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Trends

The mental health of Brazilian students during the Covid-19 pandemic: the role of gratitude, optimism, and hope in reducing anxiety

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Mental health of Brazilian students during the Covid-19 pandemic: the role of gratitude, optimism, and hope in reducing anxiety.

Running Head: Mental Health during the Covid-19 pandemic.

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The mental health of Brazilian students during the Covid-19 pandemic: the role of gratitude, optimism, and hope in reducing anxiety.

Abstract

Objectives: To investigate the role of optimism, hope, and gratitude as psychosocial factors for healthy development, especially with regard to anxiety in college students in the context of COVID-19.

Methods: This is a quantitative and descriptive cross-sectional research. The sociodemographic questionnaire and the Brazilian versions of the anxiety scale B-GRAT, LOT-R, Hope Index, and BIG-FIVE were applied. Data were analyzed using Mann-Whitney correlation, Kruskal-Wallis, Spearman, and hierarchical linear regression.

Results: A total of 297 students were assessed. In the hierarchical linear analysis, the relationship of gratitude with anxiety becomes positive, contradicting the negative association of these variables in Spearman's correlation. The contradictions may result from the suppression effect. When gratitude was added to the model, these three variables together accounted for 38% of the variance in anxiety. This indicates that optimism, hope, and gratitude together are significant predictors, but optimism alone accounts for a large part of the variance for decreased anxiety.

Conclusions: The data confirm that family and religiosity are protective factors against mental illness, specifically non-adaptive anxiety. Furthermore, developing optimism as a protective factor makes it possible to experience less anxiety while hope has the potential to provide the individual with multiple pathways to healthy development. This study has highlighted that gratitude plays a dual role in these relationships as it has the potential to be associated with anxious feelings with likely negative outcomes while at the same time it can drive positive psychosocial factors of optimism and hope in decreasing anxiety.

Keywords: anxiety; college students; pandemic; positive psychology; protective factors.

1. Introduction,

Higher education students' mental health is being studied in different countries. There has been a high prevalence of mental disorders,¹ psychological stress (26.2%),²⁻³ depression (17.3%), suicidal ideation, and self-injurious behavior (15.3%).⁴ In the European context, the World Health Organization (WHO) indicates an increase in mental illnesses in 11% of the population, reaching 10% to 20% of young adults.⁵

Research has shown that the pandemic has caused psychological illnesses, such as depression and anxiety,⁶⁻⁷ generating fear or coronaphobia.⁸ Studies currently demonstrate considerably increased anxiety in students during the Covid-19 pandemic. A relationship between anxiety and cognitive functioning before and during COVID-19 was perceived.⁹⁻¹⁰ Studies in Brazil showed an increase in anxiety (39,7%) and the prevalence of their moderate-severe symptoms, including research with a sample of students.¹¹⁻¹²⁻¹³

Anxiety is characterized by fear or extreme tension, going beyond healthy levels and bringing harm and illness. At university, as it is a new environment that requires emotional and social adaptations, feelings, sensations, and insecurities can emerge, which have the potential to compromise student learning and their relationship with professors, colleagues, and the university itself. Difficulties arise in reconciling study schedules, internships, exams, personal, professional, and family life.¹⁴⁻¹⁵

In a study with 257 college students, it was found that students' positive perception of their life also reflects positively on the physical, psychological, social relationships, and environment domains, increasing the frequency of positive affection and promoting the decrease in adverse effects.¹⁶ In this sense, the Positive Psychology movement aims to (re)build positive qualities and foster and nurture the best in subjects, focusing on healthy factors, virtues, and personal strengths as protective and preventive agents of mental illness.¹⁷⁻¹⁸ Thus, hope, gratitude, and optimism are constructs that

approach this purpose and are potential predictors of mental health in college students.¹⁹⁻

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Hope is defined as a positive emotional state present in a triad formed by objective (the search for something), route (possibility of a path to reach the goal), and agency (motivation to trace the route and achieve the objective).²² Magaletta & Oliver,²³ identified that agency is a better predictor of subjective well-being. For Merolla & Peterson,²⁴ it was negatively associated with the amount of daily interpersonal conflict, positively related to constructive conflict management when a battle occurred, and negatively related to everyday challenges in maintaining relationships.

Moreover, some studies show that higher hope was associated with greater well-being and perceived emotional control, as well as lower levels of anxiety and COVID-19 perceived stress.²⁵ Also, hope could decrease students' focus and insecurity during COVID-19,²⁰ and help them to reduce procrastination in the educational process by creating new routes in front of adversities,¹⁹ providing higher intellectual satisfaction and students' engagement.²⁶ Shellstrom,²⁷ reflects on the lessons from remote learning, including the importance of adaptability during the pandemic and the appreciation of little things crucial for better academic well-being, especially in critical moments. Algoe,²⁸ emphasizes that gratitude is also aimed at the individual's awareness of their life experiences, realizing their positive side.

Based on evidence from the Brazilian population, Vazquez et al.,²⁹ defined gratitude as a positive mental state of gratitude for life experiences, even if adverse or risky, linked to affective memories that enhance subjective well-being. The researchers found that gratitude is positively associated with hope, explaining 38% of the variance and indicating gratitude as a protective and prevention factor for anxiety and depression.

Moreover, Puente-Díaz and Cavazos-Arroyo,³⁰ in an experiment with students during the pandemic, showed that bringing to mind memories of special moments has a positive influence on gratitude and mediates the positive relationship between recalling a special event and optimism. These findings showed those constructs might help people see a brighter future under the current difficult conditions of prolonged lockdowns.

Evidence has shown that optimism promotes positive mental strategies. Individuals offer self-confidence and the more significant effort and persistence to achieve their goals using thought control and logical analysis of adversity or perceived risk³¹. Furthermore, researchers identified that coronavirus stress was negatively associated with the college students' sense of hope and optimism. These mitigated the adverse impacts of tension on mental health during the pandemic. It was concluded that being hopeful and optimistic are the potential resources to explain how coronavirus stress is related to subjective well-being.³²

In the present research, we consider that hope has the potential to provide the student with multiple routes of positive development, even in the face of anxiety and difficulties.²⁴ (H1) Hope has a negative association with anxiety levels. Also, gratitude can promote reflection and elaboration of negative feelings and increase the student's well-being by experiencing positive feelings, even in adverse situations or when the routes traced do not suit their expectations initially.²⁹ (H2) Gratitude is negatively related to anxiety, acting as a psychosocial protective factor.

Moreover, optimism can provide a positive vision of the future, even in adversity, and those students will be successful in their actions, reaching the goals they aspire to.³² (H3) optimism is negatively related to anxiety levels. The complexity of this process, in our view, will allow the student the growth necessary for their personal

and professional development in a healthy way. (H4) Optimism will act as the main protective factor in decreasing anxiety in comparison with hope and gratitude.

Given the above, the main contribution sought in this article is to investigate the role of optimism, hope, and gratitude as psychosocial factors to strengthen, boost and protect healthy development, especially regarding anxiety in college students in the context of COVID- 19. This evidence, in the present study, may contribute to well-being interventions in university students.

2. Method

This is cross-sectional quantitative and descriptive research. The data collection was carried out through the SurveyMonkey software to send email invitations to participate in the study to educational institutions and companies. Data collection took place between April 11th to June 23rd, 2020, throughout the national territory. The study is part of a larger project that included other researchers to study the link between positive psychology and mental health.

2.1 Participants

The sample was composed of 297 individuals from the student population, aged between 18 and 77 years (mean = 29.43, standard deviation = 9.87), mostly women (78.79%), college students (77.40%), and single (76.77%).

2.2 Instruments

*Brazilian version of the Optimism Scale - LOT-R.*³³ The LOT-R contains ten items of the Likert type, ranging from strongly disagree = 1 to agree strongly = 5, with an adequate reliability index ($\alpha = .79$). In the present study, reliability ($\alpha = .97$) and

LOT-R indexes were satisfactory ($\chi^2 = 13.9$, $df = 3$, $p < .001$, RMSEA = .06 [90% CI = .03 - .09], GFI = .99, CFI = .99, NFI = .99, IFI = .99).

*Anxiety Scale refers to specific items of the Emotional Adjustment/Neuroticism Factor Scale.*³⁴

This anxiety subscale has 17 Likert-type items, ranging from one to five (1- Strongly Disagree to 5 - Strongly Agree, with coefficient $\alpha = .89$. In the sample of this research, internal consistency ($\alpha = .92$) and the observed fit indices were satisfactory ($\chi^2 = 495.8$, $df = 106$, $p < .001$, RMSEA = .06 [90% CI = .06 - .07], GFI = .94, CFI = .96, NFI = .95, IFI = .96).

*The Brazilian version of the Hope Scale.*³⁵

The scale consists of 12 items distributed in two subscales: Agency thoughts (items 02, 09, 10, and 12) and Path Thoughts (items 01, 04, 06, 08), measured on a five-point Likert scale, (1=totally false to 5=totally true, with $\alpha = 0.92$. In the sample of this research, internal consistency $\alpha = .86$. The results of the confirmatory factor analysis indicated that the model has adequate statistical fit ($\chi^2 = 53.7$, $df = 16$, $p < .001$, RMSEA = .05 [90% CI = .03 - .06], GFI = .98, CFI = .98, NFI = .98, IFI = .98).

*Brazilian Gratitude scale - B-GRAT.*²⁹

The B-GRAT consists of seven items, five items measuring gratitude towards external sources of people, things, and God, plus two items assessing the dispositional state. Five-point Likert scale, where 1 represents false and five true, with a Cronbach's alpha of 0.84. In this study, the scale presented adjustment indices ($\chi^2 = 59.9$, $df = 12$,

$p < .001$, RMSEA = .06 [90% CI = .05 - .08], GFI = .98; CFI = .98; NFI = .98; IFI = .98) and adequate internal consistency ($\alpha = .85$).

3. Data Analysis Procedures

The Statistical Package for the Social Sciences (SPSS) version 25 was conducted for data analysis. Analysis of missing data was performed, participants that did not complete the four scales were excluded, and outliers were later analyzed following the procedure suggested by Hair et al.,³⁶ to calculate the Mahalanobis distance, which measures the deviations of values from the means of predictor variables. It was considered the exclusion of cases with values of d^2/df significant at the level of $p < 0.001$. Thus, 22.46 is a cutoff point.

Cook's distance was considered. This measure considers the effect of a single case on the model as a whole through calculation $4/(NK-1)$, where k is the number of predictors in the model and n is the number of participants. The point of established cutoff was 0.004. The Leverage distance was used to verify the mean value of influence through the calculation $(2K + 2)/N$, and the cutoff value was set at .014. The sum of the three distances where 1 represented a value equal to or above the cutoff point and 0 represented the s below was performed, then the sum of 2 or more was considered for cutting.

The Shapiro-Wilk test (SW) and Kolmogorov-Smirnov test (KS) were applied. The tests assume the hypothesis of data normality (H_0), returning a p -value $> .05$ if they result in adherence to normal parameters, and a significant value ($Sig. < .05$) indicates a deviation from normality. The multicollinearity analysis was conducted by checking the tolerance of a variable, which measures the proportion of its variation that is not explained by the remaining independent variables. If the tolerance of a variable is < 0.1 ,

then there is multicollinearity between the variables, which must be excluded from the model. The VIF was also used, which is the inverse of tolerance. If the VIF is smaller than 10, there is no collinearity because the closer to zero, the smaller the collinearity.³⁷⁻

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For non-parametric quantitative variables, Mann Whitney U tests were applied for dichotomous categories and Kruskal-Wallis for more than two groups, because data did not present a normal distribution. The significance level was established for a *p-value* < .05. The Cohen's d size effect was calculated for all significant group comparisons.³⁹

A biserial point correlation investigated the associations of sociodemographic features (marital status, sex, and religious practice) with anxiety, hope, gratitude, and optimism. Spearman correlation was performed to identify the association between the psychological variables. Hierarchical linear regression analysis was applied to determine whether adding variables significantly improves a model's ability to predict the criterion variable, and investigate a moderating effect of a variable.

Ethical aspects

The research ethics committee approved the research project of the Federal University from the Rio Grande do Sul (CAAE:80264617.3.0000.5334). All participants signed an informed consent form prior to data collection.

4. Results

According to missing data, Mahalanobis distance, Cook's distance, and Leverage distance, 32 participants were excluded. For the values of the four constructs, the K-S test proved to be highly significant, indicating that the distributions deviate from normality. The anxiety analyses, $D(297) = .56, p < .05$, Optimism $D(297) = .97, p < .001$, hope $D(297) = .06, p < .05$, and gratitude $D(297) = .12, p < .001$ were significantly non-normal. Deviation from normality informs the use of non-parametric tests. The transformation of variables could be done, but criticism of artificiality could arise. Therefore, it was decided not to transform the variables and employ multivariate techniques, even recognizing that the generalization of results is compromised. VIF values are below ten for the current model, and tolerances are all above .20. Therefore, we can safely conclude no collinearity within the data.

Participants were categorized according to sociodemographic variables, gender (Female and Male), and marital status were named without a spouse those who were considered single and widowed, and those who were married or in a relationship were named with a spouse. Religious practice and having children were also considered dichotomous variables. Finally, university education was considered as undergraduate, specialization, master's, and doctoral degrees (Table 1).

The comparison between sociodemographic variables, anxiety, optimism, hope, and gratitude demonstrated that females had higher levels of anxiety and gratitude than males. Regarding marital status, those who have no spouse have a higher level of anxiety, low optimism, and hope level than those who have a spouse. Moreover, those participants who evidenced no religiosity practice showed high levels of anxiety and less level of optimism, hope, and gratitude. On the other hand, those students who have

religiosity practice showed low anxiety levels and an increase in optimism, hope, and gratitude. In addition, the participants who have children evidenced low levels of anxiety and higher levels of optimism and gratitude than those that have no children (Table 1).

In relation to academic level, undergraduates showed higher levels of anxiety, followed by master's degree, doctorate, and specialization students. On the other hand, specialization students showed higher levels of optimism, followed by master's degree, undergraduate students, and finally, doctorate students (Table 1).

Table 1 – Socio Demographic Data

Mann Whitney		Anxiety		Optimism		Hope		Gratitude	
Sex	N	M (SD)	Z (d)	M (SD)	Z (d)	M (SD)	Z (d)	M (SD)	Z (d)
Female	234	3.25 (.83)	-4.2** (.24)	3.58 (.95)	.005 (.00)	3.78 (.69)	-0.61 (.04)	4.15 (.75)	-3.91** (.23)
Male	63	2.75 (.80)		3.56 (.98)		3.73 (.73)		3.65 (.92)	
Marital status									
Without spouse	228	3.22 (.83)	-3.90* (.23)	3.48 (.94)	-3.63** (.21)	3.72 (.70)	-2.18* (.13)	4.00 (.83)	-1.64 (.10)
With spouse	69	2.88 (.83)		3.93 (.90)		3.93 (.67)		4.19 (.75)	
Religiosity practice									

Yes	130	3.02 (.83)	-2.09* (.12)	3.81 (.87)	-3.48** (.20)	3.94 (.63)	-3.37* (.20)	4.41 (.68)	-7.22** (.42)
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No	164	3.24 (.85)		3.41 (.99)		3.64 (.72)		3.78 (.79)	
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Children

Yes	51	2.79 (.91)	-3.05* (.18)	3.91 (.88)	-2.80 (.16)	3.93 (.79)	-1.77* (.10)	4.30 (.81)	-2.85* (.17)
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No	246	3.21 (.82)		3.51 (.95)		3.74 (.67)		3.99 (.81)	
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Kruskal Wallis

University formation	N	M (SD)	Z (d)	M (SD)	Z (d)	M (SD)	Z (d)	M (SD)	Z (d)
Undergraduate	230	3.19 (.84)	9.097 (.53)*	3.54 (.95)	8.235 (.48)*	3.73 (.69)	4.778 (.28)	4.03 (.81)	4.156 (.24)
Specialization	21	2.61 (.70)		4.09* (.85)		4.05 (.59)		4.28 (.91)	
Master	32	3.13* (.85)		3.67* (.87)		3.73 (.72)		4.11 (.77)	
Doctorate	14	3.05 (.93)		3.37 (1.16)		3.85 (.91)		3.84 (.86)	

Note: **.Correlation is significant at the 0.01 level. *.Correlation is significant at the 0.05 level.

M = mean, SD = standard deviation, Z = score z, d = d de Cohen.

In order to identify the correlation between the variables of the study, Spearman was performed. Firstly, the correlation analysis showed that sex was negatively related to anxiety and gratitude. Also, age was negatively correlated with anxiety, although

there is a positive correlation between age and optimism, hope, and gratitude, which means young people have a higher anxiety level and less optimism, hope, and gratitude than older adults (Table 2).

University formation was negatively related to anxiety and positively significant to hope, which means that people with low education levels could be less anxious and more hopeful. Marital status was negatively related to anxiety and positively related to optimism, hope, and, gratitude. Also, religious practice and having children were positively related to anxiety and negatively related to optimism, hope, and gratitude. In other words, people that are religious, are in romantic relationships and those that have children are less anxious than those that are not (Table 2).

Moreover, it is possible to note that anxiety was negatively related to optimism, hope, and gratitude. Optimism showed the stronger negatively association with anxiety ($-.594, p < .001$), after hope ($-.375, p < .001$) and in the last gratitude ($-.214, p < .001$). Both hope and optimism were stronger related positively to each other ($.542, p < .001$), and gratitude were stronger related to hope and optimism ($.526, .502, p < .001$, respectively). The findings are shown in table 2.

Table 2 - Associations between sociodemographic variables with anxiety, optimism, hope, and gratitude.

	Anxiety	Optimism	Hope	Gratitude
Sex	-.248 ^{ab*}	.000	-.035	-.227 ^{**}
Age	-.248 ^{**}	.225 ^{**}	.219 ^{**}	.198 ^{**}

University formation	-.102*	.076	.096*	.035
Marital status	-.219**b	.207**	.131*	.148**
Religiosity practice	.122*b	-.204**	-.196**	-.422**
Children	.178*b*	-.163**	-.103*	-.165**
Anxiety	1	-.594**	-.375**	-.214**
Optimism		1	.542**	.502**
Hope			1	.526**
Gratitude				1

Note: **.Correlation is significant at the 0.01 level (1-tailed). *.Correlation is significant at the 0.05 level (1-tailed). b = point biserial correlations, and all others were Spearman correlations. sex = 1. female, 2. male. Religious practice = 1. Yes, 2. No; Children = 1. Yes, 2. No; Marital status = 1. without spouse; 2. with spouse; University formation = 1. undergraduate, 2. specialization, 3. master, 4. doctorate.

Hierarchical regression was performed to investigate the contribution of optimism, hope, and gratitude in explaining anxiety levels. However, there are some assumptions that this analysis requires. The calculated Durbin-Watson value of this study is 2.081. Based on these values, there is not a multicollinearity or autocorrelation problem among these variables.

It was determined that all added predictor variables to the generated model significantly predicted less anxiety, and according to the hierarchical regression analysis results, just two models were significant. According to this, the most antecedent variables of decreasing anxiety were optimism, hope, and gratitude respectively. According to the hierarchical regression analysis results in the first model, optimism alone predicted a 34% of anxiety decrease. Adding the hope variable to the model, these

two variables together accounted for 35% of the variance in anxiety, although that was not significant. Furthermore, when gratitude was added, these three variables together accounted for 38% of the variance in anxiety. This indicates that optimism, hope, and gratitude, together, are significant predictors, but optimism, alone, accounts for a large part of the variance for anxiety decrease.

Table 3 - Regression model for predicting the anxiety in predictive variables ^d

Model	Anx	B	R	R ²	R ² Adj.	R Change	Sig	Durbin-Watson
1	O	-.521	.587a	.345	.343	.345	.0001	
2	O	-.469	.593b	.352	.348	.007	.074	
	H	-.124						
3	O	-.526	.617c	.380	.374	.028	.0001	2.081
	H	-.218						
	G	.216						

Note: a. Predictors: (Constant), Optimism, b. Predictors: (Constant), Optimism, Gratitude, c. Predictors: (Constant), Optimism, Gratitude, Hope, O = optimism, G = gratitude, H = hope, Anx = Anxiety.

5. Discussion

Sociodemographic data pointed out that people in a romantic relationship have lower anxiety scores and higher levels of optimism and hope. Moreover, it was noticed that religious practitioners had lower anxiety levels and higher levels of optimism, hope, and gratitude. Having children also showed lower anxiety scores and increased levels

of optimism and gratitude. The data confirm that family and religiosity are protective factors against mental illness, specifically in this research on non-adaptive anxiety.⁴⁰

The highest level of anxiety was present in graduate and master's students. Studies carried out in the university context have corroborated this evidence. Chang et al.,⁴¹ noted the high prevalence of anxiety among college students during the COVID-19 pandemic in a meta-analysis study. Moreover, Ibrahim et al.,⁴² demonstrated that the high rates of anxiety and depression in students, especially in the first years of university, are even higher than those found in the general population. On the other hand, undergraduate and master's students demonstrated low levels of optimism. This shows the theoretical and practical relevance of thinking about strategies for coping with obstacles and strengthening positive effects, as they are necessary actions for well-being and emotional balance.⁴¹⁻⁴³

Moreover, optimism and hope were negatively associated with anxiety confirming hypotheses 1 e 3. Also, optimism acted as the main protective factor in decreasing anxiety in comparison with hope and gratitude as previewed in the fourth hypothesis. A negative correlation between anxiety and optimism was evidenced, according to the findings of Hutz and Nunes,³⁴ and Bastianello et al.,³³ Furthermore, a negative association with hope, was according to studies by Gadosey et al.,⁴⁴ and Long & Gallagher.⁴⁵ In the correlation data, it is possible to observe that optimism, hope, and gratitude are positively related to each other, confirming the findings of Witvliet et al.,⁴⁶ Kardas et al.,⁴⁷ Vazquez et al.,²⁹ and Biber et al.⁴⁸

Although, on the hierarchical linear analysis is noticeable that the relationship of gratitude with anxiety becomes positive, contradicting the negative association of these variables in Spearman's correlation. The contradictions of the results in the analysis may result from the suppression effect,⁴⁹ showing that Spearman's correlation

analysis of the indirect effect of gratitude, optimism, hope, and anxiety hinders the direct effect of gratitude on anxiety. Importantly, the direct effect is more informative than the indirect effect because it considers the relationship between variables considering the different influences of this relationship.⁴⁹

It is important to consider that the data were collected in the first two months of the pandemic in Brazil, this initial period experienced a notable increase in anxiety levels.⁷⁻⁸⁻⁵⁰ Based on our evidence, we noticed that in COVID-19 times, students experienced fears of loss of things they were grateful for, such as health, family members, and study. That is, the more gratitude they had for things and people, the greater their fear of losing them. Thus, gratitude seems to exert a toxic effect in times of adversity and possibilities of loss, associated positively with anxiety.

Our findings corroborate those of Davis et al.,⁵¹ Jans-Beken et al.,⁵² and Cregg and Cheavens,⁵³ who found no negative correlations between gratitude and anxiety. Other studies have found that gratitude increases well-being and decreases anxiety. In this sense, it can be seen that gratitude acts with a positive effect on hope and optimism, increasing the explanation of the model significantly. Gratitude, hope, and optimism are constructs primarily studied in the Positive Psychology field, which show evidence that their development as predictors of mental health favors individual strengthening and emotional balance, thus increasing the capacity to respond more satisfactorily to the challenges and adversities faced in life.⁵⁴⁻²⁹⁻⁴⁸

The scientific literature presents robust findings that the development of optimism as a protective factor, even in difficult times, makes it possible to experience less anxiety,³³⁻⁵⁵ while hope has the potential to provide the individual with multiple routes of healthy development, even in the face of anxiety and difficulties they are experiencing.²³⁻⁵⁶ In our study, we point to evidence that gratitude plays a dual role in

these relationships, as it has the potential to be associated with anxiogenic feelings with likely negative outcomes and, at the same time, it can boost positive psychosocial factors of optimism and hope in decreasing anxiety.

6. Conclusions

The pandemic in Brazil has evidenced many psychological illnesses, such as anxiety and depression, thus, the aim of this research was to evaluate the role of gratitude, optimism, and hope, as psychosocial protective factors for reducing anxiety, and thus, improving the mental health of college students during the pandemic of COVID-19. The hypotheses that hope and optimism would correlate negatively with anxiety and that the latter would play a major role compared to the other variables were proven. However, in relation to gratitude, a positive association with anxiety was evidenced in the hierarchical analysis, making it impossible to confirm hypothesis 2, that it would decrease anxiety. Thus, an indirect action was attributed, through hope and optimism, to decrease anxiety. In pandemic or high adversity situations, the development of optimism associated with hope and gratitude will have more protective effects on people's well-being and also be more effective in reducing anxiety.

This paper aims to contribute current data that enables a greater understanding of these constructs, realizing that they also have limitations and adverse effects when they do not confirm the importance of psychosocial protective factors such as hope, gratitude, and optimism, as well as family and religious practice, to encourage students to improve their mental health and well-being, in line with what is proposed by Positive Psychology regarding optimal functioning to reduce anxiety in order to maintain their adequate adaptive levels in adverse contexts. It can also be used to

support practitioners, teachers, and universities to think about better strategies to improve student's mental health and create effective interventions based on findings from this pandemic context.

Some limitations of the present research were the predominance of an undergraduate female sample. Also, data were collected during a pandemic situation, and the majority sample was from Brazil's southern region. However, it is important to note how these variables develop in the male and master's and doctorate students. Moreover, research in non-pandemic situations and a longitudinal design would help understand how these variables are developed in other contexts.

It is suggested that further studies be carried out to analyze the effects of optimism, hope, and gratitude on factors such as anxiety and depression, as well as positive factors related to proactivity. Furthermore, replicating this research in a non-pandemic situation would be of great value so that the constructs are better understood. It also suggests the development of interventions based on the findings of this study to verify the results in practical experiences.

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