

Translation and Validation of the Clinician Administered PTSD Scale (CAPS-CA-5) for Portuguese Children and Adolescents

Tradução e Validação da Clinician Administered PTSD Scale (CAPS-CA-5) em Crianças e Adolescentes Portugueses



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ABSTRACT

Introduction: The aim of this study was to translate and validate into European Portuguese the CAPS-CA-5 (Clinician Administered PTSD Scale for Children and Adolescents), a semi-structured scale for the diagnosis of post-traumatic stress disorder in children and adolescents, according to the DSM-5 criteria.

Material and Methods: This study was developed in three stages. In the first stage, the translation and back-translation of CAPS-CA-5 into European Portuguese was carried out. In the second stage, the version obtained in the previous step was subjected to a pre-test. In the third stage, the final version of CAPS-CA-5, the KIDCOPE questionnaires and the Depression, Anxiety and Stress Scale-Children were applied to 101 children who had experienced at least one potentially traumatic event. The children included in this study were between seven and 18 years old and had a follow-up period in a Child Psychiatry or Pediatrics Clinic in one of the three hospitals involved in this project of at least one month.

Results: Regarding the confirmatory factor analysis, our results show that the CAPS-CA-5 is a suitable psychometric instrument to assess the diagnosis and symptoms severity of post-traumatic stress disorder according to DSM-5. Convergent validity was comparable to its original version. Although there were negative relationships with almost all of its clusters, these were not statistically significant when applied with the positive coping strategies of the KIDCOPE. The European Portuguese version of the CAPS-CA-5 showed a good internal consistency (Cronbach's α for the total scale was 0.89).

Conclusion: The European Portuguese version of CAPS-CA-5 has similar psychometric properties to its original version

Keywords: Adolescent; Child; Interviews; Portugal; Psychometrics; Stress Disorders, Post-Traumatic; Translating

RESUMO

Introdução: O objetivo deste estudo foi traduzir e validar para português europeu a CAPS-CA-5 (*Clinician Administered PTSD Scale for Children and Adolescents*), uma escala semiestruturada para o diagnóstico de perturbação de stress pós-traumático em crianças e adolescentes, de acordo com os critérios do DSM-5.

Material e Métodos: Este estudo foi desenvolvido em três etapas. Na primeira, foi realizada a tradução e contra-tradução da CAPS-CA-5 para português europeu. Na segunda etapa, a versão obtida anteriormente foi submetida a um pré-teste. Na terceira etapa, a versão final da CAPS-CA-5, os questionários KIDCOPE e a Escala de Depressão, Ansiedade e Stresse - Crianças foram aplicados em 101 crianças que experienciaram pelo menos um evento potencialmente traumático. As crianças incluídas neste estudo tinham entre sete e 18 anos e tinham um período de acompanhamento em consulta de Psiquiatria Infantil ou Pediatria de pelo menos um mês, num dos três hospitais envolvidos neste projeto.

Resultados: Em relação à análise fatorial confirmatória, os nossos resultados mostram que a CAPS-CA-5 é um instrumento psicométrico adequado para avaliar o diagnóstico e a gravidade dos sintomas de perturbação de stress pós-traumático de acordo com o DSM-5. A validade convergente foi comparável à versão original. Embora tenha havido relações negativas com quase todos os seus *clusters*, estas não foram estatisticamente significativas quando aplicadas com as estratégias de coping positivo do KIDCOPE. A versão em português europeu da CAPS-CA-5 apresentou boa consistência interna (α de Cronbach para a escala total foi de 0,89).

Conclusão: A versão em português europeu do CAPS-CA-5 possui propriedades psicométricas semelhantes à sua versão original.

Palavras-chave: Adolescente; Criança; Entrevistas; Perturbações de Stress Pós-Traumático; Portugal; Psicometria; Tradução

INTRODUCTION

Posttraumatic stress disorder (PTSD) is a mental disorder that can occur at any age after exposure to a traumatic event.^{1,2} However, not all individuals exposed to traumatic situations develop PTSD, and several risk and protective factors are involved before, during and/or after exposure to these events. The way children and adolescents deal with these

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situations, that is, their coping strategies and their capacity for resilience, are one of the points of great relevance for the impact of these events, as they will influence the processes of adaptation to the experiences that have occurred and will shape their course and prognosis.^{1,3,4}

Symptoms of PTSD commonly develop within a month after exposure to a traumatic event; however, they may appear later, being classified as late-onset PTSD when symptoms occur six months or more after such exposure.^{1,2} The DSM-5 diagnostic criteria groups the symptoms of this disorder into four clusters (cluster B - Intrusion symptoms; cluster C - Avoidance symptoms; cluster D - Cognitions and mood symptoms; cluster E - Arousal and reactivity symptoms).¹ Dissociative symptoms (depersonalization, derealization) are also considered in the diagnostic criteria as specifiers. Furthermore, in order to meet the diagnosis, the previously mentioned symptoms have to cause distress or to have a negative functional impact (cluster G).¹

PTSD is a disorder for which there is an effective treatment, and its diagnosis can be difficult, particularly in children. Different factors may contribute to its identification, namely that many patients do not look for help or when they do, often omit their symptoms.^{1,2} Additionally, PTSD is frequently associated with other comorbidities, making its presentation and consequently its diagnosis more difficult.^{1,2}

These difficulties can be surpassed if the symptoms are assessed by direct questioning, which can be done by using validated scales.² It can help to identify not only the reminders of the trauma but also dysfunctional behaviours associated with the disorder, as well as to develop strategies that might prevent its development. Consequently, therapeutic interventions can be applied more efficiently in order to reduce the symptoms and to improve the prognosis.²

Even though there are internationally validated tools for assessing PTSD, such as the Clinician-Administered PTSD Scale (CAPS), to our knowledge, there are no validated instruments for its assessment in children and adolescents, according to the DSM-5 criteria, in Portugal. Although originally designed for adults, there is a version for children and adolescents, the Clinician-Administered PTSD Scale, Child/Adolescent Version (CAPS-CA) which has recently been revised according to the DSM-5 criteria - CAPS-CA-5.

The CAPS-CA-5 is a semi-structured interview used to assess PTSD in children older than seven years old.^{5,6} Semi-structured scales have been described as the preferred method for assessing mental disorders and the CAPS has been frequently described as the gold standard instrument for diagnosing PTSD.⁵⁻⁹ The CAPS-CA has good psychometric properties¹⁰⁻¹³; CAPS-CA showed good internal consistency, acceptable convergent validity with other measures of PTSD [e.g. Childhood Posttraumatic Stress Reaction Index (CPTSD-RI), or Children's Revised Impact of Events Scale (CRIES-13)] and good divergent validity with other measures like the Beck Depression Inventory (BDI) or the Revised Children's Manifest Anxiety Scale (RCMAS), and good inter-rater reliability. However, to our knowledge, there are still no studies on the CAPS-CA-5 in Portugal. In this study, we aim to fill this gap in the literature and to translate and validate the CAPS-CA-5 into European Portuguese (PT-EURO), and to evaluate its psychometric properties in a sample of Portuguese children and adolescents.

MATERIAL AND METHODS

Participants

The study included 101 children and adolescents between the ages of seven and 18, who had experienced at least one traumatic event and had a follow-up period in a Child Psychiatry or Paediatrics Clinic in one of the three hospitals involved in this project (Centro Hospitalar de Lisboa Ocidental, Hospital Fernando da Fonseca, Hospital Beatriz Ângelo) of at least one month. Certain exclusion criteria were considered: difficulties in fluency in the Portuguese language, cognitive impairment or having a psychotic disorder.

In the sample, 51.5% of the participants were female, and 48.5% were male. Regarding age, the mean value was 13.6 years, with a standard deviation of 2.93 years, ranging from a minimum of seven to a maximum of 18 years old. Grouping ages, 35.6% were children (seven to 12 years old), and 64.4% were adolescents (13 to 18 years old).

Measures

CAPS-CA-5

The CAPS-CA-5 is a 30-item interview to assess DSM-5 criteria of PTSD in children and adolescents between the ages of seven and 18.⁵ It is a modified version of the CAPS (for adults) that includes age-appropriate items and image response options.^{5,14} The CAPS-CA-5 was designed to be administered by clinicians and clinical researchers who have a working knowledge of PTSD, but it can also be administered by appropriately trained paraprofessionals.^{5,14} The interview takes 30 to 75 minutes, depending on the child's age and trauma history.⁵

Similarly to the CAPS-5, the CAPS-CA-5 assesses the 20 symptoms of PTSD grouped in clusters defined in DSM-5.^{5,14,15} These items are rated on a 5-point severity scale ranging from 0 (absent) to 4 (extreme/ incapacitating).^{5,14,15} In addition, the CAPS-CA-5 consists of questions regarding the onset and duration of the disturbance (Cluster F) and dissociative symptoms of depersonalization and derealization.^{5,14,15} With these latter two items, a dissociative subtype of PTSD can be determined. According to the basic CAPS-5 symptom scoring rule (SEV2 rule), a symptom or impairment is considered

present if its severity is rated with 2 or higher.^{5,14,15} Using the DSM-5 algorithm in combination with the SEV2 rule, it is possible to establish whether or not participants meet the PTSD diagnosis.^{5,14,15} In addition, by adding the 20 symptom severity scores (clusters B–E), a total PTSD symptom severity score is computed ranging between 0 and 80 with higher scores indicating higher PTSD symptom severity.^{5,14,15}

Other versions of the CAPS-CA have shown good internal consistency, as verified in the study by Saltzman *et al*¹³ with a sample of children aged between seven and 14 years old (Cronbach's α for the total score was 0.82), but also in the study by Diehle *et al*¹¹ with a sample of children aged between eight and 18 years old (Cronbach's α for the total score was 0.83). The coefficient of the various diagnostic symptom clusters appears to range between 0.52 and 0.9, with a trend towards better coefficients in older children.^{11–13} Regarding convergent validity, Carrion *et al*¹⁰ demonstrated for children in the age range of seven to 14 years old that the CAPS-CA has acceptable convergent validity by correlating significantly with the Reaction Index ($r = 0.51$). In child populations older than 14, Erwin *et al*¹² and Harrington¹⁶ found that the CAPS-CA correlated significantly with the PTSD checklist ($r = 0.64$) and with the Child PTSD Inventory (0.74). In the Dutch version,¹¹ the CAPS-CA showed moderate to strong correlations with the Children's Revised Impact of Events Scale (CRIES-13) (Pearson correlation coefficient for total score was 0.67). Regarding divergent validity, Harrington's validation study¹⁶ also states a good divergent validity in CAPS-CA, checking lower correlations with measures of depression (Beck Depression Inventory II, BDI), anxiety (Revised Children's Manifest Anxiety Scale, RCMAS), and behavior and emotional problems (Youth Self Report, YSR) than with self-report measures of PTSD (Child PTSD Symptom Scale, CPSS, and Children's PTSD Inventory). In the Dutch version, Diehle *et al*¹¹ found that correlations with the RCADS and SDQ subscales were moderate to strong (with some exceptions). As for the inter-rater reliability, it has shown excellent intraclass correlation coefficient (ICC) values, both in the original version (ICC = 0.97) and in other versions, such as the Dutch version (ICC = 0.99).^(10,11)

KIDCOPE questionnaires

The KIDCOPE questionnaires evaluate coping strategies in children (7 - 12 years old) and adolescents (13 - 18 years old), with a version for each age group.¹⁷ They are self-reported questionnaires, with 15 items in the children's version and 10 items in the adolescent version, and take 10 minutes or less to complete.¹⁷ Coping strategies can be analysed alone or under a two-factor model (Positive/Confrontative Coping and Negative/Avoidant Coping).¹⁷ Due to the abbreviated format of the instruments, the scope of a considerable age group, and their previous use in different populations and cultural contexts, its use is advised for several clinical and scientific applications.

Most of the studies conducted to date on the psychometric performance of KIDCOPE have been carried out in adolescents.¹⁷ In the original instrument,¹⁷ the results attested the temporal stability (test-retest) and the concurrent validity of the KIDCOPE questionnaires. Because only one to two items evaluate each coping strategy, the instrument's internal consistency was not analysed, and the authors hypothesized that this value was reduced.¹⁷ The psychometric studies on the PT-EURO versions of the KIDCOPE questionnaires are currently under development, and definitive results on their psychometric performance are not yet available.¹⁷

Depression, Anxiety and Stress Scale - Children (EADS-C)

The Depression, Anxiety and Stress Scale for Children (EADS-C) is the PT-EURO version of the Lovibond and Lovibond's Depression Anxiety Stress Scale¹⁸ adapted by Pais Ribeiro, Honrado and Leal¹⁹ for children and adolescents between eight and 15 years old. It consists of 21 items, divided into three dimensions with seven items each: Depression, Anxiety and Stress.²⁰ The answer is given on a Likert-type scale, in which the individual evaluates the extent to which they experienced each symptom during the previous week, on a scale of four points of severity or frequency, corresponding to values from 0 to 3.²⁰

The values of internal consistency, assessed using Cronbach's α , were respectively: for the Depression Scale 0.85 (0.93 in the 14-item version) in the adult version, and 0.78 in the children and adolescents version (with the item dimension correlations, corrected for overlap, ranging between 0.37 and 0.65, most of them above 0.40); for the Anxiety Scale 0.74 for the Anxiety Scale (0.83 in the 14-item version) for adults, and 0.75 in the version for children and adolescents (with item dimension correlations, corrected for overlap, varying between 0.38 and 0.58 the majority above 0.40); for the stress scale 0.81 (0.88 in the 14-item version) for adults and 0.74 in the children and adolescents version (with item dimension correlations, corrected for overlap, ranging between 0.36 and 0.56 the majority above 0.40).²⁰

Procedures of data collection and analysis

This study is part of a research project on the impact of traumatic events in childhood and adolescence in Portugal. Throughout the study, the ethical and deontological principles recommended for research in the area of Health Sciences were complied with, as described in the Declaration of Helsinki, World Health Organization and European Community. First, the author's permission to use the instruments was obtained. Approvals were also obtained by the Ethics Committees of the hospital entities involved in the study (Centro Hospitalar de Lisboa Ocidental, Hospital Fernando da Fonseca,

Hospital Beatriz Ângelo).

Permission to adapt the scale to the Portuguese language was requested to the authors of the original version of the CAPS-CA-5. There were three possible versions for adults - "Make current (past month) diagnosis of PTSD", "Make lifetime diagnosis of PTSD", "Assess symptoms PTSD over the past week", but for children/adolescents there was only the version "Make current (past month) diagnosis of PTSD". Thus, the possibility of adjusting a version that encompassed both the latter and the "Make lifetime diagnosis of PTSD" version was requested and approved by the authors of the original version.

After the previous step, the original version was translated into PT-EURO by two native Portuguese physicians, from the field of Psychiatry and Child and Adolescent Psychiatry. The translations were carried out separately and, later, a single final version was prepared by consensus, after discussion with a Review Committee. The members of this Committee were Child and Adolescent Psychiatry physicians, Clinical Psychologists, a Child Health Nurse and a Social Worker, affiliated to Centro Hospitalar de Lisboa Ocidental.

Then, the resulting version was translated back into English by two physicians from the Adult Psychiatry Unit of Centro Hospitalar de Lisboa Ocidental, fluent in Portuguese and English, who did not have access to the original scale. The translations were carried out separately and were subsequently discussed. The discrepancies found were analysed and discussed with the Review Committee in order to obtain a final version of the back-translated scale. During this process, when further clarifications were needed, the authors of the original scale were contacted.

Subsequently, a pre-test was carried out with seven children/adolescents; no changes were needed. At the end of the study, the final version of the CAPS-CA-5 in PT-EURO was found and sent to the authors of the original scale at the National Centre for PTSD, who gave positive feedback.

The participants' selection took place between September 2018 and June 2020. From March to June 2020, according to the contingency plan in Portugal for infection by SARS-CoV-2, the interviews were conducted by video consultation, following the same principles that will be presented below.

The selection was made by the physicians of the departments involved, who selected, from their list of patients, those who met the inclusion criteria. Considering that this evaluation involved the reliving of experiences that are often difficult and/or frightening, and not always innocuous, an assessment of the potential need/benefit of conducting a follow-up consultation in Child and Adolescent Psychology or Psychiatry was carried out, in order to prevent a negative impact on the course of each case.

On the participation day, the principal investigator provided detailed information about the study. Confidentiality was guaranteed by assigning a code number to the research protocol, depending on the institution in which it was collected, so that the subjects could not be identified. Those patients who agreed to participate signed an informed consent form, along with their parents/legal guardians. The interviews were conducted by a single researcher, trained in the application of the CAPS.

After the application, some minor linguistic changes were made, in order to improve the clarity of the questions, especially for younger children - the words/expressions "adverse events", "circulate" and "things looked cloudy" were replaced, respectively, by "difficult events", "tick", "things looked messed up"). The data analysis was performed with SPSS version 23. All 101 children/adolescents included in the study completed the CAPS-CA-5. Of the 101 children/adolescents, 89 completed the KIDCOPE questionnaire. Regarding the EADS-C, 86 answered the questions on Depression, 83 on Stress and 83 on Anxiety. For correlation analysis, the missing items at the subscale level were considered as absent.

The analysis of internal consistency allows the study of the properties of the measurement scales and of their questions.^{21,22} For the investigation of internal consistency of the CAPS-CA-5, we calculated Cronbach's α for the total scale and the three subscales, using the severity score for each item. Due to the fact that previous studies¹¹⁻¹³ found higher Cronbach's α in older children than in younger, we performed a separate analysis in the age ranges 7 - 12 and 13 - 18.

The Harman's single factor test is a method for bias assessment when the same measurement instrument is used to measure different constructs.²³ The total variance extracted by one factor is 33.9%, which is less than the recommended threshold of 50%, so we can conclude that common method bias is not present in this study.

Confirmatory factor analysis allows us to study the validation of the dimensions of the scales, based on their items. The measurement model allows verifying whether the items are significant and consistent to measure the constructs, which allows drawing conclusions on the validity of each construct. A reflective model is used (the causal relationship goes from the construct to the indicators). The estimation method uses the covariance matrix and consists of the maximum likelihood method. Thus, we proceeded to identify the groups of symptoms of PTSD that provided the best diagnostic algorithm of the disorder. The data analysis was performed with SPSS version 23 and AMOS version 23.²⁴

To carry out the convergent validity analysis, we studied the relationship between the CAPS-CA-5 scale (and its dimensions) with the EADS-C scale (and respective dimensions) and the negative coping strategies of the KIDCOPE. To carry out the analysis of the divergent validity, the relationship between the CAPS-CA-5 scale (and its dimensions) with the positive coping strategies of KIDCOPE was studied. The association analysis was performed using Pearson's coefficient.

We performed a separate analysis for the age groups 7 - 12 and 13 - 18 since previous studies have demonstrated that the CAPS-CA-5 showed higher correlations with related measures in older children than in younger children.¹⁰⁻¹²

RESULTS

Construct validity

The model tested for confirmatory factor analysis is represented in Fig. 1. In an initial analysis, it appears that all variables' saturation (items) measured in the respective subscales were statistically significant ($p < 0.001$ or $p < 0.05$ for item E1), (Fig. 1, Table 1).

For each subscale, the mean of the saturation factor, the internal consistency and the composite reliability, as well as the proportion of the extracted variance were calculated (Table 2).

There was a convergent validity of all clusters since the factorial saturations were high with mean values above the required minimum of 0.500 for clusters B, C and D and close to the reference value for cluster E. Factorial saturations were also significant (t values > 1.96 ; $p < 0.001$ or $p < 0.05$ for item E1) as we have already pointed out. The reliability of the construct was verified because the values of internal consistency were higher than the minimum acceptable of 0.60 (25 – 27), varying between the minimum of 0.602 and the maximum of 0.831. In turn, the values of composite reliability were always higher than the required minimum of 0.70, with the minimum observed value being 0.729; only the extracted variance was less than the desired value of 0.50. Therefore, the convergent validity validates the clusters of the CAPS-CA-5 scale, namely in the variables that determine the total severity of the CAPS-CA-5 symptoms (items 1 - 20). The convergent validity of the measurement scale was further confirmed by the existence of positive and statistically significant saturations ($t > 1.96$; $p < 0.001$) among all the clusters of this construct.

The measures indicated an adequate global adjustment of the proposed model to the collected data, if we consider the chi-square/df = 1.479, IFI = 0.880, CFI = 0.875 and RMSEA = 0.087, an inadequate adjustment only if we take NFI = 0.703 into account, although the latter value was affected by the large sample size (28 – 30).

Regarding the construct under study, the measure model allows us to conclude that the items: i) were significant; ii) were consistent; iii) had convergent validity. In addition, the model presented an adequate quality of adjustment according to practically all indexes. Therefore, we can conclude that the clusters studied can be used to measure the CAPS-CA-5.

Convergent validity

There were positive and statistically significant associations between the CAPS-CA-5 and almost all of its clusters with the dimensions of the EADS-C scale, with the exception of the relationships between cluster C. "Avoidance" and the dimensions "Depression" and "Stress", and "cluster G: Distress or impairment" and "Anxiety" (Table 3). Thus, it was concluded that the convergent validity of the CAPS-CA-5 scale with the EADS-C scale was verified.

When the analysis was carried out separately for each age group, there were some differences compared with the global sample, with a greater tendency (although not consistent) for the 13-18-year-old group (except for "Depression" dimension).

There were statistically significant and positive associations between the CAPS-CA-5 and almost all of its clusters with the number of negative coping strategies on the KIDCOPE, with the exception of their relationship with the symptom dissociation cluster (Table 4). Thus, we can conclude that the convergent validity of the CAPS-CA-5 was verified.

When the analysis was performed separately for each age group, there were some differences compared with the global sample, with a greater tendency (although not consistent) for the 13-18-year-old group (except for "Depression" dimension).

Therefore, globally, we can conclude that the convergent validity of the CAPS-CA-5 with the other scales under study was verified.

Divergent validity

There were negative relationships between the CAPS-CA-5 and almost all of its clusters with the number of positive coping strategies on the KIDCOPE, however, these relationships were only statistically significant for "cluster D: Cognitions and mood symptoms" (Table 3). Thus, we cannot conclude that there was a divergent validity of the CAPS-CA-5 with the number of positive coping strategies of the KIDCOPE.

When the analysis was carried out separately for each of the age groups, there were some differences compared to the global sample.

Internal consistency

The CAPS-CA-5, Table 4, presents Cronbach's α and item-total correlations for the three subscales and the total scale of the CAPS-CA-5 for the whole sample clustered by age group. The value of Cronbach's α was higher than 0.60 for all clusters, so we can consider the data acceptable as one-dimensional; for cluster D and for the total scale, it was greater than 0.8 which indicates an adequate internal consistency. The item-total correlations were always positive and greater than 0.3 in most situations. There was a tendency for the internal consistency of the scales to show higher values for the age group between 13 - 18 years compared to the age group 7 - 12 years.

Regarding the KIDCOPE questionnaires, because only one to two items evaluate each coping strategy, the internal

consistency of the instrument was not analysed, and the authors hypothesized that this value (i.e. Cronbach's alpha, for example) would be reduced.¹⁷

Regarding the EADS-C, the value of Cronbach's α is higher than the value of 0.70 for all dimensions, so we can consider the acceptable data as one-dimensional. For the "Depression" dimension, the value was greater than 0.8, which indicates a proper internal consistency (Table 5). The item-total correlations were always positive and with minimum values greater than 0.3 in most situations (Table 5). There was a tendency for the internal consistency of the scales to show higher values for the age group between 7 - 12 years compared to the age group 13 - 18 years (Table 5).

DISCUSSION

Our study suggests that the psychometric properties of the PT-EURO version of the CAPS-CA-5 are comparable to those of the English version of the CAPS-CA.^{12,13,31}

Regarding the analysis of internal consistency, Cronbach's α for the total scale was 0.89; since 'total scale' is used in this and other studies¹¹ we can consider the data acceptable as one-dimensional. In general, considering studies with mixed samples of children and adolescents,^{11,31} the value of the coefficient is comparable to the values found. After analysis, considering the differentiation of the two age groups in the CAPS-CA, it appears that the coefficient was slightly higher than that found by Saltzman *et al*¹³ for younger children and also slightly higher than that found by Erwin *et al*¹² for older children. In our study, there were no significant differences regarding internal consistency for the two age groups.

As reported in other studies, the cluster with the lowest coefficient is cluster C,^{11,12,31} and the two age groups differ mainly in this cluster.¹¹ The cluster C coefficient was lower for younger children, mainly at the expense of the item C2, possibility because these children are less able to avoid activities or places that remind them of the traumatic event than older children.¹¹ It may also be related to the stage of development, greater difficulty in understanding these issues and their associated meaning, the coping strategies acquired (or in development) and less autonomy in the decision to change daily life activities that allow the eviction of certain activities or places. More research on younger children is important to better understand these items and for the development of cluster C diagnostic criteria.

On the other hand, in contrast with other studies, that reported that the cluster with a higher value of Cronbach's α is cluster B,¹¹⁻¹³ in our study it was cluster D.

Regarding the confirmatory factor analysis, an assay was performed to identify the constellations of PTSD symptoms in groups of homogeneous symptoms, in order to provide the best diagnostic algorithm to assist the development of specific treatment interventions. Our results indicated that CAPS-CA-5 is a suitable psychometric instrument to assess the diagnosis and severity of symptoms in Portuguese children and adolescents. Although there are still no other studies in which the confirmatory analysis of the CAPS-CA-5 is analysed, we found that, as reported in the literature for the adult version of the CAPS,^{32,33} the four symptom clusters model for PTSD fits the data.

In most studies regarding the convergent validity of the CAPS-CA, the authors have compared it with other instruments of evaluation of PTSD or acute stress disorder^{10-12,31,34}; however, in Portugal, at the beginning of this study, there were no other tools that could be used for this purpose. In our study, considering the convergent validity of the CAPS-CA-5, we concluded that, overall, there was convergent validity between the CAPS-CA-5 and EADS-C and negative coping strategies (assessed by the KIDCOPE). When the analysis was performed separately for each age group, there were some differences in comparison to the global sample, with a greater tendency (although not consistent) for the 13 - 18-year-old group. However, it should be noted that the correlation values found were lower than expected. We expected a greater agreement between the CAPS-CA-5 and EADS-C, since the exposure to traumatic events correlates with higher levels of anxiety and depression in the short, medium and long term and because depressive and anxiety disorders are the most common comorbidities associated with PTSD.^{1,35,36} Furthermore, this may also be related with the large overlap between the symptoms of PTSD and depressive and anxiety disorders, which may be confounding factors for the diagnosis of these disorders. On the other hand, the use of inappropriate coping strategies (that is, the inability to solve or improve the problem) and anxiety and anguish when experiencing the traumatic event are associated with a higher risk of developing PTSD.^{37,38} For this reason, we expected higher levels of correlation between the CAPS-CA-5 and the negative coping strategies assessed by the KIDCOPE. The fact that the version of the CAPS-CA-5 applied was associated with the 'worst month' of the child's/adolescent's life and not to the 'last month', could lead the children/adolescents to incorrectly remember about the coping strategies used for the selected event, and could explain these findings.

Regarding divergent validity, research on this point is still very scarce. In our research, we did not find results regarding the divergent validity of the English version of the CAPS-CA. However, Diehle *et al*,¹¹ in their CAPS-CA validation study for the population of Dutch children and adolescents, found a convergent correlation between the CAPS-CA and ADIS-C/P (Anxiety Disorders Interview Schedule, a structured clinical interview that can be used to assess anxiety and mood disorders in children and adolescents), but also a divergent correlation with the RCADS (Revised Children's Anxiety and Depression Scale), a questionnaire that inquires about symptoms of anxiety and depression. In our study, there were negative relationships between the CAPS-CA-5 scale and practically all of its clusters with the number of positive coping strategies on the KIDCOPE scale. However, these relationships were only statistically significant for "cluster D: Negative changes in

cognitions and in the mood". These results once again show the difficulty of framing the symptoms of mood changes and making the differential diagnosis with PTSD, which may often also occur as a comorbidity.

We also underline that the work developed will allow us to analyse other aspects resulting from the application of CAPS-CA-5, namely the types of trauma experienced, potential individual epidemiological and clinical risk factors, and the temporal association between exposure and the development of symptoms, which will be presented in a separate paper.

Strengths and limitations

This study has some limitations. Given the extensive workload in the child and adolescent psychiatry departments, and the impossibility of recording the interviews for later comparison (for confidentiality reasons), it was not possible to have other collaborators conducting the interviews, which made it impossible to assess inter reliability-interviewing. However, it must be emphasised that the validation and availability of this instrument will raise the possibility that other technicians will apply it in the future, which will make it possible to evaluate this data over time. In the course of our study, it was not possible to perform test-retest reliability, which will be an important point to analyse in the future. At the time of data collection, there were no other validated psychometric measures for the diagnosis, or the assessment of, the severity of PTSD in childhood and adolescence, according to the DSM-5 criteria, limiting the examination of the scale's validity with other measures. In addition, the fact that CAPS-CA-5 and KIDCOPE are applied in relation to any point in the life of the child/adolescent, may also lead to the responses having biases related with some memory failures or confusion about the selected event. On the other hand, it will be important to bear in mind that there were children/adolescents who participated in the study already during the pandemic phase. However, the data obtained for the validation of the scale is about the "worst event of your life"; as none of these participants reported an event after the beginning of the pandemic, it was considered that there was no bias in obtaining data referring to the objective of this study. Another limitation is the absence of an analysis of its sensitivity to distinguish between clinical and non-clinical population.

Overall, this study provides robust support for the use of the CAPS-CA-5 and ensures the intercultural validity of a diagnostic instrument that is used worldwide, often referred to as the gold standard for the diagnosis of PTSD. As far as we know, it is the first study in Portugal to demonstrate psychometric data from the CAPS-CA-5 version. It comprises a reference interview, not only to determine the diagnosis, but also the severity of the symptoms of PTSD in children and adolescents, according to the DSM-5 clusters.

CONCLUSION

This is the first study to examine the feasibility of a Portuguese version of CAPS-CA-5 (Clinician-Administered PTSD Scale for DSM-5 Child/Adolescent Version) and it indicates high internal consistency and adequate levels of validity. It ensures the intercultural validity of a diagnostic instrument for worldwide use, often referred to as the gold standard for the diagnosis of PTSD. This will enable a more accurate identification of children and adolescents at high risk for development of PTSD, and to implement appropriate and earlier treatment interventions, thus improving the prognosis.

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AUTHORS CONTRIBUTION

IB: Substantial contributions to the conception and design of the work; acquisition, analysis, and interpretation of data; draft of the work; approval of the final version; leadership of the research team.

AV, GC, CMS: Substantial contributions to the conception and design of the work; draft of the work; approval of the final version.

GR: Substantial contributions to the conception and design of the work; approval of the final version.

RPC, JM, LSM, DSS: Substantial contributions to the conception and design of the work; critical review; approval of the final version.

PAP: Substantial contributions to the conception and design of the work; analysis, and interpretation of data; critical review; approval of the final version.

IP, PSC: Substantial contributions to the conception and design of the work; analysis, and interpretation of data; critical review; approval of the final version; supervision of all steps of project development, from conception, design, analysis of results and final review.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical

Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

COMPETING INTERESTS

All the authors declared that no competing interests exist.

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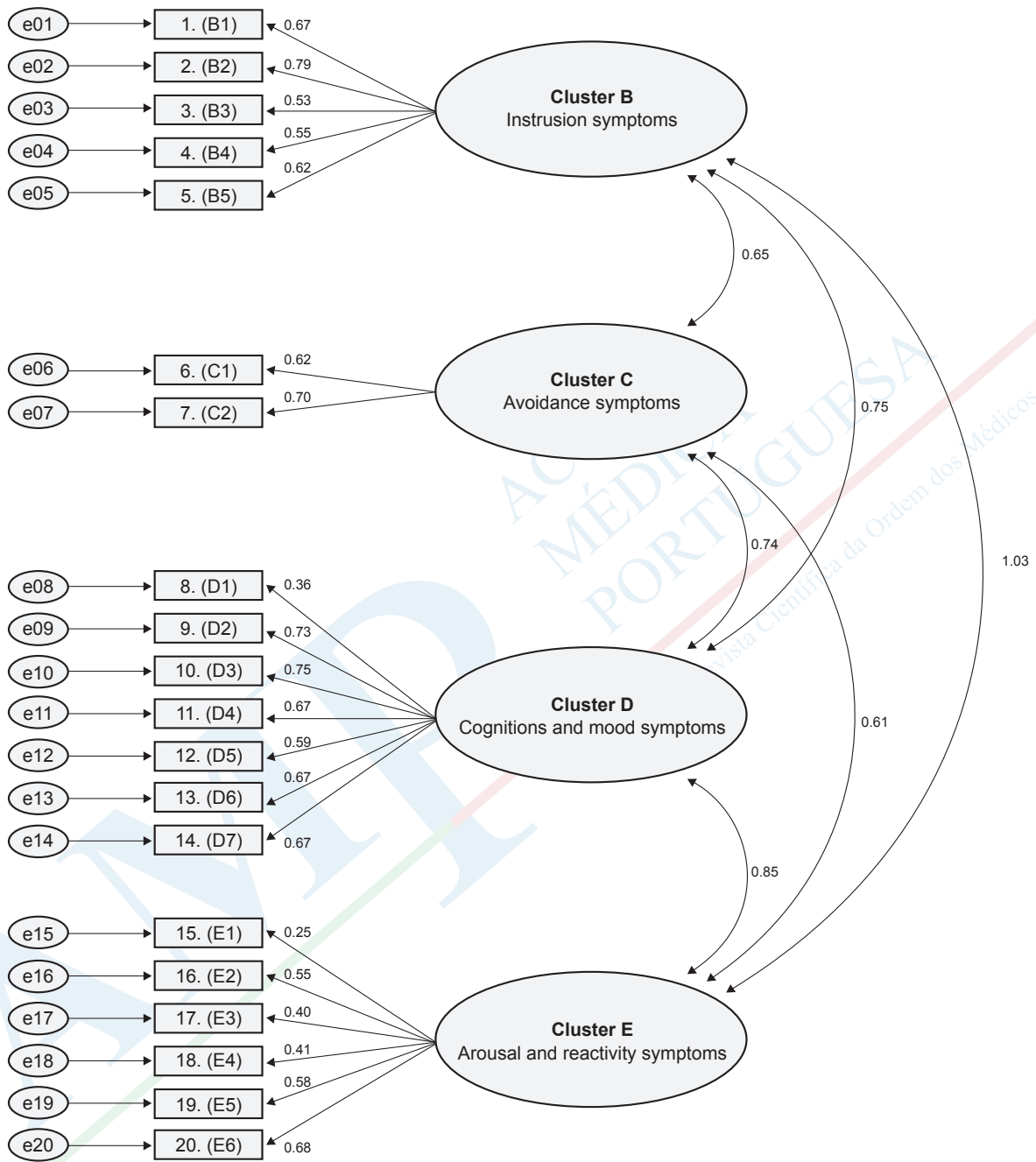


Figure 1 – Standardized estimates of the CAPS-CA-5 clusters

Table 1 – Saturations of the CAPS-CA-5 clusters, resulting from SEM and convergent validity

Clusters	Variable	Saturation		Standard error	t-Test	p
		Not standardized	Standardized			
Cluster B (Intrusion symptoms)	B1	0.854	0.674	0.119	7.191	** < 0.001
	B2	0.912	0.699	0.121	7.540	** < 0.001
	B3	0.716	0.534	0.133	5.404	** < 0.001
	B4	0.607	0.548	0.109	5.575	** < 0.001
	B5	0.831	0.624	0.127	6.525	** < 0.001
Cluster C (Avoidance symptoms)	C1	0.738	0.620	0.132	5.612	** < 0.001
	C2	0.928	0.699	0.150	6.170	** < 0.001
Cluster D (Cognitions and mood symptoms)	D1	0.327	0.361	0.093	3.502	** < 0.001
	D2	1.035	0.730	0.128	8.060	** < 0.001
	D3	1.107	0.752	0.132	8.393	** < 0.001
	D4	0.979	0.672	0.136	7.212	** < 0.001
	D5	0.824	0.587	0.135	6.080	** < 0.001
	D6	0.918	0.671	0.127	7.200	** < 0.001
	D7	0.946	0.670	0.131	7.193	** < 0.001
Cluster E (Arousal and reactivity symptoms)	E1	0.306	0.250	0.126	2.435	* 0.015
	E2	0.614	0.548	0.109	5.656	** < 0.001
	E3	0.528	0.405	0.131	4.039	** < 0.001
	E4	0.525	0.413	0.127	4.130	** < 0.001
	E5	0.750	0.578	0.125	6.019	** < 0.001
	E6	0.960	0.684	0.131	7.350	** < 0.001

*: $p < 0.05$; **: $p < 0.001$

Table 2 – Validation criteria of the CAPS-CA-5 clusters

Cluster	Items	Mean of the factorial saturations	Internal consistency	Composite reliability	Proportion of the extracted variance
Cluster B	5	0.616	0.750	0.967	0.384
Cluster C	2	0.660	0.602	0.729	0.437
Cluster D	7	0.634	0.831	0.990	0.418
Cluster E	6	0.480	0.646	0.938	0.250

Table 3 – Correlation coefficients to study the relationship between the CAPS-CA-5 scale and the EADS-C scale and the Number of KIDCOPE coping strategies

		Depression	Stress	Anxiety	Number of negative coping strategies	Number of positive coping strategies
		Total (n = 86) 7 - 12 (n = 26) 13 - 18 (n = 60)	Total (n = 83) 7 - 12 (n = 25) 13 - 18 (n = 58)	Total (n = 83) 7 - 12 (n = 23) 13 - 18 (n = 60)	Total (n = 85) 7 - 12 (n = 25) 13 - 18 (n = 60)	Total (n = 80) 7 - 12 (n = 24) 13 - 18 (n = 56)
Cluster B (Intrusion symptoms)		0.320**	0.271*	0.292**	0.379**	-0.023
		0.561**	0.215	0.345	0.446*	0.073
		0.200	0.301*	0.268*	0.363**	-0.051
Cluster C (Avoidance symptoms)	Total	0.150	0.115	0.296**	0.339**	-0.038
	7 - 12	-0.036	-0.218	0.131	-0.208	0.277
	13 - 18	0.219	0.312*	0.342**	0.497**	-0.037
Cluster D (Cognitions and mood symptoms)	Total	0.483***	0.299**	0.299**	0.498***	-0.272*
	7 - 12	0.716**	0.336	0.282	0.452*	-0.033
	13 - 18	0.421**	0.358**	0.297*	0.522**	-0.232
Cluster E (Arousal and reactivity symptoms)	Total	0.379***	0.397***	0.329**	0.305**	-0.093
	7 - 12	0.640**	0.388	0.297	0.273	0.066
	13 - 18	0.229	0.403**	0.341**	0.326*	-0.171
Total of symptoms severity of CAPS-CA-5 (items 1 - 20)	Total	0.461***	0.363**	0.370**	0.476***	-0.164
	7 - 12	0.679**	0.309	0.338	0.383	0.076
	13 - 18	0.361**	0.426**	0.372**	0.506**	-0.176
Cluster G (Distress or impairment)	Total	0.291**	0.259*	0.169	0.380**	-0.090
	7 - 12	0.448*	0.411*	0.425*	0.453*	0.128
	13 - 18	0.206	0.209	0.049	0.362**	-0.088
Dissociative symptoms	Total	0.233*	0.360**	0.323**	0.105	0.016
	7 - 12	0.202	0.068	0.084	-0.062	0.000
	13 - 18	0.259*	0.542**	0.449**	0.165	0.016

***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$

Table 4 – Item total correlations and Cronbach's α for the CAPS-CA total and subscales for the total sample and per age group

	n Items	Sample	Cronbach's α	Correlation item-total
Cluster B (Intrusion symptoms)	5	Total	0.750	0.442 - 0.630
		7 - 12	0.773	0.384 - 0.685
		13 - 18	0.736	0.396 - 0.598
Cluster C (Avoidance symptoms)	2	Total	0.602	0.433 - 0.433
		7 - 12	0.419	0.267 - 0.267
		13 - 18	0.651	0.488 - 0.488
Cluster D (Cognitions and mood symptoms)	7	Total	0.831	0.332 - 0.689
		7 - 12	0.693	-0.173 - 0.697
		13 - 18	0.849	0.444 - 0.681
Cluster E (Arousal and reactivity symptoms)	6	Total	0.646	0.233 - 0.502
		7 - 12	0.691	0.266 - 0.689
		13 - 18	0.623	0.202 - 0.481
Total scale	20	Total	0.893	0.211 - 0.683
		7 - 12	0.865	-0.244 - 0.665
		13 - 18	0.898	0.165 - 0.667
Cluster G (Distress or impairment)	3	Total	0.655	0.367 - 0.562
		7 - 12	0.658	0.393 - 0.527
		13 - 18	0.628	0.334 - 0.562
Dissociative symptoms	2	Total	0.606	0.436 - 0.436
		7 - 12	0.338	0.218 - 0.218
		13 - 18	0.744	0.595 - 0.595

Table 5 – EADS-C: Internal consistency statistics

	Number of Items	Sample	Cronbach's α	Item-total correlation
Depression	7	Total	0.862	0.407 - 0.719
		7 - 12	0.886	0.456 - 0.781
		13 - 18	0.856	0.419 - 0.745
Stress	7	Total	0.787	0.229 - 0.674
		7 - 12	0.833	0.261 - 0.812
		13 - 18	0.758	0.090 - 0.678
Anxiety	7	Total	0.748	0.104 - 0.594
		7 - 12	0.757	0.043 - 0.713
		13 - 18	0.749	0.166 - 0.585