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SEÇÃO: ARTIGOS

## “Stress and Coping Questionnaire against COVID-19 – Adolescents”: Evidences of Validity

“Questionário de Estresse e Coping frente à COVID-19 – Adolescentes”: Evidências de Validade

“Cuestionario de Estrés y Afrontamiento frente al COVID-19 – Adolescentes”: Evidencia de Validez

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**Abstract:** The COVID-19 pandemic triggered stressful events for the entire population. However, as it is a critical stage of development, adolescents do not have all the regulatory skills yet developed to face Pandemic stressors. This study aimed to develop and evaluate the evidence of validity of the “Stress and Coping Questionnaire against of COVID-19” for adolescents between 11 and 18 years old. The content validity coefficient was .96 refers to the global scale. The judges evaluated both the stressors and the coping alternatives. Reliability coefficients were .81 and .82 to coping and stress dimensions, respectively. Although it is suggested that the assessment occurs in a way that integrates the two dimensions, they can still be assessed separately. A Principal Component Analysis showed three distinct components: restriction of means and information, family support (concerns family support for coping with stress), and competencies, which presents coherence with the Motivational Theory of Coping, theoretical basis for the instrument. Further studies with different sociodemographic characteristics are suggested for more evidence of validity and its interpretation.

**Keywords:** stress and coping measures, psychological assessment, adolescence, coronavirus

**Resumo:** A pandemia COVID-19 desencadeou eventos estressantes para toda a população. No entanto, por ser um estágio crítico de desenvolvimento, os adolescentes não possuem todas as habilidades regulatórias ainda desenvolvidas para enfrentar os estressores pandêmicos. Este estudo teve como objetivo desenvolver e avaliar as evidências de validade do “Questionário de Estresse e Enfrentamento contra o COVID-19” para adolescentes entre 11 e 18 anos. O valor do coeficiente de validade de conteúdo .96 se refere a escala total. Os juízes avaliaram tanto os estressores quanto as alternativas de *coping*. Foram observados coeficientes de fidedignidade de .81 e .82 nas dimensões de *coping* e estresse. Apesar de ser sugerido que a avaliação ocorra de maneira a integrar as duas dimensões, elas ainda podem ser avaliadas separadamente. A Análise de Componentes Principais mostrou três componentes: restrição de meios e informações, apoio familiar (que se refere ao apoio familiar para enfrentamento do estresse) e competências, que apresenta coerência com a Teoria Motivacional do Enfrentamento, base teórica para o instrumento. Outros estudos com diferentes características sociodemográficas são sugeridos para mais evidências de validade e sua interpretação.

**Palavras-chave:** medidas de estresse e coping, avaliação psicológica, adolescência, coronavirus



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**Resumén:** La pandemia de COVID-19 desencadenó eventos estresantes para toda la población. Sin embargo, debido a que es una etapa crítica del desarrollo, los adolescentes aún no tienen todas las habilidades de autorregulación desarrolladas para enfrentar esta situación. Este estudio tuvo como objetivo desarrollar y evaluar la evidencia de validez del Cuestionario de Estrés y Afrontamiento contra COVID-19 para adolescentes entre 11 y 18 años de edad. El valor del coeficiente de validez de contenido .96 se refiere a la escala total. Los jueces evaluaron tanto los factores estresantes como las alternativas de afrontamiento. El coeficiente alfa fue .81 y .82 en las dimensiones afrontamiento e estrés. Aunque se sugiere que la evaluación se realice de manera que integre las dos dimensiones, aun así se pueden evaluar por separado. El Análisis del Componente Principal mostró tres dimensiones del ítem: restricción de medios e información, apoyo familiar (se refiere al apoyo familiar para afrontar el estrés) y competencias, lo que presenta coherencia con la Teoría Motivacional del Afrontamiento, base teórica del instrumento. Se sugieren otros estudios con diferentes características sociodemográficas para obtener evidencia adicional de validez.

**Palabras clave:** estrés y medidas de afrontamiento, evaluación psicológica, adolescencia, coronavirus

A given event can only be considered stressful from the cognitive assessment made by the subject (Skinner & Zimmer-Gembeck, 2016). However, some specific situations are characterized by being stressful for most people who experience them, such as the COVID-19 pandemic (Jiao et al., 2020). According to the Motivational Theory of Coping (MTC), an event is stressful when it threatens or challenges one or more of the three innate and universal Basic Psychological Needs (BPN): Competence, Relatedness, and Autonomy (Deci & Ryan, 1985; Skinner & Wellborn, 1994). Thus, coping concerns how people deal with stressors in everyday life, from a self-regulatory perspective (Skinner & Zimmer-Gembeck, 2016).

MTC proposes a hierarchical model, in which the grouping of coping behaviors that have the same function give rise to Coping Strategies (CS). The set of CS results in twelve families coping. Six of the families are classified as adaptive coping, based on the challenge of one or more BPN, having better outcomes regarding physical and mental health, while the other six are classified as poorly adaptive coping for threatening one or more BPN. Threat or challenge assessment occurs through self-referential processes, based on the perception of having or not the necessary

resources to deal with the stressor (Skinner & Wellborn, 1994). Still, each family coping is connected to a BPN. Therefore, each BPN has linked to itself four family coping, two adaptive and two maladaptive. Furthermore, understanding the process of development and acquisition of self-regulatory skills is fundamental for understanding coping in a developmental perspective, as proposed by the MTC (Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2016).

Considering coping occurs from contact with a given stressor, that is, an event that will be evaluated by adolescents as challenging or threatening of their BPNs, the specific characteristics of this stressor are intrinsically related to coping. Similarly, the skills acquired according to the development stage influence the coping strategies adopted (Zimmer-Gembeck & Skinner, 2011). From this perspective, instruments for evaluating specific coping regarding age group and stressor are necessary for a more accurate analysis. Despite the importance of coping in physical and mental health outcomes, adequate instruments for evaluation are still scarce (Connor-Smith et al., 2000). Given the COVID-19 pandemic as a stressor, according to the authors' knowledge after a systematic review (Silva et al., in press), assessment instruments and coping with stress in this context specific to adolescent are not yet available in Portuguese.

For configuring a new stressor, with social isolation and contamination fear (Jiao et al., 2020), COVID-19 requires specific instruments adapted to assess and cope with stress in this context (Silva et al., in press). Thus, this study aimed to construct and investigate the evidence of validity of a questionnaire on coping with the pandemic for adolescents aged 12 to 18 years, based on a model that comprises coping from a developmental perspective (Skinner & Wellborn, 1994).

## Method

### *Instrument Construction Process*

The process of development of the instrument "Stress and Coping Questionnaire against of CO-

VID-19 – Adolescents" had six stages, based on technical guidelines of the literature in the construction of psychometric instruments (Boateng et al., 2018; Dawis, 2000). The steps consisted of: a) Definition of the theoretical model (MCT), in order to define construct's dimensions and the number of items in each of them; b) Literature review on pandemic stressors for the target population, in order to provide a context for the evaluation of stressors and coping strategies; c) Literature review on instruments on coping for children and adolescents, with the objective of analyzing the most used and effective forms of response (Silva et al., 2020, Manuscript Submitted for publication); d) Panel of experts to write and discuss of the initial pool of items, with the purpose of selecting stressors and coping behaviors more relevant to the target audience; e) Evaluation by expert judges, in which three judges evaluated the items according to the criteria of clarity and relevance; and, finally, f) Pilot study with the target population, with the objective of identifying possible difficulties in understanding and responding to the items of the instrument.

The instrument "Stress and Coping Questionnaire against of COVID-19 – Adolescents" was constructed and analyzed in the present study. The questionnaire is composed of eleven items, in which stressors related to the COVID-19 pandemic are presented in the form of a vignette. In addition, before the presentation of the items, there are three sections: guidance on how to respond to the instrument, guidance to guardians on how to assist the adolescent if necessary, and an item model for the adolescent to know the instrument. Each item initially presents a vignette about situations that can be stressful for adolescents in the context of the pandemic, including representative images of the potentially stressful situation. The images aim to present the instrument attractive and interactive. The instrument was initially built on the Platform Canva (<https://www.canva.com>). All images were allowed according to copyright, from canvas gang and Freepik (<https://br.freepik.com>).

The adolescent was asked to answer a visual

analog scale according to the intensity of the situation as a stressor, from zero to ten, according to the intensity of the stressor. The visual analog scale aimed to facilitate the understanding of the question since the metric from zero to ten is commonly used in the evaluations of Brazilian schools, familiar to the adolescent. If a vignette is identified as stressful by the adolescent, that is, the indicated response is non-zero in the first stage of the item, the adolescent is asked to answer about coping behaviors, since coping concerns the response to a stressful event. Each of the vignettes was associated with a BPN, according to the MTC, with four possible alternatives of coping behavior in each item, with two adaptive response options and two maladaptive response options, in the same BPN. The alternatives from families coping, always being two possibilities related to adaptive coping, scored as 1, and two to poorly adaptive coping, scored as -1.

The scale aims to assess, in two dimensions, stress and coping. The coping dimension can only be assessed if there is actually stress, since coping depends on stress to exist. With this in mind, it is proposed that the scale correction be made based on the multiplication of scores, considering that the stress dimension informs an intensity and the coping dimension a quality (adaptive or maladaptive). In this way, in the end, a single result is obtained that simultaneously informs the level of stress (between 0 and 10) and whether the coping resulting from this stress is adaptive or not.

### *Participants*

The non-probabilistic sample of the pilot study included 67 adolescents from the 7th and 8th grades of a private school in the state of Mato Grosso, Brazil. The mean age of adolescents was  $12.81 \pm .68$  (from 11 to 18). In the sample, 34 participants were female and 33 were male, 35 participants were from the 7th grade and 33 from the 8th grade. The choice of classes for participation in the pilot study was for convenience. The non-probabilistic validation sample consisted of 914 adolescents from Elementary School and

High School from 67 private schools in Brazil. The mean age of the participants was  $14.58 \pm 1.76$ . Regarding gender, considering the total of 589 responses in this item, 38.37% were boys and 61.63% were girls. The sample reached the general recommendation of ten participants per item for psychometric analyses (Pasquali, 2010). Although the collection was also performed with the adolescents' guardians, in the present study we opted for the exclusive use of the data provided by the target population of the instrument.

The descriptive analysis of the data identified that the mean age of the sample was 14.15 years, with a standard deviation of  $\pm 5.88$ . Regarding gender, 61.63% of the sample ( $n=363$ ) identified as female, 38.37% ( $n=226$ ) male. Regarding the states of residence, most of the sample, 48.63% ( $n=286$ ) reported living in Mato Grosso ( $n=286$ ). Regarding the risk group, 9.67% of the sample ( $n=57$ ) reported that adolescents were in a risk group for COVID-19. Concerning the number of individuals living in the house, 48.13% ( $n=284$ ) reported four residents, and 91.35% of the sample ( $n=539$ ) reported that between three and five people live in the house.

### *Instruments*

The adolescents were invited to answer a sociodemographic questionnaire, with information regarding housing, gender, and age, among others. The questionnaire was constructed by the authors of the research project. The adolescents were also invited to respond to the "Stress and Coping Questionnaire against COVID-19 - Adolescents".

### *Procedures and Ethical Issues*

This study was approved by the Research Ethics Committee (protocol number 4.086.836). The Free and Informed Consent Form regarding the participation of the adolescent was signed by the guardians since the majority of the participants were minors. Furthermore, the adolescents agreed with the Free and Informed Consent Term regarding their participation. Research objectives, possible risks, and benefits, as well as the contact

of the main researcher, following Brazilian and international resolutions were presented.

Before initiating data collection, the instrument was evaluated by expert judges and appropriate modifications were made. All the judges were graduated in Psychology, the first with a post-doctoral degree, the second with Ph.D., and the third declared an incomplete master's degree. Two judges were from São Paulo and one from Rio Grande do Sul, Brazil. The mean age of judges is 37.33 years.

Data collection, including the signing of the Consent Form by those responsible, occurred exclusively online according to the recommendations of social isolation as a prevention for the COVID-19 pandemic. This article is the result of a joint project with researchers from different institutions, including Maringá State University. Study data were collected and managed using REDCap electronic data capture tools hosted at Maringá State University (Harris et al., 2009; Harris et al., 2019). REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies, providing 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources. Data collection was performed during the pilot study and the main collection of the validation study.

The pilot study occurred from contact with a private school in the state of Rio Grande do Sul, Brazil, which is part of a group of schools affiliated with a specific education system company. Two classes were included, and the adolescents and their guardians were invited to participate. At this stage, the participants evaluated the understanding of the items. After that, the instrument was applied to the rest of the sample for the validation study. For the second stage, the validation study, 1795 schools and 3512 teachers were contacted, from the same scholar company that part of the research was performed, to better understand

the research and authorize data collection, and 47 answers were obtained, by adolescents and parents. The time allocated to the response to the instrument was estimated at thirty minutes. The first fifteen minutes are related to data collection with guardians, and the last fifteen minutes are destined adolescents.

### Data analysis

The analyses were conducted in Software R (*R Language for Statistical Computing*) (R Core Team, 2020) and the packages used were *psych* (for structural and reliability analyses; Revelle, 2020). We estimate the Content Validity Coefficient (CVC; desirable  $\geq 0.8$ ) for judge's assessments. The content validity indicates how much the items of the instrument represent the construct of interest. The CVC is calculated from the answers by judges and can be relative to each item or the scale (Polit, Beck & Owen, 2007). In this article, the CVC of the whole scale was reported.

Parallel analyses were conducted (Timmerman & Lorenzo-Seva, 2011) to estimate the number of factors to be retained for stressor intensity and stressor coping. For the retention of the factors two criteria were observed, Kaiser (eigenvalue  $\geq 1$ ) and the comparison with eigenvalues of the factors of the empirical matrix with those estimated by the permutation of the sample values. Then exploratory factor analyses were conducted by the least square's extraction method, with tetrachoric correlation for the type indicators of coping. Then, the ordinal Cronbach's Alpha coefficient (Zumbo et al., 2007) for each subscale (stress sub-escale and coping sub-escale) were estimated. Subsequently, descriptive analysis of the data was conducted, allowing through the grouping, a better interpretation of the characteristics of the collected information, usually used as the initial phase of the analysis process. Graphs, means and percentages (Reis & Reis, 2002) can include this type of analysis.

In the present study, analyses of means and standard deviation were performed, as well as frequency analyses. Both the characteristics of the participants and the stress and coping res-

ponses were evaluated. Furthermore, a series of analyses were conducted to compare posts between the intensity of the stressor and the type of coping response (adaptive or poorly adaptive), through the Mann-Whitney U test. Box diagrams were produced for each coping category. Finally, in the descriptive analyses, histograms of the combined score ( $E \times C = T$ ) were generated for the instrument items. To evaluate the internal structure of the instrument, Principal Component Analysis (PCA). The choice for PCA was due to the total score of the instrument condensing two distinct constructs (stress and coping), by multiplying the results of each one. It is important to highlight that the instrument is composed of two responses to the participant: a) how much the item's statement represents a stressor for a person, classifying the intensity of this stressor between 0 and 10. This stressor is associated with one of the 3 BPN described by the MTC; b) which coping option among 4 options referring to the coping families of that BPN affected by the stressor best describes the participant's behavior. Thus, each of the questions asked to participants corresponds to a subscale (stress and coping), which can be assessed individually. However, upon understanding that coping only exists in the face of a stressor (we cannot cope with what does not stress us), we proposed that the subscales be planned in an integrated manner, where the resulting number refers to the level of stress generated by the assertion (sub -stress scale) and the + or - factor that accompanies this number refers to the coping family that the participant marked, being it adaptive (+) or maladaptive (-). The results of the stress assessment could range from zero to ten, and coping between a negative and a positive. Therefore, the final score ranges from negative ten to positive ten.

### Results

The item pool initially had 54 stressful situations identified for adolescents and children during the pandemic. After the specialists panel (Boateng et al., 2018), 11 more relevant stressors were selected, which gave rise to the items of

the instrument in vignette format. The CVC result from the "Stress and Coping Questionnaire against COVID-19 – Adolescents", including calculation of bias error of judges was .96. These results indicate the quality of the questionnaire regarding content validity. From the pilot study conducted with 67 adolescents, data were collected on the need for adjustments of the instrument for the main collection. The pilot study occurred from contact with a private school in the state of Rio Grande do Sul, Brazil, which is part of a group of schools affiliated with a specific education system company. Two classes were included, and the adolescents and their guardians were invited to participate. At this stage, the participants evaluated the understanding of the items. After that, the instrument was applied to the rest of the sample for the validation study. The evaluation of the pilot study took place in a qualitative way, in

which we assessed, through the application of the scale to some participants, how understandable it was through the answers offered. In this step, we adjusted some settings of the collection platform by fixing any problems, such as the correct sending of the TCLE by email to the participants.

Regarding parallel analyses, the presence of four factors with eigenvalues higher than the simulated data for stress intensity scores and six factors or coping style scores with the same condition was indicated. However, only the first factor had an eigenvalue greater than 1, with only one factor being retained for each scoring form of the items. Table 1 present the factorial loadings of the items and the reliability measures for each scoring form of the items (stressor or coping). The items presented appropriate factor loadings (i.e.  $\geq .32$ ), except item 1 for the Coping.

**Table 1** – Factor loadings and reliability measures for stressor intensity and coping measures for the "Stress and Coping Questionnaire against COVID-19 – Adolescents" items

Items	Stressor factor loadings	Coping factor loadings
l1	.56	.19
l2	.65	.73
l3	.62	.68
l2	.39	.37
l5	.61	.50
l6	.46	.53
l7	.55	.32
l8	.60	.55
l9	.45	.82
l10	.57	.51
l11	.55	.50
<b>Ordinal Cronbach's alpha</b>	.82	.81*

Note. \* Index calculated after deleting item 1.

Table 2 presents descriptive data related to the responses to the developed instrument, including mean of each stressor, proportion of adaptive coping per item and total mean of each item.

The proportion of adaptive coping was calculated based on the number of participants who selected one of the two coping options relating to adaptive coping (+).

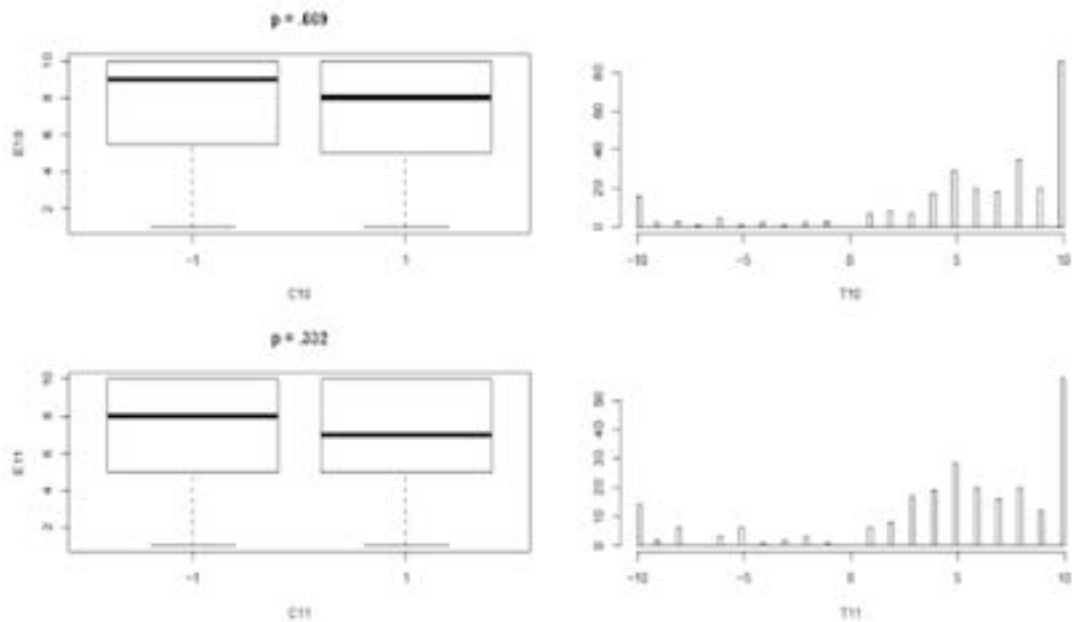
**Table 2** – Results of descriptive analyses of the instrument

Stressful situation (item)	Mean stressor (SD)	Proportion of adaptive coping (%)	Total mean (SD)
1. I can't leave home to go to school, party, play sports or see my friends and relatives	6.14 (3.48)	91%	5.58 (5.1)
2. I feel that my family does not understand me	4.42 (3.69)	75%	2.24 (6.32)
3. I have difficulty dealing with family members at home	3.26 (3.40)	58%	0.13 (5.98)
4. I worry about learning the contents of the year and doing well in the tests	5.22 (3.66)	86%	4.84 (5.32)
5. Not having the school space to talk about how I feel about quarantine with teachers and colleagues	3.12 (3.47)	69%	1.81 (6.13)
6. Teachers ask for many tasks	6.39 (3.28)	92%	5.63 (4.97)
7. I don't know how to deal with fake news	2.48 (3.08)	88%	3.4 (4.12)
8. I am concerned about the future and wonder if the fear of leaving home will always be present	3.97 (3.45)	86%	3.24 (5.29)
9. My internet is worse than that of my colleagues and I am ashamed for it	0.90 (2.03)	73%	1.18 (4.39)
10. I am afraid that any relative, friend or someone I like will get sick by COVID-19	6.85 (3.23)	87%	5.56 (5.56)
11. I'm afraid to get COVID-19 and need to go to the hospital	5.36 (3.72)	84%	4.51 (5.77)

SD: Standard Deviation.

In addition, in a descriptive analysis of the data, a comparison analysis of posts was performed between the intensity of the stressor and the type of coping response through the Mann-Whitney U test. In this analysis, the coping categories (adaptive or maladaptive) that the participant marked as an answer option were evaluated. The instrument presents 4 coping options for

each stressor, referring to the coping families associated with BPN to which the stressor refers. Two of the coping options are adaptive (+) and two maladaptive (-). Figure 1 presents the results, and in the left column are the Box Diagrams for each coping category (adaptive or poorly adaptive) and in the right column are the histograms of the combined score of each instrument item.

**Figure 1** – Box diagrams and histograms

*Note:* E: stressor; C: coping; 1: adaptive coping; -1: poorly adaptive coping; T: total (E x C).

The Figure 1 presents two examples of diagrams and boxplots that are representative of the results of all items. According to Figure 1, adolescents who perceived the stressor as very high (values close to 10) present more responses of poorly adaptive coping. In this sense, adolescents who report poorly adaptive coping hardly present mild stressors, tending to evaluate the stressor with a value equal to 10 in general in the items. On the other hand, those adolescents who reported adaptive coping showed greater variability in the stress level response. Therefore, the unification of stress and coping as a total measure of the instrument is a coherent approach not only theoretically, but also from the analysis of the data.

Regarding the internal structure of the instrument, PCA was performed since two constructs (stress and coping) were integrated to construct

the total score. Unifying stress and coping in a total, PCA approach becomes more appropriate since two components do not present a common latent trait, although reflected in the BPN. Furthermore, item one from the instrument ("I can't leave home to go to school, party, play sports or see my friends and relatives") was excluded since they're not adequate factorial and component loads. Thus, the following reported analyses were performed with the remaining ten items (from two to 11).

The PCA indicated three components named according to the characteristic of the items that compose it, considering mainly the item with the highest component load in each: restriction of means and information (first component); competencies (second component); family support (third component). Component loads and distribution are shown in Table 3.



**Table 3** – Results of principal component analysis

Item	Restriction of means and information	Family support	Competencies
2. I feel that my family does not understand me	.16	<b>.79</b>	.11
3. I have difficulty dealing with family members at home	.17	<b>.63</b>	.24
4. I worry about learning the contents of the year and doing well in the tests	-.10	.16	<b>.77</b>
5. Not having the school space to talk about how I feel about quarantine with teachers and colleagues	-.04	<b>.76</b>	-.14
6. Teachers ask for many tasks	.03	-.01	<b>.73</b>
7. I don't know how to deal with fake news	<b>.66</b>	-.01	.03
8. I am concerned about the future and wonder if the fear of leaving home will always be present	<b>.33</b>	.29	.22
9. My internet is worse than that of my colleagues and I am ashamed for it	<b>.85</b>	.20	.02
10. I am afraid that any relative, friend or someone I like will get sick by COVID-19	.28	.03	<b>.56</b>
11. I'm afraid to get COVID-19 and need to go to the hospital	<b>.61</b>	.07	.05

Component loads indicate that all items, except item one that was deleted, are appropriate. To identify the suggested number of components, a Parallel Factor analysis was performed, with extraction of four components. From this result, the best solution was interpreted. In the exploratory analyses, oscillations in the scores were evaluated according to gender, age, and the number of individuals living in the house. The analyses indicated that there was no significant effect depending on these characteristics of the participants.

## Discussion

The construction of an instrument that allows the assessment of stress and coping of adolescents regarding the context of the pandemic is one of the scientific advances that this study presents. From the existence of instruments with good evidence of validity, it is possible to better understand which stressors are more significant

for adolescents and what strategies this public has used to face challenging situations. The "Stress and Coping Questionnaire against COVID-19 – Adolescents", according to the authors' knowledge, is the first in Brazil that proposes to evaluate stress and coping integrated and specific for the COVID-19 pandemic (Silva et al., 2020, Manuscript Submitted for Publication).

Descriptive analyses allowed the identification, from the results of positive means of the final score, that although the situations were identified as stressful, the adolescents have presented adaptive coping strategies in their majority. Item ten ("I'm afraid that any relative, friend or someone I like will get sick by COVID-19") was identified as more stressful in the investigated group, presenting a higher mean. This item is quite representative of the pandemic context, since adolescents may present concerns of family members of the risk group for complications due to COVID-19 (Fegert et al., 2020). The fear of losing someone signifi-

cant is also tied to the need for care and support that adolescents, even older, present, since their self-regulation, decision-making skills, among others, are in development (Shirtcliff et al., 2009).

In adolescence, the process of individuation and differentiation of the family system intensifies and, the condition of belonging to the family group must be preserved (Gavazzi et al., 1993). The lowest mean item was nine ("My internet is worse than that of my colleagues and I am ashamed for it"). The Internet, in times of social isolation, is a resource that allows contact with friends and colleagues (Guessoum et al., 2020). The approximation of peers is a striking characteristic of adolescence (Jackson & Goossens, 2020) and, since face-to-face contact is not recommended due to the pandemic, social networks and virtual contact are expected to play a significant role in mediating these relationships. This item did not present a high mean by most of the sample since the students were from private schools, with probable better socioeconomic conditions and quality internet access. The instrument application in a sample of adolescent public-school students may reveal different descriptive results (mean difference), since internet access is not inclusive in Brazil (Gamba, 2020).

The stressor with the lowest percentage of adaptive coping was the one described in item three ("I have difficulty dealing with family members at home"), indicating the adolescents in the sample found greater difficulties to face this situation. This result is consistent with the literature regarding the characteristics of adolescence. At this stage of the life cycle, adolescents are expected to spend less time with their families and more time with peers to obtain emotional support (Magson et al., 2021). Furthermore, the process of individuation requires that adolescents can position themselves differently from their family group, which sometimes does not tolerate this difference, causing conflicts (Gavazzi, Anderson & Sabatelli, 1993). The pandemic leads adolescents to spend their days at home with their families during the period of social isolation (Fegert et al., 2020). In the context of the pandemic, the increase

in conflicts with parents is associated with worse indicators of adolescent mental health (Magson et al., 2021). This data can be justified by the fact that adolescents do not have full capacity for developed self-regulation. Therefore, adolescents need the support of adults, through affective relationship, structured environment and teaching of self-regulation skills, to deal with stressors that highlight their coping skills (Rosanbalm & Murray, 2018; Sameroff, 2010).

One of the most significant changes in the pandemic was the transposition of face-to-face education into emergency remote education. However, item six ("Teachers ask for many tasks") presented a higher percentage of adaptive coping. Indicating the adolescents in this sample found adequate resources to deal with school tasks during remote class.

In a descriptive analysis of the data, the Box Diagrams and the histograms corroborate the integration of the stress and coping constructs, being consistent with the theoretical model of MTC in which coping is understood as a response to a stressful event. In the data presented in Figure 1, adolescents who report poorly adaptive coping tend to identify the stressor with high value, close to 10. Thus, when the stressor is perceived as very intense, the adolescent tends to have poor adaptive coping response, indicating that the stressor poses a threat to BPN. On the other hand, adolescents who report adaptive coping present greater variability in the stressor intensity response, with a tendency to indicate lower values, indicating a challenge to BPN. In this sense, measuring stress and coping in an integrated dimension is consistent with the theoretical definition of coping itself. This model presented both Cronbach's Alpha adequate values.

The main stressful areas that should be observed by health and education professionals and family members, according to the results of the present study, are represented in the three main components (restriction of means and information, competencies, and family support). These three topics should be monitored mainly for those adolescents who did not present adaptive coping

or who had very high stress means. Therefore, the components represent areas in which adolescents had greater or lesser coping ability.

The name of each component of the instrument was thought by the authors based on the characteristics shared among the grouped items, but also considering the item of greater component load. Although each stressor of the instrument was thought to be associated with an A Priori BPN, from the inclusion of the item in one set, it may present other characteristics, resembling more to another BPN than its origin during the construction of the instrument. That is, the item alone presents a characteristic that can change when inserted into a set.

The first component, restriction of means and information, consists of items seven, eight, nine, and 11. The item with the highest component load was nine ("My internet is worse than that of my colleagues and I'm ashamed for it"). This component is associated with the BPN of autonomy (Skinner & Wellborn, 1994), since access to means and information is related to the possibility of making choices, deciding for oneself, and expressing an opinion. Due to restricted access to information, the possibility of choosing and giving an opinion may be impaired since they do not know the circumstances.

The component called competencies integrates items four, six, and ten, and item four ("I worry about learning the contents of the year and doing well in the tests") presents the highest componential load. Item ten ("I'm afraid that any relative, friend or someone I like will get sick by COVID-19"), in a first analysis, may seem discrepant from the rest since it is not concerning doing well in school or dealing with the class tasks. However, the stressor of item ten evoked in the sample the perception of having difficulty in dealing with someone close to sick, having or not competence for this. In addition, close individuals exercise care for the adolescent, whether emotional or practical. Fearing the illness of a family member also implies the fear of not having skills to perform daily tasks without monitoring and support, such as cooking, taking care of the

house, among others. This component relates to the BPN of competence, which describes the innate need of the human being to be effective in the environment and relationships, changing the circumstances as necessary to achieve desired results (Skinner & Wellborn, 1994).

Finally, the third component, family support, is composed of items two, three and five, and item two ("I feel that my family does not understand me") has a higher componential load. Two of the items in this component address the theme of the relationship with the family during the pandemic and the other, item five, represents the lack of school space to talk about feelings. Thus, this component is characterized by the theme of relationships and support, being similar to the BPN of relationships, which concerns the need to have close, affective and kind relationships (Skinner & Wellborn, 1994).

Even if eventually an item that for the authors was related to one BPN migrates to another in the instrument, the findings indicate that in any case stressors are associated with BPN of competence, relatedness, and autonomy. Considering the instrument was constructed based on the Motivational Theory of Coping, the similarity between the components found from the PCA and the BPN, the basis of the theory, are appropriate. Furthermore, from the integration of the stress and coping constructs into a single dimension, it was possible to recover components consistent with BPN in the PCA, which did not happen with the factorial model.

Regarding the comparison between groups, there was no significant difference in the results by gender and age. Most responses indicate adaptive coping, which is a characteristic of the sample. Regarding the number of individuals living in the house, the lack of significant difference is probably due to the fact of homogenization of the sample, since 91.35% of the sample resides with 3 to 5 people. Thus, the application of the instrument in samples with different characteristics is suggested.

In addition to the development of the specific stress and coping instrument for adolescents in

the context of the COVID-19 pandemic, another advance in the present study concerns the construction of the score. In the "Stress and Coping Questionnaire against COVID-19 – Adolescents" an alternative form of scoring of the relationship between stress and coping was developed. The final score represents the interaction between stressor and coping strategy, based on a formative model. For the construction of this scoring model, the intrinsic association between stress and coping constructs was considered. Since coping concerns the strategies used to cope with a stressor (Skinner & Zimmer-Gembeck, 2016), coping exists from the moment the subject is confronted with a stressful situation. In the instrument in question, the answer on coping is only requested if the participant has marked the intensity of the stressor as zero. If the stressful situation proposed is not a stressor for the individual, it is not coherent to answer about the coping strategies used.

Other instruments of stress and coping used in the area, such as the "Responses to Stress Questionnaire (RSQ)" (Connor-Smith et al., 2000) have a model for measuring the constructs of stress and coping separately, without considering the interaction between the stressor and the coping strategy in the final measure. In this sense, the formative model proposed in the "Stress and Coping Questionnaire against COVID-19 – Adolescents" is an alternative for stress assessment and coping in an integrated proposal, being consistent with the theoretical definitions about coping and corroborated by the data presented in Figure 1.

Stressors associated with the family relationship presented lower percentages of adaptive coping. Internet access did not present high means as a stressor but has a central position as an important stressor for those who declare it as a problem faced. The restriction of contact with pairs, on the other hand, was not a highlight in the sample responses. The easy access to virtual social networks allows contact with colleagues and friends even with social distancing and, therefore, not identified as a significant problem by the sample.

One of the limitations of this study concerns the format of application via online survey exclusively due to the need for social isolation by COVID-19. Considering that internet access is not equal to all individuals in Brazil, the sample was restricted to adolescents with probable better socioeconomic conditions. The disclosure occurred mainly in private schools, hindering the participation of public-school adolescents. As a suggestion for the next studies, the dissemination must also occur in public schools, as well as the collection in formats that provide the participation of adolescents without easy access to the Internet. Future studies that contribute to the evidence of validity of the "Stress and Coping Questionnaire against COVID-19 – Adolescents" are recommended, including external validity analyses, as well as allowing the instrument to be applied in samples with different cultural and sociodemographic characteristics.

The present study represents an advance towards presenting an integrated measure of stress and coping for adolescents specific to the context of pandemic, as well as evidence of its validity. Appropriate assessment instruments aim to contribute to a deeper understanding of stress and coping of adolescents during the COVID-19 pandemic, as well as to serve as a basis for psychosocial interventions to promote and prevent child and adolescent mental health.

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