

# Proposed Specifiers for Conduct Disorder (PSCD): Factor Structure and Validation of the Self-Report Version in Community and Forensic Samples of Portuguese Youth

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## Abstract

The Proposed Specifiers for Conduct Disorder (PSCD) was developed as a measure to assess the multifaceted model of psychopathic traits in children/youth (i.e., grandiose–manipulative [GM], callous–unemotional [CU], and daring–impulsive [DI] traits) in addition to Conduct Disorder (CD) symptoms. This study aims to test the psychometric properties of the PSCD-self-report version across community ( $n = 648$ ; 52.9% female) and forensic male youth ( $n = 258$ ) from the Portuguese population. Results supported a general factor and four specific factors (GM, CU, DI, CD), which was invariant across gender and sample type. Evidence for reliability, construct, and temporal validity were also found. Overall, the PSCD appears to be a promising measure for assessing psychopathic traits in youth from both community and forensic settings, which may contribute to the discussion around the conceptualization, assessment, predictive value, and clinical usefulness of the multifaceted model of psychopathy in youthful populations, particularly in its association with CD.

## Keywords

Proposed Specifiers for Conduct Disorder, PSCD, psychopathic traits, GM traits, CU traits, DI traits, Conduct Disorder

Psychopathy consists of a set of interpersonal (Grandiose–Manipulative [GM]), affective (Callous–Unemotional [CU]) and lifestyle (Daring–Impulsive [DI]) deviant traits that are frequently associated with antisocial behavior (Cooke & Michie, 2001; DeLisi, 2016; Hare, 2020; McCuish et al., 2015; Neumann et al., 2015). The study of psychopathy increased mostly after the development of the *Psychopathy Checklist* (PCL; Hare, 1980, and then its revised editions [PCL-R]; Hare, 1991, 2003), a systematic method to assess psychopathy in samples of adult offenders (Hare, 2020).

As psychopathy often has a detrimental impact on society and in individuals themselves, several authors have argued that the best time to prevent and intervene is early in life (see Salekin & Lynam, 2010, for a review). Therefore, it seems crucial to study psychopathic traits in children and youth (e.g., McCuish et al., 2015; Salekin et al., 2018; Viding & McCrory, 2018). The construct of child and adolescent psychopathy derived from the study of adult psychopathy and can be found in the works of several authors of the 20th century (e.g., Cleckley, 1941/1988; Karpman,

1950). However, until the 1990s, there were few published works about psychopathic traits in children and youth and very little attention was given to the possibility of observing those traits in nonadult populations (Salekin et al., 2018). Forth et al. (1990) became pioneers, publishing one of the first studies on the topic. By adapting the PCL (Hare, 1980), the authors showed that some young offenders also displayed psychopathic traits (Forth et al., 1990). After this study, some authors developed more specific measurement tools to assess psychopathic traits in children and youth, either by adapting measures used in the adult population or

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by creating new measures adjusted for these developmental stages (see Salekin et al., 2018; and see also Fink et al., 2012 for a review). As a result, the past decades have witnessed an exponential increase in the number of publications about psychopathic traits in youthful populations (Salekin et al., 2018).

The measurement tools used in the assessment of psychopathic traits in children and youth capture a construct that, apparently, is similar to the conceptualization of psychopathy in adulthood (Salekin et al., 2018). One of the most frequently used measurement tools is the *Psychopathy Checklist: Youth Version* (PCL:YV; Forth et al., 2003), a direct adaptation of the PCL-R (Hare, 2003) primarily for the youth forensic population. As with the PCL-R, the PCL:YV is considered a full-scale assessment tool, designed to be scored by skilled raters on the basis of a structured interview together with collateral file information (Forth et al., 2003).

Although the PCL:YV is the only clinical interview assessment tool to assess psychopathic traits in youth, with generally good psychometric properties, the measure requires specific training and a considerable amount of time to complete, making it difficult to include in test batteries where time is of essence (Hare, 2020; Salekin et al., 2018; Sellbom et al., 2018). Due to these and other considerations, such as participant burden, self-reports were established, first at the adult level, and subsequently, several self-report and/or screening measures were also designed to assess psychopathic traits in children and youth (e.g., Ribeiro da Silva et al., 2020; Salekin et al., 2018; Sellbom et al., 2018). The most frequently used self-report measures for the assessment of psychopathic traits in youthful populations include the *antisocial process screening device* (APSD; Frick & Hare, 2001), the *Youth Psychopathic Traits Inventory* (YPI; Andershed et al., 2002) and the *Youth Psychopathic Traits Inventory–Short* (YPI-S; Van Baardewijk et al., 2010). Most studies reporting on the factor structure of these self-report screening measures support a three-factor solution (e.g., Andershed et al., 2002; Frick & Hare, 2001; Van Baardewijk et al., 2010), which can be labeled as interpersonal (GM), affective (CU), and lifestyle (DI) factors (Salekin, 2017).

Despite the multidimensional nature of psychopathic traits in children and youth, recent research has increasingly focused on the CU traits alone and the *Diagnostic and Statistical Manual of Mental Disorders–Fifth edition* (DSM-5; American Psychiatric Association [APA], 2013) as well as the *International Classification of Diseases–11th Revision* (ICD-11; World Health Organization, 2016) decided to include only CU traits as a specifier for Conduct Disorder (CD). The inclusion of this specifier for CD was based on studies focused mostly on the broader concept of child psychopathy rather than CU traits alone, which, per se, may bias research findings (Salekin, 2017). Other

criticisms regarding the items that make up the specifier have also been raised, namely concerning its precision and specificity (Lahey, 2014; Luo et al., 2020).

Importantly, several recent studies have found that GM, CU, and DI traits can be observable at an early age, are relatively stable across time, and have specific and meaningful correlations with emotional, cognitive, psychosocial, and behavioral variables, as well as with predictive outcomes (Andershed, 2010; López-Romero et al., 2019; McCuish et al., 2015; Salekin, 2017). Moreover, several studies found that the combination of CD with high levels of all psychopathic traits better predicted behavioral problems and criminal recidivism than any single psychopathic trait by itself (Colins & Andershed, 2015; Colins et al., 2018; Fanti et al., 2018; Frogner et al., 2016, 2018; López-Romero et al., 2019; Ribeiro da Silva et al., 2019; Somma et al., 2018).

Overall, findings from these studies suggest that the multifaceted model of psychopathy, combining GM, CU, and DI, may be more informative and advantageous to specify CD than a model considering CU traits alone (e.g., Colins & Andershed, 2015; Colins et al., 2018; Lahey, 2014; Ribeiro da Silva et al., 2019; Salekin, 2016a, 2017; Somma et al., 2018). First, it seems that including the multifaceted model of psychopathy to delimitate a specifier for CD may, more accurately, help reduce the heterogeneity of this diagnosis, identifying a more severe antisocial subgroup of youth with CD (Colins et al., 2018; Ribeiro da Silva et al., 2019; Salekin, 2016b, 2017). Second, learning more about the interface between CD and GM, CU, and DI traits may help enhance our knowledge about youth with conduct problems, including the mechanisms that may underlie each trait and/or hinder the psychotherapeutic process (Patrick, 2018; Ribeiro da Silva et al., 2019; Salekin, 2017).

Finally, this multifaceted model of psychopathy may allow clinicians to be more attentive in the assessment of psychopathic traits in youth with conduct problems, which may be crucial to improve case conceptualization and to define accurate psychotherapeutic strategies (Colins et al., 2018; Jambroes et al., 2016; Lahey, 2014; Ribeiro da Silva et al., 2019; Salekin et al., 2018). In sum, several authors consider that the multifaceted model of psychopathy, combining GM, CU, and DI traits, still remains underrepresented in both research and clinical diagnosis, suggesting that this model could be more beneficial when studying and assessing youth with conduct problems and when diagnosing and specifying CD (Bergström & Farrington, 2018; Colins & Andershed, 2015; Colins et al., 2018; Fanti et al., 2018; Frogner et al., 2016, 2018; Ribeiro da Silva et al., 2019; Somma et al., 2018).

Although there are several measurement tools specifically designed to assess psychopathic traits in children and youth (see Ribeiro da Silva et al., 2020 and see also Salekin

et al., 2018), there is a lack of measures to assess GM, CU, and DI traits in conjunction with CD symptoms (Salekin, 2017). If the goal is to establish a well-validated CD diagnosis with clinically relevant specifiers, it seems of utmost importance to develop a measure capable of capturing the whole range of psychopathic traits as well as CD symptoms (Fink et al., 2012; Ribeiro da Silva et al., 2019; Salekin, 2016a, 2017). Moreover, it is important to develop such a measure that lends itself well to research, boosting the likelihood that it will be used thereby increasing the data base for the study of psychopathic traits and CD. In an attempt to respond to this need, Salekin and Hare (2016) developed the Proposed Specifiers for Conduct Disorder (PSCD). The PSCD addresses GM, CU, and DI traits, in addition to the four categories of CD symptoms (aggression to people and animals, destruction of property, deceitfulness or theft, serious violation of rules); one category of oppositional defiant disorder (ODD) symptoms (argumentative and defiant), frequently present in youth with CD, is also addressed with this measure.

The selection of items was performed using both rational and empirical criteria, following four main premises: (a) to provide a measure of the three-factor model of psychopathic traits in addition to CD, in a way that mirrors to some extent how it is often conceptualized in adulthood (Cleckley, 1941/1988, Hare, 2003); (b) to include the four categories of CD symptoms; (c) to include only those traits that meet empirical and/or theoretical support for being identified at early developmental stages (Salekin, 2016a); and (d) to increase the homogeneity within scales with item selection focused on content representativeness and item harmonization (Salekin, 2017). By doing so, items like planning and manipulation would not be juxtaposed with inability to plan and impulsivity. In sum, the PSCD aims to assess psychopathic traits in combination with CD, increase synergy among the dimensions of psychopathic traits, and provide a brief and accurate measurement tool to aid in research studies on CD as well as in clinical practice (Salekin, 2016a, 2016b, 2017).

The parent version and the self-report versions of the PSCD were previously validated in a sample of Spanish preschool children (López-Romero et al., 2019) and in a sample of Chinese community youth (Luo et al., 2020), respectively. However, there are no published studies reporting on the psychometric properties of the PSCD in forensic samples of youth, which is an important next step in the validation of the PSCD. Moreover, additional work is needed on community youth of the PSCD as it is an emerging measure in this area. The present study will add to the work on the PSCD in China and Spain. Furthermore, to establish clinical cutoffs, it is also mandatory to investigate differences between youth from community and forensic settings on the PSCD; to accurately grasp these differences, measurement invariance must be considered, to guarantee

that researchers are assessing the same constructs across those groups, avoiding therefore inference problems (Chen, 2007). Moreover, to date, no studies have used clinical interviews to assess *DSM/ICD* disorders for construct validity or examined the test–retest reliability of the PSCD. Thoroughly assessing the psychometric proprieties of the PSCD in youth seems paramount, as CD, psychopathic traits, and its associated risks tend to become more pronounced at this developmental stage (Abram et al., 2015; APA, 2013; DeLisi, 2016; McCuish et al., 2015; Salekin, 2017; Salekin et al., 2018).

## The Present Study

The present study aimed to test the psychometric properties of the PSCD-self-report version using a combined sample of Portuguese youth, including community participants (both girls and boys) and boys from forensic settings.

To this end, we aimed to compare different measurement models resorting with confirmatory factor analysis (CFA) and structural equation modelling (including Bifactor–ESEM). ESEM represents an overarching data analytic framework in which classical and flexible exploratory factor analysis (EFA) methods have been integrated into the statistical advances typically associated with CFA/SEM framework (Asparouhov & Muthén, 2009; Marsh et al., 2009; Marsh et al., 2014; Marsh et al., 2020; Morin, Arens, & Marsh, 2016; Morin, Arens, Tran, & Caci, 2016; Morin et al., 2020).<sup>1</sup> In turn, bifactor–ESEM allows for the coexistence of a general factor as well as specific factors, considering nontarget constructs and items, and overcoming the shortcomings of both (bifactor) CFA, and ESEM (Morin et al., 2020). Bifactor–ESEM has been considered the most comprehensive and flexible measurement model for assessing multidimensional constructs within instruments that include construct-relevant psychometric multidimensionality (i.e., conceptually related and hierarchically related constructs), such as psychopathic traits (Morin, Arens, Tran, & Caci, 2016; Paiva et al., 2020; Salekin, 2017; Somma et al., 2019). In fact, research has been pointing out that psychopathy is a multidimensional construct (comprising GM, CU, and DI traits that tend to hang together) highly correlated with CD (Andershed et al., 2002; Edens et al., 2007; Hare & Neumann, 2006; Neumann et al., 2012; Neumann et al., 2015; Ribeiro da Silva et al., 2019). The reliability of the scale was also tested across samples. Moreover, to establish reliable gender and sample type comparisons (Chen, 2007), we aimed to establish measurement invariance for the best-fitting model across gender and sample type. Latent mean comparison across gender and type of sample, construct validity (using another measure of psychopathic traits as well as a clinical interview for assessing *DSM/ICD* mental health disorders), and test–retest reliability of the PSCD was also tested.

Based on prior conceptualizations of psychopathic traits, on the original proposal of the PSCD (Salekin, 2017), and former research (Luo et al., 2020), we hypothesized an acceptable model fit for the bifactor solution, comprising a general factor and four specific factors (GM, CU, DI, CD). Although there are only two studies showing that the measurement model of the PSCD is invariant across gender in preschool children (López-Romero et al., 2019) and adolescents (Luo et al., 2020), considering other assessment tools of psychopathic traits via self-report ratings in youth from community and forensic settings (e.g., Pechorro et al., 2016; Pechorro et al., 2017), we expected that the PSCD would be invariant across gender and sample type. Regarding latent mean comparisons, as found in previous research using other screening measures of psychopathic traits (Colins et al., 2017; Pechorro et al., 2016; Pechorro et al., 2017; Verona & Vitale, 2018), we expected that boys from the community sample would obtain higher scores than girls on the PSCD total score and on the GM, CU, and CD factors (girls and boys are expected to have similar scores on the DI factor) and that boys from forensic settings would score significantly higher than community boys on the total score of the PSCD and all its factors.

Regarding reliability, we expected acceptable to good internal consistency for the PSCD factors and total score given past research (López-Romero et al., 2019; Luo et al., 2020). Regarding the construct validity of the PSCD, we expected positive and strong correlations with an alternative measure of psychopathic traits (Luo et al., 2020). We also expected strong and positive correlations with mental health disorders traditionally and/or theoretically related to psychopathic traits and aggressive/antisocial behavior, that is, CD and ODD (considering the presence of these diagnoses, the number of criteria met for each diagnosis, the number of criteria met for each symptom categories, and the number of criteria met for both diagnosis; Porter et al., 2018; Ribeiro da Silva et al., 2019; Vahl et al., 2016). Moreover, we hypothesize moderate and positive correlations with alcohol/substance use disorders (Brennan et al., 2017; Ellingson et al., 2018; Ribeiro da Silva et al., 2019; Sellbom et al., 2017). In turn, we did not expect to find significant correlations with attention deficit hyperactivity disorder (ADHD), as the PSCD moved away from assessing impulsivity, focusing instead on daring behavior (López-Romero et al., 2019; Luo et al., 2020; Salekin, 2017). We also hypothesized to find nonsignificant/negligible associations with mood disorders, anxiety disorders, eating disorders, tic disorders, adjustment disorders, and suicide risk (Vahl et al., 2016). Finally, we expected good test-retest reliability for the PSCD, especially for community participants, considering that psychopathic traits seem to be relatively stable across time (Andershed, 2010; Edens et al., 2007; McCuish et al., 2015).

## Method

### Participants

Participants in the current study included 906 youth (i.e., total sample), aged between 14 and 18 years ( $M = 15.99$ ;  $SD = 1.15$ ), with 2 to 12 years of education ( $M = 8.62$ ;  $SD = 1.90$ ). Concerning socioeconomic status<sup>2</sup> (SES), 26.3% of the participants had low SES ( $n = 238$ ); 57% had medium SES ( $n = 516$ ), and 16.7% had high SES ( $n = 152$ ). Of those 906 participants, 648 (71.5%) were recruited from public schools in Mainland Portugal (i.e., community sample): 305 boys (47.1%) and 343 (52.9%) girls. The total sample also included 258 (28.5%) male youth who were recruited in Portuguese juvenile detention facilities (i.e., forensic sample).<sup>3</sup> Participants in both samples, as expected (Ribeiro da Silva et al., 2019), were not equally distributed by SES,  $\chi^2(2) = 317.24$ ,  $p < .001$ , nor by years of education,  $t(374.99) = 30.22$ ,  $p < .001$ ; more participants from the forensic sample came from a low SES and presented fewer years of education than community participants. Participants taken from both samples had similar mean ages,  $t(904) = 1.10$ ,  $p = .27$ .

### Measures

**Proposed Specifiers for Conduct Disorder.** The PSCD-Self-Report Version (Salekin & Hare, 2016; Portuguese authorized version by Ribeiro da Silva et al., 2017) is a 24-item questionnaire, which was designed to assess psychopathic traits in youth via self-report ratings within four expected factors (Salekin, 2017): GM (Items 1 to 6; e.g., “I can turn on the charm in any situation”); CU (Items 7 to 12; e.g., “I don’t waste time thinking about how others feel”); DI (Items 13 to 18; e.g., “I get a thrill out of doing risky things”); and CD (Items 19 to 24; e.g., “I have engaged in physical aggression against animals or people”). Each factor is estimated by a set of six items; each item is rated on a 3-point scale (0 = *not true*; 1 = *somewhat true*; 2 = *true*). A total score can be created including all 24 items. All PSCD factors and total score can be computed by simply adding the item ratings; higher scores are indicators of increased levels of psychopathic traits.

The PSCD was translated and adapted into Portuguese following a translation and back-translation procedure (Hambleton et al., 2005). The translation was carried out by two Portuguese researchers who are fluent in Portuguese and English and had previous clinical practice with adolescents. The PSCD was revised by a senior Portuguese researcher to assure that items were worded in a way that addressed the same constructs as the original version. The questionnaire was then back-translated into English by a native English-speaking researcher, unrelated to this study. The back-translation was sent to the first author of the



original English version of PSCD for revision. No relevant inconsistencies were found between the back-translation and the original version, indicating that the Portuguese version of the PSCD had the same or very similar meaning to the original version. The final version of the questionnaire was then tested in a community sample focus group of 20 youth who discussed the clarity and suitability of the items and instructions. Minor phrasing changes were considered necessary and made to the PSCD to assure its suitability. Analyses of the psychometric properties of the PSCD within the current study will be reported in the results section.

**Youth Psychopathic Traits Inventory–Short.** The YPI-S (Van Baardewijk et al., 2010; Portuguese authorized version by Pechorro et al., 2015) is an 18-item self-report version of the original YPI (Andershed et al., 2002), which assesses psychopathic traits in youth via ratings within three different factors: GM (e.g., “It’s easy for me to manipulate people”), CU (e.g., “I think that crying is a sign of weakness, even if no one sees you”), and DI (e.g., “I like to do exciting and dangerous things, even if it is forbidden or illegal”). Each factor is estimated by a set of six items; each item is rated on a 4-point scale (ranging from 1 = *does not apply at all* to 4 = *applies very well*). A total score can also be created including all 18 items. YPI-S factors and total score can be computed by simply adding the item ratings; higher scores are indicators of increased levels of psychopathic traits. The three-factor structure of the YPI-S was, among others, confirmed in a Portuguese youth community sample (Pechorro et al., 2017) and in a sample of Portuguese male young offenders (Pechorro et al., 2015). This measurement model has proven to be invariant across gender and across boys taken from those different samples (Pechorro et al., 2017). The YPI-S has revealed convergence with the original YPI and it has been demonstrated to have acceptable to good psychometric properties (Pechorro et al., 2015; Pechorro et al., 2017; Van Baardewijk et al., 2010). In the current work, the YPI-S showed acceptable to good internal consistency based on alpha: YPI-S Total score ( $\alpha = .84$ ); GM ( $\alpha = .80$ ); CU ( $\alpha = .73$ ), and DI ( $\alpha = .73$ ).

**Mini-International Neuropsychiatric Interview for Children and Adolescents (MINI-KID).** The MINI-KID (Sheehan et al., 2010; Portuguese authorized version by Rijo et al., 2016) is a semistructured clinical diagnostic interview, which assesses *DSM/ICD* disorders in children and youth in a way that is both comprehensive and concise, namely: mood disorders, anxiety disorders, substance-related disorders, tic disorders, ADHD, disruptive disorders, psychotic disorders, eating disorders, adjustment disorders, and suicide risk. The interview also has a section that allows the screening of pervasive developmental disorders. The MINI-KID is organized into diagnostic sections, each one starting with 2 to 4

screening questions for each specific disorder. Additional symptom questions within each disorder section are asked only if the screen questions are positively answered. All questions are in a binary “yes/no” format. The MINI-KID considers not only *DSM* Criteria A, but also the impairment and duration of the symptoms, being considered a short and accurate instrument to diagnose mental health disorders. Additionally, items are included to address ruling out medical, organic, and/or drug causes for disorders. Diagnostic criteria are summarized and documented within each disorder section and on a summary sheet, where the interviewer can also identify the main diagnosis, that is, which diagnosis troubles the youth the most or dominates the others or came first in the natural history. The MINI-KID can be used to diagnose mental health disorders categorically (present or absent) and dimensionally (according to the number of criteria met for each diagnosis or symptom categories). The MINI-KID takes between 30 and 90 minutes to administer, depending on the number of screening questions that are positively answered by the child/adolescent. In a previous study (Sheehan et al., 2010), interrater reliability was found to be excellent for all mental health disorders assessed with the MINI-KID. Considering the known association between psychopathic traits and disruptive disorders (i.e., CD and ODD) and the possibility to diagnose both CD and ODD (APA, 2013; Ribeiro da Silva et al., 2019; Salekin et al., 2018) we will use not only the categorical presentation of these diagnoses but also: the number of criteria met for each diagnosis; the number of criteria met for symptom categories of CD (aggression to people and animals, destruction of property, deceitfulness or theft, and serious violations of rules) and ODD (angry/irritable mood, argumentative/defiant behavior, and vindictiveness); and the number of criteria met for both CD and ODD.

## Procedure

The current work was financed by a research grant awarded to the third author by ESF—European Regional Development Fund through the COMPETE 2020—Operacional Programme for Competitiveness and Internationalization, and by Portuguese funds through FCT—Portuguese Foundation for Science and Technology (reference project POCI-01-0145-FEDER-016724). The funding entities had no part in the decisions involved in conducting and publishing this work.

This study was approved by the ethics committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra. Institutional authorizations were sought from executive boards of public schools (to assess community youth) as well as from the Ministry of Justice (to assess forensic youth). After authorizations were obtained, all participants were informed about the nature of the study and were invited to voluntarily participate. It was

explained that their decision would not affect their sentencing/school grades in any way and that no payment or extra credit would be offered. Confidentiality and anonymity of their responses were also guaranteed. Participants with 18 years gave verbal and written consent for their own participation and participants younger than 18 years verbally assented to their own participation in addition to their parents/legal guardians' written consent. However, 34 and 13 youth, respectively, from the community and forensic samples, declined to participate. Youth with suspected cognitive impairment, psychotic symptoms, and/or developmental disorders were excluded from this study.

In the community sample, only youth with no history of behavioral problems and/or mental health disorders were eligible for the study. This initial selection was made by parents/teachers after researchers have explained these exclusion criteria for the community sample. Data collection in the community sample consisted only of self-report assessment (see the Measure section).

In the forensic sample, only youth with CD and/or ODD were eligible for the study. Data collection in the forensic sample consisted of two assessment phases: (a) the clinical interviewing procedure to assess mental health disorders in participants (including the identification of inclusion criteria and exclusion criteria not previously identified) and (b) the self-report assessment (see the Measures section). In the forensic sample, three youth fulfilled one or more inclusion/exclusion criteria and were excluded from the study (i.e., not included in the description of participants or in the data to be analyzed). The remaining participants further completed the self-report assessment.

To assess test-retest reliability of the PSCD-self-report, 51 youth from the community sample and 37 youth from the forensic sample were assessed after a 3-month and a 6-month period, respectively.

Evaluators for the current study received extensive training, including a 3-day workshop on the administration and rating of the MINI-KID and self-report measures. Once the training was completed, evaluators were supervised by a senior researcher during the assessment phase.

## Data Analysis

To explore the psychometric properties of the PSCD, *Mplus* v7.4 (Muthén & Muthén, 2015) and IBM SPSS 25.0 were used. Considering the original dimensionality and theoretical structure (Salekin, 2017), which accounts for four distinct, yet related, dimensions of psychopathic traits (i.e., GM, CU, and DI) and CD symptoms, the model fit of various measurement models were sequentially tested through *Mplus*. Considering the recommendations of Morin et al. (2020), a four-factor correlated model through CFA was compared with a four-factor correlated model through

ESEM, to assess the presence of construct-relevant psychometric multidimensionality. Key elements supporting a ESEM solution are as follows: (a) an improved model fit, (b) reduced factor correlations, (c) small to moderate cross-loadings (or expected larger cross-loadings), and (d) well-defined factors. Based on these results and considering the theoretical and empirical reasons to expect that a global factor might be present (Salekin, 2017), it is recommended to perform a comparison of the retained CFA or ESEM solution with a matching bifactor-CFA (in which factor correlations are set to zero and items load both on the general and in one specific factor) or bifactor-ESEM representation (in which factors are also uncorrelated but the estimation of cross-loadings in all specific factors is allowed, although targeted to be as close to zero as possible). The bifactor representation would be preferred over a four-factor CFA/ESEM when there are (a) an improved model fit, (b) a well-defined general factor, (c) at least some reasonably well-defined specific factors (as in bifactor models these may simply serve to control for residual specificities shared among a subset of indicators; Morin et al., 2020).

The robust weighted least square with mean and variance adjusted was used when testing the various measurement models, as the PSCD is rated on a 3-point scale and this method is robust to nonnormal and categorical data (Flora & Curran, 2004). To assess model fit, a set of goodness-of-fit indices were analyzed (Hu & Bentler, 1999): the comparative fit index (CFI;  $\geq .95$  for good,  $\geq .90$  for acceptable), the Tucker-Lewis index (TLI;  $\geq .95$  for good,  $\geq .90$  for acceptable), the root mean square error of approximation (RMSEA;  $\leq .06$  for good,  $\leq .08$  for acceptable) with its 90% confidence interval (CI), and/or the standardized root mean square residual ( $\leq .08$  for good,  $\leq .11$  for acceptable). Furthermore, when assessing CFA and ESEM models, factor correlations, target loadings and cross-loadings values were considered. To support bifactor models, meaningful loadings should be associated with the general factor in addition to reduced cross-loadings and, to some extent, well-defined specific factors.

To assess the internal consistency of the PSCD, Cronbach's  $\alpha$ s were computed for all factors. Additionally, for the bifactor models, the omega index ( $\omega$ ) was computed, representing the percentage of variance in the total scores attributed to the general factor in addition to the specific factors (Hancock & Mueller, 2001; Morin et al., 2020). To estimate the percentage of variance in total scores attributed to the general factor, the omega hierarchical index ( $\omega_H$ ) was computed.  $\omega_H$  was also divided by omega to determine reliable variance (not attributed to error) attributed to the general factor of the scale. Available guidelines (Reise et al., 2013) suggest that the use of a total score is justified when values are between 50% and 75% although values higher than 75% are preferred. Finally, to determine reliable

**Table 1.** Goodness-of-Fit Indices for the Proposed Specifiers for Conduct Disorder (PSCD).

Sample	Models	$\chi^2$	df	CFI	TLI	RMSEA	90% CI for RMSEA	SRMR
Total sample	Four-factor CFA	1585.532*	246	.874	.859	.078	[.074, .081]	.078
	Four-factor ESEM	840.876*	186	.938	.909	.062	[.058, .067]	.050
	Bifactor ESEM	325.439*	166	.985	.975	.033	[.027, .038]	.026
Community sample	Four-factor CFA	1212.913*	246	.798	.773	.078	[.074, .082]	.092
	Four-factor ESEM	436.565*	186	.948	.922	.046	[.040, .051]	.045
	Bifactor ESEM	271.931*	166	.978	.963	.031	[.025, .038]	.032
Community sample of girls	Four-factor CFA	654.057*	246	.810	.787	.070	[.063, .076]	.098
	Four-factor ESEM	279.300*	186	.957	.936	.038	[.029, .047]	.053
	Bifactor ESEM	231.724*	166	.969	.949	.034	[.023, .044]	.044
Community sample of boys	Four-factor CFA	698.158*	246	.774	.746	.078	[.071, .084]	.104
	Four-factor ESEM	321.446*	186	.932	.899	.049	[.040, .058]	.055
	Bifactor ESEM	212.606*	166	.977	.961	.030	[.016, .042]	.040
Forensic sample	Four-factor CFA	468.020*	246	.897	.885	.059	[.051, .067]	.086
	Four-factor ESEM	321.162*	186	.937	.907	.053	[.043, .063]	.060
	Bifactor ESEM	214.486*	166	.978	.963	.034	[.019, .046]	.044

Note. CFA = confirmatory factor analysis; ESEM = exploratory structural equation modeling;  $\chi^2$  = weighted least square chi-square test of exact fit; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; 90% CI = 90% confidence interval of the RMSEA; SRMR = standardized root mean square residual.

\* $p < .01$ .

variance attributed to the specific factors,  $\omega_H$  is subtracted from  $\omega$  (Rodriguez et al., 2016).

Measurement invariance was also tested between community girls and boys and between community and forensic boys. Following Chen's (2007) guidelines, models are considered as providing similar degree of fit when  $\Delta CFI \leq .01$  and  $\Delta RMSEA \leq .015$  between increasingly restrictive models. To compare latent means between groups, Configural (the same measurement model is tested in both groups), Weak (invariance of factor loadings), and Strong measurement invariance (invariance of loadings and thresholds) were tested.

Independent samples  $t$  tests were used for mean comparisons between gender and sample type. Effect sizes were computed and examined through Cohen's criteria (1988): 0.2 for small, 0.5 for medium and 0.8 for large effect sizes.

Construct validity was analyzed using Pearson correlations or point biserial correlations<sup>4</sup> between the PSCD summed scores and relevant external variables, that is, an alternative measure of psychopathic traits (including all participants from community and forensic settings) and mental health disorders assessed with the MINI-KID (including forensic participants only). Regarding correlations with MINI-KID, it was considered: disruptive disorders (CD and ODD: the presence of these diagnoses, the number of criteria met for each diagnosis, the number of criteria met for symptom categories, and the number of criteria met for both diagnosis); substance-related disorders; ADHD; mood disorders; anxiety disorders; tic disorders; eating disorders; adjustment disorders, and suicide risk.<sup>5</sup>

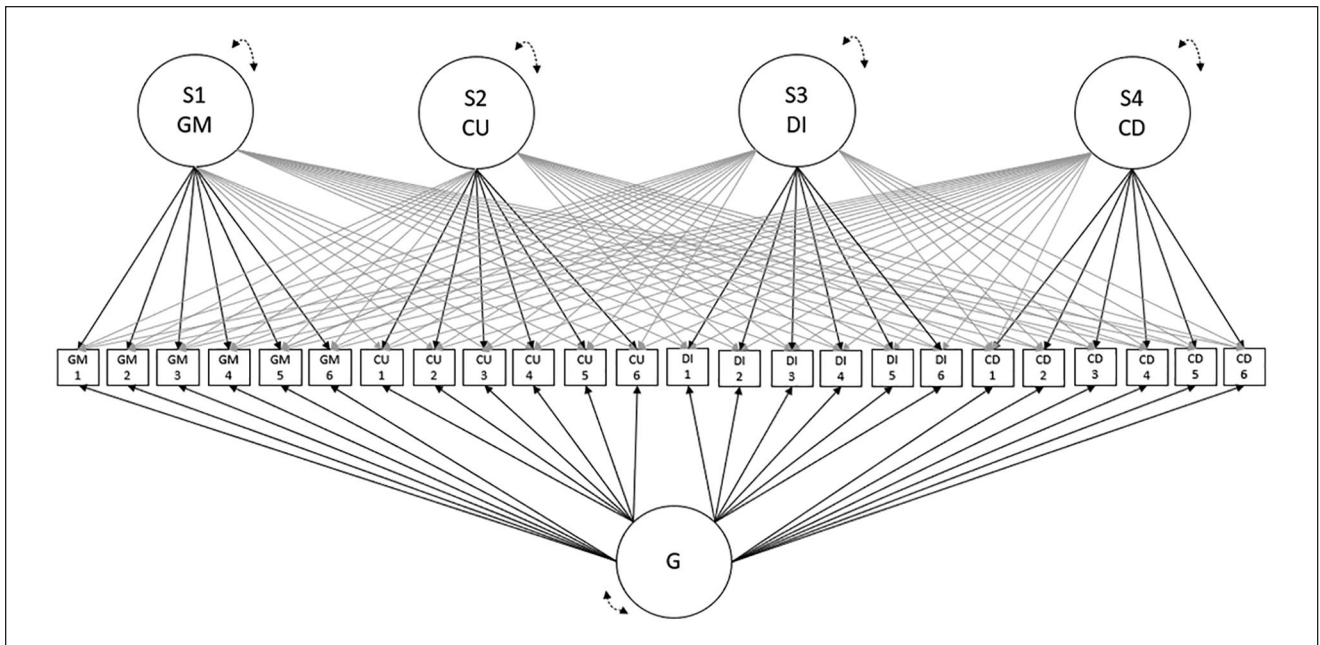
Finally, to assess temporal reliability (3 months for the community sample and 6 months for the forensic sample), both Pearson correlation coefficients and paired samples  $t$  test were performed. For the paired samples  $t$  tests, the  $p$  value was adjusted through a Bonferroni correction. Considering the number of comparisons being performed, for these comparisons, the considered  $p$  value was  $p = .007$ .

## Results

### Evidence Based on Internal Structure

As suggested by Morin et al. (2020), a four-factor CFA measurement model was compared with a four-factor model through ESEM. Model fit indices (see Table 1) favored the four-factor ESEM across all samples. Moreover, factor correlations decreased in the ESEM models, suggesting that the subscales are associated but not redundant. Considering these results, and to assess if a general factor was present, in addition to the four subscales, a bifactor–ESEM model was tested (Morin et al., 2020). Model fit indices for the bifactor–ESEM model (see Table 1) showed excellent suitability of this solution to the data<sup>6</sup> (see Figure 1).

For this measurement model, parameter estimates revealed an overall well-defined general factor across all samples (see Tables 2, 3, and 4), thus reflecting a global factor of CD/psychopathic traits. As regards the specific factors in the total sample and across community samples, when the effect of the global factor was considered, CU, DI, and CD retained a high degree of specificity than the GM specific factor (see Tables 2 and 3). As regards the forensic



**Figure 1.** Bifactor exploratory structural equation model (bifactor-ESEM) for Proposed Specifiers for Conduct Disorder (PSCD). Note: G = general factor of CD/psychopathic traits; S = specific factors (GM = Grandiose-Manipulative; CU = Callous-Uncaring; DI = Daring-Impulsive; CD = Conduct Disorder).

sample, the GM specific factor retained a higher degree of specificity when compared with CU-, DI-, and CD-specific factors (see Table 4).

Considering model fit indices and parameter estimates, the four-factor bifactor-ESEM model was considered the best fit to all samples. Thus, further analyses were conducted considering this model. Cronbach's  $\alpha$ s were computed for the scale's total score, as well as for the four subscales in all samples. For the total score,  $\alpha$ s were considered good across samples. For the subscales, across all samples,  $\alpha$ s were considered acceptable (see Table 5). Additionally,  $\omega$  and  $\omega_H$  for the bifactor-ESEM model were considered at least acceptable across samples: the reliable variance in item responding attributed to the general factor ranged between 68% and 83%; the reliable variance attributed to the specific factors when the general factor was accounted ranged between 16% and 30% (see Table 5).

### Measurement Invariance

Configural, weak, and strong measurement invariance were explored across gender (i.e., community girls and boys) and sample type (i.e., community and forensic boys). The same four-factor bifactor-ESEM fitted all samples, thus demonstrating configural invariance (see Table 6). Therefore, various invariance constraints were progressively added to the model to test weak and strong measurement invariance. Following Chen's (2007) guidelines to assess increasingly restrictive models ( $\Delta CFI \leq .01$  and  $\Delta RMSEA \leq .015$ ), both

weak and strong measurement invariance were achieved (see Table 6), demonstrating loadings and thresholds invariance and allowing for further latent mean comparisons between groups.

### Gender and Sample Type Differences in Psychopathic Traits

When comparing both community girls and boys as well as community and forensic boys, differences were found for the general score of the PSCD: girls significantly report lower levels of psychopathic traits than community boys (medium effect size) and forensic boys report higher levels of psychopathic traits than community boys (large effect size). Regarding PSCD subscales: girls significantly report lower levels of psychopathic traits than community boys (small to medium effect sizes, except for the DI subscale in which no significant differences were found across gender) and forensic boys report higher levels of psychopathic traits for all subscales than community boys (medium to large effect sizes; see Table 7).

### Construct Validity in Relation to External Variables

The general and specific factors of the PSCD were highly correlated with an alternative measure of psychopathic traits (i.e., the YPI-S), both considering the general factors and respective dimensions (see Table 8).



**Table 2.** Standardized Parameter Estimates for the Four-Factor Models in the Total Sample.

IC	Item	Bifactor–ESEM				
		GF( $\lambda$ )	GM( $\lambda$ )	CU( $\lambda$ )	DI( $\lambda$ )	CD( $\lambda$ )
GM	1	.373**	.476**	-.039	.032	-.017
GM	2	.314**	.690**	.008	.013	-.012
GM	3	.372**	.588**	.031	.069	.066
GM	4	.809**	-.063	-.094**	-.187**	-.190**
GM	5	.732**	-.035	.142**	-.214**	-.035
GM	6	.780**	-.111	-.197**	-.118**	-.310**
CU	7	.361**	.118**	.559**	.039	.020
CU	8	.434**	-.075	.626**	-.046	-.055
CU	9	.423**	-.021	.722**	-.057	.094**
CU	10	.536**	-.153**	.295**	.048	.028
CU	11	.428**	-.243**	.083	.118*	.239**
CU	12	.384**	.194**	.461**	.015	.085*
DI	13	.348**	.231**	.027	.299**	-.028
DI	14	.345**	.103**	-.052	.660**	.038
DI	15	.476**	-.046	-.014	.736**	.043
DI	16	.438**	-.121**	.019	.406**	.082*
DI	17	.186**	.220**	-.021	.401**	-.068
DI	18	.527**	-.163**	.070	.274**	.353**
CD	19	.631**	.111**	.019	-.029	.556**
CD	20	.589**	.065**	.026	.052	.645**
CD	21	.620**	.025	.049	.015	.582**
CD	22	.661**	-.039	.071	.180**	.530**
CD	23	.524**	-.088*	.061	.059	.358**
CD	24	.542**	.114*	-.065	.249**	.033

Note. ESEM = exploratory structural equation modeling; IC = item component; GM = Grandiose–Manipulative; CU = Callous–Unemotional; DI = Daring–Impulsive; CD = Conduct Disorder; CS = GF = general factor;  $\lambda$  = standardized factor loadings.

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

For the general score of the PSCD, positive associations were found with CD and ODD: considering the presence of these diagnoses, the number of criteria met for these diagnoses, the number of criteria met for symptom categories (except for the angry/irritable mood category of ODD), and for the number of criteria met for both CD and ODD. Positive associations were also found for alcohol/substance use disorders. In contrast, nonsignificant associations were found between the general score of the PSCD and any other mental health disorder considered in this study (i.e., ADHD, social anxiety disorder, and suicide risk; cf. Note 4; see Table 8).

Although the PSCD-specific factors followed a similar pattern of associations with disruptive disorders and substance-related disorders, there were some specificities regarding the GM factor, but also the CU and DI factors that need to be detailed. Moreover, in line with the general factor of the PSCD, no specific factor presented significant associations with ADHD, social anxiety disorder, and suicide risk (see Table 8).

Considering the GM factor, this showed strong and positive associations with CD, considering the number of

criteria met for this diagnosis (but not the diagnosis per se) and the number of criteria met for the symptom categories of aggression to people and animals and destruction of property (but not for deceitfulness or theft and serious violations of rules symptom categories). In turn, the GM factor was positively associated with the argumentative defiant behavior symptom category of ODD and the number of criteria met for both CD and ODD. No associations were found between the GM factor and other ODD variables or alcohol/substance use.

As regards to the CU factor, this showed the same strong and positive associations with CD variables as the GM factor. The CU factor was also positively associated with all the variables considered for ODD (the presence of this diagnoses, the number of criteria met for this diagnosis, the number of the criteria met for all its symptom categories; except for the angry/irritable mood symptom category), with the number of criteria met for both CD and ODD, and with alcohol/substance use.

In turn, the DI factor showed strong and positive associations with CD, considering the number of criteria met for this diagnosis (but not the diagnosis per se) and the number

**Table 3.** Standardized Parameter Estimates for the Four-Factor Models in the Community Sample and in the Community Sample of Girls and Boys.

IC	Item	Bifactor-ESEM (community sample)					Bifactor-ESEM (community girls)					Bifactor-ESEM (community boys)				
		GF( $\lambda$ )	GM( $\lambda$ )	CU( $\lambda$ )	DI( $\lambda$ )	CD( $\lambda$ )	GF( $\lambda$ )	GM( $\lambda$ )	CU( $\lambda$ )	DI( $\lambda$ )	CD( $\lambda$ )	GF( $\lambda$ )	GM( $\lambda$ )	CU( $\lambda$ )	DI( $\lambda$ )	CD( $\lambda$ )
GM	1	.292**	.545**	-.021	.055	.018	.204**	.507**	.062	.038	-.120	.281	.623**	-.019	.117	.137
GM	2	.197**	.725**	.076	.078	.021	.125	.786**	.018	.159*	.034	.116	.730**	.143	.046	.063
GM	3	.217**	.634**	.106	.104*	-.094	.091	.587**	.188**	.113	-.018	.181	.664**	.073	.161	-.163
GM	4	.809**	.019	-.127**	-.127**	-.181**	.807**	.067	-.138*	-.119	-.179**	.747**	.156	-.097	-.156*	-.157*
GM	5	.766**	.012	.169**	-.190**	.019	.828**	.072	.203**	-.194**	.068	.685**	.113	.166	-.225**	.019
GM	6	.832**	-.021	-.217**	-.035	-.170**	.836**	.047	-.240**	-.117	-.114	.851**	.068	-.226**	-.014	-.261**
CU	7	.328**	.154**	.616**	-.002	-.034	.275**	.052	.586**	-.025	-.115	.266**	.170**	.694**	.046	-.059
CU	8	.458**	-.028	.580**	-.102*	.005	.516**	.138*	.628**	-.113	.105	.371**	-.098	.556**	-.137	-.030
CU	9	.415**	.042	.705**	-.080	.116*	.523**	.120	.628**	.004	.169*	.254**	.005	.739**	-.136*	.095
CU	10	.578**	-.171**	.342**	.089	.098	.683**	-.204**	.364**	.088	-.071	.497**	-.125	.338**	.081	.183
CU	11	.394**	-.237**	.166**	.180**	.206**	.491**	-.239**	.116	.186**	.105	.374**	-.203**	.220*	.132	.252*
CU	12	.292**	.249**	.418**	-.035	.007	.321**	.149	.399**	-.142	-.005	.141	.325**	.459**	.098	.013
DI	13	.295**	.300**	.001	.340**	-.148**	.233**	.284**	.007	.361**	-.146	.270	.308*	-.006	.357**	-.189
DI	14	.196**	.108**	-.062	.703**	-.012	.196**	.127*	-.040	.703**	.015	.195	.094	-.069	.725**	-.013
DI	15	.336**	-.032	-.040	.796**	.057	.340**	-.018	-.106*	.779**	.072	.350**	-.040	.005	.782**	.036
DI	16	.333**	-.145**	-.043	.405**	.091	.348**	-.078	-.024	.272**	.123	.398**	-.129	-.042	.499**	.139
DI	17	.098	.237**	-.059	.395**	-.040	.090	.204**	.054*	.334**	.024	.099	.270**	-.031	.449**	-.062
DI	18	.441**	-.119**	.132*	.337**	.240**	.456**	-.119	.135	.346**	.119	.471**	-.128	.124	.323**	.248*
CD	19	.598**	.071	-.044	-.090	.389**	.617**	.065	-.038	-.160*	.305**	.511**	.138	-.031	-.009	.461**
CD	20	.478**	.016	.047	.039	.546**	.473**	-.124	-.074	.043	.530**	.418**	.076	.104	.082	.547**
CD	21	.540**	-.046	.022	-.094	.574**	.555**	-.126	.095	-.047	.542**	.495**	-.006	-.029	-.104	.586**
CD	22	.529**	-.051	.169**	.244**	.492**	.583**	.012	.163	.367**	.332**	.490**	-.117	.166*	.146	.534**
CD	23	.467**	-.074	.077	.033	.440**	.588**	.101	.068	.044	.514**	.340*	-.142	.049	.005	.455**
CD	24	.435**	.182**	-.054	.308**	.073	.430**	.139*	-.055	.321**	.008	.410**	.208	-.027	.324**	.039

Note. ESEM = exploratory structural equation modeling; IC = item component; GM = Grandiose-Manipulative; CU = Callous-Unemotional; DI = Daring-Impulsive; CD = Conduct Disorder; CS = general factor;  $\lambda$  = standardized factor loadings.

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

**Table 4.** Standardized Parameter Estimates for the Four-Factor Models in the Forensic Sample.

IC	Item	Bifactor–ESEM				
		GF( $\lambda$ )	GM( $\lambda$ )	CU( $\lambda$ )	DI( $\lambda$ )	CD( $\lambda$ )
GM	1	.195*	.485**	-.049	.146*	.153*
GM	2	.023	.692**	.006	.101	.137
GM	3	.106	.576**	.015	.166**	.210**
GM	4	.813**	.368**	-.035	-.256**	-.194**
GM	5	.586**	.307**	.132	-.145*	-.026
GM	6	.672**	.342**	-.044	-.083	-.218**
CU	7	.256**	.014	.495**	.154*	-.083
CU	8	.424**	-.047	.678**	.109	.013
CU	9	.373**	-.089	.727**	-.083	.013
CU	10	.428**	.111	.207*	.027	.011
CU	11	.431**	-.156*	-.062	-.037	.243**
CU	12	.292**	.095	.611**	.141*	.071
DI	13	.215**	.054	.124	.312**	.176*
DI	14	.390**	.050	.007	.642**	-.084
DI	15	.576**	-.021	.017	.594**	-.043
DI	16	.491**	-.012	.188**	.501**	.073
DI	17	.237**	.159	.087	.509**	.086
DI	18	.552**	-.369**	-.069	.115	.198*
CD	19	.377**	.100	.127	.000	.603**
CD	20	.484**	.045	-.053	-.009	.740**
CD	21	.501**	.063	.079	.086	.476**
CD	22	.724**	-.041	-.134*	.005	.372**
CD	23	.441**	-.001	.016	.083	.186*
CD	24	.653**	.205	-.148*	.199**	.133

Note. ESEM = exploratory structural equation modeling; IC = item component; GM = Grandiose–Manipulative; CU = Callous–Unemotional; DI = Daring–Impulsive; CD = Conduct Disorder; CS = GF = general factor;  $\lambda$  = standardized factor loadings.

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

**Table 5.** Reliability Indices: Cronbach's  $\alpha$  and  $\omega$  Values.

	Total sample	Community sample	Community sample of girls	Community sample of boys	Forensic sample
Cronbach's $\alpha$ with their 95% CI					
PSCD (total)	.866 [.853, .878]	.818 [.797, .838]	.807 [.777, .836]	.808 [.775, .837]	.832 [.801, .860]
GM	.693 [.661, .723]	.669 [.628, .707]	.628 [.564, .686]	.681 [.623, .734]	.678 [.613, .735]
CU	.670 [.635, .702]	.650 [.606, .690]	.641 [.579, .697]	.635 [.567, .695]	.639 [.566, .703]
DI	.695 [.663, .725]	.657 [.615, .697]	.623 [.557, .681]	.692 [.635, .742]	.672 [.606, .730]
CD	.821 [.803, .839]	.703 [.666, .777]	.671 [.614, .722]	.691 [.634, .742]	.734 [.680, .781]
Omega and omega hierarchical estimator for general factor of psychopathic traits in the bifactor ESEM models					
$\Omega$	.939	.921	.925	.913	.923
$\omega_H$	.777	.704	.727	.618	.676
GF	.827	.764	.786	.677	.732
SF	.162	.217	.198	.295	.247

Note. PSCD = Proposed Specifiers for Conduct Disorder; GM = Grandiose–Manipulative; CU = Callous–Unemotional; DI = Daring–Impulsive; CD = Conduct Disorder;  $\omega_H$  = omega hierarchical; GF = reliable variance explained by the general factor; SF = reliable variance explained by the specific factors; CI = confidence interval.

of criteria met for the symptom categories of aggression to people and animals, destruction of property, and deceitfulness or theft (but not for serious violations of rules

symptom category). Similar to the CU factor, the DI factor was also positively associated with the number of criteria met for ODD (but not with the diagnosis per se), the number

**Table 6.** Measurement Invariance of the Proposed Specifiers for Conduct Disorder (PSCD) Across Girls and Boys From the Community Sample (Gender Measurement Invariance) and Across Boys From Community and Forensic Samples (Sample Type Measurement Invariance).

	$\chi^2$	df	CFI	TLI	RMSEA	90% CI for RMSEA	$\Delta\chi^2$ (df)	$\Delta$ CFI	$\Delta$ RMSEA
Gender measurement invariance									
Configural	444.855*	332	.973	.955	.032	[.024, .040]			
Weak	529.561*	427	.975	.968	.027	[.019, .035]	113.122* (95)	+.002	-.005
Strong	569.553*	446	.970	.963	.029	[.021, .036]	50.431* (19)	-.005	+.002
Sample type measurement invariance									
Configural	431.632*	333	.976	.961	.032	[.023, .041]			
Weak	554.009*	428	.970	.961	.032	[.024, .040]	138.390* (95)	-.006	.000
Strong	603.230*	446	.962	.953	.035	[.028, .042]	48.256* (18)	-.008	+.003

Note.  $\chi^2$  = weighted least square chi-square test of exact fit; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; 90% CI = 90% confidence interval of the RMSEA.

\* $p < .01$ .

**Table 7.** Effect Sizes in the Specific Factors of Proposed Specifiers Do Conduct Disorder (PSCD) by Gender in the Community Sample and by Sample Type in Boys From Community and Forensic Samples.

	Community sample		<i>t</i>	Cohen's <i>d</i>	Boys		<i>t</i>	Cohen's <i>d</i>
	Girls	Boys			Community	Forensic		
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )			<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
PSCD total	14.14 (6.16)	17.46 (6.92)	6.413**	0.51	17.46 (6.92)	25.45 (7.77)	-12.786**	1.09
GM	3.79 (2.25)	4.76 (2.58)	5.079**	0.40	4.76 (2.58)	5.77 (2.67)	-4.549**	0.39
CU	1.72 (1.87)	2.56 (2.23)	5.189**	0.41	2.56 (2.23)	3.47 (2.39)	-4.681**	0.39
DI	6.44 (2.40)	6.71 (2.63)	1.371 <sup>ns</sup>	0.11	6.71 (2.63)	8.60 (2.48)	-8.735**	0.74
CD	2.19 (2.00)	3.42 (2.53)	6.828**	0.54	3.42 (2.53)	7.61 (3.11)	-17.310**	1.48

Note. PSCD = Proposed Specifiers for Conduct Disorder; GM = Grandiose–Manipulative; CU = Callous–Unemotional; DI = Daring–Impulsive; CD = Conduct Disorder.

All *t* scores where significant at  $p < .001$  unless otherwise specified.

of the criteria met for all symptom categories of ODD (except for the angry/irritable mood symptom category), the number of criteria met for both CD and ODD, and with alcohol/substance use.

Finally, the PSCD–CD factor presented the same tendency of results of the general factor of the scale.

### Temporal Reliability

Regarding the temporal reliability of the PSCD general and specific factors, results showed acceptable and significant correlation coefficients (and nonsignificant paired samples *t* tests) for the 3-month period in the community sample. The same pattern was found for the 6-month period in the forensic sample, except for the PSCD–DI factor. In detail, although total and specific scores of the PSCD increased from the initial assessment to the final assessment in the forensic sample, this increment was only significant for the

PSCD–DI factor,  $t(36) = -2.298$ ,  $p = .027$ : initial assessment ( $M = 8.38$ ;  $SD = 2.25$ ), final assessment ( $M = 9.46$ ;  $SD = 2.16$ ; see Table 8).

### Discussion

The PSCD is a new measurement tool that stands out from other measures by assessing both psychopathic traits and CD symptoms in youthful populations (Salekin, 2017; Salekin & Hare, 2016). Although scarce so far, studies on the validity of the PSCD showed that the parent-version and the self-report version of this measure presented good psychometric proprieties in community children and youth (López-Romero et al., 2019; Luo et al., 2020). However, there are no published studies reporting on the psychometric properties of the PSCD in forensic samples of youth and this seems like the logical and very important next step. Moreover, there continues to be a need for testing the



**Table 8.** Correlation Values Between the Proposed Specifiers for Conduct Disorder (PSCD) and External Variables and Temporal Validity.

	PSCD-T	PSCD-GM	PSCD-CU	PSCD-DI	PSCD-CD
PSCD-T	1				
PSCD-GM	.730**	1			
PSCD-CU	.690**	.378**	1		
PSCD-DI	.738**	.370**	.342**	1	
PSCD-CD	.848**	.477**	.465**	.510**	1
YPI-S-T	.611**	.459**	.460**	.469**	.591**
YPI-S-GM	.623**	.620**	.343**	.411**	.499**
YPI-S-CU	.386**	.202**	.421**	.227**	.331**
YPI-S-II	.536**	.246**	.323**	.456**	.552**
MINI-KID <sup>a</sup>					
CD	.209**	.083 <sup>ns</sup>	.033 <sup>ns</sup>	.096 <sup>ns</sup>	.349**
CDnc	.573**	.246**	.357**	.429**	.683**
Aggression	.536**	.224*	.384**	.392**	.607**
Dest. Prop	.391**	.203*	.213*	.308**	.444**
Deceit/theft	.305**	.145 <sup>ns</sup>	.148 <sup>ns</sup>	.261**	.356**
Ser. Viol. Rules	.180*	.101 <sup>ns</sup>	.005 <sup>ns</sup>	.085 <sup>ns</sup>	.332**
ODD	.179**	.105 <sup>ns</sup>	.156*	.064 <sup>ns</sup>	.186**
ODDnc	.395**	.175 <sup>ns</sup>	.266**	.292**	.452**
Angry/Irrit.	.161 <sup>ns</sup>	-.035 <sup>ns</sup>	.110 <sup>ns</sup>	.149 <sup>ns</sup>	.149 <sup>ns</sup>
Arg/Defiant	.435**	.282**	.300**	.270**	.270**
Vindict	.367**	.117 <sup>ns</sup>	.203*	.326**	.326**
CD/ODDnc	.603**	.263**	.386**	.449**	.707**
Alc. Use	.223**	.007 <sup>ns</sup>	.166**	.159*	.298**
Subst. Use	.281**	.079 <sup>ns</sup>	.126*	.201**	.378**
Temporal validity					
PSCD_3M	.757**	.699**	.657**	.745**	.606**
PSCD_6M	.531**	.728**	.501**	.158	.528**

Note. PSCD = Proposed Specifiers for Conduct Disorder (T = Total; GM = Grandiose-Manipulative; CU = Callous-Uncaring; DI = Daring-Impulsive; CD = Conduct Disorder); YPI-S = Youth Psychopathic Traits Inventory-Short (T = Total; GM = Grandiose-Manipulative; CU = Callous-Unemotional; II = Impulsive-Irresponsible); MINI-KID = Mini-International Neuropsychiatric Interview for Children and Adolescents; (CDnc = number of criteria met for CD; Aggression = number of criteria met for aggression to people and animals; Dest. Prop. = number of criteria met for destruction of property; Deceit/theft = number of criteria met for Deceitfulness or theft; Ser. Viol. Rule = number of criteria met for serious violation of rules); ODD = oppositional defiant disorder (ODDnc = number of criteria met for ODD; Angry/Irrit. = number of criteria met for angry/irritable mood; Arg/Defiant = number of criteria met for argumentative/defiant behavior; Vindict. = number of criteria met for vindictiveness); CD/ODDnc = number of criteria met for both CD and ODD; Alc. Use = Alcohol Use; Subst. Use = Substance Use; PSCD\_3M = PSCD 3-month assessment interval for community participants; PSCD\_6M = PSCD 6-month assessment interval for forensic participants; <sup>ns</sup> = nonsignificant.

<sup>a</sup>Only mental health disorders that had a prevalence rate of at least 5% in the forensic sample were considered, i.e., CD, ODD, Alcohol/Substance use; attention deficit hyperactivity disorder (ADHD); social anxiety disorder, and suicide risk. However, of those, ADHD, social anxiety disorder, and suicide risk had nonsignificant correlations with the PSCD general and specific factors and are not presented in the table.

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

measurement invariance of the PSCD across community and forensic youth and across gender. This study attempts to fill these gaps by examining the psychometric properties of the PSCD in a sample of Portuguese adolescents, including community girls and boys and boys from forensic settings. Specifically, the factor structure of the PSCD was explored, along with its internal reliability and measurement invariance across gender and sample type. Construct and temporal validity of the PSCD were also examined.

First, the original proposed measurement model of the PSCD (Salekin, 2017) was tested through CFA and ESEM procedures. The ESEM model not only significantly

improved model fit but also decreased factor correlations when compared with the CFA model, pointing for the presence of a common general factor underlying all subscales. Therefore, a bifactor-ESEM model encompassing a general factor and the four original specific factors was tested. When compared with the previously tested CFA and ESEM models, the bifactor-ESEM models improved model fit on all samples under study (i.e., total sample, community sample, community girls, community boys, and forensic sample), supporting the use of the latter to assess the dimensionality of the scale. Therefore, the PSCD was found to represent both a general factor of CD/psychopathic traits

as well as four specific factors (GM, CU, DI, and CD), with acceptable to good reliability across samples, providing additional support for their use. Consistent with other psychopathy research with children and youth, these findings suggest that psychopathy as measured by the PSCD is a multifaceted construct that can be modeled with CD (Bergström & Farrington, 2018; Colins & Andershed, 2015; Colins et al., 2018; Fanti et al., 2018; Frogner et al., 2016; Frogner et al., 2018; Ribeiro da Silva et al., 2019; Salekin, 2016a, 2017; Somma et al., 2018).

The PSCD also showed to be an appropriate measure to explore gender differences in community boys and girls and in boys from community and forensic settings, given that strong measurement invariance was achieved, thus allowing for meaningful latent mean comparisons across gender and sample type (Chen, 2007). In line with literature on psychopathy (Colins et al., 2017; Pechorro et al., 2016, 2017; Salekin et al., 2018; Thomson et al., 2019; Verona & Vitale, 2018), community girls presented lower levels of psychopathic traits assessed by the general factor and specific factors of the PSCD when compared with community boys, except for the DI factor, where we found no differences across gender. However, we must state that research on female psychopathy needs further investigation, as it seems that psychopathic traits may have distinctive presentations, outputs, and associations across gender, which can be not well captured by the available assessment tools (Colins et al., 2017; Edens et al., 2007; Verona & Vitale, 2018). In turn, as expected (Pechorro et al., 2016; Pechorro et al., 2017; Ribeiro da Silva et al., 2019; Salekin et al., 2018), community boys showed lower levels of psychopathic traits than boys from forensic settings. Taken together, these findings support the notion that psychopathic traits seem to be continuously distributed throughout the population, differing from normality in degree rather than kind, being more pronounced in forensic populations than in community ones (Edens et al., 2007; Neumann et al., 2012; Ribeiro da Silva et al., 2019).

With respect to construct validity, the PSCD was highly correlated with an alternative measure of psychopathic traits (i.e., the YPI-S), with the strongest correlations being with the corresponding interpersonal, affective, and lifestyle factors. These findings are consistent with the intended design of the PSCD, which aimed to accurately represent and grasp psychopathic traits on early developmental stages based on theory and research (Cleckley, 1941/1988; Hare, 2003; Luo et al., 2020; Salekin, 2016b, 2017) and to be able to have corresponding factor scores correlate most highly with each other, but also have modest correlations with other psychopathy subfactors.

Regarding the association with psychopathological disorders, the general factor of the PSCD showed strong and positive associations with CD and ODD, considering the presence of these diagnosis, the number of criteria met for

these diagnoses, the number of criteria met for their symptom categories (except for the angry/irritable mood of ODD), and the number of criteria met for both CD and ODD. These findings strengthen the well-known association of psychopathic traits with disruptive disorders, highlighting the importance of considering all psychopathic traits in relation not only to CD but also to ODD, particularly when these are comorbid diagnostics (Ribeiro da Silva et al., 2019; Salekin et al., 2018; Vahl et al., 2016; Widiger & Crego, 2018). The PSCD general factor also showed positive associations with substance-related disorders, indicating that youth with elevated scores on the PSCD are at risk for alcohol and substance use (Brennan et al., 2017; Ellingson et al., 2018; Ribeiro da Silva et al., 2019; Sellbom et al., 2017). As expected, PSCD was unrelated to ADHD, given that the PSCD moved away from assessing impulsivity but rather focuses more on daring behavior (López-Romero et al., 2019; Luo et al., 2020; Salekin, 2017). Finally, as anticipated, nonsignificant associations were found between the PSCD general factor and social anxiety disorder or suicide risk, corroborating the discriminant validity of this measure (Vahl et al., 2016).

These findings are also in line with previous research, emphasizing that individuals with psychopathic traits tend to experience few ego-dystonic symptoms such as depression, anxiety, or suicidal ideation/behavior (Cleckley, 1941/1988; Hare, 2003; Salekin et al., 2018; Vahl et al., 2016; Widiger & Crego, 2018). In accordance with recent research, it seems that elevated psychopathic traits may be protective not only for the display of internalizing symptoms but also for individuals themselves (Garofalo et al., 2018, 2020; Ribeiro da Silva et al., 2019a, 2019b). In specific, some authors consider that psychopathic traits and externalizing symptoms were probably maintained in our evolutionary repertoire due to its adaptive value, that is, a strategy to survive and thrive in harsh rearing environments, which is the case of most youth from forensic settings (see Ribeiro da Silva et al., 2015, for a review).

The PSCD-specific factors followed a similar pattern of associations with disruptive and substance-related disorders, and no significant associations were also found with ADHD, social anxiety disorder, and suicide risk. These findings strengthen relevance of investing in the study of the multifaceted model of psychopathy in youth with conduct problems and substance-related disorders (Brennan et al., 2017; Ellingson et al., 2018; Ribeiro da Silva et al., 2019; Ribeiro da Silva et al., 2020; Salekin, 2016a, 2017; Salekin et al., 2018; Sellbom et al., 2017).

Concerning the associations of PSCD-specific factors with disruptive and substance-related disorders, several specificities need to be considered. GM, CU, and DI factors showed strong and positive associations with CD, considering the number of criteria met for this diagnosis (but not the diagnosis *per se*) and the number of criteria met for the

symptom categories of aggression to people and animals and destruction of property. The DI factor was the one with the strongest association with these CD variables, followed by, CU and GM factors. These findings are in line with the literature suggesting that all psychopathic traits are highly related to CD, particularly with aggressive behaviors against people, animals, and/or property (DeLisi, 2016; Garofalo et al., 2020; Hare, 2020; McCuish et al., 2015; Neumann et al., 2015; Porter et al., 2018; Ribeiro da Silva et al., 2019). In addition, the DI factor was associated with the deceitfulness or theft symptom category of CD, suggesting that daring and impulsive traits (but not GM and CU traits) may be particularly relevant for those who engage in this distinct set of behaviors. These findings reinforce the importance of considering the full range of psychopathic traits, and not only CU traits, when diagnosing and treating youth with CD (Colins et al., 2018; Ribeiro da Silva et al., 2019; Salekin, 2017).

Concerning the associations of GM/CU/DI factors with ODD, there were several specificities that need to be detailed. First, it is important to emphasize that none of these specific factors were associated with angry/irritable mood symptom category. This finding reinforces the argument of an apparent mask of sanity in individuals with psychopathic traits, which make them relatively immune to ego-dystonic symptoms (Cleckley 1941/1988; Garofalo et al., 2020; Patrick, 2018; Ribeiro da Silva et al., 2015; Ribeiro da Silva et al., 2020). The GM factor was positively associated only with the argumentative defiant behavior symptom category, while CU and DI factors were positively associated with the number of criteria met for ODD and with argumentative/defiant behavior and vindictiveness symptom categories. In addition, the CU factor was the only subfactor associated with the presence of ODD. However, all these specific factors were strongly and positively associated with the number of criteria met for both CD and ODD, which reinforce the need to consider the multifaceted model of psychopathy to specify not only CD but also ODD (Ribeiro da Silva et al., 2019; Salekin et al., 2018).

Regarding alcohol/substance use disorders, there were also some specificities across GM-, CU-, and DI-specific factors. Although no associations were found between the GM factor and alcohol/substance use disorders, CU and DI factors were both associated with these disorders. However, while CU traits are strongly associated with alcohol use, more so than DI traits, DI traits are strongly associated with other substance use than CU traits. These latter findings suggest that the use of substances may be particularly relevant for those presenting CU and DI traits, and not only DI traits (Brennan et al., 2017). Although scarce, the literature is suggesting that the use of alcohol and substances among individuals with psychopathic traits, particularly youth, may be a strategy to buffer these individuals from the difficult emotions that they may be experiencing and/or to

enhance their disinhibition and boldness tendencies (Brennan et al., 2017; Ellingson et al., 2018; Ribeiro da Silva et al., 2015; Ribeiro da Silva et al., 2019; Sellbom et al., 2017).

Finally, it is important to state that the PSCD-CD factor showed the same pattern of results of the general factor, reinforcing the importance of assessing the multifaceted model of psychopathic traits in addition to CD/ODD, not neglecting the assessment of potential comorbidities with substance-related disorders (Brennan et al., 2017; Ellingson et al., 2018; Ribeiro da Silva et al., 2015; Ribeiro da Silva et al., 2019; Salekin, 2016a, 2017; Sellbom et al., 2017; Vahl et al., 2016). These data also reinforce the notion that it is probably the combination of all psychopathic traits, specifically in addition to CD symptoms, that present a cumulative detrimental effect in individuals (Ribeiro da Silva et al., 2019; Salekin, 2017).

Regarding the temporal stability, an important aspect of psychiatric constructs (APA, 2013; WHO, 2016), the test-retest reliability of the PSCD general factor exhibited good results at both 3- and 6-month intervals in community and forensic samples, respectively. These findings add to relevant research indicating that psychopathic traits are relatively stable over time, further indicating that the PSCD is a good optional scale for indexing this stability (Andershed, 2010; Edens et al., 2007; McCuish et al., 2015). The specific factors of the PSCD followed the same pattern, except for the DI factor in forensic participants, which significantly increased during the 6-month interval. This result is in line with former research suggesting that psychopathic traits, especially DI traits, may increase in forensic participants that do not receive tailored and specific interventions during detention length (see Ribeiro da Silva et al., 2020, for a review). In a recent clinical trial, aimed to test the efficacy of a psychotherapeutic intervention specifically tailored to reduce antisocial behavior and psychopathic traits (the PSYCHOPATHY.COMP program, based on compassion-focused therapy) with Portuguese juvenile detainees, while treatment participants decreased their levels of psychopathic traits, controls tended to increase their levels of psychopathic traits (Ribeiro da Silva et al., 2021). Differences between groups achieved a medium effect size for GM, and CU traits measured by the YPI-S and the PSCD. Regarding DI traits, differences between groups achieve a large effect size measured by the YPI-S and a medium effect size as measured by the PSCD. These findings suggest that psychopathic traits may not be effectively addressed by the current practices delivered at Portuguese juvenile detention facilities and may contribute to maintain or increase those set of traits (Ribeiro da Silva et al., 2021).

The findings from the present study must be considered within the context of limitations. First, the participants of this study were drawn from Portugal and the findings may not be generalizable to other geographical areas. Further

studies should attempt to validate the PSCD across the globe to better understand its generalizability. Second, despite the use of a semistructured interview, much of the work was based on self-report data, which has its inherent pitfalls and limitations (Sellbom et al., 2018). Thus, additional multisource data and additional prospective data will help us better understand the psychometric properties of the PSCD. The absence of a forensic sample of female youth is another limitation that needs to be addressed in further studies, adding to research on female psychopathy (Verona & Vitale, 2018). Finally, we must state that although bifactor–ESEM is considered a robust approach to assess multidimensional constructs, solving several issues of CFA and hierarchical/bifactor–CFA (Morin et al., 2020), it is important to acknowledge some concerns related to bifactor solutions (Bonifay et al., 2017; Bonifay & Cai, 2017; Burns et al., 2020; Samuel, 2019). In detail, it is important to notice that bifactor models tend to have better fit indices than nonbifactor solutions, as they are less parsimonious and tend to overfit data (Bonifay & Cai, 2017; Bonifay et al., 2017; Burns et al., 2020; Samuel, 2019). Moreover, the scoring procedure of bifactor models needs caution, especially in clinical practice, considering the loadings of items on specific and general factors (Bonifay & Cai, 2017; Bonifay et al., 2017; Burns et al., 2020; Morin et al., 2020; Samuel, 2019). In sum, bifactor models are still considered a controversial methodological approach due to their challenging interpretability and propensity to overfit data (Bonifay et al., 2017; Morin et al., 2020). Despite these concerns, some authors agree that bifactor models should be considered when there are both theoretical and empirical reasons that might favor bifactor solutions, balancing fit indices of different models (CFA, ESEM, bifactor–CFA/ESEM) against parsimony and conceptual interpretability (Bonifay et al., 2017; Morin et al., 2020).

Despite these limitations, the current study had several strengths as it was the first to examine the PSCD with community and forensic samples and to establish the measurement invariance of this measure across gender and sample type (forensic and community). This was also the first study using bifactor–ESEM, which is considered the most comprehensive, accurate, and flexible measurement model to assess multidimensional constructs, such as psychopathic traits (Asparouhov & Muthén, 2009; Marsh et al., 2009; Marsh et al., 2014; Marsh et al., 2020; Morin, Arens, & Marsh, 2016; Morin, Arens, Tran, & Caci, 2016; Morin et al., 2020). Overall, findings of this study indicate that the self-report version of the PSCD holds promise as a self-report instrument for the assessment of psychopathic traits and CD in community and forensic youth, adding to research on the psychometric proprieties of this measure (López-Romero et al., 2019; Luo et al., 2020). Moreover, this study helps further shape our understanding of the importance of psychopathic traits and youth with conduct

problems (Salekin, 2017). The findings also indicate that the conceptualization of psychopathic traits and its relation to CD should not primarily focus on a single element (CU traits), as we risk losing sight of how GM and DI traits might also be related to etiological causes and critical external correlates (Bergström & Farrington, 2018; Colins & Andershed, 2015; Colins et al., 2018; Fanti et al., 2018; Frogner et al., 2016; Frogner et al., 2018; Ribeiro da Silva et al., 2019; Salekin, 2016a, 2016b; Somma et al., 2018). The notion of considering the wider set of psychopathic traits is in line with the adult literature on psychopathy and recent arguments at the child level for considering the broader construct as well as its subcomponents (Hare, 2020). By doing so, researchers and clinicians will be able to generate detailed profiles of youth on chief dimensions of psychopathy, which is crucial for case conceptualization and treatment (Patrick, 2018; Ribeiro da Silva et al., 2020; Salekin et al., 2018).

## Conclusion

The PSCD was designed to examine the dimensions of psychopathy in conjunction with CD. Unique to the PSCD is its ability to help researchers and clinicians answer many questions and concerns regarding the connections between CD and psychopathic traits. Other key features of the PSCD are the inclusion of the ODD item as well as the focus on daring traits rather than on impulsivity. These features make the PSCD different from other psychopathy scales (e.g., APSD, PCL-YV, YPI; YPI-S), making it a potential consideration for researchers and clinicians who are concerned with these various relations or are simply interested in an alternative measure for psychopathy. Although additional research is needed to further test the psychometric properties of this measure, the PSCD will potentially allow for more direct testing of the proposed specifiers for CD and eventually ODD, which may aid in future descriptive, etiologic, and treatment investigations where conduct problems and psychopathic trait dimensions are of interest.

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## Notes

1. See Bonifay et al. (2017), Bonifay and Cai (2017), Burns et al. (2020), and Samuel, 2019) to understand the pitfalls of bifactor solutions (see also the limitations of the current study at the Discussion section). For an interesting and recent discussion around factor analytic procedures see also Morin et al., 2020.
2. Examples of professions in the high SES groups are judges and or M.D.s; for the medium SES group are nurses or schoolteachers; for the low SES group are farmers or cleaning staff.
3. Female youth from forensic settings were excluded from this study because they represent 10% to 15% of the young offenders placed in Portuguese juvenile detention facilities and any possible idiosyncrasies from this cohort would be underrepresented (Rijo et al., 2016).
4. Point-biserial Pearson correlations were only used for correlations between the PSCD and the presence/absence of mental health disorders (i.e., categorical variables; 0 = not having the diagnosis and 1 = having the diagnosis).
5. To avoid meaningless indicators, we only considered disorders that had a prevalence rate of at least 5%. So, only CD ( $n = 241$ ; 93.4%); ODD ( $n = 212$ ; 82.2%); Alcohol use ( $n = 75$ ; 29.1%); Substance use ( $n = 140$ ; 54.3%); ADHD ( $n = 26$ ; 10.1%); social anxiety disorder ( $n = 15$ ; 5.8%); and suicide risk ( $n = 55$ ; 21.3%) were considered for further analysis.
6. Further information on this topic may be requested from the first author.

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