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The HIDEA School-Based Screening Scale for Teachers to Detect ADHD Markers in Elementary Students

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Abstract

Background: Attention-deficit/hyperactivity disorder (ADHD) is associated with academic difficulties both short- and long-term. The aim of the study was to provide a new brief ADHD screening scale that could be easily used by teachers and educational professionals in elementary schools. **Method:** Participants were teachers of 158 children with a prior diagnosis of ADHD and 169 children without a diagnosis of ADHD. An initial pool of 38 items was generated from ADHD symptoms of both DSM-5 and CIE-10 criteria, as well from Conners 3, EDAH, SDQ and ADHD-RS-IV scales. **Results:** A 5-item model showed the best fit (χ^2 = 7.04; d.f. = 5; p = .218; RMSEA = .035; CFI = .999; TLI = .999). The HIDEA total score was highly correlated with both ADHD-IN (ρ = .93; p<.001) and ADHD-HY (ρ = .87; p<.001). The ROC curve for the HIDEA total score gave an AUC value of .998 (95%, CI = [.994, 1.000]). HIDEA scale showed a good sensitivity (97%) and very good specificity (3%). **Conclusion:** The HIDEA scale has shown adequate psychometric properties. It is potentially useful for screening ADHD in elementary grade as part of a preventive strategies in school settings.

Keywords: HIDEA Scale, ADHD, screening, school prevention.

Resumen

Escala HIDEA de cribado escolar orientada al profesorado para detectar marcadores TDAH en Primaria. **Introducción:** el trastorno por déficit de atención e hiperactividad (TDAH) está asociado a dificultades académicas tanto a corto como a largo plazo. El objetivo de este estudio fue desarrollar una escala breve de cribado del TDAH de sencillo manejo para profesorado y profesionales de Educación Primaria. **Método:** los participantes fueron educadores/as de 158 niños/as con un diagnóstico previo de TDAH, y 169 sin diagnóstico TDAH. Se generó un pool inicial de 38 ítems a partir del DSM-5 y CIE-10, así como de las escalas Conners 3, EDAH, SDQ y ADHD-RS-IV. **Resultados:** el modelo de 5-ítems mostró el mejor ajuste (χ^2 = 7.04; d.f. = 5; p = .218; RMSEA = .035; CFI = .999; TLI = .999). La puntuación en la escala HIDEA correlacionaba de manera elevada tanto con la "inatención" (ρ = .93; p<.001) como con la "hiperactividad/impulsividad" (ρ = .87; p<.001). La curva ROC obtuvo un AUC de .998 (95%, CI = [.994, 1.000]). HIDEA mostró buena sensibilidad (97%) y buena especificidad (3%). **Conclusión:** la escala HIDEA ha mostrado unas propiedades psicométricas adecuadas, mostrando ser una herramienta de cribado clínico para el TDAH en Primaria, potencialmente útil en estrategias preventivas aplicables en la escuela.

Palabras clave: escala HIDEA, TDAH, cribado, prevención escolar.

Most current educational systems follow the traditional "wait-to-fail" model for the detection of educational difficulties (Donovan & Cross, 2002) that is, the detection and intervention of educational special needs often occurs after the consequences of the difficulties are sufficiently serious for the student. In order to identify the students who are at risk of developing future academic or behavioral problems, it has been suggested that screening scales be used as part of a comprehensive school assessment system (Elliott, Huai, & Roach, 2007; Glover & Albers, 2007). The prevention of clinical problems in children is more efficient than providing treatment for problems that have already developed, so the early detection of mental health problems through screening and assessment can be considered forms of prevention (Levitt, Saka, Romanelli, & Hoagwood, 2007). Systematic and universal screening could connect the more vulnerable students to services and interventions much earlier in their schooling (Severson, Walker, Hope-Doolittle, Kratochwill, & Gresham, 2007). School psychologists can play an essential role in integrating early mental health identification programs into schools where overloaded teachers currently require the early detection of the student's educational needs to be able to respond to the diversity of the student body that comprises their classrooms (Levitt et al., 2007).

One of the most common neurodevelopmental disorders of childhood is attention-deficit/hyperactivity disorder (ADHD). The *Diagnostic and statistical manual of mental disorders -test revision- 5th edition* ([DSM-5] American Psychiatric Association [APA], 2013) indicates that ADHD is characterized by developmentally inappropriate levels of inattention (ADHD-IN) and/or hyperactivity– impulsivity (ADHD-HY) that have a significant impact on the child's academic, social, and familial performance). Poor academic performance is common in children with ADHD (DuPaul & Stoner, 2014; Gut, Heckmann, Meyer, & Schmid, 2012). Children with ADHD have significantly lower

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academic performance and higher grade retention and dropout rates than non-ADHD peers (Frazier, Youngstrom, & Glutting, 2007). In fact, the persistent academic difficulty is one of the major reasons for the request of a clinical evaluation in school settings (Loe & Feldman, 2007). Furthermore, a relationship between schoolwork and future functional impairments in ADHD has been suggested (Arnold, Hodgkins, Kahle, Madhoo, & Kewley, 2015).

Early detection of ADHD could mean a potential decrease of the negative academic and psychosocial impacts that this disorder causes in the life of a person, their family and their immediate environment (Sonuga-Barke, Koerting, Smith, McCann, & Thompson, 2014), as well as to the Public Health System, taking into account the high economic burden of this disorder (Pelham, Foster, & Robb, 2007). The long-term benefits of early intervention are related to academic performance; however, the benefits are also related to other risks associated with ADHD in adults such as driving difficulties, obesity, low self-esteem, social dysfunction and drug addiction (Dalsgaard, Østergaard, Leckman, Mortensen, & Pedersen, 2015; Harpin, Mazzone, Raynaud, Kahle, & Hodgkins, 2013; Shaw et al., 2012) .

Unfortunately, most ADHD scales are not implemented as brief screening tools, but as extensive scales (DuPaul & Stoner, 2014; Gut, Heckmann, Meyer, & Schmid, 2012; Wolraich, Feurer, & Hannah, 1998). One of the most substantial exceptions is the Strength and Difficulties Questionnaire (SDQ; Goodman, Lamping, & Ploubidis, 2010). The SDQ is a psychopathology child and adolescent screening tool that has shown good psychometric properties (Roy, Veenstra, & Clench-Aas, 2008; for the Spanish population, see Gómez-Beneyto et al., 2013). However, the SDQ has shown several limitations, one of them is related to the low sensitivity for either the inattentive or hyperactive/impulsive phenotype (Ullebø, Posserud, Heiervang, Gillberg, & Obel, 2011). SDQ does not seem to be an appropriate large-scale screening tool for ADHD in the clinical context (Pritchard, 2012). Despite the broad agreement on the high clinical and academic value of the early detection and intervention of educational special needs related with ADHD, there is no ADHD-specific screening scale for school setting.

The aim of this study was to develop a brief ADHD screening scale adapted to the school setting that fulfils three requirements: (i) to be exceptionally brief; (ii) to be highly sensitive to the ADHD clinical heterogeneity; and (iii) to be easily completed by teachers. Furthermore, the new scale had to be easily used by teachers and educational professionals.

Method

Participants

Participants were teachers of 158 children with a prior diagnosis of ADHD (clinical group; M = 9.48, SD = 1.55; 77% male) and 169 children without diagnosis of ADHD (control group; M = 9.53, SD = 1.52; 59% male) in various elementary schools from Murcia (Spain). Children ranged in age from 7 to 12 years (M = 9.50, SD = 1.53) and approximately three fifths were male (63%, n = 206). Fifty-two percent of the ADHD group were taking medication for ADHD at the time of the study. 102 participants of the clinical group fulfilled the DSM criteria for ADHD combined presentation (ADHD-C; age, M = 9.27, SD = 1.63; 68% were male) and 56 fulfilled the DSM criteria for ADHD predominantly inattentive presentation (ADHD-I; age, M = 9.86, SD = 1.31; 70% were male).

Instruments

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). SDQ is a 25-item screening measure with an "emotional symptoms", "conduct problems", "inattention/hyperactivity", "peer problems", and "prosocial" scale. Each item was rated on a 3-point frequency of occurrence scale for the past 6 months. In accordance with the study aim, only the "Hyperactivity/Inattentive" scale was applied. The reliability was high (Cronbach's alpha = .90).

ADHD-Rating Scale IV (ADHD-RS-IV; DuPaul, Power, & Reid, 1998). ADHD-RS-IV is a 18-item scale which measures "inattention" (9 items) and "hyperactivity/impulsivity" (9 items). Each item was rated on a 4-point frequency of occurrence scale for the six-past month. The Cronbach alphas value were .95 for both "Inattention" and "Hyperactivity/Impulsivity".

Conners 3 short teachers form (Conners, 2008) . Conners 3 is a 39-item scale that measures five dimensions: "inattention", "hyperactivity/impulsivity", "aggressiveness/defiance", "peer relationship problems" and "learning problems/Executive functions". Each item was rated on a 4-point frequency of occurrence scale for the past month. Only "inattention" and "hyperactivity/impulsivity" subscales were applied. The Cronbach alphas value were high for Inattention (.90) and Hyperactivity (.89).

Escala para la Evaluación del Trastorno por Déficit de Atención con Hiperactividad (EDAH; Farré i Riba & Narbona-García, 1998). The EDAH scale is a 20-item ADHD scale which measures "attention deficit" (5 items), "hyperactivity" (5 items) and "behavioural problems" (10 items). Each item was rated on a 4-point frequency of occurrence. The Cronbach alphas were .94 and .91 for "Hyperactivity" and "Attention Deficit", respectively.

HIDEA scale development

An initial pool of 38 items was generated from ADHD symptoms of both DSM-5 (APA, 2013) and CIE-10. Furthermore, items were also included from EDAH and Conner scale (teacher forms), as well ADHD-Rating Scale-IV and SDQ. Some of the items were adapted to the school setting whenever it was deemed necessary to do so. No duplicate items from different scales were included.

The three ADHD dimensions were measured: "Inattention" (12 items, 2 items related with executive functions), "Hyperactivity" (13 Items) and "Impulsivity" (13 items). Teachers had to rate on a 4-point frequency of occurrence scale for the past 6 months (0 = "never or rarely", 1 = "sometimes", 2 = "often", 3 = "very often"). Hyperactivity and impulsivity were measured as independent dimensions.

Procedure

The participating schools were drawn from both public and private sectors, and geographically well distributed. 190 schools were interested in collaborating with the study. Each school provided two participants (one per group). Controls were randomly selected.

The inclusion criteria required children to be between the ages of 7 and 12 years, and to have a previous diagnosis of ADHD

based on a clinical interview provided by a psychiatrist with no involvement in the current research. The initial exclusion criteria were an estimated IQ of < 70 (Wechsler Intelligence Scale for Children-IV [WISC-IV]) or a prior diagnosis of autism, epilepsy, or another neurological or major medical disorder.

A clinical algorithm was used to classify the children into two primary ADHD presentations: predominantly inattentive and combined. This algorithm considered the prior diagnosis, medication status, teacher ratings on the DSM-IV ADHD questionnaire (6 or more inattentiveness symptoms), Conners 3 (T-score greater than 64), and SDQ hyperactivity subscale. This set of criteria was also used to corroborate the ADHD diagnosis history, verifying that our sample had both a history of ADHD diagnosis as well as clinically significant ADHD symptoms at the time of the study.

The Commission on Ethics in Research of the University of Murcia approved the protocol for the study.

Data analysis

Responses collected from teachers were analysed according to the following sequence:

(i) Differences between teachers' responses from the clinical and control groups were conducted by using both parametric and nonparametric tests. It was checked whether case-control differences were due to either age or gender.

(ii) Principal Axis Factoring was used to determine the latent structure of items. Such method of factoring is recommended for non-normal distributions (Costello & Osborne, 2005). All participants were included to maximize the statistical power of our analysis.

(iii) Confirmatory Factor Analysis (CFA) with diagonally weighted least squares method (cat-DWLS) with Theta parameterization was performed based on the model from PAF (Rowland, Umbach, Bohlig, Stallone, & Sandler, 2007). Mplus 14 Sofware (Muthén & Muthén, 1998-2011) was used for that purpose.

(iv) Unique effects among ADHD dimensions (ADHD-IN and ADHD-HY) and HIDEA total score (Spearman's correlation and multiple regressions analysis, respectively) were computed.

(v) Sensitivity and Specificity analyses, and estimated the area under the Receiver Operating Characteristic (ROC curve), were conducted.

Results

Non-parametric analyses were conducted with the total sample because item-domain scores followed non-normal distributions (Kolmogorov–Smirnov test $p<.05$). Differences between teachers' responses from the clinical and control groups were computed using unequal variance *t*-test.

Exclusion criteria for items included a mean score higher than 0.5 for controls or lower than 1.5 for the ADHD group (Fenollar-Cortés & Fuentes, 2016). Six items from inattentiveness, ten items from hyperactivity and nine items from impulsivity met at least one of the exclusion criteria and were excluded from the study. The ADHD group showed significantly higher scores than controls on every single item remaining in the three ADHD dimensions ($p<.001$).

Spearman's rank correlation coefficients were also conducted. A correlation of .10 is considered a small effect, a correlation of .30 is considered a medium effect, and a correlation of .50 is considered a large effect (Cohen, Cohen, West, & Aiken, 2002) . There was no significant correlation between age and the items. ADHD dimensions, both number of DSM symptoms and ADHD total score, were highly correlated with items for inattention (ϱ = .54 to .87, $p<.001$) and for hyperactivity/impulsivity (ϱ = .63 to .86, $p<.001$).

Factor structure of HIDEA scale items

Exploratory factor analyses with all items included were conducted to determine the model with the best fit. The results showed a 12-item single model with good fit indices (KMO = .945, $p<.001$, eigenvalue = 7.57, 63.07% of variance explained, loads between .63 and .86). Reliability analysis were conducted to test the different EFA models. Items with a lower load were gradually excluded from the models to determine the shorter model with the best fit. Finally, six 5-item single models showed a good fit in the Exploratory Factor Analysis (Table 1).

CFA was conducted with each of the 5-item models. Only Model 4 and Model 5 showed good fit, that is, other models showed a root mean square error of approximation (RMSEA) higher than .07 and significant Chi-square, and were thus excluded. Model fit was assessed by inspecting fit indices including Chi-square, RMSEA, Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) with good fit defined as lower Chi-square values indicate a good fit if $p > .05$ (Bolen, 1989), RMSEA < 0.07 (Steiger, 2001); CFI > .95 (Hu & Bentler, 1999); TLI < .90 (Schumacker & Lomax, 1996).

Model 4 showed a better fit than Model 5 (Table 2), but the differences were minimal. A 6-item model was conducted which included all items from both models, but the fit was quite poorer (i.e., RMSEA = .123; CFI = .996; TLI = .994). The Chi-squared value from Model 4 ($\chi^2_{(5)} = 7.04$, $p = .218$) was lower than that in Model 5 ($\chi^2_{(5)} = 7.91$, $p = .161$), but both were non-significant. The RMSEA from Model 4 (RMSEA = .035) was lower than that in Model 5 (RMSEA = .042). The rest of the fit model statistics were quite similar (Model 4 showed slightly higher reliability; Cronbach alpha = .929 and .937 for Models 4 and 5, respectively). The HIDEA Scale form can be found in table 4.

Table 1
Comparison between factor structural alternative models (Principal Axis Factoring)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Ina_3	.850	–	.850	.819	.839	.853
Ina_8	.905	.918	–	.907	.918	.908
Ina_10	.912	.872	.888	–	.897	.900
Ina_11	.807	.812	.820	.884	–	.817
Ina_12	.863	.889	.876	.884	.875	–
Imp_13	–	.815	.802	.824	.798	.790
KMO	.899	.895	.882	.900	.887	.884
Eigenvalue	3.77	3.720	3.590	3.624	3.754	3.653
% variance explained	75.4	74.360	71.880	72.474	75.087	73.063

Table 2
Comparison between Factor Models (Confirmatory Factor Analysis)

	Model 4	Model 5
Ina_3	.863(1.000)[a]	.873(1.000)
Ina_8	.942(1.641)	.942(1.405)
Ina_10	–	.872(1.494)
Ina_11	.873(1.048)	–
Ina_12	.929(1.420)	.930(1.129)
Imp_13	.900(1.467)	.894(0.917)
Chi-square	7.04	7.91
d.f.	5	5
p	.218	.161
RMSEA	.035	.042
CFI	.999	.999
TLI	.999	.999

Note: d.f. = degrees of freedom; RMSEA = Root-Mean- Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis index
[a] Standardized (Unstandardized) loading coefficients

Both ADHD-IN and ADHD-HY predicted the HIDEA total score (Table 3). After controlling ADHD-IN, both ADHD-HY scores and symptoms predicted part of the HIDEA total score. However, ADHD-IN predicted most of the HIDEA total score after controlling ADHD-HY. The HIDEA total score was also highly correlated with all ADHD scales, both for inattention and Hyperactivity/Impulsivity subscales (Table 5).

Sensitivity and specificity: ROC curve analysis

The ROC curve for the HIDEA total score gave an area under the curve (AUC) value of .998 (95%, CI = [.994, 1.000]). Per the clinical diagnosis, the AUC was .998 (95%, CI = [.995, 1.000]) for the ADHD-C and .996 (95%, CI = [.990, 1.000]) for the ADHD-I.

The primary aim of the HIDEA Scale was to identify the potentially ADHD profiles in large samples for a subsequent clinical assessment. Thus, the sensitivity of the scale should be very high, even at the cost of a weaker specificity. This is not necessarily a problem, particularly for clinical screening scales. Furthermore, the relationship between sensitivity and specificity of a scale is related to the clinical needs and the area of implementation (Swets, 1988). For HIDEA Scale, a cut-off point of 6 showed a good sensitivity (97% of true positive) and very good specificity (3% of false positive), with scarce false positives.

Table 3
Unique effects among ADHD dimensions (total score and ADHD symptoms) and HIDEA total score

	ADHD Score				ADHD Symptoms			
	ADHD-IN β(SE)[a]	ADHD-HY β(SE)	F	r^2	ADHD-IN β(SE)	ADHD-HY β(SE)	F	r^2
HIDEA Scale -Total score	.77(.02)*	.22(.02)*	2204.4*	.935	.79(.04)*	.21(.05)*	1517.2*	.906

Note: ADHD-IN = ADHD inattention; ADHD-HY = hyperactivity/impulsivity
[a] SE = Standard Error
* *p*<.05

Table 4
HIDEA scale form

Please circle the number next to each item that best describes the child's behaviour during the past 6 months

	Never or rarely	Sometimes	Often	Very often
Easily distracted				
Loses the concentration by extraneous stimuli, even if it is insignificant				
Fails to give close attention to details				
Makes careless mistakes in the schoolwork because s/he has difficulty organizing tasks and activities				
S/he doesn't think about the consequences of this actions before acting				

Correlations and unique effects among ADHD-IN, ADHD-HY and HIDEA total score

Spearman rank correlation coefficients between the ADHD dimensions and the HIDEA total score were computed. The HIDEA total score was highly correlated with both ADHD-IN (ϱ = .93; *p*<.001) and ADHD-HY (ϱ = .87; *p*<.001). When only the clinical sample was analyzed, the correlations were also high (for ADHD-IN, ϱ = .77; *p*<.001; for ADHD-HY, ϱ = .69; *p*<.001). Similarly, correlations were also high between HIDEA total score and number of ADHD symptoms in both Inattention (ϱ = .83; *p*<.001) or Hyperactivity/Impulsivity (ϱ = .80; *p*<.001)

Discussion

The aim of this study was to develop a very brief ADHD screening for teachers and educational professionals that fulfil three requirements: shortness, high sensitivity, and simplicity. The principal practical purpose was to provide a new ADHD

Table 5
Spearman rank correlation between HIDEA score and ADHD scales/subscales

	HIDEA score
SDQ	.89***
Conners 3	
Inattention	.90***
hyperactivity/impulsivity	.77***
EDAH	
Inattention	.82***
Hyperactivity/impulsivity	.79***
ADHD-RS-IV	
Inattention	.93***
Hyperactivity/impulsivity	.87***

*** *p<.001*

screening scale to educational institutions that would enable them to discriminate the children at risk of developing clinical or academic difficulties before more serious problems develop.

Most the items in the HIDEA Scale are related with inattentiveness symptoms, which may lead to a low sensitivity for ADHD predominantly hyperactive-impulsive presentation (four items are related with inattention, and the other is related with impulsivity). However, the fact that four of the five items from the HIDEA Scale were based on inattentiveness symptoms should not be a surprise. The validity of the ADHD predominantly hyperactive-impulsive presentation (ADHD-H) has been questioned, particularly after early childhood (Willcutt et al., 2012). Given that inattentiveness is the common ADHD dimension for ADHD-C and ADHD-I, although it cannot be considered as an ADHD pathognomonic symptom, the probability to discriminate the ADHD profiles is quite high. However, future studies should explore the sensitivity of HIDEA scale for this subclinical group.

Of course, it is necessary to assess the ADHD symptoms by collecting ratings of behaviour in multiple settings, the school being one of the most important, so under no circumstances will the rates given by teachers in an ADHD scale be considered sufficient for an ADHD diagnosis. In addition, it should be stressed that the ADHD ratings from parents and teachers are often discrepant (Murray, Kollins, & Hardy, 2007). Parents tend to report a higher magnitude of ADHD symptoms than teachers do (e.g., Papageorgiou, Kalyva, & Dafoulis, 2008), particularly for inattention symptoms (Narad et al., 2014). The detection of inattentive symptoms is also important because the inattentive symptoms have been associated with long-term academic difficulties risk (Sayal, Washbrook, & Propper, 2015).

This study has several limitations. In our opinion, the most important limitation was the lack of information from parents related to child behaviour, comorbidities, pharmacology, etc. However, one of the inclusion criteria was to be diagnosed by an independent health professional from the Public Mental Health System. The diagnostic protocol for ADHD in the Public Health System includes clinical information in family setting. This allowed us to be certain about the quality of the ADHD diagnoses. Future studies should also take account the pharmacological status of children at the moment of the study. This would be particularly relevant in future studies related with cut-off points and normative data.

It's well-known that conducting EFA and CFA on the same sample could be considered as an important bias. Nevertheless, this study shows the preliminary results from a new ADHD screening scale, and further studies will test the HIDEA Scale psychometric properties in larger samples.

In summary, this study provides a new very brief ADHD screening tool –HIDEA– that can be easily used in the school setting by teachers and/or educational professionals. The use of this scale in schools, as with other screening tools for clinical or academic difficulties, is based on the broad agreement that the early identification of mental health problems can lead to the improvement of the quality of life of children with special educational needs. Furthermore, HIDEA scale can be used free of charge for non-commercial purposes is an additional advantage for teachers and clinicians working in the public sector.

References

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Arnold, L. E., Hodgkins, P., Kahle, J., Madhoo, M., & Kewley, G. (2017). Long-Term Outcomes of ADHD: Academic Achievement and Performance. *Journal of Attention Disorders*. Advance online publication. doi: 10.1177/1087054714566076

Bolen, K. A. (1989). *Structural Equations with Latent Variables*. Oxford: Wiley.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2002). *Applied multiple regression/correlation analysis for the behavioral sciences (3rd ed.)*. London, England: Routledge.

Conners, C. K. (2008). *Conners third edition (Conners 3)*. Toronto, Canada: Multi-Health Systems.

Costello, A. B., & Osborne, J. (2005). Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. *Practical Assessment, Research & Evaluation*, *10*(7), 1-9.

Dalsgaard, S., Østergaard, S., Leckman, J., Mortensen, P., & Pedersen, M. (2015). Mortality in children, adolescents, and adults with attention deficit hyperactivity disorder: A nationwide cohort study. *The Lancet*, *385*(9983), 2190-2196. doi:10.1016/S0140-6736(14)61684-6

Donovan, M. S., & Cross, C. T. (2002). *Minority students in gifted and special education*. Washington DC: National Academies Press.

DuPaul, G. J., & Stoner, G. (2014). *ADHD in the schools: Assessment and intervention strategies*. New York: Guilford Press.

DuPaul, G. J., Power, T. J., A D, & Reid, R. (1998). *ADHD Rating Scale-IV: Checklists, norms, and clinical interpretation*. New York: Guilford.

Elliott, S., Huai, N., & Roach, A. (2007). Universal and early screening for educational difficulties: Current and future approaches. *Journal of School Psychology*, *45*(2), 137-161. doi:10.1016/j.jsp.2006.11.002

Farré i Riba, A., & Narbona-García, J. (1998). *EDAH. Evaluación del Trastorno por Déficit de Atención con Hiperactividad* [EDAH. Evaluation of Attention-deficit/hyperactivity disorder]. Madrid: TEA Ediciones.

Fenollar-Cortés, J., & Fuentes, L. (2016). The ADHD Concomitant Difficulties Scale (ADHD-CDS), a Brief Scale to Measure Comorbidity Associated to ADHD. *Frontiers in Psychology*, *7*, 861. doi:10.3389/fpsyg.2016.00871

Frazier, T. W., Youngstrom, E. A., & Glutting, J. J. (2007). ADHD and achievement meta-analysis of the child, adolescent, and adult literatures and a concomitant study with college students. *Journal of*

Learning Disabilities, 40(1), 49-65. doi:10.1177/00222194070400010401

Glover, T., & Albers, C. (2007). Considerations for evaluating universal screening assessments. *Journal of School Psychology*, *45*(2), 117-135. doi:10.1016/j.jsp.2006.05.005

Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British poarents, teachers and children. *Journal of Abnormal Child Psychology, 38*(8), 1179-1191. doi: 10.1007/s10802-010-9434-x

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*(5), 581-586. doi:10.1111/j.1469-7610.1997.tb01545.x

Gut, J., Heckmann, C., Meyer, C. S., & Schmid, M. (2012). Language skills, mathematical thinking, and achievement motivation in children with ADHD, disruptive behavior disorders, and normal controls. *Learning and Individual Differences, 22*(3), 375-379. http://dx.doi.org/10.1016/j.lindif.2011.12.002

Gómez-Beneyto, M., Nolasco, A., Moncho, J., Pereyra-Zamora, P., Tamayo-Fonseca, N., Munarriz, M., …, Girón, M. (2013). Psychometric behaviour of the strengths and difficulties questionnaire (SDQ) in the Spanish national health survey 2006. *BMC Psychiatry*, *13*, 95. doi:10.1186/1471-244X-13-95

Harpin, V., Mazzone, L., Raynaud, J., Kahle, J., & Hodgkins, P. (2013). Long-Term Outcomes of ADHD: A Systematic Review of Self-Esteem and Social Function. *Journal of Attention Disorders*, *20*(4), 295-305. doi:10.1177/1087054713486516

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: A Multidisciplinary Journal, 6*(1), 1-55. doi:10.1080/10705519909540118

Levitt, J., Saka, N., Romanelli, L., & Hoagwood, K. (2007). Early identification of mental health problems in schools: The status of instrumentation. *Journal of School Psychology*, *45*(2), 163-191. doi:10.1016/j.jsp.2006.11.005

Loe, I., & Feldman, H. (2007). Academic and Educational Outcomes of Children With ADHD. *Ambulatory Pediatrics*, *7*(1), 82-90. doi:10.1016/j.ambp.2006.05.005

Muthén & Muthén (2011). *Mplus User's Guide. Sixth Edition*. Los Angeles, CA: Muthén & Muthén.

Murray, D. W., Kollins, S. H., & Hardy, K. K. (2007). Parent versus teacher ratings of attention-deficit/hyperactivity disorder symptoms in the Preschoolers with Attention-Deficit/Hyperactivity Disorder Treatment Study (PATS). *Journal of Child and Adolescent Psychopharmacology, 17*(5), 605-620. doi:10.1089/cap.2007.0060

Narad, M., Garner, A., Peugh, J., Tamm, L., Antonini, T., Kingery, K., …, Epstein, J. (2014). Parent-Teacher Agreement on ADHD Symptoms Across Development. *Psychological Assessment*, *27*(1), 239-248. doi:10.1037/a0037864

Papageorgiou, V., Kalyva, E., & Dafoulis, V. (2008). Differences in parents' and teachers' ratings of ADHD symptoms and other mental health problems. *The European Journal of Psychiatry, 22*(4), 200-210.

Pelham, W. E., Foster, E. M., & Robb, J. A. (2007). The economic impact of attention-deficit/hyperactivity disorder in children and adolescents. *Ambulatory Pediatrics*, *7*(1), 121-131. doi: 10.1016/j.ambp.2006.08.002

Pritchard, A. (2012). The Strengths and Difficulties Questionnaire hyperactivity-inattention subscale is more sensitive for the ADHD-combined subtype than other subtypes in 7-9-year-old school children. *Evidence Based Mental Health*, *15*(2), 34-34. doi:10.1136/ebmental-2011-100482

Rowland, A. S., Umbach, D. M., Bohlig, E. M., Stallone, L., & Sandler, D. P. (2007). Modifying the Response Labels of an ADHD Teacher Rating Scale: Psychometric and Epidemiologic Implications. *Journal of Attention Disorders*, *11*(3), 384-397. doi:10.1177/1087054707305082

Roy, B., Veenstra, M., & Clench-Aas, J. (2008). Construct validity of the five-factor Strengths and Difficulties Questionnaire (SDQ) in pre-, early, and late adolescence. *Journal of Child Psychology and Psychiatry*, *49*(12), 1304-1312. doi:10.1111/j.1469-7610.2008.01942.x

Sayal, K., Washbrook, E., & Propper, C. (2015). Childhood Behavior Problems and Academic Outcomes in Adolescence: Longitudinal Population-Based Study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *54*(5), 360-368.e2. doi:10.1016/j.jaac.2015.02.007

Schumacker, R. E., & Lomax, R. G. (1996). *Abeginners guide to structural equation modeling*. Hillsdale, N.J.: Erlbaum.

Severson, H., Walker, H., Hope-Doolittle, J., Kratochwill, T., & Gresham, F. (2007). Proactive, early screening to detect behaviorally at-risk students: Issues, approaches, emerging innovations, and professional practices. *Journal of School Psychology*, *45*(2), 193-223. doi:10.1016/j.jsp.2006.11.003

Shaw, M., Hodgkins, P., Caci, H., Young, S., Kahle, J., Woods, A. G., & Arnold, E. L. (2012). A systematic review and analysis of long-term outcomes in attention deficit hyperactivity disorder: Effects of treatment and non-treatment. *BMC Medicine*, *10*(1), 99. doi:10.1186/1741-7015-10-99

Sonuga-Barke, E., Koerting, J., Smith, E., McCann, D., & Thompson, M. (2014). Early detection and intervention for attention-deficit/hyperactivity disorder. *Expert Review of Neurotherapeutics*, *11*(4), 557-563. doi:10.1586/ern.11.39

Steiger, J. H. (2001). Driving fast in reverse. *Journal of the American Statistical Association*, *96*(453), 331-338. doi:10.1198/016214501750332893

Swets, J. A. (1988). Measuring the accuracy of diagnostic systems. *Science (New York, N.Y.)*, *240*(4857), 1285-1293.

Ullebø, A., Posserud, M. B., Heiervang, E., Gillberg, C., & Obel, C. (2011). Screening for the attention deficit hyperactivity disorder phenotype using the strength and difficulties questionnaire. *European Child & Adolescent Psychiatry*, *20*(9), 451-458. doi:10.1007/s00787-011-0198-9

Willcutt, E. G., Nigg, J. T., Pennington, B. F., Solanto, M. V., Rohde, L. A., Tannock, R., …, Lahey, B. B. (2012). Validity of DSM-IV attention deficit/hyperactivity disorder symptom dimensions and subtypes. *Journal of Abnormal Psychology*, *121*(4), 991-1010. doi:10.1037/a0027347

Wolraich, M. L., Feurer, I. D., & Hannah, J. N. (1998). Obtaining systematic teacher reports of disruptive behavior disorders utilizing DSM-IV. *Journal of Abnormal Child Psychology, 26*(2), 141-152.