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Psychometric Properties of the Spanish Version of the Child Problematic Traits Inventory in 3- to 12-year old Spanish children

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Table 1

Descriptive statistics of CPTI total and factor scores, by gender and grade.

Table 2

Zero-order and partial correlations between the CPTI-Total and the three factors, and external criteria measured in Study 1 and Study 2

Figure 1

Parameter estimates of three-factor model (Total sample)

Appendix I

Fit indices for one-, and three-factor models for the Child Problematic Traits Inventory for Study 1 and Study 2

Psychometric Properties of the Spanish Version of the Child Problematic Traits Inventory in 3- to 12-year old Spanish children

Abstract

The aim of this study was to test the reliability and validity of the Spanish teacher-rated Child Problematic Traits Inventory (CPTI) in two community samples of 3- to 12-years old children. Confirmatory Factor Analysis supported the three-factor structure of the CPTI (Grandiose-Deceitful: GD; Callous-Unemotional: CU; Impulsive-Need of stimulation: INS), being invariant across gender and age groups. The CPTI total and factor scores showed excellent internal consistencies (>.90) in the total group, and across gender and age groups. In support of their criterion validity, the CPTI scores were positively related to psychopathy scores as measured by an alternative teacher-rated measure. In support of their convergent validity, the CPTI scores showed the expected relations to variables that have been linked to psychopathic personality, including fearlessness, conduct problems, aggression, and low prosocial behaviour. Overall, these findings suggest that the Spanish teacher-rated version of the CPTI has good psychometric properties and seems to be a promising tool for studying psychopathic traits in children.

Keywords: Child Problematic Traits Inventory, children, conduct problems, psychopathy, assessment

Psychometric Properties of the Spanish Version of the Child Problematic Traits Inventory in 3- to 12-year old Spanish children

Psychopathic personality has been traditionally defined as a constellation of co-occurring affective, interpersonal and behavioural/lifestyle traits (Cooke & Michie, 2001; Hare & Neumann, 2008), and extensively linked to serious and persistent forms of behavioural maladjustment across different developmental stages (Forth & Book, 2010; McCuish, Corrado, Hart & DeLisi, 2015). The study of the development of psychopathy is generating increasing interest because research has shown that psychopathy does not emerge suddenly in early adulthood but that its roots may lie in childhood and adolescence (DeLisi, 2016; Frick, Ray, Thornton, & Kahn, 2014). In a double effort to further identify the potential precursors and transitions to adult psychopathy, as well as to understand the developmental pathways to severe problematic behaviour, the study of psychopathic personality has been extended downwards to youth populations, including early childhood (Colins et al., 2014).

The importance of analysing these traits at early developmental stages has been reinforced by a wide body of research evidencing their concurrent and prospective association with severe and persistent behavioural and psychosocial problems, (e.g., Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011; López-Romero, Romero, & Luengo, 2012; Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007). Most of the research has particularly focused on Callous-Unemotional-CU traits, which correspond to the affective dimension of the psychopathic traits (e.g., lack of empathy; Frick et al., 2014), as an extension of the construct to children and young population. Based on an extensive empirical research, the DSM-5 has incorporated CU traits through the new specifier for conduct disorder (CD) diagnosis “with limited prosocial emotions”. However, the multidimensionality of child psychopathic personality has

been well supported in both theoretical and empirical research (see Salekin, 2016a), with all affective, interpersonal, and behavioural traits being reliably assessed not only in adults but even in early childhood (see Colins et al., 2014; Salekin, 2016b).

Different tools intended to assess psychopathic personality traits in children are already available, including the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) as the most extensively used so far. However, neither the APSD nor the other existing measures (e.g., Youth Psychopathic Traits Inventory-Childhood version; van Baardewijk et al., 2008) were specifically designed for being used in early childhood (i.e., younger than age 6). Tools specifically designed for measuring psychopathic traits in very young children (e.g., the Inventory of Callous-Unemotional Traits; Frick, 2004), only include one (e.g., Ezpeleta, de la Osa, Granero, Penelo, & Domènech, 2013; Willoughby, Waschbusch, Moore, & Propper, 2011) or two (e.g., Scholte & van der Ploeg, 2007) psychopathic dimensions, and often showed problems with internal consistency (e.g., Hyde et al., 2013). Looking at the literature, it is unquestionable that the vast majority of studies conducted so far have focused on the role of psychopathic and CU traits in the presence of conduct problems and antisocial behaviour. However, it should be noted that psychopathic personality has shown empirical value in predicting problematic outcomes among diverse populations and subpopulations selected from community, clinical and forensic samples (see Frick et al., 2014). At this regard, there have also been different studies evidencing that there are children showing high levels of psychopathic traits (as a dimensional construct) in the absence of a CD diagnosis, and even irrespective of the presence of problematic behaviour (Rowe et al., 2010).

In order to overcome these prior limitations, and to provide a reliable assessment of the psychopathic personality construct in different populations from early childhood onwards, the Child Problematic Traits Inventory (CPTI; Colins et al., 2014) was recently

developed and its psychometric properties have been tested in different cultures and languages (i.e., Swedish, Italian, & Dutch). The CPTI (Colins et al., 2014) is a 28-item research instrument specifically developed to be a measure of psychopathic traits in children from age three to 12, and primarily to be a teacher-based measure. The authors used a theory-driven approach with the main intention of developing an instrument to assess the three-factor model of psychopathic personality (Andershed, Kerr, Stattin, & Levander, 2002; Cooke & Michie, 2001) in childhood, but only including traits that can be meaningfully assessed in early childhood (for details see Colins et al., 2014). In addition, the CPTI was also designed to help in better understanding the developmental pathways of severe and persistent conduct problems; therefore, those psychopathic traits tapping or conceptually overlapping with problematic behaviour were excluded to avoid contamination and a prognostic tautology (Skeem & Cooke, 2010) when studying child conduct problems.

To our knowledge, the psychometric properties of the teacher version of the CPTI (Colins et al., 2014) have been examined so far in four different studies conducted in a sample of 2,056 3- to 5-year-old Swedish children (53% boys; Colins et al., 2014), a sample of 1,188 5-year old twins (49.7% boys; Colins, Fanti, Larsson, & Andershed, 2016), two independent samples of 381 and 406 Italian children aged 6 to 12 (47.8% and 48.5% boys respectively; Somma, Andershed, Borroni, & Fossati, 2016), and a Dutch sample of 281 3- to 7-year-old children (52% boys; Colins, Veen, Veenstra, Frogner, & Andershed, 2016), all of them from normative populations. All these studies revealed via Confirmatory Factor Analyses that the 28 items of the CPTI loaded distinctively on the three theoretically proposed factors: an interpersonal or Grandiose-Deceitful factor, an affective or Callous-Unemotional factor, and a behavioural or Impulsive-Need for Stimulation factor (Colins et al., 2014). The model fit for this three-factor structure was

acceptable to good across studies, with RMSEA fit indices ranging from .06 to .08, and CFI and TLI values ranging from .94 to .97. Additionally, all CPTI scores showed excellent internal consistency with Cronbach's alphas values above .88. Prior studies also revealed positive significant associations of the three CPTI factors with a large set of theoretically related external criteria, including another measure of CU traits (Willoughby et al., 2011), fearlessness temperament, conduct problems, ADHD, reactive and proactive aggression, ODD, as well as negative associations with easy temperament and prosocial behaviour (most r's were around .40-.70; Colins, Fanti et al., 2016; Colins, Veen et al., 2016; Colins et al., 2014; Somma et al., 2016). When controlling for socio-demographics these associations held in significance, but they tended to substantially decrease in strength when also controlling for the other two CPTI factors. It has been suggested that this decrease converges with the idea of psychopathic personality being a constellation of co-occurring traits and, therefore, it should not be surprising to see that each CPTI factor on its own is less strongly related to the variables of interest once their overlap with the other two CPTI factors is accounted for (Colins, Veen et al., 2016; Colins et al., 2014). Notwithstanding these contributions, there is still a need of further investigating the usefulness of the CPTI in other countries, cultures and ages (Colins, Fanti et al., 2016).

This study

The current study was designed with the main purpose of examining the psychometric properties (factor structure, reliability, and validity) of the Spanish teacher-rated version of the CPTI. It will substantially add to the existing literature by analysing whether the CPTI performs comparably in two different regions of another country (i.e., Spain), and also by being the first study encompassing the complete age range for which the CPTI was originally developed for (i.e., 3 to 12). It will also contribute to the field by examining the criterion validity between the CPTI and a well-known measure of

psychopathic traits, the APSD (Frick & Hare, 2001), as well as by extending the criterion measures to test the external validity of the CPTI. Firstly, it was hypothesized that the 28 items of the CPTI best loaded in the expected three-factor structure, being invariant across gender and grade (i.e., preschool/elementary school) groups. Secondly, we also expected good-to-excellent internal consistencies for the CPTI factors, as well as higher CPTI scores for boys than girls. Thirdly, we expected to support the criterion validity of the CPTI scores by revealing positive correlations between CPTI and APSD scores. We also expected that each CPTI factor score would be most strongly correlated to its corresponding APSD score (e.g. CPTI Grandiose-Deceitful with APSD Narcissism). Finally, we expected to report significant positive associations with external measures of fearlessness, conduct problems, reactive and proactive aggression, ADHD, ODD, as well as negative correlations with prosocial behaviour. These associations were assumed to be weaker when controlling for the other two CPTI factors, supporting the interdependence of the CPTI dimensions in their relation to relevant external criterion measures.

Method

Participants

Participants were 842[1] children (48.7% boys) from two independent samples recruited in two Spanish regions, Galicia (NW Spain) and Catalonia (NE Spain). Study 1 (Galician participants) was composed of 449 children (48.6% boys) aged 3 to 12 (*M*=7.32, *SD*=2.69), recruited from four public schools, with both preschool (46.5%) and elementary (53.5%) grade levels, and located in different rural and urban areas of Galicia. Information was provided by 58 teachers. Study 2 (Catalan participants) was composed of 393 children (48.9% boys), aged 3 to 12 (*M*=7.82, *SD*=2.57), with both

[1] Only participants without missing data in CPTI responses were included. From the initial sample of Study 1 (n = 475) 26 records (6%) were eliminated, whereas 56 records (14%) were deleted from the initial sample of Study 2 (n = 449).

preschool (25.2%) and elementary (74.8%) grade levels, recruited from one public school from Manresa (a city of the province of Barcelona). Information was provided by 18 teachers (two teachers by level). In both studies, information about the purpose of the study was provided by teachers. Participants of both studies did not receive any compensation for their participation.

Measures

The Child Problematic Traits Inventory (CPTI; Colins et al., 2014) was used in both Study 1 and Study 2 for assessing psychopathic traits. Teachers rated the 28 items in a response scale ranging from 1 (*Does not apply at all)* to 4 (*Applies very well*), and on the basis of how the child usually behaves rather than how he/she behaves at the moment. The 28 items were assigned to three scales intended to assess the corresponding psychopathic traits: the Grandiose-Deceitful (GD; eight items; e.g., "Thinks that he/she is better than everyone on almost everything"); the Callous-Unemotional (CU; 10 items; e.g., "Does not become upset when others are being hurt"); and the Impulsive-Need for stimulation (INS; 10 items; e.g., "Often does things without thinking ahead"). In addition, a composite Total score was created.

The total score of each scale, as well as the composite score, were computed as the mean of the responses to items.

Study 1 (Galicia)

The Antisocial Process Screening Device (APSD; Frick & Hare, 2001). The APSD (teacher version) is a 20-item instrument rated on a three-point scale ranging from 0 (*Not at all true*) to 2 (*Definitely true*). A three-factor structure has been previously proposed and further validated (Frick, Bodin, & Barry, 2000), comprising three dimensions: Narcissism (seven items; α in the present study = .87; mean-interitem

correlation [MIC] = .49; e.g., "You brag a lot about your abilities, accomplishments, or possessions"), Callous/Unemotional (six items; α =.73; MIC=.26; e.g., "Your emotions seem shallow"), and Impulsivity (five items; α =.81; MIC=.46; e.g., "You act without thinking"). Additionally, a Total score was also computed (α =.91; MIC=.34).

The *Child Fearlessness Scale* (Colins et al., 2014) was used to assess fearlessness. This scale consists of six items (e.g., "He/she does not seem to be afraid of anything"; α =.93; MIC=.70), and teachers scored the items on a four-point response scale, ranging from 1 (*Does not apply at all*) to 4 (*Applies very well*).

Conduct problems were assessed through a 10-item questionnaire for teachers (Colins et al., 2014; α =.94; MIC=63) that correspond with DSM-IV symptoms of ODD and CD (American Psychiatric Association [APA], 1994). Each item (e.g., "Has violated important rules in school") was rated on a 5-point response scale, ranging from 1 (*Never*) to 5 (*Very often*).

The *Teacher Report of Reactive and Proactive Behaviors* (Dodge & Coie, 1987) was used for assessing both reactive and proactive aggression. This tool consists of six items, three assessing reactive aggression (α =.92; MIC=.80; e.g., "Yells at others when they have annoyed him/her"), and three measuring proactive aggression (α =.86; MIC=.68; e.g., "Threatens and bullies someone"), scored on a scale ranging from 1 (*Never true*) to 5 (*Almost always true*).

The S*trengths and Difficulties Questionnaire* –teacher version (SDQ; Goodman, 1997) was used to measure Hyperactivity (α =.84; MIC=.51; e.g., "Restless, overactive, cannot stay still for long"), and Prosocial behaviour (α =.88; MIC=.59; e.g., "Helpful if someone is hurt, upset or feeling ill"). Both scales consist of five items and need to be score on a three-point response scale that ranges from 0 ("*Not true*") to 2 ("*Certainly true*"). Of note, a higher prosocial behaviour score is indicative of fewer problems.

Study 2 (Barcelona)

The teacher-version of the *Children's Symptom Inventory-4* (CSI-4, Gadow & Sprafkin, 1997) was used to screen behavioural disorders such as ADHD (18 items; e.g., "Often has difficulty waiting his or her turn in group activities") and ODD (8 items; e.g., "Often loose temper") in 5- to 12- year old children. Items are based on the diagnostic criteria of the DSM-IV (APA, 1994). There are two different ways to score the CSI-4: Symptom Count scores (categorical) and Symptom Severity scores (dimensional). In this study, we used the Symptom Severity scoring for the three ADHD specifiers (predominantly inattentive, predominantly hyperactive/impulsivity, and combined presentation) and for ODD. Items are rated on a 4-point Likert scale, ranging from 0 (*Never)* to 3 (V*ery often).* Cronbach alpha for ADHD Inattentive symptoms was .96 (MIC=.70), for Hyperactivity-Impulsivity symptoms was .93 (MIC=.62), and for combined symptoms was .95 (MIC=.51). Cronbach alpha for ODD symptoms was .94 (MIC=.66).

Procedure

Study 1 procedure

The study was approved by the Bioethics Committee at the *Universidade de Santiago de Compostela*, and the Regional Government (*Xunta de Galicia*). The heads of four schools were initially contacted in order to get the school collaboration in the study. These schools were selected because they have children at both preschool and elementary levels. The main objectives and procedures of the study were explained. Once approval from the heads was obtained, teachers were invited to collaborate and were given specific instructions. From the 63 teachers invited to collaborate, 58 agreed to participate. Each teacher was instructed to randomly select 10 children per classroom. Teachers from one of the schools (n = 18) thought that this was a too excessive

assignment, and they were offered a more relaxed condition: 5 children per classroom who should also be randomly selected. Teachers completed the questionnaire during their regular school hours and they had a 10-day period for filling them. Conditions of anonymity and confidentiality were completely guaranteed.

Study 2 procedure

The sample is part of a larger study that focuses on the study of executive functions and behavioural problems, and was approved by the *Serveis Territorials d'Ensenyament de la Catalunya Central* (*Govern de la Generalitat de Catalunya*) and the Animal and Human Experimentation Ethics Committee of the *Universitat Autònoma de Barcelona* granted permission. A random cluster sampling was made at 2013 by selecting ten schools from all schools in Bages County (Catalonia, Spain). Each year data were collected in one school. The research group contacted the Head of the selected school, and invited the parents of all the schoolchildren to take part in the study. Those parents who agreed were given an informed consent. Once returned it signed, the correspondent teacher evaluated the children during their regular school hours (no specific time limit). In this Study 2, data collected in 2015 were used (because the CPTI was not part of the study in 2013 and 2014).

Statistical analyses

First, descriptive information of the CPTI is presented for both study samples, and separately by gender and grade (preschool/elementary). Second, Confirmatory Factor Analyses (CFA) was conducted in Mplus 6.12 (Muthén & Muthén, 2011), with robust weighted least squares used as estimator (WLSMV), which is considered less biased and more accurate than others in every condition (Li, 2016), especially with ordinal data (e.g., Flora & Curran, 2004). The three-factor model was specified with the 28 items of the CPTI as observed variables and the three factors as latent and correlated

constructs. Each item was specified to load on only one factor, and error covariances were constrained to zero. In addition, the model was specified to include an overarching latent psychopathic personality construct joining the three latent factors. For comparative reasons, a unidimensional or one-factor model, with the 28 CPTI items computed in a single factor, was also tested. Subsequently, in line with prior studies in samples of children with conduct problems (Ezpeleta & Penelo, 2015), factor loadings invariance (i.e. weak invariance), configural invariance and scalar (i.e. strong) invariance across gender and grade was measured, using robust chi square difference testing (DIFFTEST). We used the factor-variance strategy –also known as fixed factor method- and not the marker-variable strategy – also known as reference-variable method- since this method can produce Type I error inflation in anchors items (Byrne, 2012). Model fit was assessed using root-mean-square error of approximation (RMSEA), comparative fit index (CFI), and the Tucker-Lewis index (TLI). TLI and CFI values of .95 or higher, and RMSEA values lower or equal to .06 were considered indicators of good model fit, whereas TLI and CFI values of .90 or above, and a RMSEA of .08 and lower were considered as indicating adequate fit (Hu & Bentler, 1999). Third, to evaluate the internal consistency of the CPTI scores, Cronbach's alphas (α) were calculated and interpreted as poor ($\leq .60$), marginal (.60 to .69), acceptable (.70 to .79), good (.80 to .89), and excellent ($\geq .90$; Barker, Pristang, & Elliott, 2002). Additionally, because of α dependence on the number of items of a scale, mean inter-item correlation (MIC) was computed as a more straightforward indicator of the internal consistency, with values ranging .15 to .50, at minimum, being considered adequate (Clark & Watson, 1995). Finally, both criterion and convergent validity of the CPTI scores was examined through zero-order correlations between the CPTI scores and the external correlates. Partial correlations controlling for age and gender were computed

for CPTI Total. For each CPTI factor (e.g., GD), partial correlations controlling for the effect of age and gender and the other two CPTI factors (e.g., CU and INS) were computed. In Study 2, because of the low variability of the external variables in preschoolers (i.e., low mean CPTI scores; see Table 1), external validity was only tested for elementary school. To counteract the issue of multiple testing, Bonferroni's correction was applied and the threshold levels of significance were settled at .005 for Study 1 (10 variables) and .0125 for Study 2 (4 variables). Descriptive statistics, internal consistency and both zero-order and partial correlations were conducted on SPSS 21.

Results

Descriptive statistics, factor structure and internal consistency

Descriptive information for the CPTI scores across gender and grade is presented in Table 1.

Preliminary, CFA was tested in Study 1 and Study 2 separately and, additionally, in Study 2 considering just elementary school children given the low variability in CPTI scores for preschool children (see Appendix I). Because of the similarities in model configuration, with high coincidence in model fit indices for all the independent analyses, we decided to merge both samples into one (i.e., Total sample) for CFA purposes. The three-factor model of the CPTI showed an acceptable (RMSEA = .08) to excellent (CFI=.97; TLI=.97) model fit, being better than the one-factor model (RMSEA=.11; CFI=.95; TLI=.94). Configural invariance was supported for both gender (RMSEA=.08/.08; CFI=.98/.97; TLI=.98/.96, for boys and girls respectively; $\Delta\chi^2$= 34.25, Δdf=25, p=0.1027) and grade groups (RMSEA=.08/.08; CFI=.97/.97; TLI=.97/.94, for preschool and elementary school level respectively, $\Delta\chi^2$= 25.41, Δdf=25, p=0.4396). All 28 items loaded significantly on the expected CPTI factor and

on the latent psychopathic construct. Standardized factor loadings ranged from .89 to .97 for GD, from .77 to .95 for CU, and from .70 to .91 for INS (see Figure 1). Factor loadings were invariant across gender ($\Delta\chi^2$= 60.55, Δdf=52, p=0.1945) and grade groups ($\Delta\chi^2$= 62.39, Δdf=52, p=0.1534). Nevertheless, scalar invariance was not achieved neither for gender ($\Delta\chi^2$= 187.32, Δdf=49, p<0.00005) nor for grade groups ($\Delta\chi^2$= 179.98, Δdf=49, p<0.00005). In both cases, partial strong invariance was not achieved, since less than 80% of them were invariant (Dimitrov, 2010).

Overall, the Cronbach's α and MIC values were indicative of an excellent internal consistency for both the CPTI total score (α =.97; MIC=.52), and the three CPTI factors: GD (α =.93; MIC=.62), CU (α =.95; MIC=.64), and INS (α =.93; MIC=.59). Similar values were observed in both Study 1 and Study 2, and across gender and grade groups (details available upon request). Significant correlations ($p < .001$) were observed between the CPTI Total score and the three CPTI factors (r's = $.90^{GD}$; $.92^{CU}$; $.90^{INS}$), as well as between the three CPTI factors (r's = $.80^{GD\text{-}CU}$; $.70^{GD\text{-}INS}$; $.70^{CU\text{-}INS}$). Results remained substantially equivalent after controlling for sociodemographics (i.e., age and gender).

Criterion validity

According to zero-order correlations, the CPTI Total and the three factors were significantly correlated with the APSD total score and its factor scores (see Table 2). Steiger's Z tests showed that the CPTI GD and INS factors were significantly stronger correlated to their corresponding APSD factor scores (i.e., Narcissism and Impulsivity/Conduct problems, respectively) than to the other two APSD factor scores ($p < .001$). The CPTI CU factor score correlated significantly with all APSD factors; Steiger's Z-test, however, showed that the CPTI CU score was not stronger correlated to the APSD CU factor than to the two other APSD factor scores.

This pattern of results was partially supported by results of partial correlations, showing that the CPTI GD and INS factor scores were uniquely correlated with the APSD Narcissism and Impulsivity/Conduct Problems factor scores, respectively. As regards the CPTI CU factor it was correlated with all APSD factors, with the highest value for the association with the APSD CU factor according to Steiger's Z ($p < .001$, and $p < .05$ when comparing with APSD Narcissism and Impulsivity-Conduct problems respectively).

Convergent Validity

Results of zero-order correlations (Table 2) conducted in Study 1 showed moderate to strong positive associations between the CPTI scores and teacher-reported fearlessness, conduct problems, reactive and proactive aggression, and hyperactivity, as well as a negative association with prosocial behaviour. Results with Study 2 (elementary school) revealed significant and positive correlations between the CPTI and ADHD, with its different subtypes (i.e., inattentive, hyperactive/impulsive, and combined), and ODD. All these results held in significance and magnitude after controlling for sociodemographical variables (i.e., age and gender; see Table 2 for partial correlations[a] for the CPTI Total score).

When also controlling for the other two CPTI scores (see partial correlations[b], Table 2), results of Study 1 showed that associations with teacher-reported conduct problems, reactive aggression, and hyperactivity remained significant for all three CPTI factors. In contrast, associations with fearlessness only held for CU and INS, whereas unique associations were observed between GD and proactive aggression, and CU with prosocial behaviour. Results from Study 2 revealed that both CU and INS factors remained significantly correlated with ADHD inattentive and combined scores, with

INS factor being uniquely correlated with the ADHD-hyperactive-impulsive subtype. For ODD, significant associations held for all GD, CU and INS factor scores.

Discussion

The main purpose of this study was to analyse the psychometric properties of the Spanish version of the CPTI in two community samples of children between 3- to 12-years old. Overall, our findings show that the Spanish version confirms the original structure of three distinct but interrelated factors GD, CU, and INS, across gender and two age groups (preschool/elementary). The factors had excellent reliability (internal consistency); they were significantly related with an alternative measure of psychopathic traits (APSD) supporting the criterion validity of the CPTI; and their relationships with external variables including fearlessness, conduct problems, ODD, ADHD, reactive/proactive aggression, and prosocial behaviour supported the convergent validity of the CPTI.

CFA supported the three dimensions as proposed by Colins et al. (2014) with well-fitting indexes. These results are similar to earlier studies conducted in Dutch general population of 3- to 7-year-old children (Colins, Veen et al., 2016), in Italian general population of 6- to 12- year-old children (Somma et al., 2016), in Swedish general population of 5-year-old children (Colins, Fanti et al., 2016), and in Swedish general population of 3- to 5-year-old children (Colins et al., 2014). Moreover, this three-factor model showed a better fit than the one-factor model. In addition, factor loadings were significant and all higher than .70 on their corresponding factor, which is a quite novel finding in the study of child psychopathic traits through teacher's reports (e.g., Frick et al., 2000). Also of note, the reliabilities (internal consistency) of the scales were excellent, with all Cronbach's α above .90 and MICs above .50. These results, also

observed in prior CPTI studies, are supporting the usefulness of the CPTI as a psychometrically sound measure of psychopathic traits in children, filling a gap that has been highlighted in prior research (e.g., Hawes et al., 2014). These results also suggest that the CPTI coherently assesses the three facets of the psychopathic construct (i.e., interpersonal, callous-unemotional, and behavioural/lifestyle) in early developmental stages and across cultures, and it does in a way that closely resembles how it is often conceptualized in adolescent and adult populations (e.g., Andershed et al., 2002; Cooke & Michie, 2001). However, an alternative four-factor model of psychopathy has been also proposed and frequently used particularly in older populations (see Hare & Neumann, 2008). Because of the theoretical conception of the CPTI, with no items assessing deviant and problematic behaviour (Colins et al., 2014), it cannot be excluded a four-factor conceptualization of child psychopathic personality as a valid alternative (Somma et al., 2016).

This is the first study that tested the relationship of the CPTI with the well-known and commonly used APSD. Consistent with predictions, the criterion validity of the CPTI scores was supported since the CPTI is related to APSD scores and, even more interesting, each CPTI factor score remained significantly related to its corresponding APSD factor score after controlling for the other two CPTI factor scores. These results are in line with prior research, which showed that all CPTI factors were correlated with an alternative measure of CU traits (Willoughby et al., 2011), and that this association was significantly higher for the CPTI CU score (Colins, Veen, et al., 2016). However, since this is the first study examining the convergence of the CPTI with the APSD, these results should not be generalized to other samples. Replication studies, as well as future work aimed to test the convergence of the CPTI with alternative measures of both CU and psychopathic traits, are then highly recommended.

The third aim of the present study was to explore the external validity of the CPTI with theoretically related external criteria. Convergent validity was supported, with CPTI scores showing the expected relations with external criterion measures, even after controlling for sociodemographics and the shared variance of CPTI factors. The significant associations observed for the CPTI total score and all CPTI factors with conduct problems, reactive aggression and ODD criterion measures are highlighted. These results converge with an extensive line of research establishing a relevant link between psychopathic traits and the presence of serious conduct problems that may lead to long-term trajectories of chronic offending (Corrado, DeLisi, Hart & McCuish, 2015; McCuish et al., 2015). Of note, all three GD, CU, and INS factors remained significantly correlated with the aforementioned constructs after controlling for the other two CPTI factors (e.g., Colins, Fanti et al., 2016). These results are in line with prior studies suggesting that the association of psychopathic traits with external criteria may rely, at least in part, in the combination of all three CPTI factors (see Colins et al., 2014). Although an ever increasing line of research has been raised around the topic of child psychopathic personality, only one of the psychopathic dimensions (i.e. CU traits) has been analysed in depth, leading to the inclusion of a CU-based specifier for conduct disorder (i.e. with limited prosocial emotions) in the latest version of the DSM (DSM-5; APA, 2013). Most of these studies have assessed CU traits alone (Frick et al., 2014), without reference to the other psychopathic traits, making difficult to test whether it is the CU dimension or the other psychopathic dimensions, or even their combination, which account for the results. Nevertheless, our results would support the hypothesis of child psychopathic personality as a multidimensional construct, with all the affective, interpersonal and behavioural traits being part of the syndrome (see Salekin, 2016b). Further studies should now provide new evidence about if the interaction between the

three psychopathic factors is indeed more strongly related with problematic behaviour than any single dimension (Colins et al., 2014). To this end it would be interesting to assume a person-oriented perspective and identifying groups of individuals high on all psychopathic factors (i.e., potential psychopathic children), in order to compare them with groups showing other combinations of psychopathic traits (e.g., high CU and low GD-INS).

Results of partial correlations also revealed some patterns of unique associations of CPTI factor scores with criterion measures, suggesting that the association between psychopathic dimensions and criterion variables may differ when all the psychopathic traits are included as compared when they are not (e.g., by only testing CU traits; Colins, Veen et al., 2016). As expected, fearlessness remained significantly correlated with CU and INS, but not with GD. Prior research has shown that children high on psychopathic traits tend to show a fearlessness or uninhibited temperament (Lykken, 2006). Related to this, prosocial behaviour remained uniquely correlated with CU traits. The inherent features of the CU dimension (e.g., callous behaviour, lack of remorse and empathy, disregard for others) might be on the basis of these association since, conscience development, often defined by guilt and empathy (Thompson & Newton, 2010), plays an important role in child's development by both promoting prosocial behaviour and inhibiting problematic behaviour. Also in line with prior studies, only the interpersonal GD factor held the significant correlation with proactive aggression, a finding that largely converges with prior evidence of interpersonal traits being unique related to bullying, relational aggression and delinquency (e.g., Stellwagen & Kerig, 2013). Finally, ADHD with all its variants was basically correlated with INS (e.g., Colins, Fanti et al., 2016; Colins, Veen et al., 2016), although a weaker association was also observed for CU, which particularly relies on the Inattentive variant. These patterns

of unique associations may suggest that the specific facets of the psychopathic construct could be rooted in distinct underlying etiologic-dispositional factors with differentiated developmental pathways and different psychosocial correlates (Molinuevo, Pardo, González, & Torrubia, 2014), a hypothesis that should be further examined in future developmental research. They also highlight the importance of taking into account all the psychopathic features beyond CU traits. This is particularly true for GD or interpersonal traits, largely ignored in prior research, by with new evidence reinforcing their value in predicting later problems (Salekin, 2016a).

Finally, the absence of scalar invariance (equivalence) according to gender and age may point that comparisons of observed means from boys and girls or between several age groups are not readily interpretable. Though not presented in this paper, results showed that boys rated higher than girls in all psychopathic traits given the same latent trait level, in line with prior studies with the CPTI in community samples (Colins, Veen et al., 2016; Somma et al., 2016). Research on the prevalence rates of psychopathic traits according to gender is mixed, with some studies showing overall higher psychopathic tendencies among boys compared to girls, and other reporting no gender differences (Verona, Sadeh, & Javdani, 2010). Similarly, higher scores were observed in older children, especially in grandiosity traits. Comparison with previous work about the CPTI is difficult because research is scarce and the design of the studies does not contemplate it (e.g., twins, school-aged). It is possible that some symptoms are more difficult to detect at early ages or, conversely, that they are more evident in school age; or, even, that these traits may change over the course of development (Edens, Skeem, Cruise, & Cauffman, 2001; Seagrave & Grisso, 2002). Although much more research is needed on the prevalence rates of psychopathic traits in normative samples, these results might suggest different item thresholds for boys and girls, and according to

age. Future studies should go deeper into this question in order to clarify these potential differences between groups, and, therefore, to consider separate norms and different cut-off scores if the CPTI is expected to be used in a dichotomous way for research purposes.

There are several limitations that should be taken into account when interpreting these results. First, because of the cross-sectional design, conclusions of direction, cause, or stability of the effects cannot be established. Second, the reliance on teacher's report for all measures could have inflated the correlations due to shared method variance. The CPTI was developed to be primarily rated by teachers (see Colins et al., 2014) since they have, compared to parents, more opportunities to see many children, of a similar age, in many different school contexts and situations for longer periods (Abikoff, Courtney, Pelham y Koplewicz, 1993). As a consequence, they may better distinguish between age-related normative and age-related inappropriate traits and behaviors than parents (Campbell, 2002). Nevertheless, teachers as well as other informants may be affected by reporter bias (e.g., the halo effect; Abikoff et al., 1993) when assessing different children with the same item pool, particularly when these items evoke negative traits and behaviors. Following the general recommendation to use multiple source of information in the study of child and youth psychopathic personality (Vitacco, Salekin, & Rogers, 2010), the inclusion of multiple informants are particularly encouraged for future research. Third, the nature of the samples, community and voluntary, limits generalization. We cannot exclude that low scores and variability could have inflated α and MIC values for internal consistency, as well as biased the correlations between CPTI items and between the CPTI and external variables. In fact, we have used a commonly measure of internal consistency (i.e., the Cronbach's alpha), despite some assumptions are not met, such as that the scale adheres to tau equivalence

or the scale items are normally distributed. Alternative methods to assess the reliability of CPTI are recommended in future research (McNeish, 2017). Notwithstanding that the factor structure of the CPTI has been replicated across studies, since all of them have been conducted with normative samples we cannot exclude that it might be conditional upon the sample type or even the level of conduct problems. It should be noted that prior studies conducted with alternative measures of psychopathic traits, such as the APSD (Frick & Hare, 2001) or the YPI (Andershed et al., 2002), have revealed relative coherence in factor structure across samples (see Kotler & McMahon, 2010). However, whether or not the factor structure of the CPTI is replicated in high-risk or clinical samples should be settled as a primary objective for future research. Finally, other confounding variables can influence in the relationship between psychopathic traits and external variables (e.g., parental psychopathology, or parenting practices). Future studies are encouraged to include other relevant variables.

Despite these limitations, this is the first study that examined the psychometric properties of the Spanish teacher-rated version of the CPTI, encompassed the complete age range for which the CPTI was originally developed for (i.e., 3 to 12), and scrutinized the criterion validity with the APSD, a widespread measure of psychopathic traits. Overall, the present study converges with a growing body of research across several cultures suggesting that the CPTI is a promising measure to assess the affective, interpersonal, and behavioural trait dimensions of the psychopathic personality construct in (early) childhood. Psychopathic personality is considered one of the best predictors of severe and chronic problematic and antisocial behaviour (Corrado, McCuish, Hart, & DeLisi, 2015; Forth & Book; 2010; McCuish et al., 2015), highlighting its ability to connect the dots of antisociality over the life-span (DeLisi, 2016), which has a relevant social and economic impact. Because of their relevance in

identifying a high-risk profile and the need of detecting early signs of psychopathy to facilitate effective interventions, the construct needs to be properly applied and assessed at early developmental stages (Corrado, DeLisi et al., 2015). Assessment and diagnosis of psychopathy in young population is highly controversial. To this end, the CPTI is a useful tool to conducting new studies in early developmental periods in community, clinical and offender-based populations.

Since the CPTI enables a reliable assessment of the trait dimension that constitutes the three-factor model of psychopathic personality, it may provide an opportunity of studying both the conceptualization and the predictive role of psychopathic personality in depth. It may also allow for examining stability and change of psychopathic traits from early childhood, favouring the coherence in factor structure and content when tools examining the three-factor model of psychopathic personality are used (Colins et al., 2014). The CPTI may also elucidate some of the mechanisms underlying the development of psychopathic traits, shedding new light on developmental and neurobiological models of psychopathic personality (Blair, 2013). Finally, the CPTI may enhance the understanding of the heterogeneity of CD. At this regard, once we have the CPTI as a valid and useful measure in different samples, contexts, and languages, more refined objectives could be delineated. Of particular relevance would be the study of connections between the CPTI (CU scale) and the DSM-5 CU specifier, as well as comparisons between theoretically relevant groups (e.g., low vs.CU vs. high psychopathic children; e.g., Frogner, Gibson, Andershed, & Andershed, 2016), leading to elucidate the role of interpersonal and behavioural dimensions of the psychopathic construct beyond CU traits in predicting serious conduct disorder (Salekin, 2016b). In line with previous studies with instruments such us the ICU (Kimonis et al., 2015) or the YPI (Colins, 2016), it would be interesting to

know the adequacy of the CPTI-CU dimension to the DSM-5 operationalization, to study the more representative items, and to evaluate the usefulness of self-report measures to apply the specifier. All this knowledge may also serve as a way of further development of specifically targeted prevention and intervention programs, uniquely tailored to the specific features and needs of children high on psychopathic traits, and leading to prevent and/or reduce the antisocial and aggressive behaviour from the earliest stages of development. Precocious displays of psychopathy should be considered early-warning signs of what will become a lifetime of deviance (DeLisi, 2016). New efforts in accurately assessing and identifying children high on psychopathic traits should be made, with the CPTI as an auspicious instrument for opening new means of discussion and analyses in this field.

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Table 1

Descriptive statistics of CPTI total and factor scores, by gender and grade.

	Range		Total sample	Boys	Girls	Preschool	Elementary
	Min.	Max.	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
Total sample			n = 842	n = 410	n = 432	n = 313	n = 313
CPTI Total	1.00	3.61	1.43(.53)	1.53 (.59)	1.33 (.45)	1.42 (.51)	1.43 (.55)
GD	1.00	4.00	1.34(.56)	1.42 (.63)	1.26 (.46)	1.27 (.48)	1.38 (.60)
CU	1.00	4.00	1.38 (.57)	1.49 (.65)	1.27 (.46)	1.39 (.57)	1.37 (.57)
INS	1.00	4.00	1.55 (.64)	1.67 (.69)	1.44 (.57)	1.59 (.64)	1.53 (.64)
Study 1			n = 449	n = 218	n = 218	n = 209	n = 209
CPTI Total	1.00	3.61	1.63 (.59)	1.74 (.63)	1.52 (.52)	1.58 (.55)	1.67 (.61)
GD	1.00	4.00	1.48 (.65)	1.58 (.72)	1.38 (.54)	1.37 (.54)	1.57 (.71)
CU	1.00	4.00	1.56 (.64)	1.69 (.71)	1.44 (.55)	1.53 (.63)	1.58 (.65)
INS	1.00	4.00	1.81 (.68)	1.90 (.71)	1.72 (.63)	1.80 (.66)	1.82 (.69)
Study 2			n = 393	n = 192	n = 201	n = 99	n = 294
CPTI Total	1.00	3.25	1.21 (.35)	1.30 (.44)	1.11 (.20)	1.08 (.16)	1.24 (.39)
GD	1.00	3.38	1.18 (.38)	1.23 (.44)	1.11 (.29)	1.03 (.13)	1.22 (.42)
CU	1.00	3.40	1.17 (.38)	1.26 (.49)	1.09 (.20)	1.07 (.20)	1.20 (.42)
INS	1.00	3.30	1.26 (.44)	1.40 (.55)	1.13 (.24)	1.14 (.24)	1.30 (.48)

Note. CPTI=Child Problematic Traits Inventory; GD=Grandiose-deceitful factor; CU=Callous-unemotional factor; INS=Impulsive-need for stimulation factor; SD=Standard deviation.

Table 2

Zero-order and partial correlations between the CPTI Total and the three factors, and external criteria measured in Study 1 and Study 2

	CPTI Total		GD		CU		INS	
	Z-O	Partial[a]	Z-O	Partial[b]	Z-O	Partial[b]	Z-O	Partial[b]
Study 1 (preschool/elementary school)								
APSD-Total	.90*	.90*	.84*	.44*	.84*	.47*	.74*	.39*
Narcissism	.82*	.82*	.86*	.62*	.75*	.20*	.62*	.06
Callous-unemotional traits	.60*	.60*	.51*	-.03	.69*	.43*	.46*	.09
Impulsivity/CP	.83*	.83*	.70*	.10	.73*	.33*	.78*	.56*
Fearlessness	.72*	.71*	.59*	-.01	.66*	.31*	.66*	.39*
Conduct problems	.85*	.85*	.79*	.38*	.76*	.29*	.73*	.39*
Reactive aggression	.79*	.78*	.76*	.37*	.71*	.21*	.66*	.25*
Proactive aggression	.63*	.63*	.70*	.46*	.58*	.06	.47*	-.03
Hyperactivity	.70*	.69*	.52*	.15*	.58*	.21*	.74*	.59*
Prosocial behavior	-.56*	-.56*	-.48*	-.02	-.62*	-.42*	-.39*	.02
Study 2 (elementary school)								
ADHD-Inattentive	.52*	.46*	.35*	-.15	.49*	.27*	.52*	.30*
ADHD-Hyperactive-Impulsive	.67*	.63*	.47*	-.07	.50*	.04	.75*	.64*
ADHD-Combined	.66*	.61*	.45*	-.15	.57*	.24*	.70*	.52*
ODD	.67*	.61*	.60*	.16*	.63*	.27*	.56*	.16*

Note. CPTI=Child Problematic Traits Inventory; GD=Grandiose-deceitful; CU=Callous-unemotional; INS=Impulsive-need for stimulation; APSD=Antisocial Process Screening Device; CP=Conduct problems; ADHD=Attention-Deficit/Hyperactivity Disorder; ODD=Oppositional Defiant Disorder; Z-O=Zero-order correlations

[a] partial correlations controlling for age and gender (results for the three CPTI factors are available upon request)

[b] partial correlations controlling for age, gender, and the other two CPTI factors

* *p* value after Bonferroni correction (.005 Study 1; .0125 Study 2)

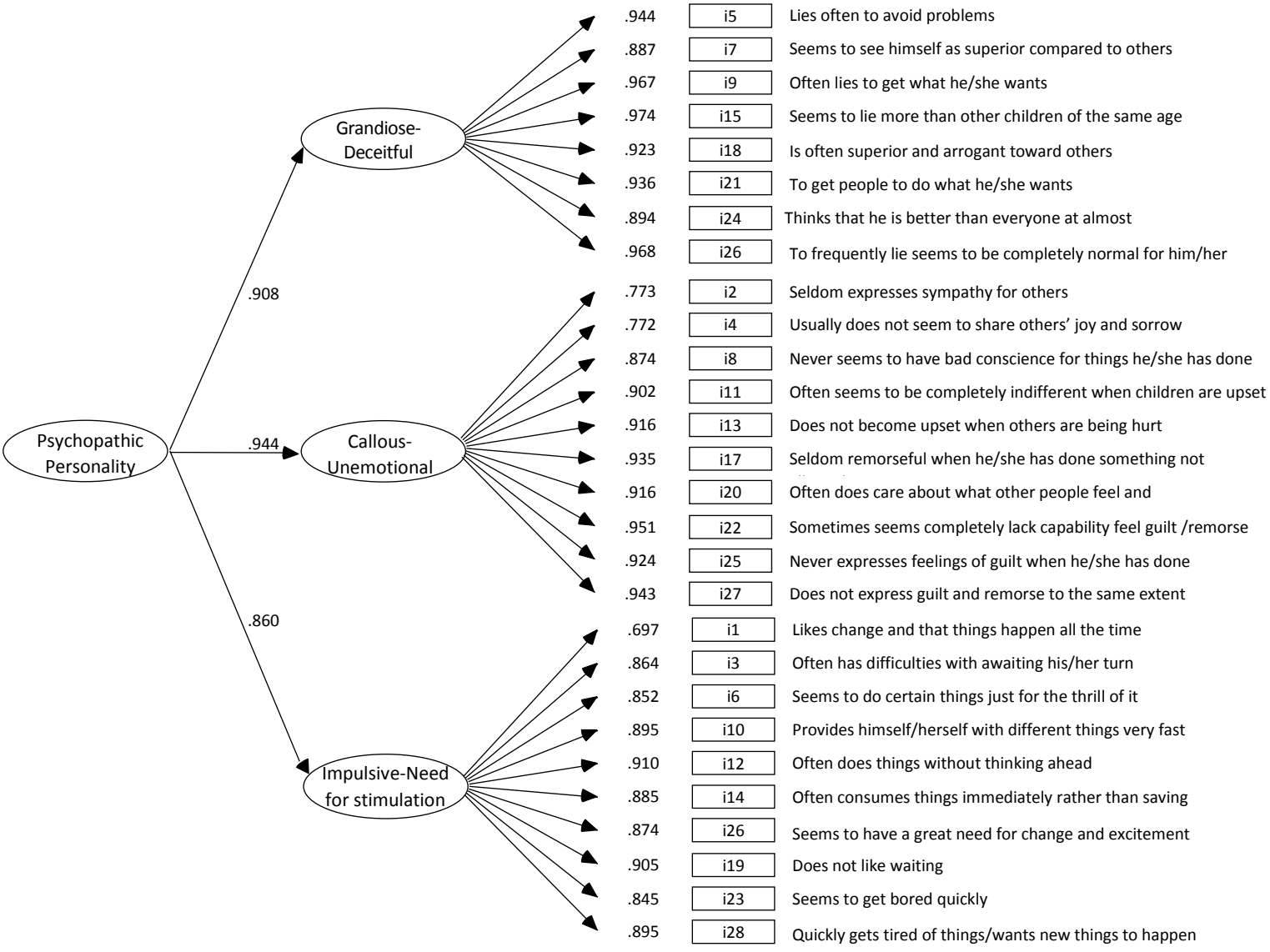

Figure 1. Parameter estimates of three-factor model (Total sample).

All estimates are significant. I = item number. All items are from the Child Problematic Traits Inventory, and some were abbreviated to save space (see Colins et al. 2014 for original wording of items).

Appendix

Fit indices for one-, and three-factor models for the Child Problematic Traits Inventory for Study 1 and Study 2

	n	RMSEA	CFI	TLI
Study 1 preschool / elementary school				
One-factor model (CPTI)	449	.12	.94	.94
Three-factor model	449	.10	.96	.96
Study 2 preschool / elementary school				
One-factor model (CPTI)	393	.08	.95	.95
Three-factor model	393	.06	.98	.97
Study 2 elementary school				
One-factor model (CPTI)	294	.12	.94	.94
Three-factor model	294	.09	.97	.97

Note. Estimation method is robust WLS. RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; CPTI = Child Problematic Traits Inventory.