


# Psychometric properties of the Portuguese teacher-version of the Inventory of Callous-Unemotional Traits

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## Abstract

Callous unemotional (CU) traits refer to specific deficits in affective experience and interpersonal style, characterized by absence of guilt, constrictive display of emotion and failure to show empathy, callous use of others for one's own gain. The Inventory of Callous-Unemotional Traits (ICU) was developed to measure CU traits in children and adolescents. The aim of this study was to analyze the factorial structure of the Portuguese version of teacher-report ICU for children in school age and examine psychometric properties such as internal consistency and convergent validity in a community sample. Thirty-six teachers provided behavioral ratings of 100 and 78 children of elementary school, 88 boys and 90 girls, aged between 6 and 10 years old. Confirmatory factor analyses provided further support to a 2-factor structure, comprising the following dimensions: *callous* and *uncaring*. This study showed that the ICU seems a reliable and accessible tool that can be used in the Portuguese educational context to evaluate CU traits with low time consumption.

## Keywords

callous-unemotional traits, inventory of callous-unemotional traits, psychometric properties, children, elementary school

Callous unemotional (CU) traits refer to specific deficits in affective experience and interpersonal style, characterized by absence of guilt, constrictive displays of emotion, failure to show empathy,

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and the callous use of others for one's own gain ((Cooke et al., 2006; Fanti et al., 2009) Frick & White, 2008; Kimonis et al., 2015; (Muñoz et al., 2010). Specifically, these traits constitute an extension of the concept of psychopathy attributed to children (Viding & Kimonis, 2018).

Several authors suggest that high CU traits may be useful in identifying children and adolescents who demonstrate severe, chronic, and aggressive behaviors (Frick et al., 2014; Viding et al., 2007). Similarly, McMahon et al. (2010) refer that CU traits assessed at school age predict positively antisocial and criminal behavior in adulthood. Thus, non-normative characteristics of CU traits can designate groups of antisocial children and adolescents, possibly with a psychobiological alteration when processing emotions, in the same way as with adults with high scores in the affective dimension of psychopathy (Viding et al., 2012). For example, these young people show less accuracy in recognizing expressions of fear (Viding et al., 2012) or sadness, compared to young people with low CU traits (Blair et al., 2001). The CU traits were also studied in comorbidity with other problems, in which children and adolescents with conduct disorders (CD) and, at the same time, high CU traits presented higher levels of emotional and behavioral dysregulation (Frick & White, 2008). This combination was also associated with higher impulsivity and a reward dominance response style, as well as a low sensitivity to punishment, proactive aggressive behavior, sensation seeking, and a worse response to treatment, compared to children and adolescents who exclusively exhibited CD. According to Frick (2004), the combination between CD and CU traits may be related to deficits in conscience development, while CD without CU traits may be associated with deficits in emotional self-regulation.

Studies indicate moderate to strong stability of CU traits throughout childhood and adolescence (e.g., Frick et al., 2003; (Obradović et al., 2007)). Fontaine et al. (2010), in a study developed with a sample of twins, found that CU traits presented a marked change throughout development stages, having identified several development paths of these traits in childhood and adolescence. The results showed that about 3% of the sample had high stable CU traits over 5 years. Children with high levels of CU traits were more likely to present high levels of behavior problems, and children with high levels of behavior problems were moderately likely to exhibit high CU traits (Fontaine et al., 2011). Therefore, more evidence is needed to show whether CU traits can be identified early in life. If so, it is important to identify CU traits in order to improve the empathic development of children and promote abilities such as caring about others, as well as recognizing and expressing emotions.

The Inventory of Callous-Unemotional traits (ICU; Frick, 2004) was developed to measure CU traits in children and adolescents. The ICU has 24 items, rated on a 4-point *Likert* scale, from 0 (*Not at all true*) to 3 (*Definitely true*). There are five versions of the ICU, namely parent and teacher rating versions for preschool-age children, parent and teacher rating versions for school-age children, and self-report versions for school-age children, adolescents, and adults. These different versions feature the same construct, with small writing differences.

Cronbach's alphas for total ICU scores range from acceptable to good (.71–.85), in different samples and different ICU versions (e.g., Benesch et al., 2014; Carvalho et al., 2018; Essau et al., 2006; Ezpeleta et al., 2013; Feilhauer et al., 2012; Kimonis et al., 2015; Lin et al., 2019). Studies present some controversy regarding factor structure.

Some studies (Benesch et al., 2014; Essau et al., 2006; Ezpeleta et al., 2013; Houghton et al., 2012) point to a 3-factor model, with a general factor and three dimensions: *callousness* (lack of empathy, remorse, and guilt), *uncaring* (related to lack of concern about performance and for the feelings of others), and *unemotional* (i.e., lack of emotional expression). These factors were identified by Essau et al. (2006), in one of the first studies to analyze the factor structure in a sample of 1433 adolescents, aged between 13 and 18 years. Subsequently, other studies corroborated these results. Benesch et al. (2014) analyzed the factor structure of the ICU parent-report, in a clinical

sample of boys between six and 12 years of age, with ODD/CD, and found a three-factor structure, but the proposed factors (Callousness, Uncaring, and Unemotional) had an inappropriate model fit. A subsequent exploratory factor analysis revealed two new subscales, namely *Callousness/Lack of Guilt or Remorse* and *Unconcerned about Performance*, and the original *Unemotional* subscale.

Two-factor models were also suggested as having a good adjustment (Carvalho et al., 2018; Kimonis et al., 2015; Willoughby et al., 2014). According to Willoughby et al. (2014), who analyzed the parent-report version in a community sample of school-age (first-grade) children, a two-factor model distinguishing *empathic-prosocial* (EP) from *callous-unemotional* (CU) behaviors provides the best fit to the data. More recently, Carvalho et al. (2018) examined the factor structure of a Portuguese translation of the self-report of ICU in a sample of children and adolescents, and proposed a two-factor model composed of *uncaring* and *callousness* dimensions. Still, it is important to note that research on CU traits with young children in Portugal is scarce, partly due to the lack of suitable instruments for this developmental stage. Carvalho et al. (2018) and Pechorro et al. (2019) provided a validation of ICU self-report and a short form with data from samples of community youths, as well as from detained juvenile offenders (Pechorro et al., 2016, 2017, 2017a, 2018) but no validation study has been conducted to date on CU traits in elementary school children and using teachers as informants.

Considering this age group, self-reports measures are not suitable and a multi-informant assessment is needed (e.g., parents and teachers), as recommended by the DSM-5 (American Psychiatric Association (APA), 2013). However, it is important to bear in mind that meta-analyses of multi-informant reports regarding child psychopathology (e.g., De Los Reyes et al., 2015; De Los Reyes & Kazdin, 2005) reveal low correlation between the parent- and teacher-report informants (e.g., Miller et al., 2014; Valo & Tannock, 2010). This might suggest that information provided by parents and teachers cover different aspects of a child's behavior, particularly because observations are made in different settings (i.e., home vs. school). Teachers often spend more time during the day with children than do parents, having the opportunity to observe them in various dynamics and in interaction with other children, as well as with themselves and other adults (Abikoff et al., 1993). Moreover, teachers observe children in both structured (e.g., classroom) and unstructured (e.g., lunchroom) settings with their peers (Curhan et al., 2020; Farrell et al., 2018). Thus, teacher-reports are relevant and unique sources of information about the children's behavior. Indeed, teacher-reports on CU traits may better predict school-based outcome variables, than a parent- or self-reports on CU traits (Wang et al., 2019). This makes the development of teacher-reports of CU traits especially relevant in school-age children (Abikoff et al., 1993).

Regarding the use of the ICU specifically in school-age children, potential gender and age group differences for ICU dimensions and for the total score were examined in some studies (Carvalho et al., 2018; Essau et al., 2006; Ezpeleta et al., 2013; Houghton et al., 2012). Studies with adolescents revealed that boys score significantly higher on ICU, both for total and subscale scores (Carvalho et al., 2018; Essau et al., 2006). Significant interactions between gender and age effects were found by Carvalho et al. (2018), with children (7–10 years) showing higher CU traits compared to preadolescents (11–14 years) and adolescents (15–17 years), particularly in boys. According to Houghton et al. (2012), no statistical differences across gender were found in children aged 7–12, and there was a small significant age effect, with older children exhibiting higher scores on uncaring than younger children.

Most of the previous studies tested the validity of the ICU in adolescents, either with community or clinical samples. It should be noted that most validity studies at school ages use the parent-report version to assess CU traits; few studies use teacher-report to assess these traits. Thus, the aim of this

study was to analyze the factor structure of the Portuguese version of the teacher-report ICU in a community sample of school children (elementary school). The first hypothesis outlined was that the adjustment to a three-factor structure would be appropriate. It was also hypothesized that the factors would be moderately correlated with each other. The second aim was to test the reliability of the ICU subscales and examine psychometric properties, such as internal consistency and convergent validity, through the Child Problematic Traits Inventory (CPTI; Portuguese version by [Barker, Pistrang, & Elliott, 2002](#)) and the Social Skills Rating System (SSRS; Portuguese version by [Lemos & Meneses, 2002](#)), and explore normative data considering sex and age-groups. Internal consistency and convergent validity were expected to be good or excellent.

## Method

### *Participants and procedures*

Thirty-six elementary school teachers provided behavioral ratings of one hundred and 78 children, between 6 and 10 years of age ( $M_{\text{age}} = 8.25$ ,  $SD = 1.17$ ), subdivided into male ( $n = 88$ ;  $M = 8.36$ ,  $SD = 1.14$ ) and female ( $n = 90$ ;  $M = 8.14$ ,  $SD = 1.20$ ) participants, recruited and randomly selected from public schools in the Northern region of Portugal, based on proximity, accessibility, and availability. Children with neurological or neuropathological problems, as well as motor, sensory, or cognitive deficits, were excluded. These problems were reported by their teachers. The participation rate was approximately 88%.

All procedures were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The informed consent was provided to parents and teachers of the eligible children. The ICU, CPTI, and SSRS questionnaires were answered by the teachers of the children.

### *Measures*

*Inventory of callous-unemotional traits.* Callous-unemotional traits were assessed by the Inventory of Callous-Unemotional Traits (ICU; [Essau et al., 2006](#); [Frick, 2004](#)), a teacher-report questionnaire composed of 24 items. Each item is answered on a 4-point Likert scale, ranging from 0 (= *Not at all true*) to 3 (= *Definitely true*). The minimum score possible is zero and the maximum is 72. [Essau et al. \(2006\)](#), with the first validation study of the ICU, found satisfactory to adequate internal consistency values, with Cronbach's  $\alpha$  of .64 (unemotional), .70 (callousness) and .73 (uncaring) for the subscales, and .77 for the total score.

### *Child problematic traits inventory*

The Child Problematic Traits Inventory (CPTI; [Colins et al., 2014](#)) is a teacher-report questionnaire composed of 28 items, used to assess psychopathic personality traits. Each item is classified on a 4-point Likert scale, ranging from 0 (= *Does not apply at all*) to 3 (= *Applies very well*). The CPTI is composed of three dimensions: *Grandiose-Deceitful psychopathy* (GD) dimension (eight items); *Callous-unemotional* (CU) dimension (10 items); and *Impulsivity-need of stimulation* (INS) dimension (10 items). The total score varies between zero and 84, ranging from zero to 30 for the CU dimension and the INS dimension, and to 24 for the GD dimension. The Confirmatory Factorial Analysis (CFA) of the Portuguese version of the CPTI ([Barker et al., 2002](#)) confirmed the presence of the Interpersonal, Affective, and Behavioral factors, which showed good internal consistency

values ( $\alpha$  range .88–0.92). The internal consistency for the current study was between  $\alpha = 0.89$  and  $\alpha = 0.93$ .

### Social skills rating system

The Social Skills Rating System (SSRS; Gresham & Elliott, 1990) is a questionnaire filled out by the teachers of the children, and assesses several facets of social competence. The SSRS is composed of 54 items: the first 48 are rated on a 3-point Likert scale, ranging from 0 (= *Never*) to 3 (= *Often*). The last six items (*Academic competence* dimension) are rated on a 5-point Likert scale, where number one indicates the lowest or least favorable performance and five indicates the highest or most favorable performance. This questionnaire integrates three scales: social skills, behavioral problems, and academic competence. Participants can score a minimum of zero and a maximum of 58 on the *Social Skills* subscale, 20 on the *Self-control* and *Assertion* subscales, 18 on the *Cooperation* subscale, 36 on the *Behavior Problems* subscale, 14 on the *Externalizing Problems* subscale, 12 on the *Internalizing Problems* subscale, 10 on the *Hyperactivity* subscale, and 30 on the *Academic Competence* subscale. The Portuguese version of the SSRS (Lemos & Meneses, 2002) shows Cronbach's  $\alpha$  values between .86 and .93 for social abilities subscales and between .83 and .92 for behavior problems.

### Translation and adaptation procedures

The English version of the ICU was adapted and translated according to ITC Guidelines for Translating and Adapting Tests (ITC, 2017). Two independent researchers translated the scale from the original language (English) to Portuguese, and a third bilingual expert provided a detailed review of the translated items. In addition, the back-translation was carried out by a language specialist. It should be noted that differences in the original and back-translated versions were discussed and resolved by consensus. A pilot test was conducted, with 12 elementary school teachers, to understand how the translated version performed in a real-world scenario. These teachers filled out the translated scale and were asked for feedback on the difficulty and clarity of each item, the administration procedure, and on the purpose of the test, in their opinion. After these steps, a final version of the ICU was obtained.

### Statistical analyses

The ICU factor structure was examined using CFA. The CFA was carried out resorting maximum likelihood estimation, according to (Emrich & Urfer, 2004), because of the sample size ( $n = 178$ ). Model fit was assessed using the Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA), as recommended by Sharma et al. (2005). RMSEA values below .05 indicate good adjustment, while values between .05 and .08 indicate an acceptable fit. A CFI and TLI index of .95 or higher indicates excellent fit, and a CFI and TLI of .90 or higher indicates good fit (Hu & Bentler, 1999). Jöreskog & Sörbom (1996) propose the use of  $\chi^2/df$ , which should be as small as possible for a good fit of the model. Although no absolute standard is established, a value between two and three represents a “good/acceptable” adjustment (Schermelleh-Engel et al., 2003).

After defining the model, the measurement invariance of this model across the gender subgroups was analyzed through multi-group confirmatory factor analysis (MGCFA). Measurement invariance can be analyzed with three dimensions, namely; (a) configural invariance, (b) metric invariance, and

(c) scalar invariance (Jöreskog & Sörbom, 1996). For criteria to provide invariance, the hierarchic differences of model-data fit indices (RMSEA, RMR, CFI, GFI, and TLI) and the differences of model-data fit  $\chi^2$  statistics between the dimensions were considered. When the differences of the model-data fit indices were more than 0.01 and/or  $\chi^2$  statistics were statistically significant ( $p < .05$ ), these findings were interpreted as a violation of invariance. Otherwise, it was decided that measurement invariance was provided across subgroups.

Cronbach’s alpha coefficients were computed to analyze the internal consistency of the factors produced, and interpreted according to Kline (Kline, 2005), who suggested that values above .70 are acceptable. Pearson’s correlation coefficients were used to investigate intercorrelations between the subscales of the ICU. Correlations below .70 indicate an acceptable independence of subscales for correlations within the evaluator (Nunnally & Bernstein, 1994). Pearson’s correlations and Fisher’s  $z$  were also calculated to assess the convergent validity of the ICU with CPTI and SSRS scales.

## Results

### Confirmatory factor analysis

Resorting to CFA, the three models previously established on children through teacher- or parent-report were tested in an independent sample, to study the adequacy of the ICU (Table 1). The original model (Essau et al., 2006) and models of Benesch et al. (2014) and Ezepeleta et al. (2013) comprise three factors, while the model of Kimonis et al. (2015) comprise two factors, using 12 of 24 original items (see Table 2). Both models were subject to adjustment made from the change rates.

Based on goodness-of-fit indices resulting from these models (see Table 1), findings revealed the strongest support for the two-factor model based on the 12-item ICU measure (Kimonis et al., 2015), adjusted to a sample of 178 children, revealed a good adjustment quality ( $\chi^2/df = 1.85$ ; CFI = .95; GFI = .93; RMSEA = .06), after correlating the measurement errors of the items 9 and 11 (see Figure 1), and after deleted item 6, because factor loading was under .4.

Measurement invariance across gender was analyzed with a MGCFA. As seen in Table 3, as all goodness of fit statistics are between acceptable ranges for perfect model-data fit, structural invariance is the first step. TLI and CFI are above .90, RMR is under .05, and RMSEA close to .05. Also, model-data fit  $\chi^2$  value is statistically significant at the level of .01. These findings point out that this model is significant and available in each gender. As the configural invariance was supported, the factor pattern coefficients were then constrained to be equal to test for metric invariance. The model of metric invariance had good fit indices ( $\chi^2/df < 3$ ; RMSEA  $< .08$ ; CFI  $> .90$ ), but the chi-square test was significant, indicating that the imposition of constraints (equal factor loadings across groups) resulted in statistically significant decreases in the fit of metric invariance compared to configural invariance. However, this test had limitations. Considering the other

**Table 1.** Fit indices for the four models tested.

	$\chi^2$ (df)	$p$	CFI	TLI	RMSEA	GFI
Essau et al. (2006) and Ezepeleta et al. (2013)	572.36 (245)	0.000	0.80	0.78	0.09	.64
Benesch et al. (2014)	368.10 (179)	0.000	0.87	0.85	0.08	.84
Kimonis et al. (2015)	77.74 (42)	0.001	0.95	0.93	0.06	.93

Note. CFI = comparative fit index; TLI = Tucker-Lewis coefficient; RMSEA = Root Mean Square Error of Approximation; GFI = goodness of fit index.

**Table 2.** Factor structures of the four models tested.

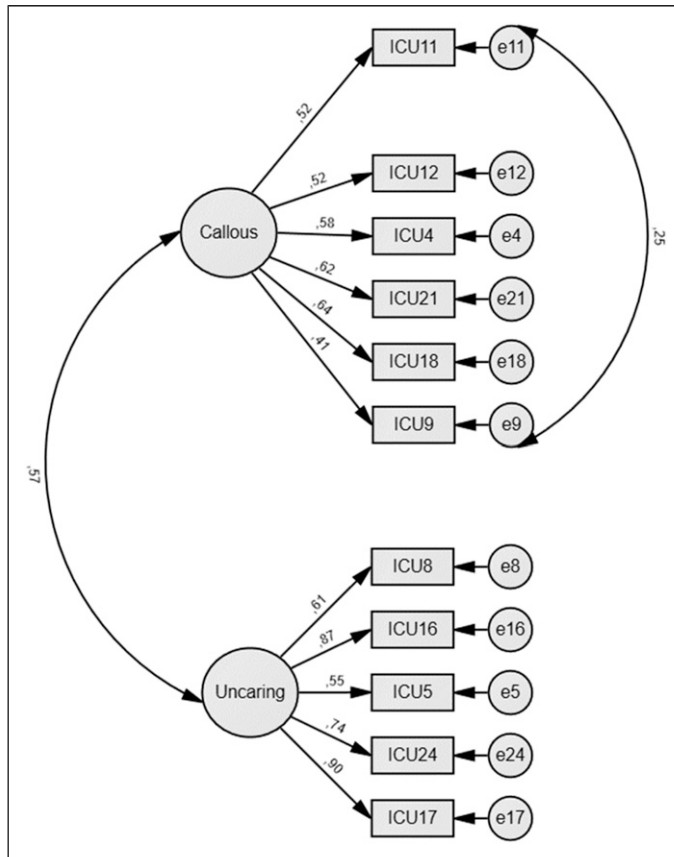
	Essau et al. (2006; three factor model)	Ezpeleta et al. (2013; three factor model)	Benesch et al. (2014) (Three factor model)	Kimonis et al. (2015; two factor model)
1. Expresses his/her feelings openly	Unemotional	Unemotional	Unemotional	_____
2. Does not seem to know "right" from "wrong"	Callousness	Callousness	_____	_____
3. Is concerned about schoolwork	Uncaring	Uncaring	Unconcerned about performance	_____
4. Does not care who he/she hurts to get what he/she wants	Callousness	Callousness	Callousness/lack of guilt or remorse	Callous
5. Feels bad or guilty when he/she has done something wrong	Uncaring	Uncaring	Callousness/lack of guilt or remorse	Uncaring
6. Does not show emotions	Unemotional	Unemotional	Unemotional	Callous
7. Does not care about being on time	Callousness	Callousness	_____	_____
8. Is concerned about the feelings of others	Callousness	Callousness	Callousness/lack of guilt or remorse	Uncaring
9. Does not care if he/she is in trouble	Callousness	Callousness	Callousness/lack of guilt or remorse	Callous
10. Does not let feelings control him/her	Callousness	Callousness	_____	_____
11. Does not care about doing things well	Callousness	Callousness	Unconcerned about performance	Callous
12. Seems very cold and uncaring	Callousness	Callousness	Callousness/lack of guilt or remorse	Callous
13. Easily admits to being wrong	Uncaring	Uncaring	Callousness/lack of guilt or remorse	_____
14. It is easy to tell how he/she is feeling	Unemotional	Unemotional	Unemotional	_____
15. Always tries his/her best	Uncaring	Uncaring	Unconcerned about performance	_____
16. Apologizes ("say he/she is sorry") to persons he/she has hurt	Uncaring	Uncaring	Callousness/lack of guilt or remorse	Uncaring
17. Tries not to hurt others' feelings	Uncaring	Uncaring	Callousness/lack of guilt or remorse	Uncaring
18. Shows no remorse when he/she has done something wrong	Callousness	Callousness	Callousness/lack of guilt or remorse	Callous
19. Is very expressive and emotional	Unemotional	Unemotional	Unemotional	_____

(continued)



**Table 2.** (continued)

	Essau et al. (2006; three factor model)	Ezpeleta et al. (2013; three factor model)	Benesch et al. (2014) (Three factor model)	Kimonis et al. (2015; two factor model)
20. Does not like to put the time into doing things well	Callousness	Callousness	Unconcerned about performance	_____
21. The feelings of others are unimportant to him/her	Callousness	Callousness	Callousness/lack of guilt or remorse	Callous
22. Hides his/her feelings from others	Unemotional	Unemotional	Unemotional	_____
23. Works hard on everything	Uncaring	Uncaring	Unconcerned about performance	_____
24. Does things to make others feel good	Uncaring	Uncaring	Callousness/lack of guilt or remorse	Uncaring



**Figure 1.** Confirmatory factor analysis of the inventory of callous-unemotional traits, two-factor structural model with standardized estimates.



comparative fit indices, the overall results indicate the viability of constraining the factor loading to be the same across the groups. The scalar invariance model also provided excellent fit to the data. As can be observed in Table 3, the overall goodness-of-fit indices and the tests of differences in fit between models support measurement invariance.

### Internal consistency

The internal consistency for the total score was good, with a Cronbach's  $\alpha = .83$ . The internal consistency of the two dimensions (callous and uncaring) was also good (see Table 4). Inspection of the item-total correlation and alpha coefficient did not suggest that the deletion of any single item would significantly improve the internal consistency of the scale. The dimensions were significantly intercorrelated: the *callous* subscale showed a moderate correlation with the *uncaring* subscales. Both subscales show a strong correlation with the total scale. Means and standard deviations of ICU scores are presented in Table 5.

### Association with other dimensions of psychopathic traits and behavior problems

To test whether ICU scores were associated with measures of psychopathic traits, their correlations with scores from the CPTI were analyzed (Table 6). The ICU total scores correlated positively with the CPTI total scores, as well as with other dimensions of CU traits, such as the *affective*, *interpersonal*, and *behavioral* dimensions. Similar results were obtained for both sexes. That is, for boys, the ICU total score correlated positively with the CPTI total score, and with the *interpersonal*, *affective*, and *behavioral* dimensions of the CPTI. Concerning girls, the ICU total score correlated positively with the CPTI total score, and with the *interpersonal*, *affective*, and *behavioral* dimensions of the CPTI. Table 6 presents all correlation coefficients for each dimension of ICU and CPTI (for the total sample and by sex).

**Table 3.** Tests for cross-sex invariance of the callous-unemotional traits goodness of fit statistics.

	Model goodness of fit statistics						
	RMR	TLI	CFI	RMSEA	$\chi^2$	df	p
Configural invariance	0.030	0.932	0.951	0.048	111.930	80	0.011
Metric invariance	0.041	0.914	0.931	0.054	133.961	89	0.001
Scalar invariance	0.041	0.921	0.934	0.051	134.786	92	0.001

Note. RMR = root mean square residual; CFI = comparative fit index; TLI = Tucker-Lewis coefficient; RMSEA = Root Mean Square Error of Approximation.

**Table 4.** Reliability analyses.

	Number of items	Cronbach's $\alpha$	Inter-item mean correlations	Item-total correlations
Callous	6	0.72	0.31	0.39–.53
Uncaring	5	0.85	0.53	0.51–.80
Total	11	0.83	0.31	0.25–.71

**Table 5.** Means and standard deviations of all scales by gender and age effects.

	Total			Callous			Uncaring		
	Total M (SD)	Boys M (SD)	Girls M (SD)	Total M (SD)	Boys M (SD)	Girls M (SD)	Total M (SD)	Boys M (SD)	Girls M (SD)
	Age								
6 years old	7.80 (5.37)	10.00 (4.56)	6.33 (5.61)	1.40 (1.99)	1.83 (2.64)	1.11 (1.54)	6.40 (3.81)	8.17 (2.48)	5.22 (4.21)
7 years old	7.66 (3.74)	7.69 (3.33)	7.63 (4.09)	1.22 (1.60)	1.23 (1.42)	1.21 (1.75)	6.44 (3.03)	6.46 (2.88)	6.42 (3.20)
8 years old	9.00 (4.77)	10.56 (4.60)	7.32 (4.44)	2.12 (2.37)	2.19 (2.24)	2.08 (2.54)	6.87 (3.28)	8.37 (2.98)	5.24 (2.82)
9 years old	7.67 (4.96)	8.44 (5.06)	6.79 (4.80)	1.76 (2.22)	1.78 (2.19)	1.75 (2.29)	5.90 (3.45)	6.67 (3.48)	5.04 (3.30)
10 years old	6.71 (5.20)	7.20 (4.99)	6.15 (5.58)	1.82 (2.65)	1.73 (2.69)	1.92 (2.72)	4.89 (3.54)	5.47 (3.81)	4.23 (3.21)
Total age	7.92 (4.79)	8.88 (5.73)	6.98 (4.69)	1.75 (2.22)	1.82 (2.21)	1.69 (2.25)	6.16 (3.40)	7.76 (3.35)	5.29 (3.24)
Effects									
Sex	$t(176) = 2.69, p = .008; g = .37$				$t(176) = 0.39, p = .699; g = .06$			$F(176) = 3.58, p = .000; g = .75$	
Age	$F(4,173) = 0.95, p = .439; \eta^2 = .02$				$F(4,173) = 1.70, p = .152; \eta^2 = .04$			$F(4,173) = 1.17, p = .326; \eta^2 = .03$	
Sex*Age	$F(4,168) = 0.75, p = .561; \eta^2 = .02$				$F(4,168) = 0.10, p = .982; \eta^2 = .00$			$F(4,168) = 1.28, p = .278; \eta^2 = .03$	

**Table 6.** Correlations between the callous-unemotional traits and child problematic traits inventory and behavioral problems.

	Total			Callous			Uncaring		
	Total r/z	Boys r/z	Girls r/z	Total	Boys	Girls	Total	Boys	Girls
Total CPTI	.64**/ .76	.56**/ .63	.69**/ .85	.60**/ .69	.59**/ .68	.61**/ .71	.51**/ .56	.41**/ .44	.57**/ .65
CPTI_Interpersonal	.64**/ .76	.55**/.62	.71**/ .89	.58**/ .66	.52**/ .58	.64**/ .76	.52**/ .58	.44**/ .47	.59**/ .68
CPTI_Affective	.46**/ .50	.58**/ .66	.68**/ .83	.60**/ .69	.60**/ .69	.61**/ .71	.50**/ .55	.42**/ .45	.56**/ .63
CPTI_Behavioral		.37**/ .39	.52**/ .58	.44**/ .47	.42**/ .45	.46**/ .50	.36**/ .38	.24**/.25	.44**/ .47
Behavior problems	.13/.13	.57**/ .65	.21/.21	.21**/ .21	.52**/ .58	.30**/ .31	.04/.04	.47**/ .51	.09/.09
Externalized problems	.13/.13	.58**/ .66	.21*/.21	.22**/ .22	.48**/ .52	.30**/ .31	.04/.04	.51**/ .56	.09/.09
Internalized problems	.12/.12	.12/.12	.20/.20	.21**/ .22	.27**/ .28	.29**/ .30	.04/.04	-.01/-	.08/.08
Hyperactivity	.13/.12	.50**/ .55	.21*/.21	.21**/ .21	.37**/ .39	.30**/ .31	.04/.04	.46**/ .50	.09/.08

Note. \*\* $p < .01$ ; \* $p < .05$ .

CPTI = Child problematic traits inventory.

As expected, significant correlations were found between ICU subscales and the behavior problems subscales of the SSRS (see Table 6). Among boys, significant correlations were found between the total ICU scale and the *behavior problems*, *externalizing problems*, and *hyperactivity* subscales. Concerning the *callous* subscale, significant correlations were found with the *behavior problems*, *externalizing problems*, *internalizing problems*, and *hyperactivity* subscales. Regarding girls, and concerning the total ICU scale, significant correlations were found between *externalizing problems* and *hyperactivity* subscales. Concerning *callous* subscale, significant correlations were found between *behavior problems*, *externalizing problems*, *internalizing problems*, and *hyperactivity* subscales. With regard to the girl's sample, no significant correlations were found between any scale of the *uncaring* subscale and the SSRS.

### Sex and age effects

Normative data are presented in Table 5. Sex and age differences in mean scores of the ICU were also examined. T test and separate two-way ANOVAs were conducted to examine the effects of *sex* (male, female) and *age-group* (6, 7, 8, 9, and 10 years) on the total and subscale scores of the ICU. The results showed a significant main effect of *sex* on the total score of the ICU,  $t(176) = 2.69, p = .008, g = .37$ , with girls revealing significantly lower CU traits than boys. The results also revealed a significant main effect of *sex* on the *uncaring* subscale,  $t(176) = 3.58, p = .000, g = .75$ , with girls showing significantly lower CU traits than boys. No significant main effects of age-group were found. No interaction effect between sex and age, for the total ICU score and subscales, was found.

## Discussion

The purpose of the current study was to test the factor structure, psychometric properties, and validity of the ICU (Essau et al., 2006; Frick, 2004), in a Portuguese community sample of children without any diagnosis. In general, our findings supported the utility of this measure for the assessment of CU traits in children.

A confirmatory factor analysis provided further support to a 2-factor structure of the ICU, as the suggested by Kimonis et al. (2015), resorting 12 items of a total of 24 of original version of ICU (Essau et al., 2006). This analysis fits well with the two dimensions proposed by Kimonis et al. (2015): *Callous and Uncaring*. Items of the first dimension refer to disregard and unconcern about the feelings of others. The items of the *Uncaring* dimension describe low expression of feelings or emotions toward others (except when used for gain or in shallow/insincere/superficial ways). It should be noted that the two factors and the total score have acceptable to good internal consistency, in the total group of children, as well as for each sex.

Although boys present higher scores, in the three factors and the total ICU, than girls, these differences are only significant for the total scale and *uncaring* subscale. These findings are consistent with previous research indicating that boys tend to score higher compared with girls, on psychopathic traits (Colins et al., 2016; Gill & Stickle, 2015; Hecht et al., 2016), including the *callous* dimension (Carvalho et al., 2018; Ezpeleta et al., 2013).

The convergent validity of the ICU was also examined through its associations with measures of psychopathic traits and behavior problems. Our findings reveal a significant association between the dimensions of the ICU and the CPTI, a psychopathic trait instrument. Contrary to other findings, no significant associations were found between behavior problems and the total score and uncaring dimensions of the ICU, in the total sample. Similar results were observed by Ezpeleta et al. (2013) for the teacher-report ICU, which did not confirm an association between unemotional scores and aggression. However, when results were analyzed by sex, there was a significant relationship between behavioral problems and the various dimensions of the ICU, suggesting that high levels of CU traits were associated with more behavior problems in boys. As mentioned by Colins et al. (2014), results such as these can be useful to better understand the risk factors involved in antisocial behavior.

It is noteworthy that most of previous studies have had parents as informants (Carvalho et al., 2018; Ezpeleta et al., 2013; Willoughby et al., 2014). However, as recommended by Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013), multi-informant measures of CU traits are best practice in assessment. Thus, it is important to consider the teacher as an additional informant, based on the fact that teachers are the persons with whom children spend the most time, having the opportunity to observe the child in various dynamics and in interaction with different people (Abikoff et al., 1993). The experience of teachers as educational figures allows for a better distinction between normative and inappropriate characteristics and behaviors for the age group (Campbell, 2002). Moreover, it should be noted that the evaluation of CU traits should be devoid of emotional involvement. This task seems to be more difficult for parents, who are more emotionally involved with their children, and may be more biased reporting their children's characteristics.

As is common to all research, some limitations also affected this study. The ICU was validated in a sample of adequate size, but with a restricted age group (6–10 years old), not providing support for the reliability and validity of the ICU in older or younger children. Second, although teachers are considered a good source of information for data about CU traits, we did not collect data from parents, which could be useful to analyze agreements and discrepancies. Finally, it should be point as a limitation that only 36 teachers had assessed 178 students, which influences the perceived

independence of the students' ratings. A Multilevel Confirmatory Factor Analysis (MCFA) is needed to obtain unbiased parameter estimates and statistical inferences. For a MCFA approach is recommended cluster sizes between five and 30 (McNeish & Stapleton, 2014). However, the number of cases evaluated per professor is insufficient to generate robust analyses, because in our data there are teachers with a minimum of one and a maximum of eight children evaluated. In addition, despite being considered a limitation, this method is not uncommon. Several other studies resort to this method, in which teacher assessed multiple students on various variables (e.g., Farrell et al., 2018; Liu et al., 2010; López-Romero et al., 2019; Sointu et al., 2011; Stoppelbein et al., 2020; Wang et al., 2019).

To sum-up, since cross-cultural research on CU traits in children is still scarce (Verona et al., 2010), studies that test the psychometric properties of the ICU and similar instruments, in other young age groups and several cultures, become important. As stated by Colins et al. (2014), having a reliable and well validated instrument available, which explores traits of psychopathic personality in early childhood, can help in understanding the development of psychopathic personality from childhood to adulthood, although should not be used for clinical decision making (Colins et al., 2020) until more findings have been replicated. This study showed that the Portuguese teacher-version of the ICU seems reliable, accessible, and can be used to evaluate callous-unemotional traits in the educational context, with low time consumption.

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### Ethical approval

“All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.”

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