Multi-informant assessment of Cognitive Disengagement Syndrome (formerly Sluggish Cognitive Tempo). Self-reported measures of children in relation to parents

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Título: Evaluación multi-informante del Síndrome de Desconexión Cognitiva (anteriormente Tempo Cognitivo Lento). Medidas autoinformadas de los niños con relación a padres.

Resumen: El objetivo fue examinar, desde una aproximación multi-informante, las medidas del Síndrome de Desconexión Cognitiva (SDC) de padres/madres e hijos/as y su relación con síntomas internalizantes y externalizantes. 279 niños/as (9-13 años), y sus padres/madres completaron las evaluaciones sobre SDC, la inatención del trastorno por déficit de atención e hiperactividad (TDAH) y otras medidas internalizadas y externalizadas. Los ítems de las tres medidas de SDC convergieron razonablemente bien en el factor SDC. Se aportaron pruebas discriminantes de la validez de las relaciones entre las puntuaciones de las pruebas y las medidas de los tres constructos diferentes (SDC, soledad y preferencia por la soledad). La asociación más estrecha estuvo entre la evaluación parental de las medidas de SDC con ansiedad y depresión, y entre inatención con hiperactividad/impulsividad y trastorno negativista desafiante. Se observó capacidad predictiva de la medida de SDC sobre la soledad y preferencia por estar solo autoinformadas. Se encontró una posible asociación entre la medida del SDC evaluado por padres/madres y sexo y edad de los niños. En conclusión, los datos apoyan la inclusión de medidas autoinformadas en la evaluación del SDC. Las medidas del SDC en niños se vinculan con medidas internalizantes y, la inatención con las externalizantes.

Palabras clave: SDC. Evaluación multi-informante. TDAH. Niños.

Abstract: The aim was to examine, using a multi-informant approach, parent and child measures of Cognitive Disengagement Syndrome (CDS) and their relationship with internalising and externalising symptoms. 279 children (9-13 years old) and their parents completed assessments of the CDS, the inattention of Attention Deficit Hyperactivity Disorder (ADHD), and other internalising and externalising measures. The items of the three measures of CDS converged reasonably well on the CDS factor. Discriminant evidence of validity of the relationships between test scores and the measures of the three different constructs (CDS, loneliness and preference for solitude) was provided. A stronger association was found between parental assessment of the measures of CDS with anxiety and depression, and between inattention with hyperactivity/impulsivity and oppositional defiant disorder. The predictive ability of the measure of CDS on self-reported measures of loneliness and preference for being alone was observed. A possible association was found between parent-rated CDS measure and children's gender and age. In conclusion, the data support the inclusion of self-reported measures in assessing CDS. Measures of CDS in children are linked to other internalising measures and inattention to externalising measures.

Keywords: CDS. Multi-informant assessment. ADHD. Children.

Introduction

The Cognitive Disengagement Syndrome (CDS) (Becker et al., 2022; Fredrick & Becker, 2022a, 2022b), previously referred to as Sluggish Cognitive Tempo (SCT), refers to a cluster of symptoms characterised by excessive lethargy, mental confusion, and drowsiness (Becker, 2021; Becker et al., 2022; Becker & Barkley, 2018). The current name CDS is used instead of SCT in the present paper. In recent years, progress has been made in the evaluation of the measure of CDS, which has demonstrated its reliability, as its scores have been shown to be consistent across all phases of the test procedure so far. In addition, relevant evidence has been accumulated that provides a sound scientific basis for the proposed scoring interpretations. In this way, the validity of the interpretations made of the scores obtained in CDS, especially through the application of the Child and Adolescent Behaviour Inventory (CABI) (Burns et al., 2015) has been demonstrated. Regarding to the evidence based on relations to other variables, discriminant evidence has been proven in relation to the test scores for the CDS measure, in particular

with the ADHD Inattention Profile (ADHD-IN) (American Educational Research Association et al., 2014; Becker, 2021; Becker, Leopold, et al., 2016; Penny et al., 2009).

Interpretations of test scores while using CDS measures of parents have exhibited good external validity, as its higher scores correlate more strongly than ADHD with social problems, isolation, and shyness in studies conducted by different researchers (Becker et al., 2019; Becker, Leopold et al., 2016; Burns & Becker, 2021; Fırat et al., 2019; Holdaway & Becker, 2018; Lee et al., 2014; Marshall et al., 2014; McBurnett et al., 2014; Moreno-García et al., 2022; Servera et al., 2018; Willcutt et al., 2014) sleep problems (Becker, Luebbe, et al., 2014; Langberg et al., 2014) poorer academic performance (Becker et al., 2019; Belmar et al., 2017; Lee et al., 2018; Tamm et al., 2016) sensitivity to punishment (Becker et al., 2013) and suicidal ideation (Becker et al., 2018; Becker, Withrow, et al., 2016). However, parent-rated CDS measures of their children's behaviours were unrelated (or even negatively related) to hyperactivity, oppositional defiant disorder (ODD), and other disruptive behaviours (Becker, Leopold, et al., 2016; Becker, Marshall, et al., 2014; Bernad et al., 2016; Moreno-García et al., 2022; Penny et al., 2009). Consequently, although further empirical support is needed, parent-rated CDS measures shows a higher correlation with internalised symptoms measures than with externalised measures, thus differentiating itself from ADHD, despite commonalities in

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the area of inattention (Becker, Leopold, et al., 2016; Belmar et al., 2017; Burns et al., 2021; Burns & Becker, 2021; Fenollar Cortés et al., 2017). In fact, families with children with an inattentive ADHD profile report greater emotional impairment (Fenollar-Cortés et al., 2016), informing about emotional and social regulation problems (Amin Yazdi et al., 2018).

Most of the literature has relied on adults as primary informants (Barkley, 2013; Becker, Leopold, et al., 2016; Burns et al., 2021; Jacobson et al., 2012; Lee et al., 2014; McBurnett et al., 2014; Moreno-García et al., 2022; Penny et al., 2009). However, the inclusion and analysis of self-reported measures of CDS in children and adolescents may be useful to improve understanding of how this dimension operates. (Becker & Willcutt, 2019; Smith & Langberg, 2017). Among the few papers that have included self-reported measures, we highlight the publication by Becker et al. (2015), which included an initial validation of the interpretation of test scores that measure CDS through the application of the Child Concentration Inventory (CCI). The scale was adapted from the scale proposed by Penny et al. (2009) for the Sluggish Cognitive Tempo to a sample of 124 children in grades 3-6. The results showed that the total score obtained on the CCI was associated with poorer academic performance and greater social, loneliness, and emotional problems. In addition, they found a strong correlation between CDS scores with depression ($r = .68$) and anxiety ($r = .55$). The studies by Smith et al. (2018, 2019) and Smith & Langberg (2017) also included a self-report version of the CDS, as well as a self-report version of the Penny et al. scale for children. The parent measures were found to be more closely related to academic performance, and the child measures to anxious-depressive symptomatology. There was a moderate correlation between parent and child measures, so the authors recommended that both parents' assessments be included.

The meta-analysis developed by Becker, Leopold, et al. (2016) confirmed 13 items of the scale by Becker et al. (2015) scale as optimal for the assessment of measures related to CDS together with three items for measuring symptoms of mental confusion (McBurnett et al., 2014). These 16 items made up the second version, CCI-2 (Sáez, Servera, Burns, et al., 2019), which demonstrated reliability. Interpretations of the scores obtained on the CDS measure through the application of this test showed its validity. Although the item 'I am not motivated to do things' was excluded in some studies, as it loaded not only on the CDS factor but also on ADHD-IN (Barkley, 2013; Becker, Burns, et al., 2019; Jacobson et al., 2012; McBurnett et al., 2014; Penny et al., 2009; Servera et al., 2018). High child-reported CDS scores were associated with parent-reported academic and social difficulties. Correlations were also found between self-administered measures, specifically between CDS scores and preference for being alone and, to a greater extent, between CDS and measures of loneliness (Sáez, Servera, Burns, et al., 2019). In another sample of South Korean adolescents, they found that all 15 parent-rated CDS symptoms in children showed convergent evidence, but only 11 on the self-administered measure did so (Jung et al., 2021).

With regard to this meta-analysis (Becker et al., 2016), it should be noted that some studies have analysed the relationship between CDS and demographic variables of sex and age. However, contradictory results have been found. In some cases, CDS appeared to be related to age (Barkley, 2012, 2013; Leopold et al., 2016), but in other cases, this association was not found (Becker, 2014; Carlson & Mann, 2002; Jarrett et al., 2017; Marshall et al., 2014). In terms of gender, there are results that point to differences (Becker, 2014) and other studies that point to no significant differences (Barkley, 2012; Carlson & Mann, 2002). Consequently, to shed light on the issue, the existing literature highlights the need to continue providing data in this direction.

With the present research, we intend to examine, from a multi-informant approach, the evaluation of CDS through the measures of fathers, mothers, and children, as well as its relationship with other internalising and externalising symptomatology following the line of research by Sáez, Servera, Burns, et al. (2019). To this end, the following specific objectives are proposed:

The first objective is to test whether the items of each of the CDS measures (fathers, mothers, and children) load adequately on the factor. As in the work of Sáez et al. (2019), minimum loadings of .40 are expected. Next, the correlations between the three informants will be analysed, with minimum values of approximately .30 expected between children and parents and higher values between fathers and mothers (Becker, Leopold, et al., 2016; de Los Reyes et al., 2015; Smith et al., 2018).

On the other hand, given the usual high relationship between measures of CDS and social interaction problems (Becker, Garner, et al., 2019; Carlson & Mann, 2002; Marshall et al., 2014; Moreno-García et al., 2022; Sáez, Servera, Burns, et al., 2019; Willcutt et al., 2014) the second aim is to show discriminant evidence of validity of the relationships between test scores and the measures of the three different constructs (CDS, loneliness and preference for solitude). We expect loadings with minimum approximate values of .30.

The third objective seeks to evaluate, on the one hand, the predictive ability of parent-rated CDS and inattention, IN measures (mutually controlling for each other) on other measures parent-rated measures focused on symptoms of psychopathological disorders, academic difficulties, and social interaction problems: anxiety (ANX), depression (DEP), hyperactivity/impulsivity (HI), oppositional defiant disorder (ODD), limited prosocial emotions (LPE), social difficulties (INT), academic difficulties (AS) and shyness (SHY). On the other hand, we also aim to determine the predictive ability of children's self-reported CDS measures on their loneliness scores and preference for being alone. In addition, the predictive ability of self-reported CDS on the same variables is analysed after controlling for the effect of parents' IN scores. On the one hand, we expect the CDS measures to have greater predictive power for social difficulties, as well as for

ANX, DEP and SHY, than for ODD and LPE, based on existing data (Becker, Epstein et al., 2019; Becker, Leopold, et al., 2016; Belmar et al., 2017; Bernad et al., 2016; Burns et al., 2017, 2021; Burns & Becker, 2021; Fenollar Cortés et al., 2017; Khadka et al., 2016; Lee et al., 2014; Moreno-García et al., 2022; Sáez, Servera, Burns, et al., 2019). On the other hand, concerning children's assessments, significant correlations of CDS measures on loneliness and preference for being alone measures are expected, even when controlling for the effect of parent-rated IN.

Finally, the fourth objective is to analyse the relationship of CDS measures, self-reported by children and parents, with the variables age and sex. According to previous findings, we probably expect to find no or virtually no relationship because the age range of our sample was limited to the school stage and did not include the late adolescent stage when CDS symptoms are more noticeable, and differences may be more visible (Becker, Leopold, et al., 2016; Leopold et al., 2016).

The main contribution of this manuscript is to support the inclusion of self-reported measures in the assessment of CDS derived from the application of two instruments with the same content of CDS items by different raters. Most research includes adults as the main evaluators of children's behaviours (heteroinformed measures), but the results of this paper contribute to support the incorporation of self-reported measures together with the assessment of adults, parents, and teachers to deepen the knowledge of CDS. It demonstrates the need to include self-report measures to improve understanding, assessment, and future diagnosis of CDS. Considering the child's self-reported measures adds information in a way that parental assessment cannot, especially in the internalisation of symptom information. In addition, it includes an analysis that relates self-reported measures of CDS, loneliness, and preference for being alone. The inclusion of a measure of preference for loneliness to be rated by the children themselves is a strength of this work, as there are hardly any data on this subject, with the exception of the research conducted by Sáez et al., (2019). An added value of this article is that these measures have been obtained through the application of CCI-2 in a Spanish sample. On the other hand, of course, it provides other interesting data on the measures of CDS and other measures linked to CDS, as well as providing more data on parents' assessments of their children's behaviour and showing the association between child-parent measures. Thus, all this completes and enriches the information about CDS and other related psychopathological symptoms.

Method

Participants and Procedure

Ethics approval was obtained for research involving human participants from the Ethics Committee of the University of the Balearic Islands. The procedures used in this study adhere to the tenets of the Declaration of Helsinki. We invited 324 families from 3 schools in Seville whose children were in 3rd to 6th grade of primary school to participate. The final study sample consisted of 279 children (149 boys and 130 girls). The age range was between 9 and 13 years old ($M = 10.4$, $SD = 1.3$).

All participating parents signed an informed consent form and filled in the questionnaires. Data protection, confidentiality and privacy was guaranteed. The families belonged to a middle socio-economic status. In addition, the parent questionnaire extracted socio-demographic information from the variables: educational level, occupation, and marital status.

Parents received the evaluation protocol in an envelope to be returned after two weeks. Those who had completed at least one of the questionnaires were checked individually for consideration in the last phase of the children's assessment. The children completed the evaluation protocol in the classroom, assisted by two researchers who gave them instructions and answered their questions. Recovery sessions were held to bring together children unable to attend and complete the behavioural questionnaire on the day originally scheduled in their centre. Consequently, we did not record any missing cases in this phase, as we were able to collect responses from all children.

Instruments

First, we present the instruments applied to the children:

Child Concentration Inventory - Version 2 (CCI-2) (Becker, 2015). Validation in Spanish was carried out in the work of Sáez, Servera, Burns, et al. (2019) and the Cronbach's alpha for the 15 symptoms of CDS was .80. Consisting of a total of 15 items. Each item could be rated from 0 to 3 points (0 = false; 1 = sometimes; 2 = often; 3 = true). The higher the score, the greater the presence of CDS.

Child Social Preference Questionnaire (CSPQ) (Coplan et al., 2013). The test was adapted into Spanish by Sáez, Servera, Burns, et al. (2019) and the Cronbach's alpha for the measure was .77. It consists of 7 items that could be rated from 0 to 4 points (0 = false, 1 = rarely, 2 = sometimes, 3 = almost always and 4 = true). The higher the score, the higher the child's preference for being alone.

The Loneliness Questionnaire (LQ) (Asher et al., 1984). The test was adapted into Spanish by Sáez, Servera, Burns, et al. (2019) and the Cronbach's alpha for the measure was .78. It consists of 9 items in its abbreviated version (Ebesutani et al., 2012). There are 9 items and each item has a response format of 3 graded categories (0 = false, 1 = sometimes, 2 = true). The higher the score, the higher the child's perceived loneliness.

Second, the instruments applied to the parents are shown:

Child and Adolescent Behaviour Inventory (CABI) (Burns et al., 2015) validated in Spanish for parents (https://tinyurl.com/CABI-Spanish) which contains 69

items. All items are assessed on a scale ranging from 0 (the child seldom exhibits the problem behaviour) to 5 (almost always exhibits the problem behaviour), except for the measures of academic performance difficulties and social interaction difficulties which range from 0 to 6. Cronbach's alpha was .71 to .95 for all scales, which demonstrated good reliability coefficients and adequate structural and discriminant validity (Burns et al., 2021).

Child Social Preference Questionnaire (CSPS) (Coplan et al., 2004) for parents. Validation in Spanish was developed by Servera et al. (2018). In this work, the internal consistency values ranged from .78 to .87 for mothers, fathers, and teachers. Only the shyness subscale was included with a total of 7 items with scores between 0 and 5 (0 = false, 1 = rarely, 2 = sometimes, 3 = often, 4 = very often, and 5 = almost always). The higher the score, the higher the level of shyness.

Data analysis

For the statistical analyses, we used the R software version 4.2.2 (R Core Team, 2013). First, we performed a descriptive analysis of the variables. Then, the correlations and regressions between measures have been obtained using structural models. For the first objective, we proceeded with a confirmatory factor analysis, applying the "CFA" function of the "lavaan" library version 0.6-12 (Rosseel, 2012). The results were replicated using the Mplus programme. The reliability coefficients were then obtained using the reliability function of the semTools library (Jorgensen et al., 2021), and the correlations between the two were obtained. Moreover, correlations were obtained between the predicted scores for the three sources of information. The items were treated as categorical (ordinal) variables, and the WLSMV (weighted least squares robust least squares) estimator was used. The overall fit was made with the comparative fit index (CFI, good fit ≥ .9; excellent fit ≥ .95), the Tucker Lewis index (TLI, good fit ≥ .9; excellent fit ≥ .95), and the root means a squared error of approximation (RMSEA, good fit ≤ .08; excellent fit ≤ .05). Regarding the second objective, a structural model (CFA) was conducted to measure correlations between children's self-reported scores of CDS, loneliness and preference for being alone. The criteria proposed by Rönkkö & Cho (2022) were used in order to assess the discriminant validity in structural models. Regarding the third objective, we also conducted a regression analysis with measures of mothers, fathers, and children on CDS, ADHD-IN, and other measures. Standardised betas and correlations between mothers' and fathers' variables were obtained, as well as children's scores on CDS, loneliness, and preference for being alone. As for the fourth objective, children's CDS, mothers' and fathers' CDS, and ADHD-IN variables were correlated with children's gender and age variables.

Results

Regarding the first objective, the items of the three measures (fathers, mothers, and children) of the CDS converged reasonably well on the CDS factor with a good model fit based on the CFI (between .97 and .99) and TLI (between .96 and .98) indices. The RMSEA values also showed an acceptable fit (between .05 and .08). Table 1 shows the standardised parameter values for each source of information. Coefficients ranged from .30 (I am not very active) to .76 (My mind is a mess) for children ($M = .55$). For fathers, the coefficients ranged from .45 (He moves slowly) to .89 (He gets his ideas mixed up) ($M = .72$). Finally, mothers had coefficients ranging from .51 (She moves slowly) to .92 (Her thinking is slow) ($M = .74$).

Table 1
Standardised coefficients and standard deviations for each of the 15 items of the CDS scale and informant.

Item CDS scale	Children	Mothers	Fathers
Moving slowly	.49 (.06)	.51 (.06)	.45 (.06)
Is lost in the 'clouds'	.73 (.04)	.83 (.03)	.82 (.03)
Stares into the void	.61 (.05)	.68 (.05)	.72 (.05)
Is lethargic during the day	.48 (.06)	.64 (.06)	.56 (.06)
Daydreaming	.41 (.07)	.63 (.06)	.64 (.06)
Loses their train of thought	.60 (.05)	.79 (.04)	.81 (.03)
Has a low level of activity	.30 (.07)	.56 (.06)	.50 (.06)
Lost in his thoughts	.69 (.04)	.80 (.03)	.80 (.03)
Tires easily	.44 (.06)	.65 (.05)	.62 (.05)
Forgets what they was going to say	.54 (.05)	.75 (.04)	.75 (.04)
Easily confused	.57 (.05)	.85 (.03)	.79 (.04)
Is "disconnected"	.66 (.05)	.90 (.02)	.84 (.03)
They get their ideas mixed up	.76 (.04)	.89 (.02)	.89 (.02)
Their thinking is slow	.58 (.06)	.92 (.02)	.83 (.03)
Has difficulty in expressing what he/she thinks	.41 (.06)	.73 (.04)	.75 (.04)

Note. CDS (Cognitive Disengagement Syndrome).

Reliability indices (based on omega indices) for children, fathers, and mothers showed good internal consistency, as shown in the fourth row of the table of the supplementary material (https://figshare.com/s/9c32a980d61092c74807). Furthermore, in this table, the correlations between the three sources of information can be observed in the three first rows ($r = .27$ for children and mothers, $r = .29$ for children and fathers, and $r = .78$ between both parents).

For the second aim, to analyse the structure of the self-reported measures, a confirmatory factor analysis (CFA) was conducted with the child measures of the CDS, loneliness, and preference for being alone scales. Again, a good fit was found ($\chi^2(431) = 533.474$, $p < .001$, $CFI = .99$, $TLI = .99$, $RMSEA = .03$). High CDS scores were positively related to measures of loneliness ($r = .67$, $SD = .05$, $p < .001$) and preference for being alone ($r = .32$, $SD = .07$, $p = .016$). There was also a positive relationship between measures of loneliness and preference for being alone ($r = .68$, $SD = .05$, $p < .001$). Table 2 shows the estimated parameters and their standard errors for each item. The results were replicated us-

ing the Mplus program. Coefficients ranged from .30 (item 7) to .80 (item 14) for the CDS (M = .56). On the loneliness variable, coefficients ranged from .33 (item 7) to .93 (item 8) (M = .69). Finally, the items on the measure of preference for being alone had coefficients ranging from .48 (item 4) to .81 (item 1) (M = .70). The discriminantValidity function of the semTools library (Jorgensen et al., 2021) developed by Rönkkö and Cho (2022) was used to seek evidence of discriminant validity. Comparison of the structural model with the restricted model showed a better fit of the first model (chi-squared(χ^2) = 22, p <.001, for the correlation between CDS and loneliness; chi-squared(χ^2) = 75.5, p <.001, for the correlation between CDS and the preference for solitude; chi-squared(χ^2) = 24.9, p <.001, for the correlation between loneliness and the preference for solitude).

Concerning the third objective, on the one hand, a good fit was found in the factor analysis models of the mother (χ^2(3839) = 4416.961, p < .001; CFI = .996, TLI = .995, $RMSEA$ = .028) and father (χ^2(3839) = 4013.178, p = .025; CFI = .999, TLI = .999, $RMSEA$ = .015) which included the measures CDS, IN, ANX, DEP, HI, ODD, LPE, SHY, INT and AS. On the other hand, Table 3 shows the unique predictive ability of the CDS and IN measures for each of the assessors, father and mother. The mothers' CDS measure significantly predicts, in that order, SHY, DEP, and ANX, with moderate to largely standardised coefficients, above .48 and in the expected direction: the higher the CDS score, the more problems. The parents' CDS measure coincides, albeit in a slightly different order, with DEP, SHY, and ANX and with moderate coefficients. However, somewhat lower (ex-

cept in the case of DEP, which is still above .50). In contrast to mothers, the prediction of INT is also significant for fathers (-.38), so the higher the score on CDS, the more problems with social interaction. Finally, in the case of mothers, the predictive capacity of IN is centred, in this order, on HI, ODD, AS and SHY, with large coefficients greater than +/.50, except in the case of SHY (.40). In the case of fathers, the order and coefficients are similar for HI, ODD, and AS, but SHY is not significant. At the same time, DEP appears with a moderate coefficient (.31).

Table 2
Factor loadings of children's self-reported measures of CDS items, loneliness, and preference for being alone.

Item	CDS	Loneliness	Preference of being alone
1	.48 (.06)	.70 (.06)	.81 (.05)
2	.74 (.04)	.82 (.04)	.75 (.04)
3	.61 (.06)	.51 (.07)	.72 (.05)
4	.52 (.06)	.89 (.05)	.48 (.06)
5	.47 (.07)	.77 (.04)	.69 (.05)
6	.54 (.05)	.64 (.08)	.69 (.04)
7	.30 (.08)	.33 (.07)	.76 (.04)
8	.68 (.05)	.93 (.04)	-
9	.49 (.06)	.66 (.11)	-
10	.50 (.05)	-	-
11	.59 (.05)	-	-
13	.63 (.05)	-	-
14	.80 (.04)	-	-
15	.56 (.07)	-	-
16	.45 (.06)	-	-

Note. CDS (Cognitive Disengagement Syndrome).

Table 3
Partial standardised regression coefficients of mothers' and fathers' CDS and ADHD-IN measures on psychopathological and distress measures.

	Mothers							
	ANX	DEP	HI	ODD	LPE	SHY	INT	AS
M_CDS	.48 (.16)***	.54 (.11)***	-.07 (.13)	.12 (.13)	-.10 (.17)	.69 (.17)***	-.28 (.16)	-.05 (.14)
M_IN	.05 (.16)	.21 (.12)	.65 (.12)***	.49 (.13)***	-.21 (.17)	-.40 (.17)*	-.07 (.16)	-.48 (.13)***
	Fathers							
	ANX	DEP	HI	ODD	LPE	SHY	INT	AS
F_CDS	.34 (.17)*	.51 (.11)***	-.16 (.11)	.07 (.13)	.01 (.15)	.41 (.17)*	-.38 (.16)*	-.15 (.12)
F_IN	.15 (.15)	.31 (.11)**	.81 (.10)***	.57 (.12)***	-.25 (.13)	-.03 (.16)	-.05 (.15)	-.44 (.11)***

Note. M_CDS (mother-rated CDS), M_IN (mother-rated IN), F_CDS (father-rated CDS), F_IN (father-rated IN), CDS (Cognitive Disengagement Syndrome), IN (inattention), ANX (anxiety), DEP (depression), HI (hyperactivity/impulsivity), ODD (oppositional defiant disorder), LPE (limited prosocial emotions), SHY (shyness), INT (social difficulties), AS (academic difficulties).
*p < .05. **p < .01. ***p < .001

On the other hand, a good fit (χ^2 (489) = 558.118, p = .016, CFI = .99, TLI = 0.99, $RMSEA$ = 0.025) was found in the CFA conducted with children's self-reported measures of CDS, loneliness and preference for being alone. Table 4 presents the estimated parameters and their standard errors for each regression. The results were replicated using the Mplus program. Significant data were found for the self-reported CDS measures of loneliness (.59) and preference for being alone (.31) when controlling for the effect of parental measures of IN (inattention). However, no significant results were obtained for fathers' measures of IN when controlling for CDS and mothers' IN variables. Similarly, no significant

results were obtained for mothers' measures of IN when controlling for fathers' measures of CDS and IN.

Table 4
Predictive ability of CDS children's self-reported measures of loneliness and preference for being alone, controlling for parents' IN score.

	Loneliness	Preference for being alone
C_CDS	.59 (.06)***	.31 (.07)***
M_IN	.25 (.14)	.08 (.11)
F_IN	.04 (.15)	-.06 (.12)

Note. C_CDS (CDS assessed by child), M_IN (IN assessed by mother), F_IN (IN assessed by father), CDS (Cognitive Disengagement Syndrome), IN (inattention).
*p < .05. **p < .01. ***p < .001

Finally, regarding the fourth objective, the children's self-reported measures in the CDS did not show any significant association with their age and gender (the values were close to zero), as seen in Table 5. However, in the mothers' and fathers' assessments, significant correlations were observed between the CDS and ADHD-IN with the sex and age of the children.

Table 5
Correlations of the CDS and ADHD-IN measures by each rater with the variables sex and age of the child.

	Age	Gender
C_CDS	-.02 (.09)	-.05 (.11)
M_CDS	.44 (.20)*	.34 (.24)
M_IN	-.39 (.20)*	-.64 (.24)**
F_CDS	.37 (.18)**	.66 (.20)***
F_IN	-.41 (.17)**	-.89 (.18)***

Note. C_CDS (CDS assessed by child), M_CDS (CDS assessed by mother), M_IN (IN assessed by mother), F_CDS (CDS assessed by father), F_IN (IN assessed by father), CDS (Cognitive Disengagement Syndrome), IN (inattention).
*$p < .05$. **$p < .01$. ***$p < .001$

Discussion and Conclusions

Most publications have considered only adults as the main informants of children's CDS. However, the overall aim of this research was to adopt a multi-informant approach and to analyse the relationship between parents and school-age children's assessments. Therefore, one of the contributions of this study in the field is to find data supporting the inclusion of self-reported measures in the assessment of CDS derived from the application of two instruments with the same content of CDS items by different raters.

Specifically, the first objective was focused on analysing the convergent validity of the CDS measure obtained in this study between parents and their children. As expected, on the one hand, a high convergence was found between both parents, in line with other work carried out by Moreno-García et al. (2022), Sáez, Servera, Becker et al. (2019), Smith et al. (2018) and Smith & Langberg (2017) and, on the other hand, correlations between parents and their children were low. Considering this low agreement obtained between both raters, it could have been interesting to assess the predictive power of each measure with respect to some objective external criterion other than a self-report or a parent`s evaluation. However, in this paper, the aim of this analysis was simply observe the correspondence between parents and children and to prove if the results were similar to other published research. Given these results, and since CDS is an internalising dimension, one would expect less agreement between parents and children than if it were an externalising entity. This could be explained by the fact that there is a greater agreement between information from different raters when the measures are more observable or externalising than when they are internalising. (de Los Reyes et al., 2015). Therefore, the multi-informant method would allow for bet-

ter and correct detection of CDS. It is possible that some children with problems would be underestimated based on adult ratings only (Durbeej et al., 2019).

Regarding the second aim, it was found that there is a high relationship between children's measures of CDS and loneliness/social isolation, as hypothesised. In some of the previous publications where this association has been found, it has been speculated that one of the causes may be the enormous exhaustion children with CDS experience in their social interactions. It is possible that individuals with CDS may feel overwhelmed by the enormous amount of stimulation and information they must continuously process in their social performance and consequently avoid social situations and isolate themselves, as demonstrated in previous publications by Becker et al. (2015), Garner et al. (2017), Marshall et al. (2014) and Willcutt et al. (2014). In addition to the association between the measures of CDS and loneliness, we also considered including a self-report measure of preference for being alone in this research to analyse its association with CDS measure. Although the preference for being alone has been included in a smaller number of studies compared to the relationship between CDS and loneliness measures, the data obtained represent a particularly relevant contribution to the study of the social domain of CDS, as a moderate relationship was observed between measures of loneliness and the preference for being alone. Thus, the consideration of this variable could contribute to the elucidation of the underlying mechanism of social problems and isolation in CDS and, in addition, its possible correlation with suicide. That is, as the results we found indicate, if the factors of depression and ADHD symptoms were controlled, one could understand the role of CDS in suicide, in line with the works published by Becker et al. (2018), Becker, Withrow et al. (2016) and Sáez, Servera, Burns, et al. (2019). Furthermore, due to the close relationship between these three dimensions, the factor model indicated that the items were grouped into independent factors. That is, we confirmed that the 15 CDS items saturated primarily on the CDS factor (with loadings above .40) and did not saturate on loneliness (assessed by the LQ) or on preference for being alone (assessed by the CSPS). Similarly, the independence of the other two factors was tested, i.e. the nine items of the LQ and the seven items of the CSPS. These results were similar to those obtained in the work of Sáez, Servera, Burns, et al. (2019), who also provided discriminant evidence of validity of the relationships between test scores and the measures of the three different constructs (CDS, loneliness and preference for solitude).

The data from the third objective allowed, on the one hand, to confirm the expected relationship between internalising and externalising symptomatology in parents' assessments, as CDS symptoms were mainly associated with a greater presence of internalising symptoms. Specifically, the data showed that CDS (controlling inattention, IN) was more closely associated with anxiety and, in particular, with depression, which is consistent with the findings of other studies developed by Barkley (2013), Başay et al. (2021), Be-

cker et al. (2022), Becker, Luebbe, et al. (2014), Fenollar Cortés et al. (2017) and Jacobson et al. (2012). Regarding the correlation between self-reported CDS and conflictual shyness (SHY), it could be explained by the social difficulties experienced by these children (also reflected in the correlations between self-reported measures), which would confirm the results found by Becker, Leopold, et al. (2016) and Burns et al. (2021). On the other hand, we observed how measures of IN would be more closely linked to externalising measures, such as hyperactivity/impulsivity (HI) and oppositional defiant disorder (ODD). Therefore, the corresponding associations between CDS and IN measures and other internalising and externalising measures would align with those published by Moreno-García et al. (2022), supporting the distinction between CDS and ADHD-IN and the possible inclusion of CDS in the general framework of internalising disorders. On the other hand, regarding the predictive ability of children's self-reported measures of CDS on their scores on loneliness and preference for being alone, significant values were found, even after controlling for parents' IN scores. Thus, CDS symptoms would predict a higher presence of child-reported social problems, as was shown in the research of Becker, Garner et al. (2019), Rondon et al. (2020), and Sáez, Servera, Burns et al. (2019) which also included measures of loneliness, withdrawal, and isolation/social disengagement.

Regarding the fourth aim, although we hypothesised that perhaps the fact of working with a primary school sample would lead to a lack of relationship between the CDS measures and gender and age, this was not the case in the case of parents, as the correlations were significant, although relatively moderate. On the other hand, in the case of self-reported CDS measures, we observed no relationship with either gender or age. Previous work with samples of adolescents has shown that scores on CDS measures are higher at older ages, raising the possibility that this symptomatology becomes more apparent with age. However, these data should be treated with caution, as further empirical support from publications with longitudinal designs would be needed, as noted in the work by Becker, Leopold, et al. (2016), Becker & Willcutt (2019), Bernad et al. (2016) Fredrick et al.

(2022), Holdaway & Becker (2018), Leopold et al. (2016), Sáez, Servera, Burns, et al. (2019) and Servera et al. (2016).

In conclusion, this research demonstrates the need to include self-reported measures to improve the understanding, assessment and future diagnosis of CDS. On the one hand, including child, adolescent, and adult measures could enrich and complete the assessment process, especially in the internalisation of symptom information. In addition, evidence of discriminant validity is provided for three of the self-report measures in children. Furthermore, a distinction is made between CDS, loneliness and preference for being alone, with a relationship found between CDS and loneliness / social isolation on the one hand and preference for being alone on the other, even when controlling for the effect of the parental inattention measure. Finally, no clear relationship was observed between self-reported CDS measure and children's gender and age, although a possible relationship between parents' CDS assessments and children's gender and age is suggested. It would be advisable to continue in this direction to gather conclusive evidence on the stability of CDS across the lifespan and its relationship with other symptoms.

One of the main limitations of this work is the sample size. The conclusions would be more robust if a larger sample were used. A wider age range could also be included, including preschool and adolescent stages and other clinical samples. Including teachers providing information in the school context could be considered in the future. Another interesting issue is the introduction of other measures related to sleep, emotional regulation or neuropsychological measures. Finally, and most importantly, the cross-sectional approach would be complemented by a longitudinal perspective to observe the patterns of change and the consistency of the characteristics throughout the developmental process.

Complementary information

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