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ORIGINAL

Posttraumatic stress symptoms and posttraumatic growth in Chilean children and adolescents during the COVID-19 Pandemic

Síntomas de estrés postraumático y crecimiento postraumático en niños y adolescentes chilenos durante la pandemia de COVID-19

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ABSTRACT

Introduction: the COVID-19 pandemic significantly altered the lifestyles of children and adolescents, with school closures and social isolation affecting their mental health.
Objetive: this study aims to evaluate a predictive model incorporating sociodemographic (age and sex), pandemic-related (infection or death of close ones), and psychological variables (rumination, coping strategies) to predict PTSS and PTG in Chilean youth during the pandemic.
Method: the study included 1,466 children and adolescents from Chile, with 48,6 % girls and 51,4 % boys, aged 10 to 17 years. Bivariate relationships and hierarchical linear regression models were evaluated.
Results: productive and unproductive coping strategies, intrusive and deliberate rumination, gender, age, and pandemic-related variables, such as the death of a loved one, predicted PTSS and PTG.
Conclusions: these findings enhance understanding of factors related to PTG and improve the ability to predict PTSS and PTG in children and adolescents after stressful events. They also inform potential strategies for interventions to mitigate the effects of adverse events on mental health.

Keywords: Child Mental Health; Coping; Coronavirus; Posttraumatic Growth; Post-Traumatic Stress Symptoms.

RESUMEN

Introducción: la pandemia de COVID-19 alteró significativamente los estilos de vida de niños y adolescentes, con cierres de escuelas y aislamiento social que afectaron su salud mental.
Objetivo: este estudio tiene como objetivo evaluar un modelo predictivo que incorpora variables sociodemográficas (edad y sexo), relacionadas con la pandemia (infección o muerte de seres queridos) y psicológicas (rumiación, estrategias de afrontamiento) para predecir TEPT y CPT en jóvenes chilenos durante la pandemia.
Método: el estudio incluyó a 1,466 niños y adolescentes de Chile, con 48,6 % niñas y 51,4 % niños, de 10 a 17 años. Se evaluaron relaciones bivariadas y modelos de regresión lineal jerárquica.
Resultados: las estrategias de afrontamiento productivas e improductivas, la rumia intrusiva y deliberada, el género, la edad y las variables relacionadas con la pandemia, como la muerte de un ser querido, predijeron TEPT y CPT.

Conclusiones: estos hallazgos mejoran la comprensión de los factores relacionados con el CPT y mejoran la capacidad de predecir TEPT y CPT en niños y adolescentes después de eventos estresantes. También informan sobre posibles estrategias de intervención para mitigar los efectos de los eventos adversos en la salud mental.

Palabras clave: Salud Mental Infantil; Afrontamiento; Coronavirus; Crecimiento Postraumático; Síntomas de Estrés Postraumático.

INTRODUCTION

COVID-19 infections began in China in December 2019 and spread rapidly around the world. The World Health Organization[1] subsequently declared it a pandemic and a public health emergency. Globally, more than 760 million people were reported infected and about 7 million people died.[1] Official data in Chile, reported by the Ministry of Health (2023), indicate more than five million confirmed cases, while 65 thousand people died.

Research efforts of the last few years have detailed the ways in which the COVID-19 pandemic impacted the mental health of millions of people worldwide.[2] Quarantine measures, forced isolation, and close experiences with suffering, illness, and death of loved ones, drastically affected people's daily lives and contributed to the development or exacerbation of various psychological problems.[3] Symptoms of stress, anxiety, depression,[4] fear, loneliness, increased substance use,[5] and post-traumatic stress (PTSS), are among the most common reactions.[6]

Pandemic-related risk factors for PTSS include pre-existing emotional and behavioral problems[7] changes in routines,[8] being female[9] and being younger, with children and adolescents being among the most affected groups.[10,11] For children and adolescents, studies suggest that variables such as the closure of educational establishments and isolation. from classmates and others in their social network have severely affected their mental health.[12] In a study in India, more than half of the children in the sample were affected by post-traumatic stress syndrome.[13] Not enough is yet known about factors associated with risk/protection of children and young people in the pandemic context.

In the broader literature on the impact of adversity, evidence suggests that while stressful events and circumstances can cause distress and contribute to a host of negative psychological effects, studies regularly document that some children and youth cope and adapt effectively.[14] In more recent years, findings suggest that some children and adolescents may also experience positive changes and positive learning subsequent to significant life events and their aftermath[15] a possibility which has also been observed during the pandemic.[16] Tedeschi et al.[17] named this phenomenon "posttraumatic growth" (PTG), defined as the perception of positive changes from the struggle undertaken to cope with the consequences of a highly stressful event.[18] As one example, an effort investigating PTG during the COVID-19 pandemic found that 45,6 % of adolescents reported PTG.[19] Of the potentially positive post-adversity indicators, PTG is the focus of the present work.

The existing evidence suggests that diverse factors contribute to PTSS or PTG subsequent to a stressful or potential traumatic event.[20] For example, while the presence of intrusive repetitive thoughts has been found to relate strongly to PTSS, reflective and deliberate thinking has been found to be associated with well-being and PTG.[21] Overall, evidence indicates that intrusive and deliberate rumination are central to developing PTSS and PTG in children and adolescents.[22,23,24,25]

Some studies have explored the roles of varying coping strategies and their association with PTG, with a subset of investigations of caregivers' coaching of coping or coping guidance.[25] In one study of youth who had survived cancer, youth who used productive and acceptance-focused coping strategies reported higher levels of PTG than those who employed avoidant coping strategies.[26]

To date, research on the associations among PTG, PTSS, and related variables has been conducted mainly in natural disaster and specific illness contexts; however, in the COVID-19 context (which affected the day-to-day lives of the broader populations of many countries), limited research has explored these constructs. Moreover, the literature focusing on the infant-juvenile (i.e., pediatric) population is not well developed.[27]

The present work draws on the Kilmer and colleagues'[25] conceptual model of PTG in children and youth. According to this model, there is a linkage between intrusive rumination and distress, such as PTSS (and one can extrapolate that intrusive rumination partially mediates the relationship between unproductive strategies and PTSS), and deliberate rumination partially mediates the relationship between positive or adaptive coping (e.g., problem-focused) strategies and PTG. Consistent with these hypotheses, several studies have shown that rumination mediates the associations between different psychological processes (i.e., self-compassion, emotional regulation strategies, perception of trauma severity, positive reframing, and religious coping) and the consequences of PTSS and PTG in both children[22] and adults;[28,29,30] however, studies addressing these hypotheses with child and youth samples remain limited. Work is needed to enhance understanding regarding

the nature of these relationships and, in turn, guide intervention for children and youth in the context of adversity.

The present study aims to contribute to understanding in this area by evaluating a predictive model that includes sociodemographic variables (age and sex), pandemic-related variables (if the youth had been infected or if someone close had been infected or died), and psychological variables (rumination, coping strategies) in the prediction of PTSS and PTG in children and adolescents living in Chile during the COVID-19 pandemic. Based on the Kilmer et al.[25] conceptual model, we also evaluated a path model in which rumination processes mediate the relationship between different coping strategies with PTSD and PTG. We also test a model testing the relationships between intrusive rumination on deliberate rumination and of PTSS on PTG, as suggested by Kilmer et al.[25] and supported by previous empirical findings in both children[22] and adults.[31,16]

METHOD

Design

A descriptive and correlational design was used. The study was cross-sectional.

Participants

A total of 1,466 children and adolescents residing in Chile participated, of whom 48,6 % were girls and 51,4 % were boys. The youth's ages ranged from 10 to 17 years (M = 13,24; SD = 2,12). Children and adolescents diagnosed with severe neurological problems were excluded.

Instruments

Posttraumatic stress symptoms (PTSS). The Children's Posttraumatic Stress Disorder Symptom Scale (CPSS)[32] was used to assess the presence and severity of PTSD symptoms. Developed for children and adolescents aged 8 to 18 years with a known history of trauma, the scale is based on the DSM-IV diagnostic criteria for PTSD and is composed of 17 Likert-type response items referring to the frequency of symptoms ranging from 0 (never) to 4 (9 times or more), with a total score ranging from 0 to 68. The psychometric properties indicate adequate internal consistency (α = 0,89) and temporal stability (r = 0,84). It was validated in Chile by Bustos et al.[33] obtaining appropriate values of internal consistency, similar to those of the original instrument (α = 0,91) and a capacity of 90,7 % of discrimination of the scale concerning the presence/non-presence of PTSD established by clinical criteria. A cutoff score of 24 is used for considering PTSD risk.

Posttraumatic growth (PTG). PTG was measured with the Posttraumatic Growth Inventory for Children-Revised (PTGI-C-R) (Kilmer et al;[24] translation from Andrades et al.[34], a 10-item scale with responses ranging from 0 (no change) to 3 points (a lot). This instrument has shown adequate internal reliability (α = 0,77) and temporal stability (r =0,44).[24] In the Chilean validation,[34] two factors were established: general change and spiritual change, and the total instrument's α = 0,94.

Coping strategies. The Coping Scale for Children[35] was used to evaluate: (a) unproductive coping strategies, including indifference, aggressive behavior, keeping the problem to oneself, cognitive avoidance, and behavioral avoidance; and (b) productive coping strategies, including active solution, communicating the problem to others, seeking information and guidance, and positive attitude. Participants rate 35 items that using a scale from 0 (never) to 2 (many times). Exploration of its structure yielded two second-order factors coinciding with productive and unproductive strategies and the reliability results are acceptable.[35] In a previous study with Chilean children and adolescents exposed to a natural disaster.[36] adequate internal consistencies were obtained for the productive (α = 0,87) and unproductive (α = 0,78) strategy dimensions.

Intrusive and deliberate rumination. The Rumination Scale for Children (Cryder et al.[37] translation from Andrades et al.[22] was used. This five-item scale assesses intrusive and deliberate rumination via a Likert-type scale from 0 ("I don't think about this") to 3 ("I think about this a lot"). The original version obtained an α = 0,75 for the total scale. A Chilean child population affected by natural disasters obtained an α = 0,94 for deliberate rumination and r = 0,52 for intrusive rumination.[36]

Sociodemographic and pandemic-related variables. A brief questionnaire collected sociodemographic data (gender, age, grade) and assessed (yes-no) variables related to the pandemic (e.g., if they have been infected, if a family member has been infected, if a friend or relative has died from COVID-19).

Procedure

Data collection was carried out from 01 September to 17 December 2021. For this purpose, educational institutions were contacted by telephone and e-mail. The selection of courses was randomly chosen from among the schools that agreed to participate. Questionnaires were administered in person to groups of children and adolescents in their classrooms by psychologists and undergraduate and postgraduate students, accompanied by the respective class teacher.

Parents/guardians of each participant were previously informed of the study, and their written informed consent was obtained. The participation by children and adolescents was voluntary, and only those with

parental/guardian consent took part. Participant identities were handled with discretion, data were analyzed in aggregate, and the confidentiality of the data provided was guaranteed. The Scientific Research Ethics Committee of the [blinded for review] reviewed and approved the project, resolution number 46/2020.

Data analysis

After descriptive analysis of the study variables, bivariate relationships were evaluated using Pearson's r correlation coefficient. Next, the models were evaluated using hierarchical linear regression.

The maximum likelihood estimation method was used to evaluate the path model, following prior evaluation of multivariate normality. The x2 was used as the goodness-of-fit index; however, because this index is sensitive to sample size, we also used the ratio obtained from the division between x2 and its respective degrees of freedom (x2/df), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), with its respective confidence interval, and the Standardized Root Mean Square Residual (SRMR). A good fit is indicated when the following criteria are met: the x2 obtains a p > 0,05, the x2/df does not exceed 5 points, the CFI and TLI exceed .95, the SRMR and RMSEA have a value of less than 0,08, and the confidence interval of the RMSEA is less than 0,10.[38,39]

SPSS v.21 and AMOS SPSS 20.0 software were used for analyses.

RESULTS

Descriptive and internal consistency analyses of the study variables were conducted (table 1). Most instruments demonstrated internal consistencies above 0,70, indicating acceptable reliability; however, some variables had values between 0,55 and 0,66, suggesting lower reliability. Given that these scales have been validated in previous research with Chilean children and youth and meet the minimum 0,50 threshold for research purposes (Nunnally, 1978), we retained the measures. Overall, children and youth reported moderate PTG levels, low PTSS levels, and relatively low levels of intrusive and deliberate rumination. The skewness and kurtosis values for all variables were within the ±3 range, allowing for analyses with parametric statistics.

Table 1. Descriptive statistics and internal consistency of study variables (n=1466)

Variable	Min	Max	M	SD	Skewness	Kurtosis	α
PFC – Active solution	0	9	4,42	1,93	-0,12	-0,41	0,65
PFC - Communicate to others	0	9	3,48	2,11	0,16	-0,61	0,71
PFC - Information search and guidance	0	9	3,48	2,17	0,16	-0,67	0,71
PFC - Positive attitude	0	8	4,58	2,20	-0,28	-0,59	0,77
UC – Indifference	0	8	2,72	1,91	0,41	-0,33	0,61
UC - Aggressive behavior	0	8	2,88	2,12	0,46	-0,46	0,75
UC - Keeping the problem to yourself	0	9	5,02	2,44	-0,36	-0,87	0,81
UC - Cognitive avoidance	0	6	2,95	1,57	0,01	-0,61	0,55
UC - Behavioral avoidance	0	9	4,01	2,01	-0,05	-0,44	0,66
Intrusive rumination	0	6	0,86	1,39	1,76	2,57	r = 0,46
Deliberate rumination	0	9	3,20	2,45	0,37	-0,77	0,65
Posttraumatic stress symptoms	0	68	22,28	13,07	0,47	-0,38	0,86
Posttraumatic growth	0	40	17,49	6,75	-0,32	-0,28	0,83

PFC = Problem-focused coping; UC = Unproductive coping

The correlations between the study variables show that aggressive behavior (r = 0,39) and keeping the problem to oneself (r = 0,34), both unproductive strategies, were the coping strategies with the highest absolute correlations with PTSS. PTSS was also significantly correlated with intrusive (r = 0,47) and deliberate (r = 0,35) rumination. The problem-focused strategies positive attitude (r = 0,48) and active solution (r = 0,43) had the highest absolute correlation with PTG, and PTG was significantly correlated with intrusive (r = 0,09) and deliberate rumination (r = 0,30). The PTSS-PTG correlation was significant but small (r = -0,09). Table 2 shows the correlations between key study variables (except for the correlations between coping strategies).

Of the sociodemographic variables, a low and significant correlation of age with PTSS was observed (r = -0,12; p < 0,001), suggesting that older youth in our sample tended to report fewer symptoms. Age and PTG were not related (r = 0,01; p = 0,665). When examining sex, the t-student test (t =10,652; p < 0,001) showed that girls (M = 25,71; SD = 13,21) endorsed more PTSS than boys (M = 18,66; SD = 11,75). The opposite occurs with PTG (t = -6,268; p < 0,001), such that girls (M = 16,50; SD = 6,53) scored lower than boys (M = 18,69; SD = 6,68).

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Table 2. Correlation between key study variables (correlations between coping strategies are omitted) (n = 1466)

Variable	Intrusive rumination	Deliberate rumination	PTSS	PTG
PFC – Active solution	0,10***	0,26***	0,05*	0,43***
PFC - Communicate to others	0,12***	0,23***	0,03	0,36***
PFC - Information search and guidance	0,13***	0,28***	0,05	0,36***
PFC - Positive attitude	0,05	0,27***	-0,12***	0,48***
UC – Indifference	-0,03	-0,10***	0,11***	-0,16***
UC - Aggressive behavior	0,15***	0,07**	0,39***	-0,12***
UC - Keeping the problem to yourself	0,07**	0,03	0,34***	-0,12***
UC - Cognitive avoidance	0,15***	0,20***	0,26***	0,10***
UC - Behavioral avoidance	0,15***	0,25***	0,23***	0,24***
Intrusive rumination	-	0,47***	0,47***	0,09***
Deliberate rumination		-	0,35***	0,30***
Posttraumatic stress symptoms			-	-0,09***
Posttraumatic growth				-

PFC = Problem-focused coping; UC = Unproductive coping; PTSS = Posttraumatic stress symptoms; PTG: Posttraumatic growth; *p < 0,05; **p < 0,01; ***p < 0,001

Table 3. Hierarchical multiple linear regression to predict PTSS and PTG (n = 1466)

	PTSS				PTG			
	R^2	dR^2	ß	t-value	R^2	dR^2	ß	t-value
Step 1	0,09				0,01			
(Constant)				14,993***				14,548
Age			-0,12	-4,890***			0,00	0,076
Sex			-0,20	-7,882***			0,09	3,527***
You were infected			0,05	2,102*			0,02	0,830
A friend or relative was infected			0,09	3,491***			0,04	1,386
A friend or relative died			0,13	5,304***			0,03	1,104
Step 2	0,44	0,35***			0,33	0,32***		
(Constant)				6,449***				8,416***
Age			-0,05	-2,423*			-0,01	-0,428
Sex			-0,11	-5,677***			0,09	4,230***
You were infected			0,06	2,924**			0,02	0,911
A friend or relative was infected			0,06	2,973**			0,01	0,627
A friend or relative died			0,06	2,759**			0,00	0,188
PFC – Active solution			0,04	1,374			0,18	6,468***
PFC - Communicate to others			0,02	0,571			0,10	3,096**
PFC - Information search and guidance			-0,02	-0,588			0,03	1,006
PFC - Positive attitude			-0,17	-6,666***			0,26	9,509***
UC - Indifference			0,02	1,005			-0,04	-1,736
UC - Aggressive behavior			0,19	8,331***			-0,04	-1,453
UC - Keeping the problem to yourself			0,18	7,929***			-0,05	-1,878
UC - Cognitive avoidance			0,06	2,109*			-0,11	-3,688***
UC - Behavioral avoidance			0,05	1,678			0,14	4,440***
Intrusive rumination			0,31	13,828***			-0,02	-0,737
Deliberate rumination			0,17	7,029***			0,16	5,946***

PFC = Problem-focused coping; UC = Unproductive coping; PTSS = Posttraumatic stress symptoms; PTG: Posttraumatic growth; *p < 0,05; **p < 0,01; ***p < 0,001

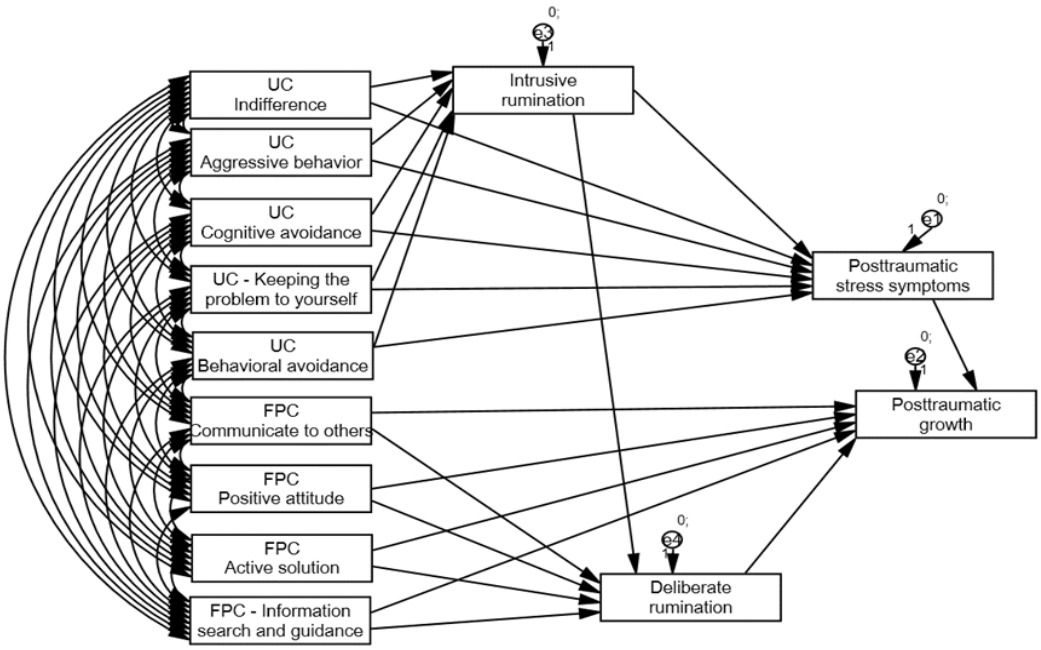

Figure 1. The hypothesis model of post-traumatic growth of children and adolescents during the COVID-19 Pandemic

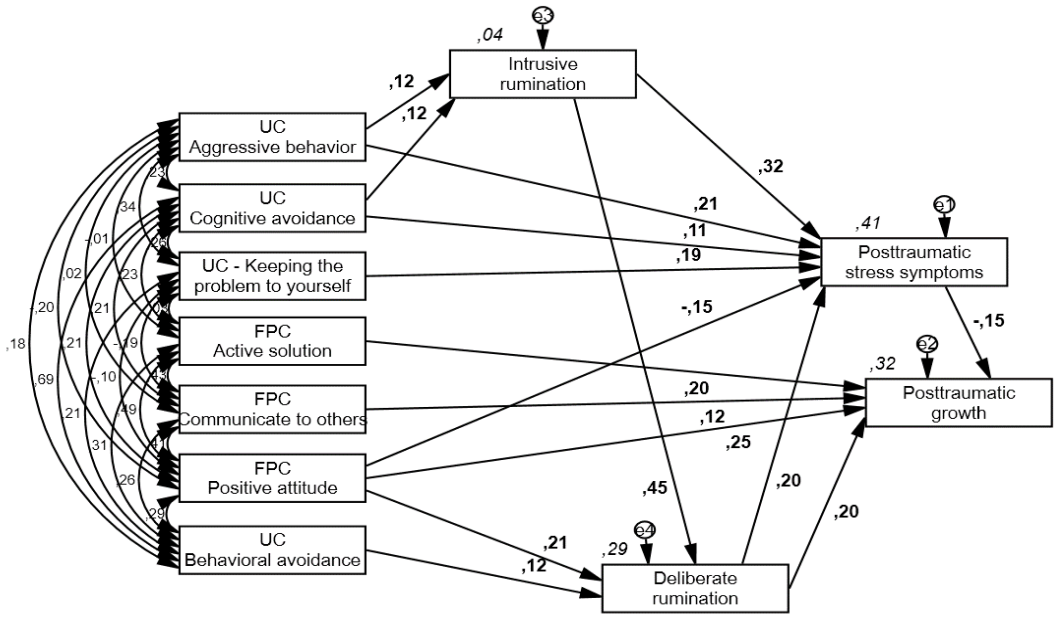

Figure 2. Final adjusted model of post-traumatic growth of children and adolescents during the COVID-19 Pandemic

When exploring the role of the COVID-19-related variables, analyses (t = -3,120; p = 0,002) indicate that children who were infected with the virus (M = 23,82; SD = 12,99) reported more PTSS than those who were not infected (M = 21,53; SD = 13,03). No significant differences were observed in PTG (t = -1,151; p = .250) on this variable. Those who had a close family member infected (M = 23,02; SD = 12,69) also reported more PTSS than those who did not have infected family members (M = 19,43; SD = 14,08; t = -4,014; p < 0,001). No significant differences were observed in PTG (t = -1,607; p = 0,109). A similar pattern was observed for youth who had lost a loved one, friend, or relative to COVID-19 – i.e., those who lost a loved one (M = 25,85; SD = 12,93) endorse more PTSS than those who did not suffer a loss (M = 21,31; SD = 12,93; t = -5,393; p < 0,001). No significant differences were observed in PTG (t = -1,526; p = 0,127).

A hierarchical multiple linear regression was performed to evaluate a predictive model of PTSS and PTG in children. The first step included sex, age, and categorical variables related to the pandemic. The second step included the study's key psychological variables, i.e., coping strategies and rumination.

The final model for PTSS was significant, F(16, 1442) = 71,649, p < 0,001, with an R2adj= 0,44, which implies

that the model predicts 44 % of the variance in the dependent variable. Predictors of PTSS are younger age, female sex, having been infected, having a person close to you infected, having a close person or loved one die, engaging in aggressive behavior, keeping the problem to oneself, using cognitive avoidance, experiencing intrusive rumination, and engaging in deliberate rumination; the coping strategy of trying to have a positive attitude predicts less PTSS.

The final model for PTG s also significant, F(16, 1442) = 46,504, p < 0,001, with an R2adj of 0,33. Predictors of PTG are younger age, male sex, trying to identify an active solution, communicating to others, using behavioral avoidance, and engaging in deliberate rumination; using cognitive avoidance was associated with lower PTG. Table 3 summarizes both the PTSS and PTG models.

As a final step, we evaluated the model proposed in figure 1. Results suggested an adequate goodness-of-fit: x2 = 162,271, df = 20, p < 0,001; x2/df = 8,11; CFI = 0,98; TLI = 0,91; RMSEA = 0,070, CI = 0,060 to 0,080; SRMR = 0,028. The model was then re-specified by eliminating non-significant paths or those with loadings below 0,1. In addition, two paths suggested by the modification indices were added: positive attitude → PTSS, behavioral avoidance → deliberate rumination, and deliberate rumination → PTSS. These various modifications resulted in a better fitting and more parsimonious model (x2 = 72,935, df = 18, p < 0,001; x2/df = 4,05; CFI = 0,99; TLI = 0,96; RMSEA = 0,046; CI = 0,035 to 0,057; SRMR = 0,030). This final adjusted model is shown in figure 2.

DISCUSSION

The COVID-19 pandemic has had a noteworthy psychological impact on the population, contributing to many people experiencing negative reactions such as distress, or anxiety and some perceiving positive changes such as PTG. The present study evaluated the associations between multiple sociodemographic, COVID-19 related, and psychological variables and PTSS and PTG and tested a predictive model of PTSS and PTG in children and adolescents aged 10-17 years during the pandemic.

When analyzing the effect of demographic variables in our sample, it was found that younger age and female sex were predictors of PTSS and younger age and male sex were associated with PTG. As for age, although there are discrepancies in this regard, some studies conducted during the COVID-19 pandemic suggest that being younger is a factor associated with greater mental health problems[41] and, in particular, higher levels of PTSD.[42] It is likely that the changes generated by the pandemic, such as confinement and social isolation, have had a greater effect on younger children's daily lives.[43] The results of the present study also indicate that the older students in our sample reported lower levels of PTG. This tendency for levels of PTG to decrease with age may reflect the increasing challenges associated with the transition from childhood to adulthood.[44] Alternatively, it may be that older youth did not experience the same levels of distress thought to be necessary to catalyze and maintain the PTG process.[25]

Our analyses involving sex showed that girls endorsed higher levels of PTSS and lower levels of PTG compared to boys. The higher reported distress in girls is consistent with previous studies in children and adolescents[45] in which a greater tendency to experience and express distress, anxiety, and depression associated with stress or adversity is noted. Some have attributed these observed differences to varying socialization processes[46] and variability in the ways important others may respond to boys and girls in the context of adversity. Some evidence suggests that girls may recover more slowly from stressful events than boys, due at least in part to the negative cognitive appraisals of threats that they continue to make.[47] In our sample, boys reported higher perceived PTG than girls, which aligns with a recent study in which they also found higher PTG in adolescent boys than in girls during the COVID-19 pandemic.[48] However, among young adults, Chilean women reported higher PTG during the pandemic than their male counterparts.[49] Further studies are needed to investigate these sex differences.

That those youth who were infected with the virus, had someone close to them infected, or had a loved one die from COVID-19 had higher PTSS is not unexpected. Dealing with the disease and grappling with the fear of losing a family member or friend to the infection is understandably a highly stressful experience for children and adolescents.[50] It is notable that these experiences (i.e., COVID diagnosis or loss) were not associated with PTG. From the present data, it is not clear how much time had passed since the reported COVID-19-related adversity. It is possible that the experience (e.g., the loss of a loved one) was too negative and foundation-shaking for PTG to begin to emerge, or that data were collected at a time when it may have been too soon for the child to have begun to perceive positive changes as a result of their experience and its aftermath.

The study's regression analyses assessed correlates of PTSS and PTG, and the path model evaluated specific possible pathways of relationships involving the key study variables. While the initially tested model showed adequate goodness-of-fit indices, its re-specification improved these indices and yielded a simpler and more robust model. This latter model showed the mediating role of intrusive and deliberate rumination between selected coping strategies and PTSS and/or PTG.

For instance, higher levels of keeping the problem to oneself and lower levels of efforts to maintain a positive attitude had a direct influence on PTSS. Keeping the problem to oneself is an unproductive coping

strategy, of the avoidant type, in which the person suppresses and hides the worries and emotions he/she is experiencing, which tends to increase the associated distress, as shown by several studies evaluating the effects of expressive suppression in children and adolescents.[51]

In contrast, efforts to maintain a positive attitude not only showed a negative relationship with PTSS, it was positively linked with PTG. Although maintaining a positive attitude is not the same as active cognitive reframing to cope or cognitive reappraisal as an emotional regulation strategy, it could very well reflect similar psychological mechanisms and resources. That is, it could encourage a more positive reinterpretation of what the child or adolescent is experiencing, potentially mitigating its emotional impact and increasing the likelihood of PTG. This relationship has been found in other studies with children and adolescents exposed to highly stressful events.[19]

The path model demonstrated that unproductive strategies such as engaging in aggressive behavior and using cognitive avoidance related to higher levels of self-reported PTSS, both partially mediated by intrusive rumination. It would seem apparent that aggressive behavior increases rather than solves youths' problems. Furthermore, cognitive avoidance, i.e., trying not to think about it, may lead to more recurrent and intrusive memories of the trauma.[52] A highly stressful event for children and adolescents, such as the COVID-19 pandemic (with the disruptions and adversities that it caused or to which it contributed), can generate cognitions that are distressing and unwanted, such as intrusive ruminations.[53,54] The individual does not want to have these thoughts and (ineffectively) tries to expel them by using strategies such as not thinking about the problem; this practice renders these thoughts uncontrolled and inhibits the individual's ability to deploy more adaptive resources, thereby increasing stress levels.[49]

Youths' use of productive strategies of active solution (working to actively identify a solution) and communication with others directly affected PTG. Both strategies are active and problem-focused and, by their very nature, suggest that children and adolescents maintain a sense of control that leads them to face the consequences of the stressor event (or their new reality) and not avoid them. Such efforts to seek support and problem solve may increase the likelihood that they would perceive positive changes in themselves and their relationships. This direct influence of problem-focused coping strategies on PTG has been found in other studies.[55]

The regression analysis showed the influence of the unproductive coping strategy of behavioral avoidance on PTG. The path model demonstrated that this relationship was mediated entirely by deliberate rumination. This finding is consistent with research conducted with adults during the pandemic, in which use of the self-distraction strategy predicted greater PTG.[56] In another study with adults during a medical emergency[57] findings suggested that when the adults in the sample resorted to other activities to get away from the source of stress, they tended to report higher levels of PTG. It may be that children, youth, and adults alike need time and other activities to distance themselves from the threat and adversity to develop PTG.[58] Main et al.[59] argued that avoidant strategies can be effective in coping with uncontrollable stressors, of which a global pandemic involving an infectious virus is surely an example[60] It seems plausible that the COVID-19 pandemic was perceived as an uncontrollable threat,[56] in the face of which resorting to strategies such as behavioral avoidance may have been a way of coping with that discomfort and taking the distance necessary for growth or learning to emerge.

The mediating role of deliberate rumination between intrusive rumination and PTG is consistent with the model presented by Kilmer et al.[25] to explain PTG in children. Deliberate rumination is a constructive version of cognitive processing, as it involves an analysis of the new situation, searching for meaning, and reevaluating the experience. Thus, initial intrusive rumination processes may lead to or give way to more constructive ruminations that facilitate PTG.[18] This occurrence of deliberate rumination in the face of threatening events may account for its direct, positive relationship with PTSS.[49]

Our results show that a high level of PTSS seems to negatively influence the development of PTG. Previous studies with children and young people have shown rather a positive relationship between these variables[22] and it has been proposed that it is precisely the perceived severity of the event that triggers mechanisms that enable personal growth.[61] The negative influence observed in the present study could indicate that the development of symptoms could rather hinder the development of growth in this population, probably due to a greater focus on the distress experienced.

Multiple study limitations bear mention. Of greatest salience, the study's cross-sectional design does not allow us to infer causality in the relationships and between the variables analyzed. We suggest that longitudinal data be collected in future research. Moreover, only self-report scales were used in the current study, so the results may be affected by common-method variance and social desirability bias. There would be value in future work incorporating other measurement methods and using additional respondents to minimize these difficulties. Data from the children's caregivers would hold particular relevance, and parental or caregiver reports would allow for a wider range of assessed constructs relevant to the child's life and ecological context. In a similar vein, we selected study variables thought to be related to PTSS and PTG in children and

adolescents, while seeking to reduce potential burden on the youth participants. This necessary selectivity in the development of our questionnaires led to the exclusion of other variables of potential relevance, ones that may have contributed to enhanced understanding of the mechanisms that influence mental health functioning in this age group, such as social support[62] or the emotional state of their parents.[24]

Notwithstanding those limitations, the present study is the first known effort to address PTSS and PTG in children and adolescents living in Chile since the COVID-19 pandemic. In turn, this effort contributed to the broader literature regarding how coping strategies and rumination processes activated in the face of a potentially traumatic event such as the pandemic influence PTSS or PTG levels. The available data allowed for the testing and corroboration of some of the relationships raised by the conceptual model of PTG put forth by Kilmer et al.[25]

CONCLUSIONS

Beyond contributing to the knowledge base, these findings are relevant for health professionals and educators. They can use these results to support children and youth and design interventions that promote strategies to prevent or mitigate the consequences of adverse events. For instance, support group sessions focusing on developing empathy skills, understanding and accepting emotions, and sharing reactions to stressful experiences like the pandemic.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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