levels of fear of COVID-19 as compared to low-schizotypy students. Multivariate analyses have shown that high-schizotypy individuals were likely to rely on coping responses that are maladaptive (venting) and have potential exacerbating effects on fear of COVID-19, whereas low-schizotypy individuals were likely to use adaptive responses (acceptance) that seemed to be effective in reducing fear of COVID-19.
Conclusion: This study provided preliminary cross-sectional evidence for a differential impact of COVID-19 on individuals according to their schizotypy features. However, larger longitudinal population-based studies are necessary to confirm our findings.

1. Introduction

The COVID-19 pandemic entered our life with serious threats to people's physical health and a fear of death that is much greater than that from seasonal flu, even though the latter has led to more deaths (Asmundson & Taylor, 2020). The fear of COVID-19 is likely due to its rapid and invisible transmission, its morbi-mortality and the uncertainties about its future (Ahorsu et al., 2020; Asmundson & Taylor, 2020). One survey found that 10,368 respondents from a nationally representative sample of U.S. adults were uncertain about COVID-19 and its consequences, worried and fearful, with fear being scored nearly 7 on a sliding scale of 0–10 (Fitzpatrick, Harris, & Drawve, 2020). Higher levels of fear were reported among university students. For example, Ji et al. (2020) found that Chinese university students who were on winter break under a high level quarantine (February 2020, $n =$ 13,478) had a self-reported intensity of fear of COVID-19 score of 7.8 on a scale ranging from 0 for "no fear" to 9 for "extreme fear", and that those who were taking academic courses at home under a low

quarantine level with no new cases reported ($n =$ 8816) had a score of 6.5 on the same scale.

Apart from the fact that the student population represents a population at high risk of negative impact on mental health of major infectious disease outbreaks (Li, Cao, Leung, & Mak, 2020; Zheng, Jimba, & Wakai, 2005), research from previous infectious disease outbreaks suggests that psychological vulnerability factors, including individual difference variables (Asmundson & Taylor, 2020), may play an important role in increasing fear of the COVID-19. Previous studies have found that individual characteristics such as personality traits may mediate mental health outcomes related to COVID-19 (Sarkar & Majumder, 2020). Indeed, individuals with certain personality features, such as schizotypal traits, would be more likely to report higher levels of stress experienced (Pruessner, Iyer, Faridi, Joober, & Malla, 2011), and to perceive events as more stressful (Myin-Germeys & van Os, 2007) than most people would.

The term "schizotypy" refers to multidimensional personality features that reflect sub-threshold experiences of the positive (unusual

perceptual experiences and odd beliefs or appearance) and negative (anhedonia, disorganization in thinking processes, and interpersonal deficits) symptoms of schizophrenia (Claridge, 1997; Vollema, & van, d. B., 1995). According to Pedrero and Debbané (2017), schizotypal traits represent a "set of subclinical psychotic experiences and traits which do not reach clinical threshold and are distributed throughout the general population". Individuals scoring high on measures of schizotypy have a prevalence rate of 10% in the general population (Meehl, 1990), and an increased risk for later developing a psychotic disorder (Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994; Meehl, 1990). Not all individuals with high levels of schizotypal traits who experience stress will develop a schizophrenia-spectrum disorder. Indeed, schizotypy has been an important construct for understanding the diathesis-stress model of schizophrenia spectrum pathology (Cohen, Mohr, Ettinger, Chan, & Park, 2015), which stipulates that having a diathesis (a biological predisposition) to developing schizophrenia combined with environmental factors (e.g., the experience of a major psychosocial stressor) may lead the to the onset of psychosis (Carter, Schulsinger, Parnas, Cannon, & Mednick, 2002; K.H. Nuechterlein et al., 1992; Walker, Mittal, & Tessner, 2008).

According to this model, coping responses to psychosocial stressors would play a major role in the development and outcomes of a psychotic disorder in individuals with high psychosis liability. Coping is a psychological construct that refers to cognitive and behavioral efforts to manage, master, tolerate, reduce or minimize stressful events that are appraised as taxing or exceeding the resources of the person (Lazarus & Launier 1978; Lazarus & Folkman, 1984; Folkman, Lazarus, Gruen, & DeLongis, 1986). It is not enough to use a coping strategy (Westermann, Rief, & Lincoln, 2014), as it is also necessary to adopt it correctly and successfully (Moritz et al., 2014); which is not always the case for nonclinical individuals with high schizotypy levels.

In past research, coping strategies to deal with life stressors have been combined into categories of adaptive (e.g. active coping) and maladaptive coping (e.g. denial) (Meyer, 2001). Prior research has shown that subjects with schizophrenia tend to use maladaptive coping styles significantly more often than non-psychiatric controls (W.P. Horan & Blanchard, 2003), including more distraction-based coping and worrying (Van den Bosch & Rombouts, 1997). Similar coping patterns were also objectified among individuals at ultra-high-risk (UHR) for developing psychosis (Jalbrzikowski et al., 2014; Kim et al., 2013; Phillips, Edwards, McMurray, & Francey, 2012). One study even found that UHR subjects used active coping styles less frequently than both non-psychiatric controls and first episode schizophrenia patients, and tended to engage in more maladaptive coping than non-psychiatric controls (Pruessner et al., 2011). However, only a very few studies have examined coping in the context of a continuum of the psychosis phenotype, using schizotypal traits and psychotic-like experiences. Dangelmaier, Docherty, and Akamatsu (2010) found that individuals prone to psychosis endorsed using higher levels of non-adaptive coping than controls; but they did not differ on levels of adaptive coping. A longitudinal study in non-clinical adolescents found that there was a bidirectional relationship between emotion-focused coping and increased psychotic like experiences (Lin et al., 2011). Moreover, differential uses of coping processes have been found in subjects who reported elevated levels of schizotypy as compared to low-scoring control subjects (Schuldberg, Karwacki, & Burns, 1996).

Investigating the relationship between appraisal of stressful life events experienced and coping strategies in individuals with a liability for schizophrenia-spectrum disorders may allow us to better understand the stress-vulnerability model of schizophrenia (Jalbrzikowski et al., 2014), and may help developing preventive and early intervention approaches that aim at fostering effective coping skills and thus protect this vulnerable population from progressing into the disorder.

The COVID-19 pandemic is by far one of the biggest stressors that has plagued everyone's life across the globe in recent decades. Research has shown that, when individuals' coping strategies failed, the pandemic has led to symptoms of anxiety and depression (Huang and Zhao, 2020), and even to psychosis. Indeed, a review of contemporary epidemic and pandemic research highlighted that exposure to COVID-19 is likely to predict an increase in incident cases of psychosis (E. Brown et al., 2020). In addition, prior reports have shown that the fear of COVID-19 may precipitate the outbreak of a psychotic phase and impact symptom manifestation in patients with previous schizophrenia (Fischer, Coogan, Faltraco, & Thome, 2020), and could lead to the onset of psychotic symptoms in naïve psychiatric individuals (Huarcaya-Victoria, Herrera, & Castillo, 2020). However, to date, little consideration has been given to the impact of COVID-19 on people with psychosis or at risk of psychosis despite their particular preexisting vulnerability (E. Brown et al., 2020). Also, scarce scientific studies exist that explicitly evaluate the specific relationship among schizotypy, coping strategies, and stressor-related emotional response within this population.

In this context, we aimed to examine levels of fear of COVID-19 and coping strategies, as well as the role of coping strategies in determining the levels of fear in nonclinical college students with high levels of self-reported schizotypal personality traits as compared to low schizotypy controls. We hypothesized that individuals who showed high schizotypy levels would experience higher levels of fear of COVID-19 and a more frequent use of maladaptive coping strategies than individuals who showed lower schizotypy levels.

2. Methods

2.1. Sample and procedure

Once Tunisia was going through a phase of decrease in the number of newly diagnosed COVID-19 cases and related deaths, the Government has decided to gradually reopen universities in early May. We thus carried-out a cross-sectional survey, with the data collection being initiated on June 1st, 2020 and closed on July 15th, 2020. In order to be eligible for this study, Tunisian college students had to: (1) be aged >18 years; (2) have been enrolled in three major universities in Tunis during the 2019–2020 academic year; (3) have returned to their universities for the second semester after lockdown, (4) have no personal psychiatric history. Students who met eligibility criteria and were willing to participate in the survey were invited to answer a self-administered anonymous questionnaire. Free and informed verbal consent was obtained from each of the students participating in the study before beginning the interviews. No compensation was offered. The survey was anonymous, and confidentiality of information was assured. Participants could quit the process at any time. Participants were informed that the study questionnaire might cause feelings of distress, and received information about mental health services. The study was approved by the Institutional Review Board of The three universities and by the ethics committee of Razi Psychiatric Hospital.

During the study period, 1000 students were invited to participate in our study. A total of 145 students refused to participate and 855 were interviewed and responded to our study, 53 of whom failed to answer some questions and were thus excluded from the study. A total of 802 students were included: 29.8% (n = 239) were enrolled in the Faculty of Human and Social Sciences of Tunis, 28.9% (n = 232) in the Faculty of Mathematical, Physical and Natural Sciences of Tunis, 23.3% (n = 187) in the Faculty of Letters, Arts and Humanities of Manouba, and 18% (n = 144) in the Higher Institute of Management of Tunis, with a participation rate of 80.2%.

2.2. Measures

The self-administered questionnaire contained three sections. The first section contained questions about sociodemographic variables, including age, gender, marital status, current living arrangement, residency, Monthly family income and family psychiatric history.

Another section of the questionnaire included COVID-19 related

variables. In this section, participants were asked about social isolation due to COVID-19 (having not left the house, having left the house only if necessary or having no problem to leave the house), whether they think they have sufficient knowledge of COVID-19 (including protective measures, methods of transmission, symptoms) (Yes/No/May be), and whether they think they have had COVID-19 symptoms (including fever, cough, difficulty breathing) (Yes/No/May be). Four items were used to assess direct COVID-19 exposure, including being (or having been) personally affected by the COVID-19, discussing with another person the details of a person's illness or death due to COVID-19, having been in contact with a person with a COVID-19 infection while they were ill, having someone close who was a confirmed case or who died of COVID-19. Media exposure was measured by a one-item. All participants were asked to estimate the average number of hours per day they spent watching the news about the COVID-19 via media platforms (e.g., newspaper, radio, television, Internet, social media networks, etc.) in the month before the survey.

A third section contained three research instruments: The Schizotypal Personality Questionnaire (SPQ), the Fear of COVID-19 Scale (FCV-19S) and The Brief-Coping Orientation to Problems Experienced (Brief-COPE).

The SPQ (Raine, 1991) was used to measure the construct of schizotypy in our students. This instrument consists of 74 items divided in 9 subscales: Ideas of reference (9 items), Odd beliefs or magical thinking (7 items), Unusual perceptual experiences (9 items), Paranoid ideation/suspiciousness (8 items), Excessive social anxiety (8 items), No close friends (9 items), Constricted affect (8 items), Odd or eccentric behavior (7 items) and Odd speech (9 items). The measure has three subscales which include: positive or cognitive-perceptual, negative or interpersonal, and disorganized. Items are summed to yield subscale scores and a total score, with higher scores indicating more schizotypal characteristics. According to total scores on the SPQ, subjects are classified into high and low schizotypy groups (Raine, 1991), with individuals in the upper and lower 10% of a standardization sample being classified as having high or low levels of DSM-III-R schizotypal personality disorder symptoms, respectively. Using this criterion, the data from the SPQ were used to classify our students into two groups of low and high schizotypal individuals. The Arabic version of the SPQ used in this study (Lahmar, Gassab, Beltaief, & Mechri, 2014) has adequate psychometric properties, with a Cronbach's alpha coefficient for the total SPQ of 0.92, and for the SPQ subscales ranging from 0.62 to 0.75. This version also confirmed the multidimensional structure of the schizotypal personality in Tunisian non-clinical populations, with the three-factor model accounting for 70.7% of the total variance of the scale (Lahmar et al., 2014).

The perceived fear of COVID-19 infection was assessed using the FCV-19S (Ahorsu et al., 2020). This instrument is a self-report unidimensional scale that comprises seven items (e.g., "I cannot sleep because I am worried about getting coronavirus-19"), with a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) and a total score ranging from 7 to 35. Higher scores reflect higher fear of COVID-19 infection. The original Persian version of the FCV-19S has shown satisfactory psychometric properties, with a Cronbach's alpha of 0.82 (Ahorsu et al., 2020). The Arabic FCV-19S used in this study had a good internal consistency ($\alpha = 0.88$), a good concurrent validity, and an acceptable construct validity (Alyami, Henning, Krägeloh, & Alyami, 2020).

The Brief-COPE (Carver, 1997) in its Arabic version (Hamdan-Mansour, Al Badawi, Haourani, & Marmash, 2013) was administered to assess students' coping strategies. This tool contains 28 items rated by a four-point Likert scale, ranging from one ("I haven't been doing this at all") to four ("I have been doing this a lot"). The scale covers 14 dimensions, with every dimension having two items. The scales are then combined to form adaptive and maladaptive coping scales (Meyer, 2001). Eight dimensions measure presumably adaptive coping strategies (active coping, use of emotional support, use of instrumental support, positive reframing, planning, humor, acceptance and religion), and six

of which focus on presumably maladaptive coping (self-distraction, denial, substance use, behavioral disengagement, venting and self-blame). Total scores range from 8 to 32 for problem-focused coping, and from 6 to 24 for maladaptive coping. Total scores for coping styles are calculated by adding respective subscales, with higher scores representing greater coping strategies used by the respondents. In this study, participants instructed to rate coping strategies specifically in response to COVID-19. The Brief-COPE has good internal inconsistency with Cronbach's alpha of 0.83 (Carver, 1997).

2.3. Statistical analyses

Data were analyzed using SPSS, ver. 24. Distribution of continuous variables was compared to normal distribution via Shapiro-Wilks test. Data were expressed as a frequency for the nominal variables and as mean ± standard deviation (SD) for the continuous variables. We carried out a Chi square analysis in order to ascertain the relationship between schizotypy features and other study variables. Bivariate correlations among all variables were investigated using Pearson product-moment correlation coefficients. After the univariate analysis, hierarchical multiple regression analyses were carried out in order to determine the role of coping strategies on fear of COVID-19 above and beyond sociodemographic variables in the two groups. We thus constructed two models with the FCV-19S total score as dependent variable. The independent variables were divided into two blocks: a first block containing the sociodemographic variables (age, gender and monthly family income), and a second block containing the 14 coping dimensions. In all statistical tests, the significance threshold was set at 0.05.

3. Results

A total of 96 subjects (34 males and 62 females) were classified in the high-schizotypy group, and 88 subjects (43 males and 45 females) were classified in the low-schizotypy group. Sample characteristics are represented in Table 1. The high and low schizotypal groups were comparable in demographic characteristics, namely age, gender, living arrangements, monthly family income and residence.

A total of 38.5% of subjects in the high-schizotypy group though they have had (yes/maybe) COVID-19 symptoms, compared to 20.4% of the low-schizotypy group ($p = 0.023$).

We found no significant difference with regard to total time spent on news and events related to COVID-19 on media per day, COVID-19 exposure between the two groups. High-schizotypy students tended to be more isolated due to COVID-19 than the low-schizotypy group (41.7% vs 35.2% reported having not left the house before returning to universities), but the difference was not significant.

As illustrated in Table 2, high schizotypal students had significantly higher maladaptive strategies scores as compared to low schizotypal students (21.4 vs 23.5, $p = 0.042$).

Fig. 1 shows the distribution of the FCV-19S values by group, and Table 3 presents the mean scores of the two groups on the seven items of the FCV-19S. Overall, results indicate that the high-schizotypy group had higher levels of fear of COVID-19, and higher FCV-19S total scores than the low-schizotypy group (15.1 vs 18.7, $p < 0.001$).

The correlation with sex (Table 4) found that females had significantly higher levels of fear of COVID-19 (13.1 vs 16.9, $p = 0.006$) and higher adaptive strategies scores (33.2 vs 38.2, $p = 0.036$) than males in the low-schizotypy group, but not in the high-schizotypy group.

Pearson correlations (matrix found in Table 5) indicated that, in the low-schizotypy group, fear of COVID-19 total scores were significantly and positively correlated with active coping, emotional support, instrumental support, positive reframing, planning, religion, self-distraction, behavioral disengagement, and venting; while in the high-schizotypy group fear of COVID-19 total scores correlated positively only with emotional support, instrumental support, behavioral disengagement and venting.

Table 1
Sample characteristics.

	Low-schizotypy (n = 88)	High-schizotypy (n = 96)	p
Age, Mean ± SD	22.0 ± 2.2	22.2 ± 3.2	0.648[a]
Gender, N (%)			0.065[b]
Male	43 (48.9%)	34 (35.4%)	
Female	45 (51.1%)	62 (64.6%)	
Marital status, N (%)			0.083[b]
Married	–	3 (3.1%)	
Single	88 (100%)	89 (92.7%)	
Divorced/widowed	–	4 (4.1%)	
Living arrangements			0.172[b]
With parents	55 (62.5%)	57 (59.4%)	
With father	2 (2.3%)	3 (3.1%)	
With mother	3 (3.4%)	9 (9.4%)	
With friends	14 (15.9%)	6 (6.3%)	
Academic home	11 (12.5%)	15 (15.6%)	
Alone	3 (3.4%)	6 (6.3%)	
Monthly family income, N (%)			0.075[b]
<500 TD	7 (8.0%)	10 (10.4%)	
500–1000 TD	19 (21.6%)	27 (28.1%)	
1000–2000 TD	28 (31.8%)	35 (36.5%)	
2000–3000 TD	13 (14.8%)	16 (16.7%)	
> 3000 TD	21 (23.9%)	8 (8.3%)	
Residence, N (%)			0.553[b]
Urban area	72 (81.8%)	82 (85.4%)	
Rural area	16 (18.2%)	14 (14.6%)	
Tobacco consumption, N (%)			0.880[b]
Yes	32 (36.4%)	36 (37.5%)	
No	56 (63.6%)	60 (62.5%)	
Alcohol use, N (%)			0.543[b]
Never	54 (61.4%)	61 (63.5%)	
Occasional use	33 (37.5%)	31 (32.3%)	
Daily use	1 (1.1%)	4 (4.1%)	
Lifetime cannabis use, N (%)			0.106[b]
Yes	14 (15.9%)	25 (26.0%)	
No	74 (84.1%)	71 (74.0%)	
Lifetime other drugs use, N (%)			0.808[b]
Yes	8 (9.1%)	10 (10.4%)	
No	80 (90.9%)	86 (89.6%)	
Family psychiatric history			.871[b]
Yes	5 (5.7%)	6 (6.3%)	
No	83 (94.3%)	90 (93.8%)	
Social isolation due to COVID-19			0.352[b]
Having not left the house	31 (35.2%)	40 (41.7%)	
Having left the house only if necessary	45 (51.1%)	39 (40.6%)	
Having no problem to leave the house	12 (13.6%)	17 (17.7%)	
Having sufficient knowledge of COVID-19 (including protective measures, methods of transmission, symptoms)			0.523[b]
Yes	59 (67.0%)	57 (59.4%)	
No	7 (8.0%)	11 (11.5%)	
May be	22 (25.0%)	28 (29.2%)	
Having had COVID-19 symptoms (including fever, cough, difficulty breathing)			**0.023**[b]
Yes	7 (8.0%)	18 (18.8%)	
No	70 (79.5%)	59 (61.5%)	
May be	11 (12.5%)	19 (19.8%)	
COVID-19 exposure			
Discussing with another person the details of a person's illness or death due to COVID-19 (Yes)	59 (67.0%)	67 (69.8%)	0.752[b]
Having been in contact with a person with a COVID-19 infection while they were ill (Yes)	1 (1.1%)	6 (6.3%)	0.120[b]
Someone close being a confirmed case or died of COVID-19 (Yes)	6 (6.8%)	10 (10.4%)	0.441[b]
Being (or having been) personally affected by the COVID-19 (Yes)	0	3 (3.1%)	0.247[b]
			0.399[b]

Table 1 (*continued*)

	Low-schizotypy (n = 88)	High-schizotypy (*n* = 96)	p
Total time spent on news and events related to COVID-19 on media[c] per day			
	41 (46.6%)	46 (47.9%)	
	1–2 h	29 (33.0%)	
< 1 h	23 (24.0%)		
	3–4 h	10 (11.4%)	
	12 (12.5%)		
> 5 h	8 (9.1%)	15 (15.6%)	
SPQ subscales, mean ± SD			
Ideas of reference	0.49 ± 0.7	6.6 ± 1.5	<0.0001[a]
Excessive social anxiety	0.6 ± 0.9	6.3 ± 1.5	<0.0001[a]
Odd beliefs or magical thinking	0.6 ± 0.9	4.0 ± 1.9	<0.0001[a]
Unusual perceptual experiences	0.4 ± 0.7	6.5 ± 1.8	<0.0001[a]
Odd or eccentric behavior	0.4 ± 0.7	5.4 ± 1.5	<0.0001[a]
No close friends	0.8 ± 1.0	7.0 ± 1.6	<0.0001[a]
Odd speech	0.6 ± 0.8	7.5 ± 1.7	<0.0001[a]
Constricted affect	0.7 ± 0.9	6.0 ± 1.4	<0.0001[a]
Suspiciousness	0.9 ± 1.2	6.9 ± 1.2	<0.0001[a]
Negative factor	3.0 ± 2.3	26.2 ± 3.8	<0.0001[a]
Positive factor	2.4 ± 2.1	24.0 ± 4.2	<0.0001[a]
Disorganized factor	1.0 ± 1.2	12.9 ± 2.5	<0.0001[a]

TD: Tunisian Dinar; SD: standard Deviation; SPQ: Schizotypal Personality Questionnaire; Bold values: significant at *p* < 0.05.
[a] p Value was analyzed using the Student's test.
[b] p Value was analyzed using the chi-square test.
[c] Television, radio, press, social networks, other websites

Table 2
Comparison of coping outcome (Brief-COPE sub-scores) between individuals with and without schizotypy features.

	Low-schizotypy (n = 88)	High-schizotypy (n = 96)	t	p
Self-distraction	4.5 ± 1.8	4.5 ± 1.8	−0.149	0.882
Active coping	4.3 ± 1.8	4.9 ± 1.8	−2.383	**0.018**
Denial	3.6 ± 1.9	3.7 ± 1.7	−0.356	0.722
Substance use	2.5 ± 1.1	2.8 ± 1.5	−1.391	0.166
Emotional support	4.0 ± 1.9	4.2 ± 1.8	−0.447	0.656
Instrumental support	3.8 ± 1.8	4.3 ± 1.9	−1.982	**0.049**
Behavioral disengagement	3.7 ± 1.7	3.8 ± 1.6	−0.563	0.574
Venting	3.9 ± 1.8	4.5 ± 1.8	−2.397	**0.018**
Positive reframing	4.4 ± 1.8	4.8 ± 1.8	−1.500	0.135
Planning	4.5 ± 1.8	5.0 ± 1.8	−1.548	0.123
Humor	4.6 ± 2.1	4.8 ± 2.1	−0.909	0.365
Acceptance	5.3 ± 1.9	5.4 ± 1.8	−0.315	0.753
Religion	4.7 ± 2.0	4.6 ± 2.1	0.546	0.586
Self-blame	3.2 ± 1.5	4.1 ± 1.9	−3.360	**0.001**
Adaptive strategies	35.7 ± 11.1	38.1 ± 10.2	−1.491	0.138
Maladaptive strategies	21.4 ± 6.7	23.5 ± 6.7	−2.050	**0.042**

Brief-COPE: brief-coping orientation to problems experienced.

The hierarchical multiple regression analyses (shown in Table 6) found that, after controlling for demographic variables (age, gender, and monthly family income), only acceptance correlated negatively with FCV-19S total scores in the low-schizotypy group (β = −0.352, *p* < 0.05), explaining 23.3% of the total variance in fear of COVID-19; while only venting remained significantly and positively associated to FCV-19S total scores in the final model (β =. 369, *p* < 0.01), explaining 27.4% of the variance in fear of COVID-19.

4. Discussion

This study showed that high-schizotypy individuals were likely to rely on coping responses that are maladaptive (venting) and have
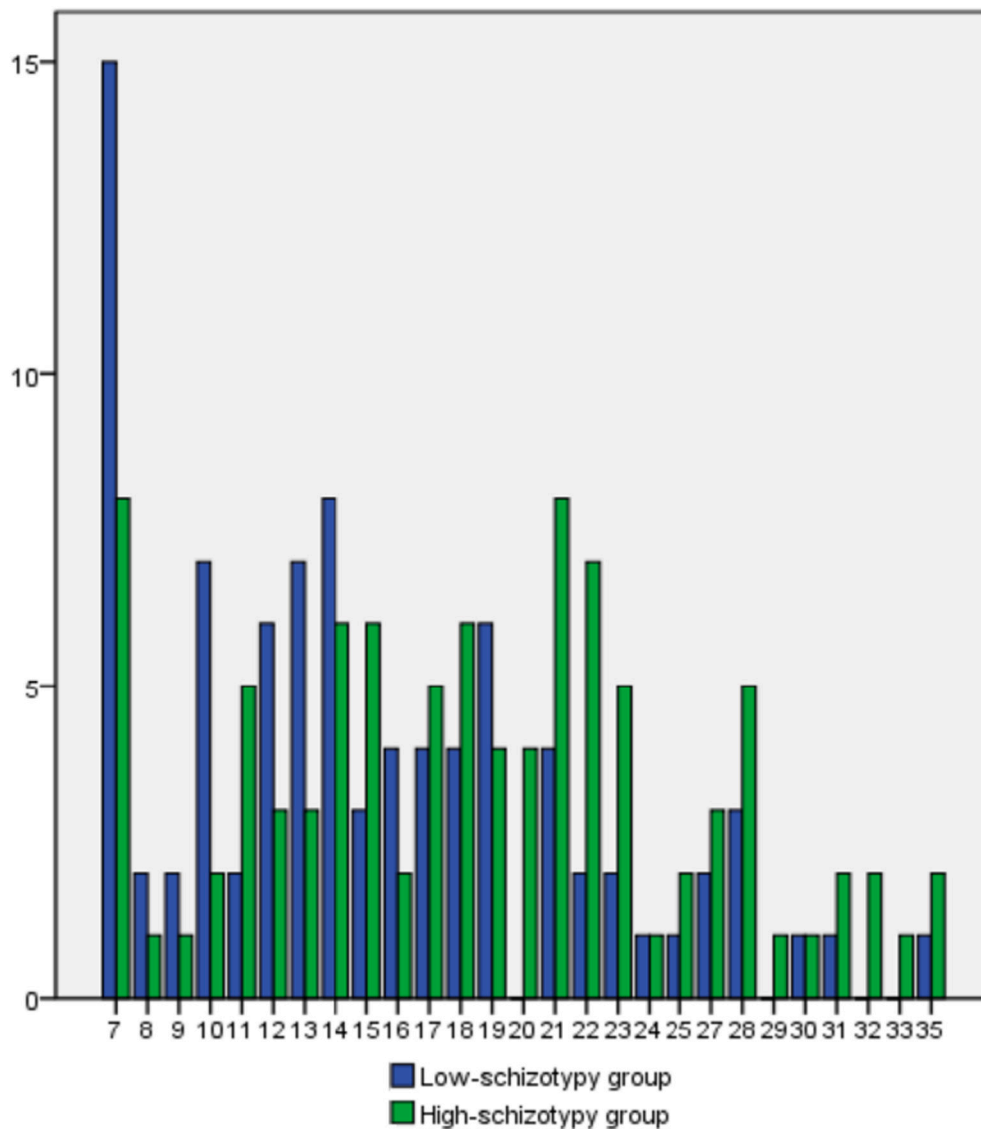
Fig. 1. Distribution values of Fear of COVID-19 Scale by group.

Table 3
Comparison of fear of COVID-19 scores between individuals with and without schizotypy features.

	Low-schizotypy (n = 88)	High-schizotypy (n = 96)	t	p
1. I am most afraid of Corona	2.2 ± 1.2	2.7 ± 1.3	−3.049	**0.003**
2. It makes me uncomfortable to think about Corona	2.7 ± 1.3	3.2 ± 1.3	−2.857	**0.005**
3. My hands become clammy when I think about Corona	1.8 ± 1.0	2.2 ± 1.2	−2.649	**0.009**
4. I am afraid of losing my life because of Corona	2.2 ± 1.3	2.9 ± 1.4	−3.296	**0.001**
5. When I watch news and stories about Corona on social media, I become nervous or anxious.	2.6 ± 1.3	3.1 ± 1.3	−2.780	**0.006**
6. I cannot sleep because I'm worrying about getting Corona.	1.8 ± 1.1	2.1 ± 1.2	−1.362	0.175
7. My heart races or palpitates when I think about getting Corona.	1.8 ± 1.1	2.5 ± 1.3	−3.903	**<0.001**
Fear of COVID-19 total scores	15.1 ± 6.6	18.7 ± 7.1	−3.603	**<0.001**

potential exacerbating effects on fear of COVID-19, whereas low-schizotypy individuals were likely to use adaptive responses (acceptance) that seemed to be effective in reducing fear of COVID-19. Except for a few small studies, clinical research in this regard is still lacking; and the present study is the first, to our knowledge, to directly investigate whether coping strategies are correlated with fear of COVID-19 in healthy individuals with low and high levels of schizotypy.

In accordance with our hypothesis, we found that individuals in the high-schizotypy group were significantly more likely to think they have had COVID-19 symptoms, and exhibited far higher levels of fear of COVID-19 as compared to low-schizotypy individuals. Our findings are consistent with research showing that, even under normal circumstances, high levels of schizotypy are linked to higher levels of negative affect (W.P. Horan, Blanchard, Clark, & Green, 2008; Watson & Naragon-Gainey, 2010), and predicts psychological distress including anxiety and depression (N. Barrantes-Vidal et al., 2013; L.H. Brown, Silvia, & Myin–Germeys, I., Lewandowski, K.E., Kwapil, T.R., 2008; T.R. Kwapil, Barrantes-Vidal, & Silvia, 2008; Lewandowski et al., 2006) and worse functional outcome (N. Barrantes-Vidal, Lewandowski, & Kwapil, 2010). For example, a study found that non-clinical Chinese college students with schizotypal personality disorder features reported the worst outcomes in levels of depression, anxiety and general health status

Table 4
Correlations of study variables by gender in the two groups.

	Low-schizotypy (n = 88)			High-schizotypy (n = 96)		
	Male	Female	p	Male	Female	p
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Schizotypy features (SPQ dimensions)						
Negative factor	2.8 ± 1.9	3.2 ± 2.8	0.531	25.8 ± 3.9	26.4 ± 3.7	0.501
Positive factor	2.7 ± 2.2	2.1 ± 1.9	0.141	24.1 ± 4.2	23.9 ± 4.3	0.830
Disorganized factor	1.2 ± 1.2	0.8 ± 1.2	0.088	13.0 ± 2.4	12.8 ± 2.6	0.758
Coping outcome (brief-COPE sub-scores)						
Self-distraction	4.2 ± 1.6	4.8 ± 2.0	0.107	4.2 ± 1.7	4.7 ± 1.9	0.176
Active coping	3.9 ± 1.7	4.6 ± 1.9	0.074	4.7 ± 1.8	5.0 ± 1.9	0.385
Denial	3.6 ± 2.0	3.6 ± 1.8	0.816	3.2 ± 1.4	3.9 ± 1.8	0.052
Substance use	2.7 ± 1.2	2.4 ± 0.9	0.117	3.3 ± 1.7	2.5 ± 1.4	**0.011**
Emotional support	3.5 ± 1.7	4.5 ± 1.9	**0.013**	3.9 ± 1.7	4.3 ± 1.8	0.302
Instrumental support	3.2 ± 1.6	4.3 ± 1.9	**0.007**	4.0 ± 1.7	4.4 ± 2.0	0.297
Behavioral disengagement	3.3 ± 1.6	4.1 ± 1.8	**0.037**	3.6 ± 1.4	3.9 ± 1.8	0.346
Venting	3.5 ± 1.4	4.3 ± 2.0	**0.028**	3.9 ± 1.6	4.9 ± 1.7	**0.009**
Positive reframing	4.0 ± 1.8	4.9 ± 1.8	**0.027**	4.8 ± 1.9	4.9 ± 1.9	0.906
Planning	4.3 ± 1.7	4.7 ± 2.0	0.306	4.6 ± 2.0	5.2 ± 1.8	0.119
Humor	4.9 ± 2.2	4.2 ± 2.1	0.122	5.4 ± 2.0	4.6 ± 2.1	0.071
Acceptance	5.1 ± 1.9	5.6 ± 1.9	0.259	5.2 ± 1.8	5.6 ± 1.8	0.285
Religion	4.1 ± 1.8	5.3 ± 2.1	**0.005**	3.6 ± 1.7	5.1 ± 2.1	**< 0.001**
Self-blame	3.3 ± 1.5	3.1 ± 1.6	0.714	3.7 ± 1.7	4.3 ± 2.0	0.145
Adaptive strategies	33.2 ± 9.3	38.2 ± 12.2	**0.036**	36.1 ± 8.6	39.1 ± 10.9	0.171
Maladaptive strategies	20.6 ± 5.6	22.2 ± 7.5	0.253	22.0 ± 6.0	24.3 ± 6.9	0.110
Fear of COVID-19 total scores	13.1 ± 6.2	16.9 ± 6.5	**0.006**	18.3 ± 6.2	18.9 ± 7.6	0.664

SPQ: Schizotypal Personality Questionnaire; Brief-COPE: Brief-Coping Orientation to Problems Experienced; SD: standard Deviation; Bold values: significant at p < 0.05.

(Zong et al., 2010).

In their editorial recently published, (Sarkar & Majumder, 2020) suggested that, in the context of the Covid-19 crisis, having schizotypal personality traits may be beneficial for both physical and mental health. Authors argued that the preference for solitude of individuals with these personality features would lead to a low risk of COVID-19 transmission, and could insulate them from distress given that loneliness is normally not distressing for them (Sarkar & Majumder, 2020). Our results contradict these suggestions since, even though high-schizotypy students were more isolated due to COVID-19 and tended to more avoid leaving home than their low-schizotypy counterparts, this did not protect them from experimenting significantly higher levels of fear. This fear has likely led to concerns about the likelihood of having had COVID-19-like symptoms, since 38.5% of high-schizotypy students though they have had COVID-19 symptoms against only 3.1% of this group having tested positive. Indeed, in some cases, COVID-19-like symptoms may be triggered by fear of being infected despite testing negative for the virus (Colizzi et al., 2020). Available research corroborates our findings, showing that perceived COVID-19 symptomatology was associated with

depressive symptoms (Shevlin et al., 2020), and that people who indicated having displayed COVID-19 symptomatology (dry cough, fever) had been in self-isolation for longer than those with no COVID-19 symptomatology (R. Jaspal, Lopes, & Lopes, 2020).

Furthermore, we found a positive correlation between fear of COVID-19 and disorganized schizotypy in the two groups. This finding is consistent with the literature stating that disorganized schizotypy (loosened thinking and speech, and inadequate emotional reactions) was associated with increased emotionality (Kerns, 2006), and was negatively related to mental health and adequate sleep (Polner, Simor, & Kéri, 2018). A recent study also found that disorganized schizotypy was associated with increased negative affect and diminished positive affect in daily life (T.R. Kwapil et al., 2020). According to Ered, Gibson, Maxwell, Cooper, and Ellman (2017), cognitive deficits seen in individuals at risk for psychosis could lead to misidentifying stressful situations, such as evaluating neutral situations as stressful, that consequently may result in exaggerated perception of stress.

Our analyses revealed that relative to the low-schizotypy group, students with high levels of schizotypy reported using comparable adaptive coping strategies and significantly more maladaptive coping strategies.

These results suggest that, like those with a diagnosis of schizophrenia or UHR, high-schizotypy individuals may not possess the skills to effectively cope with environmental major stressors such as COVID-19. Additionally, when high-schizotypy individuals do attempt to cope with COVID-19, they tend to use strategies that seem detrimental to their mental health. These results were consistent with previous findings stipulating that high-schizotypy individuals used more maladaptive coping mechanisms than those endorsing low levels of schizotypy (Dangelmaier et al., 2010).

One possible explanation for these findings may be that, because of an increased perception of stress among individuals at risk for psychosis, a low-stress event may appraise as potentially stressful and fearful, leading to either a failure to cope or a use of non-effective coping strategies (Ered et al., 2017). In the same line, a study among a Chinese college sample (n = 427) found that subjects with schizotypy features generally perceived stressors as less controllable and had significantly lower coping effectiveness (such as endorsing significantly more emotion-focused strategies in uncontrollable situations) than subjects without schizotypy features (Zong et al., 2010). Another study found that, in a sample of 454 American undergraduates, increases in maladaptive coping were significantly related to total number of traumatic life events and perceived stress, and mediated the relationship between stress (traumatic life events and perceived stress) and psychotic like experiences (Ered et al., 2017). In line with these findings, Ered et al. (2017) suggested that greater perceived stress previously objectified in individuals at risk for psychosis could rather have arisen from a reduced ability to activate or mobilize coping strategies due, among others, to the use of poor forms of coping.

Interestingly, we found that high-schizotypy individuals do not seem to have deficits in their adaptive responses to COVID-19, but rather were employing more maladaptive coping responses than low-schizotypy individuals. Prior research regarding the use of adaptive coping mechanisms in high-schizotypy individuals as compared to their counterparts with low-schizotypy remains controversial. Similar to our findings, a study by Dangelmaier et al. (2010) revealed no difference in the use of adaptive coping strategies between persons with high and low schizotypy; while another study by Pruessner et al. (2011) found that high-schizotypy individuals employed less adaptive modes of coping.

Overall, we have shown that individuals with high levels of schizotypy appear to endorse specific patterns of coping responses when dealing with the COVID-19 crisis, with no difference in the use of adaptive coping strategies and a greater use of maladaptive strategies. This in a preliminary way suggests that prevention programs should focus on both reducing use of maladaptive and enhancing use of adaptive coping strategies in this vulnerable at-risk population.

Table 5
Pearson correlations between schizotypy features and study variables in the two groups.

	1-	2-	3-	4-	5-	6-	7-	8-	9-	10-	11-	12-	13-	14-	15-	16-	17-
Low-schizotypy																	
1- Negative factor	–																
2- Positive factor	0.425**	–															
3- Disorganized factor	0.117	0.203	–														
4- Fear of COVID-19	−0.113	−0.191	−0.210*	–													
5- Self-distraction	0.029	0.020	−0.040	0.323**	–												
6- Active coping	0.171	0.150	−0.162	0.393**	0.684**	–											
7- Denial	−0.015	0.149	0.038	0.024	0.107	0.145	–										
8- Substance use	−0.004	−0.127	0.093	0.017	0.045	−0.014	0.218*	–									
9- Emotional support	0.120	0.027	−0.169	0.350**	0.438**	0.612**	0.255*	−0.056	–								
10- Instrumental support	0.132	0.013	−0.234*	0.448**	0.446**	0.566**	0.172	0.007	0.780**	–							
11- Behavioral disengagement	−0.042	0.017	−0.032	0.211*	0.341**	0.332**	0.492**	0.118	0.425**	0.412**	–						
12- Venting	−0.055	−0.059	−0.093	0.433**	0.498**	0.582**	0.426**	0.132	0.585**	0.639**	0.423**	–					
13- Positive reframing	0.042	−0.096	−0.139	0.335**	0.541**	0.738**	0.067	−0.084	0.642**	0.513**	0.407**	0.584**	–				
14- Planning	0.115	0.050	−0.149	0.260*	0.629**	0.717**	0.083	0.016	0.475**	0.460**	0.278**	0.431**	0.767**	–			
15- Humor	−0.020	0.249*	0.043	0.072	0.404**	0.279**	0.395**	0.159	0.242*	0.217*	0.281**	0.307**	0.211*	0.249*	–		
16- Acceptance	0.084	0.029	−0.082	0.100	0.502**	0.495**	−0.018	−0.130	0.332**	0.312**	0.180	0.340**	0.669**	0.742**	0.319**	–	
17- Religion	0.169	0.059	−0.119	0.228*	0.405**	0.387**	0.284**	−0.007	0.331**	0.426**	0.488**	0.419**	0.475**	0.494**	0.156	0.500**	–
18- Self-blame	−0.085	0.048	0.024	0.206	0.345**	0.379**	0.486**	0.196	0.402**	0.418**	0.456**	0.545**	0.378**	0.398**	0.257*	0.253*	0.424**
High-schizotypy																	
1- Negative factor	–																
2- Positive factor	0.182	–															
3- Disorganized factor	0.228*	0.021	–														
4- Fear of COVID-19	0.192	0.150	0.218*	–													
5- Self-distraction	−0.049	0.021	0.131	−0.001	–												
6- Active coping	−0.237*	0.044	0.026	0.085	0.532**	–											
7- Denial	0.103	0.170	0.074	0.098	0.168	0.338**	–										
8- Substance use	−0.028	0.015	0.075	−0.046	0.189	0.216*	0.178	–									
9- Emotional support	−0.014	0.131	0.000	0.252*	0.246*	0.445**	0.450**	0.057	–								
10- Instrumental support	−0.040	0.151	−0.050	0.225*	0.238*	0.444**	0.389**	0.145	0.721**	–							
11- Behavioral disengagement	−0.059	0.056	0.272**	0.138	0.292**	0.343**	0.435**	0.151	0.224*	0.212*	–						
12- Venting	0.139	0.169	0.197	0.316**	0.203*	0.357**	0.455**	0.254*	0.381**	0.426**	0.447**	–					
13- Positive reframing	−0.160	−0.091	0.062	−0.102	0.506**	0.673**	0.339**	0.259*	0.312**	0.414**	0.460**	0.303**	–				
14- Planning	−0.060	−0.058	0.152	0.010	0.383**	0.604**	0.238*	0.095	0.374**	0.574**	0.245*	0.396**	0.628**	–			
15- Humor	−0.031	−0.115	0.242*	−0.177	0.275**	0.192	0.191	0.374**	0.057	0.106	0.224*	0.235*	0.455**	0.252*	–		
16- Acceptance	−0.139	0.047	0.240*	−0.128	0.541**	0.591**	0.064	0.095	0.201*	0.295**	0.220*	0.216*	0.468**	0.552**	0.335**	–	
17- Religion	0.156	0.089	−0.093	0.080	0.105	0.301**	0.290**	−0.043	0.312**	0.459**	0.079	0.382**	0.177	0.432**	0.057	0.283**	–
18- Self-blame	0.193	0.097	0.145	0.133	0.227*	0.157	0.364**	0.198	0.200	0.318**	0.279**	0.429**	0.265**	0.299**	0.142	−0.005	0.224*

* Significant at $p < 0.05$.
** Significant at $p < 0.01$.

Table 6
Hierarchical multiple regression model correlating fear of COVID-19 to coping outcome in the two groups.

Variables	Low-schizotypy group (n = 88)		High-schizotypy group (n = 96)	
	FCV-19S total scores		FCV-19S total scores	
	Step 1	Step 2	Step 1	Step 2
Age	0.001***	−0.126	0.075	0.016
Gender	0.275**	0.136	0.048	−0.108
Monthly family income	0.226*	0.234	0.064	0.046
Coping outcome (Brief-COPE sub-scores):				
Self-distraction	–	0.018	–	0.099
Active coping	–	0.132	–	0.224
Denial	–	−0.126	–	−0.132
Substance use	–	0.045	–	−0.125
Emotional support	–	−0.082	–	0.067
Instrumental support	–	0.174	–	0.196
Behavioral disengagement	–	−0.060	–	0.121
Venting	–	0.313	–	0.369**
Positive reframing	–	0.111	–	−0.287
Planning	–	0.160	–	−0.065
Humor	–	0.046	–	−0.106
Acceptance	–	−0.352*	–	−0.242
Religion	–	0.071	–	−0.038
Self-blame	–	−0.078	–	0.017
F	4.37**	1.85*	0.35	2.10*
R2	0.135	0.368	0.011	0.285
ΔR2	0.135**	0.233**	0.011	0.274*

Note. Standardized β weights reported at each step evaluate changes in weights with the inclusion of additional predictors. F: test of overall model significance; R2: coefficient of determination; ΔR2: change in R2 value resulting from the inclusion of new predictors.
FCV-19S: The Fear of COVID-19 Scale; Brief-COPE: Brief-Coping Orientation to Problems Experienced.

  * $p < 0.05$.
  ** $p < 0.01$.
  *** $p < 0.001$.

In the multivariate analysis, we noted that after controlling for confounding variables, an adaptive coping response (acceptance) correlated negatively with fear of COVID-19 in the low-schizotypy group; whereas a maladaptive coping response (venting) correlated positively with fear of COVID-19 in the high-schizotypy group. This indicates that individuals who are psychosis prone endorsed using more maladaptive coping that that was associated with the exacerbation of fear, with an inverted pattern in the low-schizotypy group. However, it is worth mentioning that caution is required in interpreting these cross-national associations.

Consistent with our results, previous studies have shown that, under normal circumstances, young adult college students who tend to use maladaptive coping behaviors may experience more negative affect (including depression, anxiety, and stress) than those who use adaptive coping strategies (Mahmoud, Staten, Hall, & Lennie, 2012).

In the context of the pandemic crisis, fear of COVID-19 can lead people to adopt risky or maladaptive behaviors in response to COVID-19 (R. Jaspal et al., 2020; R. Jaspal & Nerlich, 2020). For example, a study among a sample of 411 participants in the United Kingdom (50% females with a mean age of 44.85 years) found that participants have reported moderate to high levels of fear of COVID-19 that seemed to underpin their maladaptive behaviors (R. Jaspal et al., 2020).

The link between fear and maladaptive coping seems to be more pronounced in vulnerable populations. Indeed, major circumstances such as the COVID-19 pandemic appear to exacerbate the already prevalent maladaptive behaviors in subjects with underlying mental health problems (Kellett & Bolton, 2009), suggesting that particular attention should be given to this vulnerable group to help them to more effectively overcome the fear of this pandemic (R. Jaspal et al., 2020).

This study has several strengths. First, it employs an adequate sample size. Second, participants are sampled from multiple universities (n = 4)

to be representative of the student population in the region. Third, the response rate of 80.2% is acceptably high and our two groups of respondents had similar sociodemographical characteristics. Fourth, study variables were assessed using well-validated standardized instruments. Fifth, demographic variables were statistically controlled when examining the associations between fear of COVID-19 and coping strategies in the two groups.

On the other hand, some limitations to the current study need to be discussed. First, this study was cross-sectional in design and thus cannot address how coping may change over time, nor how coping strategies may relate to changes in fear of COVID-19. Second, we only included individuals attending universities at the time of recruitment, which may limit the generalizability of our findings. Third, data concerning fear of COVID-19 and coping strategies were obtained using self-report forms, which have the potential for response bias.

5. Conclusion

This study provided preliminary cross-sectional evidence for a differential impact of COVID-19 on individuals according to their schizotypy features, and the role that different coping responses may play in these differences. This study is timely and particularly relevant for health policy makers since it represents a first attempt to provide implications for prevention and early intervention for young people with high psychosis liability in the context of COVID-19. However, larger longitudinal population-based studies are necessary to confirm our findings.

In summary, we have demonstrated that high-schizotypy individuals are a particularly vulnerable group during this time of COVID-19 crisis. Given the well-known stress vulnerabilities among this group, effective coping strategies to deal with the threat of the pandemic may protect them from progressing into the disorder.

The development of programs that educate about the different styles of coping and the differential outcomes of their use on mental health is particularly needed in young adults with schizotypy features who are struggling with COVID-19 stressors and concerns. In order to implement an evidence-based program that is adapted to the needs of individuals with high levels of schizotypy, decision-makers can draw inspiration from programs that have previously proven effective in the student population, such as the program Transforming Lives through Resilience Education (Steinhardt & Dolbier, 2008). Cognitive Behavioral Therapy including a component on teaching of coping strategies may also be particularly beneficial in young people at risk of psychosis (Ered et al., 2017).

In addition, individuals who are psychosis prone may require particular support in these difficult times of COVID-19, and prevention programs should be specifically developed to target decreasing the levels of fear of COVID-19 through enhancing the use of adaptive coping strategies and reducing the use of maladaptive behaviors.

Future studies are needed to confirm our findings on larger clinical samples and on a global level, and to identify the reasons why high-schizotypy individuals would more likely engage in maladaptive coping strategies.

CRediT authorship contribution statement

Feten Fekih-Romdhane: Conceptualization, Methodology, Software, Writing- Original draft preparation. **Nouha Dissem:** Investigation, Software, Writing- Original draft preparation. **Majda Cheour:** Supervision, Writing- Reviewing and Editing.

Declaration of competing interest

None.

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