






Covid-19

Fear of COVID and trait anxiety: Mediation of resilience in university students

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Abstract

The current research aimed to assess the effect of the trait anxiety on the fear of Covid-19 mediated by resilience. For that, we counted on a convenience sample of 261 university students from Brazil. Participants completed a survey composed of the Fear of Covid-19 Scale (FC-19S), the Brief Resilience Scale, the Trait Anxiety Inventory, and demographic questions. Results from a simple mediation with 5000 bootstrap simulations supported the hypothesis that resilience mediates the link between the trait anxiety and fear of Covid-19 ($\beta = .14$; 95% C.I. = .027, .254). It was observed that resilience mediated around 35% of the link between the trait anxiety and the fear of Covid-19. In sum, we concluded that resilience plays an important role in maintaining people's mental health, which is especially relevant in troubled times like the pandemic.

Keywords: trait anxiety; resilience; fear; Covid-19; mediation.

MEDO DA COVID E ANSIEDADE-TRAÇO: MEDIAÇÃO DA RESILIÊNCIA EM ESTUDANTES UNIVERSITÁRIOS

Resumo

O objetivo principal deste estudo foi verificar o poder explicativo da ansiedade-traço no medo da Covid-19 sendo mediado pela resiliência. Para tanto, contou-se com a participação de uma amostra por conveniência composta por 261 estudantes universitários brasileiros. Os participantes responderam a um questionário online (Google formulários) contendo a *Escala de Medo da Covid-19* - (FC-19S), a *Escala Breve de Resiliência*, o *Inventário de Ansiedade Traço* e questões de caráter sociodemográficas. Por meio de uma análise de mediação simples e 5000 re-amostragens bootstrap, confirmou-se a hipótese do presente estudo, uma vez que houve efeito de mediação (efeito indireto) estatisticamente significativo ($\beta=0,14$; 95% C.I. = 0,027 - 0,254), onde a variável resiliência mediou aproximadamente 35% da relação entre ansiedade-traço e medo da Covid-19. Conclui-se que a resiliência tem um papel importante para manutenção da saúde mental das pessoas, sobretudo em períodos de crise como de uma pandemia.

Palavras-chave: ansiedade-traço; resiliência; medo; Covid-19; mediação.

MIEDO AL COVID Y ANSIEDAD: MEDIACIÓN DE LA RESILIENCIA EN ESTUDIANTES UNIVERSITARIOS

Resumen

El objetivo principal de este estudio fue verificar el poder explicativo del rasgo de ansiedad en el miedo Covid-19, mediado por la resiliencia. Para ello, participó una muestra de conveniencia de 261 estudiantes universitarios brasileños. Los participantes respondieron un cuestionario en línea (formularios de Google) que contiene Escala de miedo Covid-19 (FC-19S), Escala de resiliencia breve, Inventario de ansiedad de rasgos y preguntas sociodemográficas. Mediante un análisis de mediación simple y un remuestreo de 5000 bootstrap, se confirmó la hipótesis del presente estudio, ya que hubo un efecto de mediación estadísticamente significativo (efecto indirecto) ($\beta = 0,14$; IC 95% = 0,027 - 0,254), donde la variable resiliencia medió aproximadamente el 35% de la relación entre el rasgo de ansiedad y el miedo al Covid-19. Concluimos que la resiliencia juega un papel importante en el mantenimiento de la salud mental de las personas, especialmente durante períodos de crisis como una pandemia.

Palabra clave: rasgo de ansiedad; resiliencia; miedo; Covid-19; mediación.

1. Introduction

The COVID-19 outbreak started in December 2019 in Wuhan, China. Since then, this disease (caused by Severe Acute Respiratory Syndrome Coronavirus 2: SARS-CoV-2) has grown exponentially worldwide. The spread of the virus led the World Health Organization (WHO) to announce COVID-19 as a pandemic with serious social and economic consequences (WHO, 2020a).

In order to contain the spread of the virus, which does not yet have a specific vaccine or specific medication, some measures have been recommended by the WHO, both at the individual (for example, frequent hand washing, wearing a medical face mask), and national levels (for example, certain countries imposed strict blockages to restrict both urban mobility and the entry of foreigners) (WHO, 2020a). One of the recommendations that are perhaps having the greatest impact on people's lives is social isolation.

According to Usher, Bhullar, and Jackson (2020), quarantine or imposed isolation is an unknown and unpleasant experience that involves the separation of friends and family. This is because quarantine imposes distance from common daily routines, such as workplaces, schools, and leisure activities. The educational

context was one of those that suffered the most negative impact since possibly millions of students worldwide had to stay away from classrooms. This might have influenced students' educational, social, and psychological performances. They had to adapt to distance education models (e.g., remote classes), but there is still a lack of evidence about the effectiveness of this learning approach (Cao et al., 2020).

As a result, changes in life ways can make people feel anxious and insecure, especially with feelings of fear associated with the possible contagion of the virus. In China, one of the first studies examining the psychological impact of Covid-19 on mental health included 1,210 respondents (general population) from 194 cities. This research was conducted online in the first months after the COVID-19 outbreak was announced by the WHO and it took three days (between January 31 and February 2, 2020). In this study, moderate to severe anxiety symptoms were reported by 28.8% of the participants. Among these, females, students, and people with specific COVID-19 physical symptoms were associated with a greater psychological impact on mental health and higher anxiety levels (Wang et al., 2020).

A similar survey (online) with the participation of 10,368 adults in the United States and conducted in March 2020 revealed that the fear of Covid-19 among the participants had an average of almost 7 points in a 10-point response scale. This study showed that moderate to severe anxiety symptoms were reported by more than 25% of the sample (Fitzpatrick, Harris, & Drawve, 2020).

Recently, Cao et al. (2020) also examined a sample of university students (7,143 university students from Changzhi medical school) and observed that 24.9% of the students were suffering from anxiety due to the COVID-19 outbreak. This result might be related to the consequences of the virus on their studies and future employment because of the measures of social isolation imposed by the government (Cao et al., 2020). These authors also found that living in urban areas, living with parents, and having a stable family income were protective factors for university students against the anxiety experienced during the Covid-19 outbreak. However, having a relative or an acquaintance infected with Covid-19 was an independent risk factor for experienced anxiety. The stressors related to Covid-19, which included economic stressors, changes in daily habits, and academic delays, were positively associated with anxiety in Chinese university students during the epidemic. Cao et al.'s (2020) study also observed that social support was negatively correlated with anxiety.

Considering the aforementioned, it is important to understand which variables can be considered “protective” or “adverse” for university students’ mental health at troubled times like the pandemic. According to Yildirim and Arslan (2020), positive psychological resources, such as resilience and hope, can promote psychological well-being. In this direction, Zanon, Dellazzana-Zanon, Weschler, Fabretti, and Rocha (2020) showed that resilience (i.e., ability to deal with adversity) is an important factor to promote mental health from the perspective of Positive Psychology, which is especially relevant in the face of the consequences brought by the spread of COVID-19 in the world.

The term “resilience” emerged from the concept of invulnerability, which was what American and British researchers in the 1970s and 1980s initially called people who remained healthy even when exposed to severe adversity. In psychology, the term “resilience” is commonly conceptualized as the positive way in which people face life’s difficulties and adversities (Chen & Bonanno, 2020). According to Killgore, Taylor, Cloonan, and Dailey (2020), psychological resilience is the capacity to effectively deal with difficulties, uncertainties, and changes.

This statement is supported by a study performed in the USA with a sample of 1,004 participants. The study showed that low resilience was associated with worse mental health outcomes, which included, for example, severe anxiety and concerns about the effects of Covid-19. Also, during the third week of recommendations for social isolation, after the pandemic outbreak, the people who expressed the greatest difficulty and emotional challenges in dealing with this crisis were those with the lowest levels of resilience (Killgore et al., 2020).

Focusing on university students from Spain, Lozano-Díaz et al. (2020) examined the psychological and academic impact of the COVID-19 pandemic. They concluded that people who scored high on resilience usually received the smallest psychological and academic negative impact during the COVID-19 pandemic. In the same direction, studying 7,800 Chinese university students, Ye et al. (2000) found that resilience, coping strategies, and social support mediated the relationship between stress related to COVID-19 and acute stress disorder. These findings reinforce the role that psychological strategies, such as resilience, play in reducing psychological problems during the pandemic.

In this sense, since resilience is associated with maintaining mental health despite exposure to psychological or physical adversities (Kalisch et al., 2017), it is

possible to think that, even in the face of this unique moment the world is going through, adopting strategies that can endorse resilience would be indispensable in coping with the consequences of the pandemic (Killgore et al., 2020). Therefore, the current study has the objective to verify the effect of the trait anxiety to explain the fear of Covid-19, being mediated by college students' resilience.

Although some studies, mainly in China, are already seeking to investigate the impact of fear of Covid-19, such as the social changes caused by the pandemic and its effects on people's mental health (Cao et al. 2020), in Brazil, studies of this nature have not yet been published, especially regarding a specific sample of university students. In this sense, understanding how the social isolation and fear of Covid-19 can affect these individuals' anxiety and psychological health during the pandemic can be useful to understand the impact of preventive behaviors on psychological health (Zanon et al., 2020).

2. Method

2.1 Research design

The present study adopted a quantitative method with the use of ex-post-facto measures. We seek to identify the relationship between trait anxiety, resilience, and the fear of Covid-19 in Brazilian university students. For this purpose, a mediation model was tested with resilience as a mediator of the relationship between the trait anxiety and the fear of covid-19.

2.2 Participants

As a criterion for sample inclusion, students should be at least 18 years old and regularly enrolled in a public or private university (having attended at least one semester of their course). Participation was voluntary, and we used a convenience sampling. Participants were 261 university students, ranging from 18 to 60 years ($M = 24.38$; $SD = 7.44$). The majority of the students were female (63.9%) and enrolled in public universities (69.2%). Data was collected in different Brazilian states, with the majority being from Pernambuco (38%), Bahia (12.5%), and Piauí (11%). Most of these students were studying in the countryside of these states (68.1%). Also, most university students indicated that they were living with their parents or guardians (63.1%) and they reported an income of 1 to 3 minimum wages (35%).

2.3 Instruments

Participants completed a survey with the following instruments:

- Fear of Covid-19 Scale - (FC-19S): developed and validated by Ahorsu et al. (2020) in the Iranian context, the FC-19S is a single factor scale composed of seven items that assess how much the individual is afraid of the Covid-19 (e.g., “I am afraid of losing my life because of COVID-19”). Participants responded to the FC-19S using a Likert scale of five points (1 = strongly disagree to 5 = strongly agree), in which a high score indicates a high fear of Covid-19. Concurrent validity was observed with correlations between the FC-19S and the Hospital Anxiety and Depression Scale (HADS) and the Perceived Vulnerability to Disease Scale (PVDS). The FC-19S also showed good internal consistency indexes ($\alpha = 0.82$; $CC = 0.88$). A preprint (Faro, Silva, Santos & Feitosa, 2020) adapted the FC-19S for the Brazilian context, in which they corroborated the one-factor solution of the measure using a confirmatory factor analysis ($CFI = .986$, $GFI = .992$, $TLI = .980$, $RMSEA = .066$ and $SRMR = .060$) and Cronbach’s alpha (.86). In the present study, this measure also showed adequate internal consistency ($\alpha = .89$).
- Brief Resilience Scale: developed by Smith et al. (2008, as cited by Coelho, Hanel, Cavalcanti, Rezende & Gouveia, 2016, p. 398) and validated to the Brazilian context by Coelho et al. (2016), this scale is composed of six items (e.g., “I usually recover quickly from difficult times”). Participants responded to this scale using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The reversed items were transformed so that high scores indicate high resilience. These authors observed satisfactory psychometric properties and internal reliability (Cronbach’s Alpha and McDonald’s Omega greater than 0.70).
- Trait Anxiety Inventory: The State-Trait Anxiety Inventory (STAI) was developed by Spielberger, Gorsuch, and Lushene (1970, as cited by Borine 2011, p. 25), and was initially translated and adapted to Brazil by Biaggio, Natalício, and Spielberger (1977, as cited by Borine 2011, p. 25). Recent studies showed evidence of convergent validity between the STAI and the Neuroticism Factorial Scale, as well as its validity as an instrument for assessing anxiety (Borine, 2011). For this study, we considered the trait

anxiety component (T-A) only. The trait anxiety component is composed of 20 items that assess anxiety as a trait (e.g., “I worry too much about unimportant things”). The trait anxiety component’s response scale ranges from 1 to 4, 1 being “absolutely not” and 4 “very strongly agree.” The sum of the scores ranges from 20 to 80 to characterize the degree of anxiety. In Borine’s (2011) study, this measure showed adequate reliability ($\alpha = 0.79$).

The students also answered sociodemographic questions elaborated for this research in order to characterize the sample (age, sex, income, type of institution, among others).

2.4 Procedure

Data collection was performed online using Google Forms, and participants were contacted through social media (Instagram, Facebook, WhatsApp groups) with an invitation to fill the survey out. In this invitation, the study’s main objectives were informed, as well as their inclusion criteria (being a university student and with a minimum age of 18). The Informed Consent Form for online data collection was also presented on the research home page. To proceed with the participation, the participant had to accept the informed consent form, which was developed in accordance with resolutions 466/12 and 510/16 of the National Health Council. It is noteworthy that this research was approved by a local ethics committee (No. 3.458.802). Participants completed the survey in 20 minutes on average.

2.5 Data analysis

Data were analyzed using the SPSS statistical program (version 22) for descriptive statistics, correlations, and regressions. The mediation model was assessed using Mplus (version 8.4) and 5000 bootstrap simulations. Before assessing the analysis, confirmatory factor analysis was performed to identify the suitability of the three scales to the Brazilian context. Model fit was examined using CFI (comparative fit index), SRMR (standardized root mean squared residual), and RMSEA (root mean squared error approximation). The guidelines to indicate a reasonably good fit are: CFI must be close to .95, but values higher than .90 are considered acceptable; SRMR must be .08 or less, and RMSEA values must be close to .06 or lower, but a value of .08 is considered acceptable (Hu & Bentler, 1999).

Indirect effects were estimated using the bootstrap bias correction method that generates 95% confidence intervals (C.I.s). C.I.s that do not include zero indicate statistically significant total, direct or indirect effects.

3. Results

Descriptive statistics are available in Table 3.1:

Table 3.1. Descriptive statistics.

| | Mean | SD | Minimum | Maximum |
|------------------|-------------|-----------|----------------|----------------|
| Fear of Covid-19 | 3,54 | 1,4 | 1 | 7 |
| Resilience | 2,99 | 0,88 | 1 | 5 |
| Anxiety-Trait | 2,36 | 0,64 | 1 | 4 |

Before examining the link between the variables used in the current research, we examined the internal consistency (Cronbach's alpha) and confirmatory factor analysis (using the WLSMV estimator) for each scale. The WLSMV estimator is recommended for ordinal variables (Li, 2015). Internal consistency was greater than .70 for each of the measures indicating satisfactory reliability. Regarding the confirmatory factor analysis, we tested all variables simultaneously to examine whether each item would load in the factor they were supposed to load and examine whether anxiety, resilience, and fear of Covid-19 would show independence from one another. Results showed that this model was satisfactorily estimated with an acceptable model fit ($X^2(461) = 1045$, CFI = .941, RMSEA = .070, and SRMR = .067).

We then examined correlations to explore the link between fear of Covid-19, anxiety, and resilience. Results showed that the fear of Covid-19 was positively related to trait anxiety ($r = .42$; $p < .001$), and the opposite occurred in relation to resilience ($r = -.40$; $p < .001$). Resilience was also negatively related to trait anxiety ($r = -.69$; $p < 0.001$). In order to know the predictive role of trait anxiety and resilience to explain the fear of Covid-19, hierarchical regression was performed. We considered fear of Covid-19 as the dependent variable and age and sex (Block1), resilience (Block 2), and trait anxiety (Block 3) as independent variables. Results can be seen in Table 3.2.

Table 3.2. Hierarchical regression to explain the fear of Covid-19.

| | | Fear of Covid-19 | | | |
|---------|---------------|------------------|----------------|-------------------------|------------------------|
| Blocks | Predictors | Beta | R ² | R ² adjusted | R ² changed |
| Block 1 | Age | .093 | .06** | .05** | .06** |
| | Sex | .226* | | | |
| Block 2 | Age | .117* | .19** | .18** | .13** |
| | Sex | .135* | | | |
| | Resilience | -.376*** | | | |
| Block 3 | Age | .149** | .23** | .22*** | .04** |
| | Sex | .101 | | | |
| | Resilience | -.194** | | | |
| | Trait-Anxiety | .278*** | | | |

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Sex: 0 = men; 1 = woman.

As it can be seen in Table 3.2, variables in Block 1 explained 5% of the variance. When Block 2 and Block 3 were included, the explained variance increased to 18% and 22%, respectively. The R² change for each block was statistically significant. In Block 1, the prediction of sex was significant, but it became non-significant in the third block. Resilience showed a significant negative effect in Blocks 2 and 3, and trait anxiety showed a significant effect in Block 3. Therefore, the most consistent findings are that younger people with the highest scores of resilience and lowest of trait anxiety showed less fear of Covid-19.

We then explored a mediation model in which resilience was used to mediate the link between trait anxiety and fear of Covid-19. We first examined this model using the WLSMV estimator and the model fit was satisfactory ($X^2(461) = 1045$, CFI = .941, RMSEA = .070, and SRMR = .067). We then examined the indirect effects using the Maximum Likelihood (ML) estimator and 5000 bootstrap simulations. The ML estimator was chosen because bootstrap simulations in Mplus are available for this estimator only. Results showed that the inclusion of resilience as a mediator decreased the main effect (main effect without the estimation of the mediator: $\beta = .47$; 95%; C.I. = .360, .575; main effect with the estimation of the mediator: $\beta = .27$; 95%; C.I. = .018, .528) between the trait anxiety and the fear of Covid-19 (indirect effects: $\beta = .14$; 95%; C.I. = .027, .254). It was observed that resilience mediated around 35% of the link between the trait anxiety and fear of Covid-19.

However, as the effect between trait anxiety and fear of Covid-19 remained significant, the mediation was only partial (see Figure 3.1).

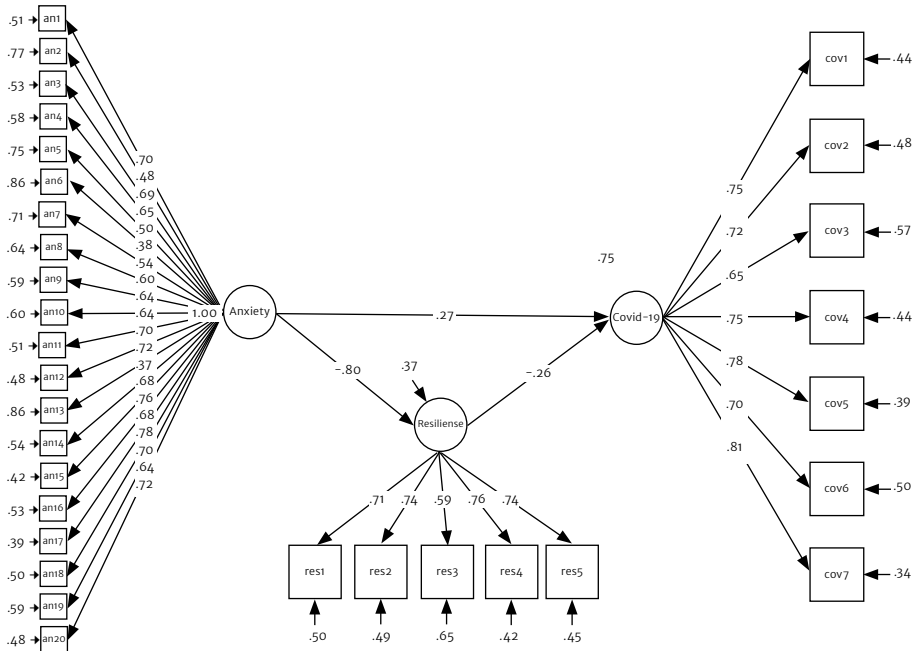


Figure 3.1. SEM model with anxiety as a predictor, resilience as a mediator, and fear of COVID-19 as the outcome. Parameters are standardized and the confidence interval was estimated with 5000 bootstrap simulations.

4. Discussion and conclusion

The main objective of this study was to verify the mediating role of resilience in the relationship between trait anxiety and the fear of covid-19. The results confirmed the mediating role of resilience since the relationship between anxiety and the fear of Covid-19 was reduced after the inclusion of resilience as a mediator.

It is important to note that for the mediating effect to be present it is necessary that the inclusion of the mediating variable (in this case, resilience) as a predictor of the dependent variable (for this study, fear of Covid-19) reduces or mitigates the effect of the independent variable on the dependent (Hair et al.,

2014). After the inclusion of resilience in the model, the direct effect of trait anxiety on the fear of Covid-19 dropped from $\beta = 0.47$ to $\beta = 0.27$. In addition, as the effect of the direct effect controlled by the mediator (standardized) was significant, a partial mediation was observed.

The positive and significant relationship between anxiety and the fear of covid-19 goes in the same line as documented literature in different countries (Killgore et al., 2020; Lozano-Diaz et al., 2020; Ye et al., 2020). In a study conducted with 324 English participants, with an average age of 34.32 (SD = 11.71), Harper et al. (2020) observed a strong relationship between the fear of Covid-19 and anxiety. This finding corroborates the results found in the present study, in which feeling anxiety explained the fear of Covid-19. However, these authors also found that being afraid of Covid-19 was the only significant factor in complying with the isolation rules and other protective behaviors against the virus. In their findings, personality factors, political orientation, and moral values did not influence the change in behavior. These authors also argue that negative emotions linked to anxiety, in general, may have evolved to serve more adaptive and protective functions helping people to stay safe. This might be happening in the current context of the pandemic, in which anxiety induce fear of Covid-19, and this leads to adaptive behaviors in line with public health (e.g., hand washing, social distancing).

Thus, even though the fear of Covid-19 may play an important role in adhering to protective behaviors against the virus, fear and anxiety arising from Covid-19 can impact people's mental health. Therefore, the present study adds to the literature by showing the mediating effect of resilience on the link between trait anxiety and fear of Covid-19. This indicates that during periods of crisis and adversity resilience plays an important role in maintaining people's mental health, which has already been verified in recent literature about the impact of Covid-19 on mental health (Killgore et al., 2020), especially in university students (Lozano-Diaz et al., 2020; Ye et al., 2020), corroborating the model we examined.

There are some indications that people seem to have greater social support and unity in times of crisis, which might be an effect of resilience (Chen, & Bonanno, 2020). Assuming that resilience can have different scores in periods of crisis, its role might be influenced by the situation or context investigated. According to Vinkers et al. (2020), not all people adapt easily to new circumstances. Factors such

as living conditions, poverty, poor access to health care, social support, and uncertainty about the future can affect people in different ways. In university students, for example, economic issues and academic delays are seen as relevant characteristics to understand their well-being and adaptation to the consequences of the crisis they might be facing, such as remote teaching during the pandemic (Cao et al., 2020).

Therefore, studies of this nature involving variables of positive psychology, such as resilience, can be useful to enable intervention strategies to promote well-being. This is because studies point to the dynamic view of resilience in which individual and environmental factors (family, culture, community) act in an interdependent and reciprocal way so that the individuals adapt adequately even in crisis and adversity situations (Chen, & Bonanno, 2020). Therefore, resilience exists at the individual level and at the community level, with shared resilience being vital for countries to face current challenges together (Vinkers et al., 2020).

Although our results contribute to the debate about the psychological mechanisms that influence the fear of Covid-19, it is important to highlight that some limitations can be identified in the present research. For instance, we counted on a sample of convenience composed of university students (mostly from the northeast region of Brazil), which does not allow the generalization of our findings. Thus, future research should examine this relationship with a stronger method, such as a study using representative data or longitudinal design. Future research can also explore whether other psychological variables influence the fear of Covid-19, such as personality traits, social support, media influence, and knowledge about the new coronavirus. In addition, an examination of these variables in more specific samples, such as health professionals dealing more directly with Covid-19, would greatly contribute to the debate about the variables that protect people against the psychological consequences brought by Covid-19.

Furthermore, as resilience has been positively correlated with well-being, quality of life and mental health (Yildirim, & Arslan, 2020; Zanon et al., 2020) and negatively with stress, anxiety, and chronic diseases (Killgore et al., 2020; Vinkers et al., 2020;), in addition to functioning as a protective factor against risks of diseases and emotional and behavioral changes (Chen & Bonanno, 2020), its importance is observed both for the physical health and for the mental health of

the population worldwide. This is especially relevant in this current pandemic moment, which has affected society in different sectors, whether in the individual or social sphere, which will increasingly demand the development of people's resilience.

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