



Psychometric Properties of the Social Responsiveness Scale 2nd Edition (SRS-2) and Development of a Short Version in a Spanish Sample

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Abstract

Earlier identification of autistic traits is crucial for timely interventions in children and adolescents. This study aims to evaluate the psychometric properties of the Social Responsiveness Scale 2nd Edition (SRS-2) -answered by parents- in a Spanish population and to develop a shortened form of the scale for autism screening. A total of 528 children and adolescents with autistic diagnosis, ADHD, and non-diagnosis participated in the study. Factorial analysis indicated a unidimensional structure with excellent reliability (Cronbach's $\alpha=.96$) and a KMO index of .95. A moderate sensitivity (69.4%) and high specificity (88.5%) were found for a score of ≥ 60 . The 10 items with the highest factor loading have constituted a reliable SRS-2 short form ($\alpha=.92$), valid for identifying autism. This shortened version showed an area under the ROC curve of 86.3%, with high sensitivity (83.8%) and moderate specificity (75.3%) for a score of ≥ 5 . This short form has shown to be an effective screening tool in the Spanish population, retaining psychometric properties comparable to the original scale. The findings conclude that both versions are reliable and valid, and we support the utility of the SRS-2 short form as a practical tool for improving autism detection in the Spanish population, with significant implications for clinical and research applications.

Keywords Autism · ADHD · Social Responsiveness Scale · Children · Adolescents

Introduction

Autism is characterized by lifelong differences in communication, social interaction, and restricted or repetitive behaviors and interests, which may involve additional challenges to daily functioning and quality of life (APA, 2013; Lancaster et al., 2022). The global prevalence of autism is estimated to be around 1% (Zeidan et al., 2022). Although autism diagnosis can be stable from as early as 14 months

(Pierce et al., 2019), many individuals experience misdiagnoses or significant delays in receiving a diagnosis. The average age of diagnosis in children up to 10 years is around 4–5 years (Maenner et al., 2023; van 't Hof et al., 2020), whereas among children at 14 years, most (79%) are diagnosed after starting school, with 28% receiving a diagnosis after entering secondary school (Hosozawa et al., 2020). However, many diagnoses are delayed until adulthood due to the complex interrelationship between autistic traits, personality, sex/gender specificity (Huang et al., 2020; Rosello et al., 2021) or the accuracy of assessment instruments, among others. Moreover, the presence of co-occurring conditions, such as ADHD, further complicates early identification (Canals et al., 2024; Huang et al., 2020).

For these reasons, early identification and diagnosis of autism are essential for timely support, which can significantly improve developmental outcomes and overall well-being (Clark et al., 2017; Colombi et al., 2023; Liu et al., 2022). Screening tools play a key role in the diagnostic

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process, as they help identify autism across different stages of life. For example, the Modified Checklist for Autism in Toddlers, Revised with Follow-up (M-CHAT-R/F; Robins et al., 2001) has shown strong performance in early autism screening (Wieckowski et al., 2023). From age 4 and throughout the lifespan, the Social Communication Questionnaire (SCQ; Rutter et al., 2003a) and the Social Responsiveness Scale 2nd Edition (SRS-2; Constantino & Gruber, 2012), which serve both screening and diagnostic purposes, have been established as relatively useful measures (Hirota et al., 2018).

The SRS, initially designed to assess the intensity of social differences in children with a high likelihood of autism and to support clinical diagnosis (Constantino et al., 2000; Constantino & Todd, 2003), has since been applied in various contexts, including behavioral, genetic, and intervention evaluation studies, and, for general population screening (Constantino & Gruber, 2012; Wigham et al., 2012). The SRS-2 is a 65-item questionnaire that provides differentiated scoring norms by age and sex. Its total score effectively identifies autistic traits in children, distinguishing them from those with other psychiatric conditions. The five subscales—social awareness, social cognition, social communication, social motivation, restricted interests, and repetitive behavior—quantitatively assess these traits according to the two domains proposed by the DSM-5: Social Communication and Interaction (SCI), comprised of the first four subscales and, Restricted Interests and Repetitive Behavior (RRB), represented by the last subscale. These subscales contribute to the SRS-2 total score (Constantino et al., 2000; Constantino & Gruber, 2012; Constantino & Todd, 2003).

Psychometric evaluations of the SRS-2, conducted beyond the original version, have confirmed its good reliability across diverse cultural contexts, such as UK (Wigham et al., 2012), Germany (Bölte et al., 2010), Korea (Chun et al., 2021), Iran (Tavakolian et al., 2024; Tehrani-Doost et al., 2020), Vietnam (Nguyen et al., 2019), and Mexico (Fombonne et al., 2012). The authors reported that the SRS-2 demonstrated a highly acceptable area under the ROC (Receiver Operating Characteristic) curve of 96.8% indicating excellent overall diagnostic accuracy. For a cut-off score of ≥ 60 , SRS-2 showed high sensitivity (93%) and high specificity (91%) allowing for the correct identification of individuals with and without the condition. For a score of ≥ 75 , the instrument maintained good sensitivity (84%) and very high specificity (94%) in the US population (Constantino & Gruber, 2012). Regarding the factorial structure of the instrument, while some studies, such as Kidd et al. (2019), have supported the five-subscales model, subsequent research has identified alternative factor structures for the SRS-2. For instance, Wigham et al. (2012) conducted a study in the UK and found that items loading onto the

first factor (SCI) represented core autism behaviors, leading their analyses to support a single-factor model. In contrast, Chan et al. (2017) proposed that a two-factor model would better represent autistic traits, while Uljarević et al. (2020) found that a four-factor structure provided an excellent fit. Despite ongoing debates over its factorial structure, the SRS-2 has demonstrated strong validity and is widely used across the globe, with translations in multiple languages. As far as predictive validity is concerned, Sturm et al. (2017) studied the psychometric characteristics of the SRS-2 in a large sample of children and adolescents. As part of their study, they developed a short version of the SRS-2, known as the SRS-Short Form (SRS-SF), which includes 16 items selected from the original 65 while maintaining excellent internal reliability ($\alpha = .96$). Although Sturm et al. (2017) did not establish a specific cut-off point for the short version, Nguyen et al. (2019) evaluated its diagnostic utility, reporting that a score of 15 on the SRS-SF yielded a sensitivity of 90% and a specificity of 98%. This suggests that in school-age populations, the short version of the SRS-2 is highly accurate for detecting traits associated with autism. Nevertheless, a later study by Lyall et al. (2020), which compared Sturm's version with the original form, found that in both versions, the sensitivity and specificity in preschool children were significantly lower, with values of 75% and 64%, respectively, compared to 85% and 90% observed in school-age populations. This underscores the need for future research, particularly in light of the crucial role that age and gender/sex play in the identification of autism.

While the psychometric properties of the SRS-2 have been well-documented in various international settings—including the Spanish version used in Mexico (Fombonne et al., 2012)—they have not yet been reported for use in Spain. Therefore, the present study aims to evaluate psychometrics characteristics (factorial structure, reliability, criterion and convergent validity) of the SRS-2 in a Spanish population of children and adolescents. To offer a brief and effective screening tool from the SRS-2, this study examines the validity and reliability of both the short version by Sturm et al. (2017) and a newly shortened version developed in the present study. Additionally, it aims to present descriptive data of the SRS-2 versions by diagnosis (autism, subthreshold autistic traits, ADHD, and a comparison group), sex, and age groups. As autistic traits tend to be more evident in males than in females (May et al., 2016; Ornoy et al., 2023), and evolve with age (Landa et al., 2022; Ozonoff et al., 2018), we hypothesized that SRS-2 scores will differ by sex and age group.

Methods

Study Design and Diagnostic Procedure

This study was conducted using data from the Epidemiological Research Project on Neurodevelopmental Disorders (EPINED and EPINED-2) and clinical centers related to Rovira i Virgili University. The EPINED project is a two-phase cross-sectional study conducted between 2014 and 2019 with the primary aim of determining the prevalence of autism and attention deficit hyperactivity disorder (ADHD) in a sample of schoolchildren from two age groups (4–5 years and 10–12 years). All participants from the second phase of the EPINED were invited to participate in the follow-up longitudinal EPINED-2 project from 2019 to 2022. The overall EPINED protocol was approved by the Ethics Committee of the *Hospital Universitari Sant Joan* in Reus, Spain (13-10-31/10proj5).

The potential sample in EPINED consisted of 6,921 children from 86 public and private schools, randomly selected from various regions of the province of Tarragona, Spain. However, data was collected from 6,894 teachers and 3,727 families. In the first phase, sociodemographic and clinical data (age, sex, ethnicity, and family socioeconomic status, calculated using the Hollingshead index; Hollingshead, 2011) were obtained through an ad hoc questionnaire. In the screening process for autism, parents completed the Spanish version of the Childhood Autism Spectrum Test (CAST; Morales-Hidalgo, et al., 2017a; Scott et al., 2002) and teachers completed the EDUTEA (Morales-Hidalgo et al., 2017b). For screening ADHD, parents and teachers completed the 10-item Conners for pre-schoolers (CONNERS Early Childhood; Conners, 2009) and school-aged children (Conners 3 ADHD Index; Conners, 2008).

Children identified with an increased likelihood of autism and/or ADHD, those with a previous diagnosis, and a comparison group with no increased likelihood for autism and/or ADHD were individually assessed in the second phase of the study, resulting in 781 participants. For autism, gold-standard diagnostic instruments were used to obtain information from children and parents, respectively: the Autism Diagnostic Interview-Revised (ADI-R; Rutter et al., 2003b) and the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2012). For ADHD diagnosis, the Schedule for Affective Disorders and Schizophrenia for School-Age Children ADHD scale (K-SADS-PL; Kaufman et al., 1997) was administered to parents. Specialized and trained professionals also administrated the Wechsler Intelligence Scales for Preschool and School-Aged Children (WPPSI-IV and WISC-IV according to age group; Wechsler, 2003, 2012). The severity of autism traits was assessed using ADOS-2 calibrated scores for the overall

scale in which scores between 1 and 3 are considered as ‘non-spectrum’, 4–5 ‘ASD’, and 6–10 ‘autism’ (Gotham et al., 2009), as well as for the social-communication and restricted and repetitive behavior scales (Hus et al., 2014). Diagnoses were established according to DSM-5 criteria, along with clinical consensus among trained researchers. The autism and ADHD diagnoses were established when the child met all the required DSM-5 criteria. Subthreshold autistic traits were considered when the child scored slightly below the cut-off points on the ADI-R and ADOS-2, the screening questionnaires were positive in both contexts, and two professionals agreed that the child did not meet all the DSM-5 diagnostic criteria. The comparison group was composed of participants without autism and/or ADHD. Further details on the study design and procedure have been extensively described by Canals et al. (2021) and Morales-Hidalgo et al. (2021).

All participants from the second phase of EPINED study were invited to participate in EPINED-2 follow-up project. The focus of EPINED-2 was on understanding age-related changes in the progression of autistic traits and re-assessing the initial diagnosis established. As part of this follow-up, the SRS-2 was specifically administered during the second phase to the parents of all participants.

Participants

The present study included 528 participants, comprising 453 children and adolescents from the EPINED/EPINED-2 projects and 75 autistic children from clinical centers related to Rovira i Virgili University. All participants were selected following the same data collection protocol and assessed by the same group of researchers, ensuring consistency and reliability across the sample.

The sample was divided into the following diagnostic groups: 235 children without autism and/or ADHD conditions (comparison group), 43 children with subthreshold autistic traits (11 of whom also had ADHD), 111 children with a diagnosis of autism (10 of whom also had ADHD), and 139 children with a diagnosis of ADHD. All participants attended mainstream schools (not special education schools).

Psychological Assessment

Social Responsiveness Scale. The SRS-2 (SRS-2; Constantino & Gruber, 2012) is a 65-item questionnaire that measures autistic traits using a Likert-type scale with responses ranging from “0=Not true” to “3=Almost always true”. Items 3, 7, 11, 12, 15, 17, 21, 22, 26, 32, 38, 40, 43, 45, 48, 52 and 55 are reverse scored. The intensity of social differences is reflected in both the total score and the scores

of five subscales: social awareness, social cognition, social communication, social motivation, restricted interests, and repetitive behavior. The original SRS-2 manual suggests that *T* scores can be interpreted as: ≤ 59 *T*, within normal limits; 60–65 *T*, mild; 66–75 *T*, moderate; ≥ 76 *T* severe. The SRS-2 consists of three forms according to age: the Preschool Form covers ages 2.6 to 4.6, the School-Age Form covers ages 4.0 to 18.0, and the Adult Form covers ages 19 to 89. For this study, the Spanish-language version of the School-Age Form, as presented by Constantino and Gruber (2012) was administered to parents.

Statistical Analysis

Descriptive statistics and bivariate analyses were conducted using IBM SPSS Statistics version 29.01 (IBM Corp., 2013), while factor analyses were performed using FACTOR version 12.04.05 (Lorenzo-Seva & Ferrando, 2013). First, descriptive statistics were calculated for all variables, including means (*M*) and standard deviations (*SD*) for continuous variables, and frequencies with percentages for categorical variables. The original SRS-2 scores are reported using both standardized *T*-scores and raw scores, while for the 10-item version and the Sturm's version are reported using raw scores, as these forms do not have the standardized ones. To analyze differences between diagnostic groups, one-way ANOVA with Bonferroni post hoc tests and independent samples Student's *t*-tests were performed for continuous variables. The magnitude of the observed differences was assessed using effect size metrics, including η^2 and Cohen's *d*. For categorical variables, chi-square tests were employed. Effect sizes were interpreted using thresholds of .01, .06, and .14 for η^2 , and .2, .5, and .8 for Cohen's *d*, corresponding to small, medium, and large effects, respectively. Comparisons were made between the following groups: autistic children, children with subthreshold autistic traits, ADHD, and a comparison group of children without autism and/or ADHD.

Exploratory Factor Analysis (EFA) was employed to assess the factor structure of the SRS-2 in our sample. Additionally, Cronbach's alpha was calculated to evaluate the internal reliability of the questionnaire. Factor loadings were inspected to determine the most relevant items and model fit indices were considered for assessing unidimensionality, including the Root Mean Square of Residuals (RMSR), Unidimensional Congruence (UniCo), Explained Common Variance (ECV), and Mean of Item Residual Absolute Loadings (MIREAL) to confirm the dimensionality of the scale (Ferrando & Lorenzo-Seva,). The items with the highest factor loadings ($\geq .68$) formed the basis for a 10-item short version of the SRS-2.

For the development and validation of the reduced version of the SRS-2, Receiver Operating Characteristic (ROC) curve analyses were conducted to determine the optimal cut-off points for distinguishing clinical groups (e.g., autism and subthreshold autistic traits) from other conditions (e.g., ADHD and the comparison group). To assess the diagnostic performance of each version of the SRS-2 (the Original form, our 10-item version, and Sturm's version), we calculated the Area Under the Curve (AUC), sensitivity, specificity, and the Youden Index.

The optimal cut-off points were determined by balancing statistical criteria (highest Youden Index) and clinical considerations (sensitivity and specificity). These analyses focused on differentiating autism from other conditions, with results provided for three diagnostic comparisons: (1) autism vs. other conditions (subthreshold autistic traits, ADHD, and the comparison group), (2) autism spectrum (autism and subthreshold autistic traits) vs. other conditions (ADHD and the comparison group), and (3) autism vs. the comparison group.

Subgroup analyses were performed to evaluate potential differences in diagnostic accuracy across age (children vs. adolescents) and sex (boys vs. girls).

Convergent validity of the reduced version of the SRS-2 was further assessed through Pearson correlation analyses with the ADI-R and the ADOS-2, to examine the strength of associations between these instruments.

A significance level of $p < .05$ was used for all analyses.

Community Involvement

The school coordinators offered us facilities to evaluate the students and their families in their centers. Furthermore, the teachers were implicated in maximizing the participation of families in the project.

Results

Characteristics of the Sample

In Table 1, sociodemographic and psychological data by diagnostic and comparison groups have been described. In the groups diagnosed with autism, subthreshold autistic traits, and ADHD, there were significantly more boys than girls. Regarding socioeconomic status (SES), 29% of participants were classified as high SES, 58.5% as medium SES, and 12.5% as low SES. Psychological treatment was most prevalent in the autism group (80.2%), whereas pharmacological treatment was more frequently reported in the ADHD group (14.4%). Although most participants scored within the normal range on the Wechsler scales,

Table 1 Characteristics of the sample (N=528)

	Com- parison (n=235) ^a	Subthresh- old autism (n=43) ^b	Autism (n=111) ^c	ADHD (n=139) ^d	<i>p</i>	Group difference
<i>Sociodemographic data</i>						
Sex, % (n)					<.001	
Male	55,7 (131)	76,7 (33)	82,0 (91)	65,5 (91)		ab**, ac***, cd**
Female	44,3 (104)	23,3 (10)	18,0 (20)	34,5 (48)		ab**, ac***, cd**
Age group, % (n)					<.001	
Children (<12 age)	48,5 (114)	60,5 (26)	64,0 (71)	27,3 (38)		ac**, ad***, bd***, cd***
Adolescents (≥12 age)	51,5 (121)	39,5 (17)	36,0 (40)	72,7 (101)		ac**, ad***, bd***, cd***
Family socioeconomic status, % (n)					<.001	
Low	7,7 (18)	16,3 (7)	11,0 (11)	21,6 (30)		ad***, cd*
Medium	59,6 (140)	58,1 (25)	51,4 (57)	62,6 (87)		
High	32,8 (77)	25,6 (11)	38,7 (43)	15,8 (22)		ad***, cd***
Ethnicity, % (n)					.450	
Spanish	87,7 (206)	95,3 (41)	91,0 (101)	87,8 (122)		
Others	12,3 (29)	4,7 (2)	9,0 (10)	12,2 (17)		
Treatment (yes), % (n)						
Psychological	8.1 (19)	46.5 (20)	80.2 (89)	21.6 (30)	<.001	ab***, ac***, ad***, bc***, bd***, cd***
Psychopharmacologic	1.3 (3)	16.3 (7)	9.0 (10)	14.4 (20)	<.001	ab***, ac***, ad***
<i>Cognitive evaluation</i>						
Total Wechsler IQ, <i>M</i>(<i>SD</i>)	105,0 (13,7)	97,1 (18,4)	93,95 (20,5)	95,0 (13,0)	<.001	ab* ac***, ad***
<i>Autism diagnostic evaluation scores</i>						
SRS-2 (<i>T</i>-scores), <i>M</i>(<i>SD</i>)						
Social Awareness	49,2 (11,1)	52,3 (12,9)	59,1 (12,5)	53,1 (11,1)	<.001	ac***, ad*, bc**, cd***
Social Cognition	50,1 (10,6)	58,3 (12,5)	65,9 (13,8)	55,6 (12,5)	<.001	ab**, ac***, ad***, bc***, cd***
Social Communication	50,2 (10,1)	57,5 (14,2)	65,7 (14,5)	55,5 (12,0)	<.001	ab**, ac***, ad***, bc***, cd***
Social Motivation	51,5 (10,8)	60,7 (14,8)	65,0 (14,7)	56,5 (11,5)	<.001	ab***, ac***, ad***, cd***
RRBB	50,3 (10,0)	61,8 (15,3)	68,2 (14,3)	55,5 (13,2)	<.001	ab***, ad***, ac***, bc*, bd*, cd***
SCI	50,3 (10,7)	59,7 (13,0)	66,4 (14,1)	56,1 (11,9)	<.001	ab***, ac***, ad***, bc*, cd***
Total Scale	50,1 (10,8)	60,4 (13,0)	67,2 (14,2)	56,0 (12,3)	<.001	ab***, ac***, ad***, bc*, cd***
ADI-R, <i>M</i>(<i>SD</i>)						
Reciprocal social interaction	1,7 (1,9)	7,5 (3,9)	13,5 (5,2)	2,7 (2,9)	<.001	ab***, ac***, ad*, bc***, bd***, cd***
Communication	1,4 (1,6)	5,8 (3,4)	10,7 (3,6)	2,5 (2,1)	<.001	ab***, ac***, ad***, bc***, bd***, cd***
Restrictive behavior patterns	0,6 (0,8)	2,4 (1,3)	4,3 (2,2)	0,8 (0,9)	<.001	ab***, ac***, bc***, bd***, cd***
Developmental alterations	0,1 (0,4)	1,6 (1,4)	2,9 (1,6)	0,3 (0,8)	<.001	ab***, ac***, bc***, bd***, cd***
ADOS-2, <i>M</i>(<i>SD</i>)						
Social Communication	0,4 (0,8)	0,7 (0,6)	2,1 (2,5)	0,5 (0,7)	<.001	ab***, ac***, bc**, bd***, cd***
Social Interaction	1,0 (1,9)	2,7 (1,8)	4,2 (3,2)	1,0 (1,4)	<.001	ab***, ac***, bc***, bd***, cd***
Restricted and Repetitive Behavior	0,2 (0,7)	1,5 (1,7)	4,4 (3,9)	0,1 (0,4)	<.001	ab***, ac***, bc***, bd***, cd***
Total Scale	1,4 (2,8)	4,4 (3,1)	7,6 (6,5)	1,6 (2,0)	<.001	ab***, ac***, bc***, bd***, cd***

Comparison group children without autism and/or ADHD; *M*: Medium; *SD*: standard deviation; *IQ*: intelligence quotient, *SRS-2*: social responsiveness scale second edition; *RRBB*: repetitive behavior; *SCI*: social communication and interaction; *ADI-R*: autism diagnostic interview; *ADOS-2*: autism diagnostic observation scale—2

Significant differences: *for $p \leq 0.05$, ** for $p \leq 0.01$ and *** for $p \leq 0.001$

approximately 3.80% of the total sample (n=20) met criteria for intellectual disability, of whom there were 12 autistic children, 1 child with subthreshold autistic traits, 5 children with ADHD and 2 from the comparison group. Additionally, children in the diagnostic groups had significantly lower full-scale IQ scores compared to the comparison group.

SRS-2, ADI-R and ADOS-2 subscales scores were presented by diagnostic and comparison groups. The autistic groups scored higher on these questionnaires in comparison to the rest groups (Table 1).

Factor Analysis and Development of a Reduced Version of the SRS-2 Questionnaire

The sedimentation graph of EFA suggested that the SRS-2 items best fit a one-factor model. While the first factor accounted for 31% of the variance, the second factor explained only 4%, supporting the predominance of a single-factor solution (see Fig. 1). Indicators of essential unidimensionality confirmed this structure, with all being over the cut-off points used to assess unidimensionality: greater than .95 for UniCo, .85 for ECV, and lower than .30 for MIREAL (Ferrando & Lorenzo-Seva,) (see Table 2).

Most items strongly loaded $\lambda \geq .30$ except item 21 “Imitates others’ actions”, item 40 “Imaginative, good at pretending” (without losing touch with reality), item 43 “Separates easily from caregivers”, and item 45 “Attends to where others are looking or listening” which loaded between .07 and .23. The Cronbach’s α for the original form was .963 and the Kaiser–Meyer–Olkin (KMO) index was .95, indicating that the correlation matrix was adequate for factor analysis. A bi-dimensional structure was also tested; however, the items that composed them did not make clinical sense, and the correlation between them was high ($r = .80$ approximately; Fig. 1). While most items had factor loadings above .50, only 10 items had loadings ranging from $\lambda = .68$ to $\lambda = .76$, which were selected to form a short version of the questionnaire.

These items were: 37, 8, 13, 10, 51, 30, 33, 24, 29, and 35. Factor analysis of this reduced version showed a KMO of .947 and a Cronbach’s α of .927 (Table 2), preserving the psychometric properties of the original version. Similarly, the short version by Sturm et al. (2017) (16 items) demonstrated good reliability in our sample ($\alpha = .916$). However, its version consisted of the following items: 4, 7, 8, 13, 16, 18, 22, 23, 29, 30, 33, 37, 38, 39, 42, and 54, which did not show the highest factor loadings in our sample.

Descriptive Analysis of Total Scores for Three Versions of the SRS-2 by Diagnosis, Sex, and Age Group

Table 3 presents the descriptive statistics for the total scores of the original SRS-2 (in both T -scores and raw scores) and the two reduced versions (10-item and Sturm’s versions) in our sample. In all three versions, the autism group, the sub-threshold autistic traits group, and the ADHD group scored higher compared to the comparison group. Specifically, the autism group scored significantly higher than the other groups across all three versions of the SRS-2. Effect sizes were large, indicating considerable differentiation between diagnosis groups for the three versions ($\eta^2 = .227$ and .234 for the original SRS-2, $\eta^2 = .267$ for the 10-item version, and $\eta^2 = .256$ for Sturm’s version).

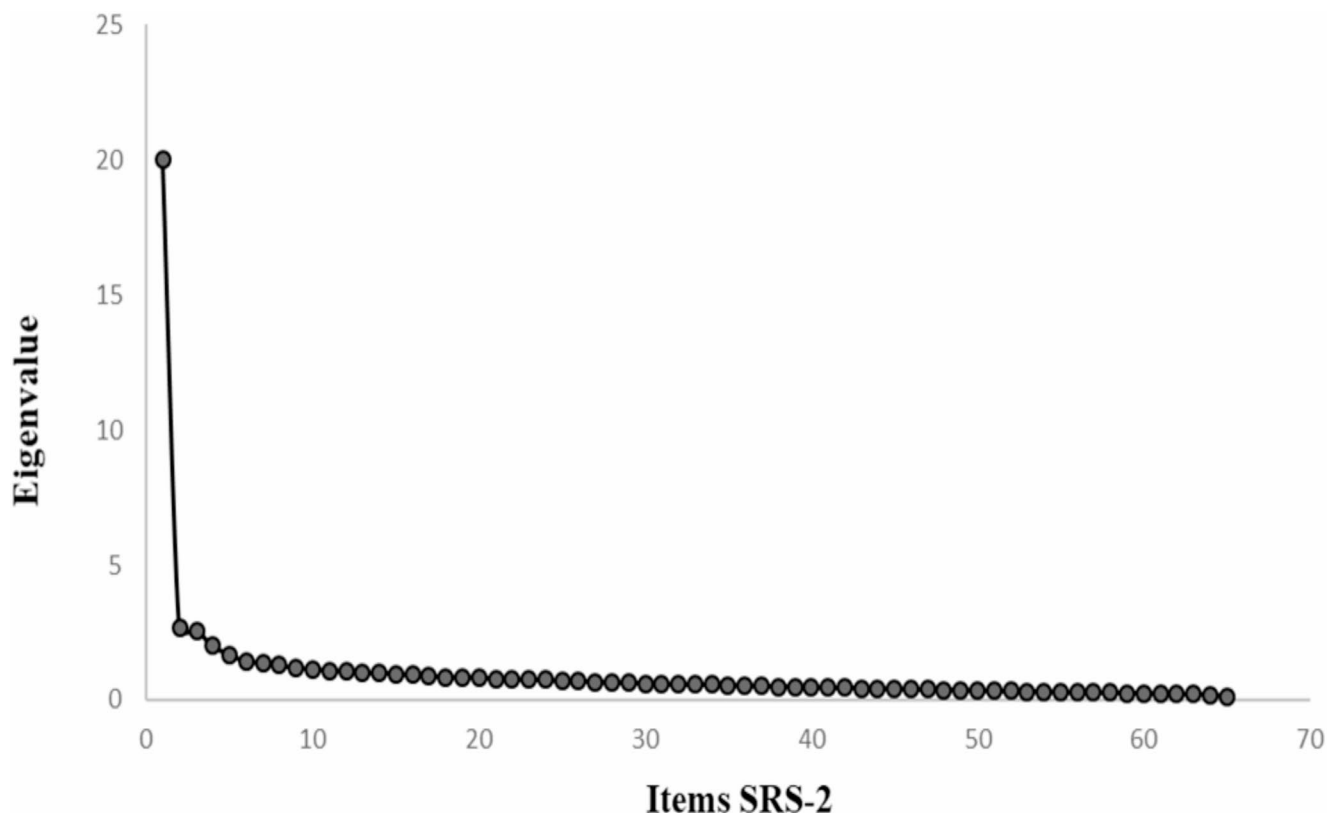


Fig. 1 Sedimentation graph of the Exploratory Factor Analysis for the SRS-2

Table 2 Factor analysis of the SRS-2

Item	λ
	Factor 1
1.More fidgety in social situations	.568
2.Facial expressions not consistent with language	.435
3.Confident in interactions with others	-.477
4.Rigid or inflexible when stressed	.670
5.Unaware when taken advantage of	.556
6.Prefers to be alone	.518
7.Aware of others' thoughts and feelings	-.415
8.Strange behavior	.686
9.Too attached to or dependent on adults	.621
10.Interprets everything literally	.696
11.Self-confident	-.493
12.Communicates own feelings	-.459
13.Awkward in turn-taking situations	.693
14.Poor coordination	.456
15.Understands intonation and facial expressions	-.550
16.Abnormal eye contact	.587
17.Aware of fairness	-.476
18.Difficulty making friends	.643
19.Frustration when conversing with others	.608
20.Unusual sensory interests	.481
21.Imitates others' actions	-.213
22.Plays appropriately with same age peers	-.595
23.Doesn't join group play on own	.629
24.More rigid with routine than peers	.726
25.Okay with being out of step	.298
26.Comforts others when sad	-.463
27.Avoids initiating social interactions	.573
28.Thinks or talks about the same things	.636
29.Viewed as weird or odd by peers	.735
30.Upset when too much is going on	.713
31.Can't get mind off thoughts	.604
32.Good personal hygiene	-.328
33.Socially awkward	.724
34.Avoids emotionally close people	.526
35.Trouble keeping up conversation	.759
36.Difficulty relating to adults	.480
37.Difficulty relating to peers	.682
38.Appropriate response to others' mood changes	-.444
39.Narrow range of interests	.649
40.Imaginative, good at pretending	-.234
41.Wanders aimlessly between activities	.494
42.Overly sensitive to sounds, textures, smells	.472
43.Separates easily from caregivers	-.071
44.Doesn't understand cause and effect	.652
45.Attends to where others are looking or listening	-.144
46.Overly serious facial expressions	.413
47.Too silly, laughs inappropriately	.498
48.Sense of humor	-.567
49.Particular strengths on some tasks	.548
50.Repetitive, odd behaviors	.562
51.Difficulty answering questions on subject	.699
52.Aware of own noise level	-.367
53.Converses with an unusual tone of voice	.430
54.Reacts to people as if they are objects	.341

Table 2 (continued)

Item	λ
	Factor 1
55.Aware of others' space	-.351
56.Walks in between people talking	.540
57.Teased a lot	.575
58.Concentrates on details, not big picture	.600
59.Overly suspicious	.447
60.Emotionally distant, no expression of feelings	.494
61.Inflexible, hard time changing mind	.598
62.Unusual or illogical reasoning	.589
63.Touches others unusually	.525
64.Tense in social settings	.676
65.Stares into space	.528
Explained variance (%)	.890
<i>Reliability (Cronbach's α)</i>	
Original form	.963
10-item version	.927
Sturm's version	.916
<i>Matrix statistics</i>	
Bartlett's statistic	7408.6 ($df=2080$; $p=.000010$)
KMO	.9498
<i>Overall Assessment</i>	
UniCo	.962
ECV	.892
MIREAL	.161

****Items marked in bold are the items selected for the short version**

KMO: Kaiser–Meyer–Olkin; *UniCo*: Unidimensional Congruence; *ECV*: Explained Common Variance; *MIREAL*: Mean of Item Residual Absolute Loadings

In terms of age, significant differences were only found in the comparison group in the 10-item version, specifically between children and adolescents (children: $M=4.0$, $SD=5.3$; adolescents: $M=2.6$, $SD=4.1$; $p=.027$). However, a tendency is observed in the autistic groups (autism and subthreshold autism), where adolescents reported slightly higher scores than children on the short forms (see Table 3).

Regarding sex, no significant differences were found between males and females in any of the groups or versions.

Sensitivity and Specificity of the Cut-Off Points for Three Versions of SRS-2

Table 4 presents the best cut-off points considering the sensitivity, specificity, and the Youden Index for the original SRS-2 and the two reduced versions in our sample. Specifically, the original SRS-2 is reported using standardized T -scores, while both the 10-item version and Sturm's version are reported using raw scores, as these short forms do not have standardized norms. For the original version, cut-off T -scores between 58 and 60 showed the best discrimination in all groups of comparisons, with sensitivities from 63.6 to 74.8%, specificities from 72.7 to 88.5% and Youden index

values between .445 and .580. For this study, data suggest that the best cut-off point was 59, which presents 72.1% of sensitivity and 76.3% of specificity to differentiate autism from other conditions, and increases the specificity for discriminating autism vs the comparison group (86%). Regarding the 10-item version, the best cut-off points ranged from 4 to 6 (raw scores), with sensitivities from 74.7% to 85.6%, specificities between 59.0% and 79.1%, and Youden Index values between .435 and .591. A cut-off point of 5 (raw score) offered the best discrimination in all groups of comparisons, achieving sensitivities of 79.2–83.8%, specificities of 63.8–75.3%, and Youden Index values of .466–.591 (Table 4). For Sturm's version, the best-performing cut-off points ranged from 13 to 15 (raw scores), with sensitivities of 63.6–73.0%, specificities of 76.3–90.2% and Youden index values of .453–.605 (Table 4). A cut-off point of 13 (raw score; sensitivities of 67.5%–73.0%; specificities of 76.3%–87.2%) was chosen based on clinical criteria, as it provided the highest sensitivity for autism detection in our sample (Table 4).

Considering the ROC curves in Fig. 2, across the three comparison groups, the 10-item version has an area under the curve somewhat higher compared to the other versions.

Table 3 Comparative analysis of three SRS-2 versions total scale scores across diagnostic, age, and sex groups

	Comparison group ^a (n=235)	Subthreshold autism ^b (n=43)	Autism ^c (n=111)	ADHD ^d (n=111)	<i>p</i>	Group difference	Effect size (η^2)
Comparison by diagnosis							
SRS-2 Original Form, <i>M(SD)</i>							
<i>T</i> -scores	50.1 (10.8)	60.4 (13.0)	67.2 (14.2)	56.0 (12.3)	<.001	ab***, ac***, ad***, bc*, cd***	.227
Raw scores	32.6 (25.6)	58.1 (32.6)	75.3 (35.9)	48.1 (30.6)	<.001	ab***, ac***, ad***, bc**, cd***	.234
SRS-2 Sturm's shortened version, <i>M(SD)</i>							
Raw scores	6.8 (7.2)	14.9 (10.3)	20.2 (10.8)	11.0 (9.3)	<.001	ab***, ac***, ad***, bc**, cd***	.256
10-item version, <i>M(SD)</i>							
Raw scores	3.3 (4.8)	9.4 (7.7)	13.4 (7.9)	6.6 (7.3)	<.001	ab***, ac***, ad***, bc**, cd***	.267
Comparison by age							
SRS-2 Original Form, <i>M(SD)</i>							
Children^A							
<i>T</i> -scores	50.8 (12.0)	59.9 (13.5)	66.5 (14.7)	55.9 (11.6)	<.001	ab**, ac***, cd***	.212
Raw scores	34.7 (28.3)	56.5 (33.4)	73.8 (37.5)	49.1 (28.8)	<.001	ab*, ac***, cd***	.215
Adolescents^B							
<i>T</i> -scores	49.5 (9.4)	61.2 (12.7)	68.3 (13.4)	56.0 (12.6)	<.001	ab***, ac***, ad***, cd***	.241
Raw scores	30.5 (22.7)	60.7 (32.0)	78.1 (33.1)	47.8 (31.4)	<.001	ab***, ac***, ad***, cd***	.252
Group difference A,B (<i>p</i>)							
<i>T</i> -scores	.339	.755	.533	.978			
Raw scores	.207	.688	.546	.818			
Effect size (Cohen's <i>d</i>)							
<i>T</i> -scores	.125	-.098	-.124	-.005			
Raw scores	.165	-.126	-.120	.044			
10 item version, <i>M(SD)</i>							
Children^A							
Raw scores	4.0 (5.3)	9.0 (7.6)	12.8 (8.0)	8.1 (7.5)	<.001	ab**, ac***, ad**, cd**	.236
Adolescents^B							
Raw scores	2.6 (4.1)	10.0 (8.0)	14.4 (7.7)	6.0 (7.2)	<.001	ab***, ac***, ad***, cd***	.300
Group difference A,B (<i>p</i>)							
<i>T</i> -scores	.027	.681	.310	.141			
Effect size (Cohen's <i>d</i>)							
<i>T</i> -scores	.293	-.129	-.202	.282			
SRS-2 Sturm's shortened version, <i>M(SD)</i>							
Children^A							
Raw scores	7.6 (7.8)	14.6 (10.2)	19.4 (11.3)	12.2 (10.6)	<.001	ab**, ac***, cd***	.224
Adolescents^B							
Raw scores	6.0 (6.4)	15.3 (10.6)	21.7 (10.0)	10.5 (9.3)	<.001	ab***, ac***, ad***, cd***	.288
Group difference A,B (<i>p</i>)							
<i>T</i> -scores	.085	.835	.298	.354			
Effect size (Cohen's <i>d</i>)							
<i>T</i> -scores	.227	-.065	-.207	.177			
Comparison by sex							
SRS-2 Original Form, <i>M(SD)</i>							
Males^C							
<i>T</i> -scores	49.1 (10.3)	60.9 (13.6)	67.4 (14.4)	56.5 (12.6)	<.001	ab***, ac***, ad***, cd***	.258
Raw scores	31.3 (25.0)	59.8 (34.2)	76.7 (36.6)	50.0 (31.6)	<.001	ab***, ac***, ad***, bc*, cd***	.257
Females^D							
<i>T</i> -scores	51.4 (11.2)	58.9 (11.3)	66.3 (13.9)	55.2 (11.8)	<.001	ac***, cd**	.142
Raw scores	34.2 (26.3)	52.7 (27.1)	69.0 (32.6)	44.6 (28.5)	<.001	ac***, cd**	.141
Group difference C,D (<i>p</i>)							
<i>T</i> -scores	.109	.684	.764	.574			
Raw scores	.375	.553	.385	.325			
Effect size (Cohen's <i>d</i>)							
<i>T</i> -scores	-.211	.148	.074	.101			
Raw scores	-.117	.216	.216	.176			
10-item version, <i>M(SD)</i>							
Males^C							
Raw scores	3.0 (4.7)	10.3 (8.2)	13.4 (8.0)	6.9 (7.3)	<.001	ab***, ac***, ad***, cd***	.280

Table 3 (continued)

	Comparison group ^a	Subthreshold autism ^b	Autism ^c	ADHD ^d	<i>p</i>	Group difference	Effect size (η^2)
	(n=235)	(n=43)	(n=111)	(n=111)			
Females^D							
Raw scores	3.6 (4.9)	6.5 (4.8)	13.2 (7.4)	6.0 (7.2)	<.001	ac***, cd***	.204
Group difference <i>C,D</i> (<i>p</i>)	.364	.081	.896	.476			
Effect size (Cohen's <i>d</i>)	-.119	.497	.032	.128			
SRS-2 Sturm's shortened version, <i>M</i>(<i>SD</i>)							
Males^C							
Raw	6.4 (6.6)	15.5 (10.7)	20.2 (10.9)	11.7 (9.7)	<.001	ab***, ac***, ad***, cd***	.273
Females^D							
Raw scores	7.3 (7.8)	12.8 (8.8)	20.3 (11.1)	9.6 (8.6)	<.001	ac***, cd***	.187
Group difference <i>C,D</i> (<i>p</i>)	.360	.471	.998	.212			
Effect size (Cohen's <i>d</i>)	-.120	.263	-.001	.224			

Comparison group: participants without autism and/or ADHD; ADHD: Attention-deficit/hyperactivity disorder; *M*: Medium; *SD*: Standard Deviation. Comparisons have been made using ANOVA and Student's *t*-test. Significant differences: * for $p \leq 0.05$, ** for $p \leq 0.01$ and *** for $p \leq 0.001$

The highest AUC was observed in the comparison between the autism group and the comparison group (.863, 95% CI: .819, .907, $p < .01$).

Convergent Validity

As shown in Table 5, the correlations between the scores of the three SRS-2 versions and the ADI-R and ADOS-2 scores ranged from weak to moderate. Overall, the 10-item version showed higher correlations compared to the original 65-item version and compared to the Sturm's version. The highest correlations for SRS-2 (any version) were observed with ADI-R ($r = .339$ to $.542$), specifically on the communication scale ($r = .442$ to $.542$). The highest correlation between SRS-2 (any version) and ADOS-2 was with the restricted and repetitive behavior scale ($r = .372$ to $.465$).

Discussion

This study aimed to evaluate the psychometric properties of the SRS-2 in a Spanish population, focusing on its factor structure, reliability, and validity, and to explore the development of a short form of the SRS-2. The results indicated that this short form may be a reliable and valid screening tool for autism in children and adolescents. We compared the psychometric performance of the original SRS-2 version, the newly proposed 10-item version, and the short version developed by Sturm et al. (2017) within our sample.

Although the original authors defined two main domains proposed by the DSM-5 (Constantino et al., 2000; Constantino & Gruber, 2012; Constantino & Todd, 2003), our analyses suggest that the SRS-2 best fit a unidimensional model aligns with previous studies from the US (Sturm et al., 2017), the UK (Wigham et al., 2012), Germany (Bölte

et al., 2010), and Korea (Cheon et al., 2016). Nevertheless, its factor structure is still under debate: some studies support five subscales (Kidd et al., 2019), whereas others have identified two (Chan et al., 2017) or four factors (Uljarević et al., 2020). This could be due to variability in sample size among studies. Despite these differences, SRS-2 maintains a solid validity. Our data demonstrate excellent internal reliability for the original SRS-2 (Cronbach's $\alpha = .96$), consistent with Constantino and Gruber's (2012) findings and similar to reliability reported in other populations, such as Germany, ($\alpha = .91$ to $.96$; Bölte et al., 2010); UK ($\alpha = .92$; Wigham et al., 2012), China ($\alpha = .90$; Cen et al., 2017), or Mexico ($\alpha = .97$, Fombonne et al., 2012) and higher than in Korea ($\alpha = .81$ to $.86$; Cheon et al., 2016). This consistency in reliability underscores the utility of the SRS-2 as a robust tool for assessing autism-related traits across diverse cultural and clinical contexts. Regarding the criterion validity study, our results, based on *T*-scores, suggest that a cut-off point of 59 is more sensitive (72.1%) than 60 (69.4%) for detecting autism vs other conditions. On the other hand, although the specificity is higher for a score of 60 (79% vs. 76.3%), the best Youden index is achieved at 59, making it the more advisable threshold for screening (more sensitive to detect cases of autism). The original validation study by Constantino and Gruber (2012) reported a sensitivity of 93% and specificity of 91% for the cut-off of 60, in a large sample of autistic children and unaffected-siblings but not including a non-familial control population. Similarly, Fombonne et al. (2012) reported for the same cut-off a high sensitivity (92.5%) and specificity (92.6%). More similar to our study, Guttentag et al. (2021) reported a sensitivity of 80% and a specificity of 64% in the U.S. using smaller but comparable samples. Likewise, South et al. (2017) found a sensitivity of 75% and a specificity of 66% with the cut-off point of 60.

Table 4 Cut-off point, sensitivity and specificity

Scale	Diagnosis	Cut-off point	Sn (%)	Sp (%)	YI	Cut-off point	Sn (%)	Sp (%)	YI	Cut-off point	Sn (%)	Sp (%)	YI
SRS-2 (T-scores)	Autism vs other conditions*	58	74.8	72.7	.474	59	72.1	76.3	.483	60	69.4	78.9	.483
	Autism spectrum** vs other conditions***	58	68.8	75.7	.445	59	66.9	79.7	.466	60	63.6	82.1	.457
	Autism vs comparison group	58	74.8	83.0	.578	59	72.1	86.0	.580	60	69.4	88.5	.579
10 item version (Raw scores)	Autism vs other conditions*	4	85.6	59.0	.446	5	83.8	63.8	.476	6	78.4	68.3	.467
	Autism spectrum** vs other conditions***	4	81.2	62.3	.435	5	79.2	67.4	.466	6	74.7	72.2	.469
	Autism vs comparison group	4	85.6	71.1	.566	5	83.8	75.3	.591	6	78.4	79.1	.575
Sturm's version (Raw scores)	Autism vs other conditions*	13	73.0	76.3	.492	14	70.3	77.9	.482	15	70.3	79.9	.501
	Autism spectrum** vs other conditions***	13	67.5	79.7	.472	14	64.3	81.0	.453	15	63.6	82.9	.465
	Autism vs comparison group	13	73.0	87.2	.602	14	70.3	88.5	.588	15	70.3	90.2	.605

Sn: Sensitivity; Sp: Specificity; YI: Youden Index; SRS-2: Social Responsiveness Scale Second Edition

*Includes subthreshold autistic traits, ADHD and comparison group; **Includes autism and subthreshold autistic traits groups; ***Includes ADHD and comparison group

Comparison group participants without autism and/or ADHD; ADHD/Attention/Deficit Hyperactivity Disorder

In bold the best cut-off points suggested in this study

Based on the original SRS-2, Sturm et al. (2017) proposed a short version composed of 16 items, which maintained excellent internal reliability ($\alpha=.96$) and demonstrated strong psychometric properties. In our analysis, of the original 65 items, we identified 10 with the highest factor loadings ($\lambda>.68$), which were sufficient to preserve the robustness of the scale and improve its efficiency. However, the items with the highest factor loadings in our study differed from those identified by Sturm, probably due to differences in sample composition. In addition, our sample included predominantly individuals with slight to moderate autism, which may have influenced item selection. This led us to the development of a 10-item version designed to address the need for a brief but reliable screening tool, particularly in time-sensitive settings. Our 10-item version, with a cutoff point of 5, demonstrated good capacity for identifying autism in front other conditions (subthreshold autism, ADHD and comparison group) with high sensitivity (83.8%) and acceptable specificity (63.8%). Analyses of Sturm's version in the present sample did support the data found by Nguyen et al. (2019). While these authors reported for cut-off of 15 a high diagnostic accuracy (sensitivity of 90% and specificity of 98%), our data found that the best cut-off to differentiate autism from other conditions was 13, which showed good ability to detect autism (73.0% of sensitivity) and to be specific (76.3%). Comparing the two short versions, both could be useful to identify autism, but it is worth noting that the shorter version (10 items) may be very suitable for screening as it is very brief and sensitive.

Beyond the analysis of the psychometric performance of the short versions, we also examined their ability to discriminate between diagnostic groups. All three version of the SRS-2 effectively differentiated between groups, consistently showing significantly higher scores in the autism group compared to the comparison, subthreshold autistic traits, and ADHD groups. These findings are consistent with previous research demonstrating the ability of the SRS-2 to distinguish between autistic individuals and those without the condition (Yang et al., 2023), as well as between autism and ADHD (Guttentag et al., 2021). In our study, the mean SRS-2 T-score for autistic children was 67.2, which falls within the lower clinical range. These results are consistent with those reported by Stickley et al., (2017), who found a mean T-score of 70.5 in their autistic group. In both cases, autistic participants showed a normal developmental level, which may explain the relatively lower scores observed.

Although no significant differences by sex or age were found in the autistic groups (autism and subthreshold autism), there was a tendency for adolescents to score slightly higher than children on both short versions. This difference suggests that, at earlier ages, autistic traits may not be as clearly defined in some children -for example.

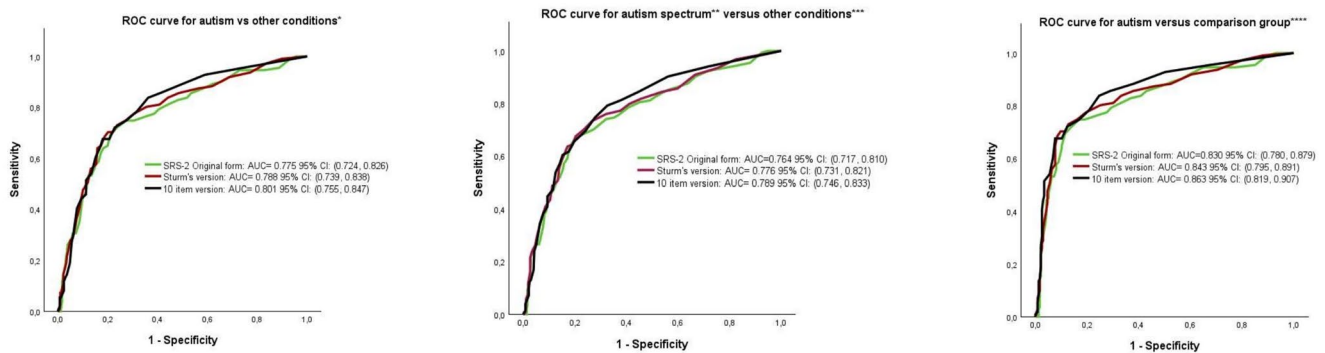


Fig. 2 ROC curves for groups of comparisons. *ROC* Receiver Operating Characteristic; *SRS-2* Social Responsiveness Scale Second Edition (*T*-scores); *Includes subthreshold autistic traits, ADHD and compari-

son group; **Includes autism and subthreshold autistic traits groups; ***Includes ADHD and comparison group. ****Includes participants without autism and/or ADHD

Table 5 Convergent validity for three SRS-2 versions with ADI-R and ADOS-2

	SRS-2 Original Form	10-item version	Sturm's version
	Total scale	Total scale	Total scale
	<i>r</i>	<i>r</i>	<i>r</i>
ADI-R			
Reciprocal social interaction	.431**	.487**	.405**
Communication	.484**	.542**	.442**
Restrictive behavior patterns	.339**	.426**	.348**
Developmental alterations	.355**	.422**	.333**
ADOS-2			
Social Communication	.235**	.272**	.223**
Social Interaction	.269**	.320**	.264**
Restricted and Repetitive Behavior	.401**	.465**	.372**
Total Scale	.269**	.336**	.271**

SRS-2: Social Responsiveness Scale Second Edition; *ADI-R*: Autism Diagnostic Interview; *ADOS-2*: Autism Diagnostic Observation Scale-2; *r*=Pearson correlation coefficient. Analyses were conducted using raw scores for all SRS-2 versions. *for $p \leq .05$, ** for $p \leq .01$ and *** for $p \leq .001$

in cases of comorbidity or when high cognitive ability is accompanied by low levels of interference-, which may make their detection more difficult. Thus, although the autism diagnosis can already be diagnosed and be stable from second age of life (Pierce et al., 2019), autistic traits tend to manifest more clearly at later stages of development, as social demands increase (Landa et al., 2022; Ozonoff et al., 2018). This underscores the need for ongoing monitoring of autistic traits across the lifespan, as the manifestation of traits may evolve with age. In our study, the sample distribution across age groups was not sufficiently large to allow for the development of age-specific cut-off points.

Regarding sex differences, no significant variations were observed between the diagnostic groups. However, it is noteworthy that for all versions, score on autism is very

similar in females and in males, but score on subthreshold autistic traits is much lower in females than in males, which could indicate greater difficulty in detecting mild cases in females. Our results align with previous findings who did not find significant differences between males and females (Cen et al., 2017; Fombonne et al., 2012), but differ from those who find significant differences (Constantino & Gruber, 2012) and Putnam et al., (2024). Sex differences in total scores may be explained by variations in how autistic traits are manifested. Boys tend to express these traits more overtly, often through challenging behaviors (May et al., 2016; Ornoy et al., 2023), whereas girls present higher rates of camouflaging strategies (Dean et al., 2016; Key et al., 2022) and display more internalized problems, such as anxiety and depression (Nasca et al., 2019). However, it is important to note that the sample size for girls in this study was very limited ($n=182$, with 20 autistic girls), which prevented us from exploring specific cut-off points for females or significant differences compared to males. By previous studies, it is necessary to create tailored assessment tools for women, including female-specific indicators and adjusted cut-off points, to ensure accurate identification of autistic traits in girls and prevent late or misdiagnosis.

Concerning the convergent validity, our results demonstrate that the 10-item version shows higher correlations with ADI-R and ADOS-2 than the original SRS-2 and Sturm's version, with overall correlations ranging from weak to moderate. This reflects the instrument's ability to accurately assess core features of autism. Despite this, correlations with ADI-R were lower than those reported by Constantino and Gruber (2012) ($r=.60-.77$) but within the range reported by other studies (from $r=-.02$ to $.56$; Bölte et al., 2010; Roeyers et al., 2011; Yang et al., 2023). For ADOS-2, correlations were slightly lower than those with ADI-R, consistent with prior findings (from $r=.25$ to $.58$; Constantino et al., 2003; Gergoudis et al., 2020; Yang et al., 2023). This difference may be explained by the fact that,

like the SRS-2, the ADI-R relies on retrospective and current information provided by parents, whereas the ADOS-2 is based on a clinician's real-time assessment, which may contribute to variability in correlations.

Limitations and Future Directions

Despite the strengths of our study, several limitations should be acknowledged. First, the sample size and its characteristics may limit the generalizability of the results to other populations or cultural contexts. Our sample predominantly included individuals with non-severe presentations of autism, potentially limiting the applicability of the results to the broader autism spectrum, including those with more severe forms. Second, the potential for response bias exists, as parents' interpretations of their children's behavior and their understanding of the assessment items may influence their responses. Third, since we focused only on the psychometric properties of the questionnaire, we did not consider whether participants diagnosed with autism and/or ADHD were receiving intervention services. This represents a relevant limitation, as interventions may influence symptom presentation and consequently affect SRS-2 responses. Fourth, the analysis did not assess the discriminatory power of individual items according to sex, which is crucial for accurately capturing the clinical profile of autism in females, particularly given the limited representation of girls in our sample. Finally, due to the small number of participants in certain subgroups, some group-level comparisons may have lacked sufficient statistical power. To address these limitations and build on our findings, future research should focus on several key areas. First, studies should evaluate the applicability of the SRS-2 in broader Spanish population, allowing to explore data according to age groups and sex. Second, the discriminative power of individual items should be examined, with a specific focus on improving the identification of autism in females, who often present with distinct clinical profiles. Third, replicating the study using teachers as informants would provide valuable insights, as the SRS-2 also includes this assessment and may offer a complementary perspective to parent reports, relevant in the detection and diagnosis of autism. Fourth, future studies should consider the status of the clinical intervention to better understand its impact on autistic traits over time and on the consistency of caregiver ratings. Finally, the 10-item version should be validated in larger samples across different age and sex groups as well as in other countries to confirm its efficacy as a screening tool in diverse settings. Developing effective screening tools is essential for the early identification of individuals at risk of autism, enabling timely interventions that can significantly improve developmental outcomes and quality of life.

In addition, future studies should explore the factor structure of the other SRS-2 forms -Preschool-Age and the Adult Form. This would help to determine whether a common factor structure can be applied across developmental stages or whether the structure change as a function of age or other variables. Understanding these possible developmental changes could help to interpret scores and improve diagnostic accuracy across the lifespan.

Conclusion

The SRS-2 demonstrated a unidimensional structure with excellent internal reliability in a Spanish sample of children and adolescents. While the original version remains a robust tool for assessing autism-related traits, our proposed 10-item version demonstrates strong reliability, providing an efficient screening tool with high discriminative ability. Notably, this version is even shorter than those proposed by other authors while maintaining the necessary sensitivity for effective screening. Although no significant differences based on sex and age were found in our study, these factors remain important to consider when developing assessment tools. Future research should validate the 10-item version across diverse populations and explore its application in identifying autistic traits in females and different clinical settings.

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Declarations

Conflict interest The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Ethical approval This study was approved by the Research and Ethics Committee of the Sant Joan University Hospital (13-10-31/10proj5) and by the Catalan Department of Education.

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