Screening for Autism in Romanian Population: An Initial Study Investigating the Clinical Utility of the Screening Questionnaire for Autism Spectrum Disorders (Chestionarul de Screening pentru Tulburări de Spectru Autist – CS-TSA)

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Abstract

Autism spectrum disorders are highly disabling conditions having early onset and poor prognosis the later the intervention is initiated. Although dedicated screening tools for autism spectrum disorders have already been reported in the literature, no one has been adapted for use with Romanian population. Therefore, the goal of this study was to preliminary validate a screening questionnaire for autism spectrum disorders. This instrument (i.e., Chestionarul de Screening pentru Tulburari de Spectru Autist, CS-TSA) has been developed specifically to fit the particularities of the Romanian society. More specifically, the CS-TSA was developed by specialists within the Romanian Health Ministry to be use in a context that would maximize its usefulness, i.e., in the offices of the Romanian general practitioners. Our preliminary results indicated that CS-TSA has adequate psychometric properties and can be use successfully for early screening of autism spectrum disorders in general Romanian population. With this study, we hope to provide an initial step towards establishing large scale, affordable, feasible, and efficient screening procedures, in an effort to identify early cases requiring further assessment and specialized assistance.

Keywords

Autism Spectrum Disorders, screening, Romanian general practitioners

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Introduction

Autism was used as an umbrella term until recently, covering five separate disorder categories: autistic disorder, Rett syndrome, Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorders not otherwise specified (Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition - Revised; DSM-IV-TR). However, with DSM-V, the most recent version of DSM, autistic disorders are conceptualized under a single diagnostic label: autism spectrum disorders (ASDs). This reconfiguration of the diagnostic system reflects the idea that ASDs refer to a behavioral disorder/syndrome varying in appearance and clinical severity along a spectrum, from a slight functional impairment to a severe one. Two main types of deficits characterize ASDs: (a) social communication deficits, and (b) fixed interests and repetitive behavior/activity. The first class of deficits, namely social communication deficits, includes deficits in social-emotional reciprocity (i.e., problems with social initiation and response); deficits in nonverbal communicative behaviors used for social interactions; and deficits in developing and maintaining relationships (i.e., problems with social awareness and insight, as well as with the broader concept of social relationships). The second class of deficits, fixed interests and repetitive behavior/activity, includes stereotyped or repetitive speech, motor movements, or use of objects (i.e., atypical speech movements, and play, excessive adherence to routines, rituals and resistance to change), highly restricted/fixated interests abnormal in intensity and/or focus (i.e., preoccupations with certain objects and topics), and atypical sensory behaviors (i.e., hyper- or hypo reactivity to sensory input). Although ASDs are considered to be a single spectrum under the DSM-V diagnostic criteria, the significant individual variability is clearly recognized: ASDs can vary largely in terms of severity, pattern of onset and clinical course/response to treatment, etiologic factors, cognitive abilities, and associated conditions/comorbidity; these variations should be indicated by use of specifiers. Symptoms must be shown from early childhood, even if they are not recognized until later. Therefore, an emphasis is placed on the early diagnosis of ASDs, with the caveat that symptoms may not be fully manifest until social demands exceed individual's adaptive capacity.

Once considered to be a rare disorder, autism is quite frequent diagnosed nowadays, and puts a huge burden on society (Matson & Kozlowski, 2011; Ganz, 2007). The number of diagnosed cases increased dramatically from

1980, with a current median of 62 cases per 10000 people worldwide (Elsabbagh et al., 2012).

No data on the prevalence of ASDs in Romania are available currently, but more and more Romanian parents face ASDs challenge. Proofs stand (1) non-governmental associations and/or treatment centers dedicated to children with autism and set in recent various in different parts of the country (e.g., Autism Transilvania in Cluj-Napoca, Copiii de Cristal in Brasov, Casa Faenza in Timisoara, Nagual in Slatina, etc.), and (2) legislative initiatives regarding the right of people suffering from autism and related mental health disorders (i.e., Law no. 151 from 12.07.2010 on specialized integrated health and special education for persons suffering from autism and related mental health disorders).

Importantly, autism is considered a life-long disorder (Dababnah, Parish, Brown, & Hooper, 2011; Matson, Rieske, & Tureck, 2011). Costs associated with caring for a diagnosed person are estimated to 1.6 million dollars (Ladrigan, Schechter, Lipton, Fahs, & Schwartz, 2002), and the impact on society (including costs due to the decreased productivity, as well as costs associated with medical services and treatment) is estimated at 3.2 million dollars (Ganz, 2007).

Multiple etiologies (including genetic and environmental variable) are supposed to be involved in the ASDs onset and maintenance, without definitive factors being clearly delineated (Dababnah et al., 2011; Ratajzak, 2011). Genetic influences seem to be quite pronounced, as siblings of autistic children have a higher risk of developing a form of ASDs themselves. However, despite numerous genetic and neurobiological correlates of ASDs, there is no yet a biological marker that can be reliable used for purposes of ASDs diagnosis. Consequently, the diagnosis is based on the formal criteria listed in the international diagnostic systems like DSM-V. Assessing the presence or absence of the diagnostic criteria is achieved by means of direct observation of the child and in-depth interview with parent/legal carer/adult who spent the most time with the child. To standardize the assessment procedure, specific tools with adequate psychometric properties are available (e.g., Autism Diagnostic Observation Schedule, ADOS, Lord et al., 2000; Autism Diagnostic Interview – Revised, ADI-R, Lord, Rutter, & Le Couteur, 1994). Beyond assessing the presence/absence of diagnostic criteria, the child's cognitive functioning is often assessed by means of standardized tests targeting learning skills, memory, executive functioning, etc. In addition, comprehensive assessment

involves also some more general medical examinations such as hearing testing, neurological examination, blood analysis and other laboratory tests, aimed to rule out other possible (associated) physical or psychiatric conditions. Therefore, the clinical evaluation is quite complex and costly. However, it is essential for proper diagnosis, based on which an appropriate intervention program can be implemented.

Importantly, as ASDs have an early onset and the ASDs prognostic is better the earlier the intervention is initiated (Dabanah et al., 2011), the importance of an early diagnosis is vital. ASDs can be reliable diagnosed starting with 18 months (Johnson & Myers, 2007) and the diagnosis tends to remain stable (Baron-Cohen et al., 1996; Chawarska, Klin, Macari, & Volkmar, 2009). The high efficiency of early intervention seems to be related to the existence of sensitive periods for developing certain skills. Early intervention promotes achievement of skills that would not be achieved without intervention during sensitive developmental periods, given the presence of the disorder (e.g., language, basic social skills) and thus would jeopardize the course of subsequent development. At the same time, early intervention prevents the worsening of the symptoms and/or the onset of additional problems (like disruptive or aggressive behaviors) by means of assisting child in developing ways of relating to others. Importantly, early intervention decreases costs associated with life-time caring for an autistic person by up to two thirds (Jabrink & Knapp, 2001).

Beyond setting the stage for the early intervention, early diagnosis of ASDs means parents' access to information that help them understand what is happening with their child and how they can support him. Thus, their distress may be lowered and their ways of coping can be improved. Also, parents may benefit from genetic counseling regarding the possibility of having another baby (Dababnah et al., 2011; Johnson & Myers, 2007).

However, in Romania most cases of ASDs are diagnosed after the child enter kindergarten/early school, i.e. too late for an intervention that improves prognosis significantly or change the situation markedly. This is due in part to the lack of knowledge regarding the specifics of ASDs. To address this situation, the Romanian Healthy Ministry initiated a project aimed to create the premises for the early detection of ASDs. The idea behind the project was to create a screening instrument amenable for use by general practitioners that regularly stay in touch with families. Given the increasing prevalence of ASDs on the one hand, the complexity and costs associated with a

comprehensive evaluation, as well as the late diagnosis of the most ASDs cases, this project was aimed to create the context and the instrument for a large scale screening implemented early during development. The screening procedure consisting in an initial, brief, and rough assessment would ensure early identification of cases presenting developmental abnormalities/discontinuities possibly related to a diagnosis of ASDs. Based on the screening results, suspect cases would be referred for further evaluation by a mental health professional.

Two main rationals determined the Romanian Health Ministry to develop a new screening instrument for ASDs rather than translating and adapting an existing one. First of all, no screening instrument for ASDs has been validated for use with Romanian population. Second and most importantly, in order to efficiently implement the screening procedure, we needed not only a screening instrument, but also the proper/favorable context of using it, to maximize its utility. The idea of implementing the screening procedure through the network of general practitioners (GPs) monitoring families' health status seemed to fit better the specific of the Romanian civil society and health care system. This paper describes the initial validation study of the newly-developed screening instrument, namely the Screening Questionnaire for Autism Spectrum Disorders (Chestionarul de Screening pentru Tulburări de Spectru Autist – CS-TSA).

Method

Participants

We obtain data from a total of 132 children aged between 18 and 60 months (mean age: 31.92, standard deviation: 10.35) recruited from community. Sixty-four of them were typical developing children, with no history of physical or psychiatric diseases/disorders. Another 27 of the children had a diagnostic of ASD, while the remaining 41 had some other primary psychiatric diagnostic. Demographic data for these three samples are shown in Table 1.

Table 1. *Demographic characteristics of the samples included in the study*

	ASDs diagnosed children (*N* = 27)	**Other psychiatric diagnosis (*N* = 41)**	**No diagnosis / Typical children (*N* = 64)**
Age at the assessment time			
Mean (Standard Deviation)	33.9 (9.75)	29.05 (9.08)	32.58 (11.10)
Sex: Boys (%)	74.1%	48.8%	42.2%
Parent's educational level			
Elementary school (%)	29.6%	48.7%	18.7%
High school (%)	18.5%	22%	23.4%
Post High school (%)	7.4%	12.2%	17.2%
Higher Education (%)	44.4%	17.1%	37.5%
Siblings			
Older (%)	43%	56%	35%
Elder (%)	13%	10%	16%

Measures

Screening Questionnaire for Autism Spectrum Disorders (Chestionarul de Screening pentru Tulburări de Spectru Autist – CS-TSA). The CS-TSA has been developed based on the model provided by the Checklist for Autism in Toddlers (Baron-Cohen, Allen, & Gillberg, 1992). CHAT has been developed in Great Britain to screen for joint attention and imaginative abilities of toddlers and designed to be used by nurses during the routine visits in homes. Its administration took about 5 minutes and entailed obtaining certain information from parents (9 items) as well as observing child behavior during visit (5 items). CHAT has been used successfully for identifying children with ASDs, but it has been found that its sensibility is rather reduced and it is unclear how good CHAT is for differentiating ASDs from other disorders (Baird & Charman, 2000). Similar to CHAT, CS-TSA has two sections: *Section One*, containing questions about child's behavior, questions that GPs address to parents. GPs subsequently record parent's answer in one of the following categories: "Yes", if there is evidence that behavior referred in the question occurs in most situations and is characteristic to the child; "No", if there is evidence that behavior referred in the question does not occur at all/occur incidentally and very rarely, without being characteristic for the child; "Sometimes", if there is evidence that behavior referred in the question occur in some situations, but not in others, and it's difficult to clearly assess if it is characteristic for the child. This first session comprises 10 questions (see Ap-

pendix). The GP reads aloud the instructions for the parent; then they do the same for every item, and record parent's answer. Importantly, to ensure collecting relevant data, the GP will check with the parent if every question is clear and will offer additional information if needed. *Section Two* is designed to allow the GP to record his own observations of the child's behavior during regular visit. It included three observational items, as well as a space for recording qualitative observations regarding child's behavior. The two sections of the CS-TSA are scored separately. Items included in the first section are rated on a three-point Likert scale, where 1 corresponds always to "Sometimes". However, for the other two response categories, the numeric values vary as a function of item formulation (reverse items were not included for reasons of easy and intuitive scoring; see Appendix). The total score for the first section can vary between 0 and 20. Items included in the second section of the CS-TSA are dichotomous, with zero standing for the absence of the target behavior, and 1 standing for the presence of the behavior. Total score for the second section can vary between 0 and 3. GP's qualitative observations regarding the child's behavior are not taken into consideration in deriving numeric scores. However, they could provide important additional information and could guide further development of the CS-TSA.

The ***Modified Checklist for Autism in Toddlers*** (M-CHAT; Robins, Fein, Barton, Green, 2001) was included for purposes of convergent validation. M-CHAT is a revision of CHAT (Baron-Cohen et al., 1992) consisting of 23 items rated by child's parent. Items describes behaviors such maintaining visual contact, repetitive and symbolic play, patterns of social interactions, nonverbal communication (for example, asking for help), imitation capabilities, etc. Parent is asked to respond by "yes" (= 1) or "not" (= 0) for every item, indicating the presence or the absence of the described behavior. Scores can vary between 0 and 23, with larger scores indicating a greater risk for ASDs diagnosis.

Child Behavior Checklist 1 ½ - 5 years (CBCL 1 ½ - 5 yrs.; Achenbach & Rescorla, 2000) was included for purposes of convergent and divergent validation. CBCL 1 ½ - 5 yrs. is designed to assess symptoms of psychopathology between the age of 1 ½ and 5. It includes 100 items describing symptoms, 99 of which are rated by parent/caregiver in terms of intensity/severity during the last two months, on a three-point Likert scale, where 0 = False, 1 = Somewhat true, and 2 = True. For the last item, the parent/caregiver is asked to indicate other possible problems/concerns not covered by the previous items.

Items are grouped in five main subscales, informed by the diagnostic criteria listed by DSM-IV for the mental disorders diagnosed for the first time during childhood or adolescence, namely: affective problems, anxiety problems, pervasive developmental problems, attention deficit/hyperactivity disorder problems, oppositionist behavior and aggression problems. Scores can be computed separately for each subscale, as well as for the entire instrument, by adding up ratings for individual items.

Procedure

We have contacted GPs, clinical psychologists, psychotherapists, and representatives of organizations offering services for children diagnosed with ASDs from all over the country. As CS-TSA is specifically designed to be used by Romanian GPs in their clinical practice, the questionnaire should be administered by a GP, regardless of the recruitment source (i.e., psychologist, psychotherapist, etc.). Data were collected between July 2011 – March 2012. The study was advertised in a Romanian medical journal addressed to GPs. We also informed the Romanian General Pratitioners' Association about the project and, through it, we sent written invitation to GPs, inviting them to participate in the study. Additionally, we contacted by phone and/or email representatives of Romanian organizations offering services for children diagnosed with autism and ask their support with the implementation of the project. Following project dissemination, about 500 GPs expressed interest to participate in the study. We contacted them, offered additional information and sent the individual assessment packages by email. Every assessment package included: two consent forms that should be signed by parent/legal caregiver (one form should have been returned with the questionnaires, the other represented parent's copy); a demographic sheet; CS-TSA; M-CHAT; CBCL 1 ½ - 5 yrs. Every GP agreed to evaluate at least one child with typical development, with an ASD diagnostic (as established by a pediatric psychiatrist) and/or with a primary psychiatric diagnosis other than ASD (psychiatric diagnosis should have been established by a pediatric psychiatrist). GPs were required to send us a copy of the diagnostic document attesting the children's diagnostic status when appropriate. We received back a total of 132 packages containing completed scales.

To investigate test-retest reliability, the CS-TSA was administered again, after two weeks from the initial administration, to a subsample of 15 ASDs diagnosed children recruited from Cluj-Napoca city.

Results

Descriptive statistics for the considered measures by sample type are shown in Table 2.

Table 2. *Descriptive statistics by sample type; Mean (Standard deviation)*

	ASDs diagnosed children ($N = 27$)	Other psychiatric diagnosis ($N = 41$)	No diagnosis / Typical development ($N = 64$)
CS-TSA.S1	8.96 (3.11)	6.21 (3.72)	3.97 (2.52)
CS-TSA.S2	2.37 (0.96)	0.53 (0.64)	1.40 (1.98)
M-CHAT	10.07 (4.59)	5.00 (5.01)	1.69 (1.60)
CBCL.affect	5.44 (3.06)	4.47 (3.16)	2.00 (1.99)
CBCL.anx	6.62 (3.48)	6.50 (3.98)	4.80 (3.05)
CBCL.PDP	12.66 (4.92)	8.05 (4.19)	4.12 (3.00)
CBCL.ADHD	8.62 (2.46)	6.75 (3.57)	5.26 (2.95)
CBCL.OD	5.96 (2.94)	5.15 (2.69)	3.50 (2.66)

Notes:CS-TSA.S1 = Chestionarul de Screening pentru Tulburari de Spectru Autist (Screening Questionnaire for Autism Spectrum Disorders), Section One; CS-TSA.S1 = Chestionarul de Screening pentru Tulburari de Spectru Autist (Screening Questionnaire for Autism Spectrum Disorders), Section Two; M-CHAT = The Modified Checklist for Autism in Toddlers (Robins et al., 2001); CBCL.affect = Child Behavior Checklist 1 ½ - 5 years (Achenbach & Rescorla, 2000), Affective Problems; CBCL.anx = Child Behavior Checklist 1 ½ - 5 years (Achenbach & Rescorla, 2000), Anxiety Problems; CBCL.PDP = Child Behavior Checklist 1 ½ - 5 years (Achenbach & Rescorla, 2000), Pervasive Developmental Problems; CBCL.ADHD = Child Behavior Checklist 1 ½ - 5 years (Achenbach & Rescorla, 2000), Attention Deifict/Hyperactivity Problems; CBCL.OD = Child Behavior Checklist 1 ½ - 5 years (Achenbach & Rescorla, 2000), Oppositional Defiant Problems

***CS-TSA* Reliability**. We investigated CS-TSA reliability by means of internal consistency and test-retest reliability. Internal consistency was estimated computing Alpha Cronbach separately for the first section, and the second section. For the first section, the Alpha Cronbach was 0.715, while for the second section it was 0.813. Both values indicate adequate internal consistency for a behavioral scale. Descriptive characteristics for the items included in every section by sample type are shown in Table 3. As shown, for almost every item included in the first section of CS-TSA, the mean was higher in the ASDs diagnosed sample compared with the other two samples. In addition, all items (except for item 9) correlated significantly with the total score.

In terms of test-retest reliability, the computed correlation coefficient (r = 0.86) indicated that the instrument measures relatively stable the behaviors of interests.

Table 3. *Descriptive statistics for each item by sample type*

No.	Item	Typical children / No diagosis (N=64)		ASDs diagnosed children (N=27)		Children with other psychiatric diagnosis (N=41)		Correlation item-total score
		M	SD	M	SD	M	SD	
1	Does your child look into your eyes when you talk to him/her?	0.33	0.52	0.95	0.57	0.48	0.66	.628
2	Have you ever thought that your child cannot hear normally?	0.33	0.56	1.05	0.78	0.45	0.71	.280
3	Is your child difficult in what regards eating? Does he/she seem to lack appetite?	0.70	0.70	1.18	0.85	0.79	0.82	.342
4	Does he/she raise his/her hands to be hold in your arms?	0.26	0.49	0.45	0.73	0.45	0.61	.309
5	Does your child oppose when you hold him in your arms?	0.33	0.56	0.41	0.50	0.27	0.51	.405
6	Does he/she participate to the “peek-boo” game?	0.12	0.32	0.77	0.86	0.61	0.86	.456
7	Does he/she smile when you smile to him/her?	0.21	0.46	0.82	0.58	0.45	0.71	.590
8	Does he/she use the word “mother” when he/she calls you?	0.30	0.59	1.14	0.83	0.76	0.93	.423
9	Can he/she stay alone in his bed when he is awake?	1.16	0.81	1.27	0.88	1.24	0.86	- .079
10	Does your child always react when you call his/her name?	0.17	0.377	1.14	0.64	0.48	0.71	.635
11	Avoids direct gazing. / Does not sustain visual contact.	0.30	0.63	0.82	0.39	0.15	0.36	.473
12	Obvious lack of interest for persons.	0.37	0.72	0.73	0.55	0.00	0.00	.505
13	Has motor stereotypes (waving hands, walking on his/her toes, rolling around his/her own axis)	0.42	0.66	0.82	0.39	0.30	0.46	.378

CS-TSA Validity

Content validity. CS-TSA was designed to screen for ASD symptoms as they are listed in the current diagnostic systems. Items were generated by specialist pediatric psychiatrists.

Criterion validity. For purposes of investigating criterion validity, we examined the CS-TSA ability to discriminate between ASDs diagnosed children, children with other primary psychiatric diagnoses, and no diagnosed/typical developing children. Analysis of variance revealed that the mean score for the first section of CS-TSA differed significantly as function of diagnostic status, $F(2,127) = 26.527$, $p = .000$. Post hoc test (Scheffe) indicated statistically significant mean difference between ASDs diagnosed group and normal developing children (mean difference = 5.057, $p = .000$), as well as between ASDs diagnosed group and children with other psychiatric diagnosis (mean difference = 2.860, $p = .001$). Similarly, for the second section of the CS-TSA, analysis of variance revealed significant differences as function of the diagnostic status. Scheffe post hoc test indicated statistically significant mean difference between ASDs diagnosed group and normal developing children (mean difference = .995, $p = .018$), as well as between ASDs diagnosed group and children with other psychiatric diagnoses (mean difference = 1.850, $p = .000$). Table 4 details how every item of CS-TSA discriminates between the three diagnostic groups. As shown, CS-TSA item scores were systematically larger for ASD diagnosed children compared with children having other psychiatric diagnoses and/or normal developing children, except for items 3, 4, 5, and 9. In the first section of CS-TSA, items that discriminated systematically between children based on their diagnostic status were items 1, 2, and 10. In the second section, all the items reliably discriminated between children having an ASD diagnostic, children having other psychiatric diagnoses, and typical developing children.

Table 4. *Items differentiating between the group of children without psychiatric diagnosis, those with a diagnosis of ASD and children with other psychiatric diagnosis*

No.	Item	Typical children / No diagosis (N=64)		ASDs diagnosed children (N=27)		Children diagnosed with another psychiatric disorder (N=41)		Test	Analysis
		M	SD	M	SD	M	SD		
1	Does your child look into your eyes when you talk to him/her?	0.33	0.52	0.95	0.57	0.48	0.66	$F(2,95)=.844$, $p=.001$	Discriminates between typical children and ASD diagnosed children (mean differences = -.606, $p = .001$), and also between ASD diagnosed children and children with other psychiatric disorders (mean differences =.470, $p = .018$)
2	Have you ever thought that your child cannot hear normally?	0.33	0.56	1.05	0.78	0.45	0.71	$F(2,95) = 8.735$, $p=.000$	Discriminates between typical children and ASD diagnosed children (mean differences = -.720, $p=.000$), and also between ASD diagnosed children and children with other psychiatric disorders (mean differences = .591, $p = 0.008$)
3	Is your child difficult in what regards eating? Does he/she seem to lack appetite?	0.70	0.70	1.18	0.85	0.79	0.82	$F(2,95) = 2.898$ $p=.060$	-
4	Does he/she raise his/her hands to be hold in your arms?	0.26	0.49	0.45	0.73	0.45	0.61	$F(2,95) = 1.339$ $p=.267$	-
5	Does your child oppose when you hold him/her in your arms?	0.33	0.56	0.41	0.50	0.27	0.51	$F(2,95) = 0.427$ $p=.654$	-

6	Does he/she participate to the "peek-boo" game?	0.12	0.32	0.77	0.86	0.61	0.86	$F(2,95) = 8.432$ $p = .000$	Discriminates between typical children and ASD diagnosed children (mean differences =-.656, $p = .002$), but NOT between ASD diagnosed children and children with other disorders (mean differences = .167, $p = 0.175$)
7	Does he/she smile when you smile to him/her?	0.21	0.46	0.82	0.58	0.45	0.71	$F(2,95) = 7.918$ $p = .001$	Discriminates between typical children and ASD diagnosed children (mean differences = -.609, $p = .001$), but NOT between ASD diagnosed children and children with other psyhiatric disorders (mean differences = .364, $p = 0.084$)
8	Does he/she use the word "mother" when he/she calls you?	0.30	0.59	1.14	0.83	0.76	0.93	$F(2,95) = 8.870$, $p = .000$	Discriminates between typical children and ASD diagnosed children (mean differences = -.843, $p = .000$), but NOT between ASD diagnosed children and children with other psyhiatric disorders (mean differences = .379, $p = 0.216$)
9	Can he/she stay alone in his bed when he/she is awake?	1.16	0.81	1.27	0.88	1.24	0.86	$F(2,95) = 0.150$, $p = .861$	-
10	Does your child always react when you call his/her name?	0.17	0.377	1.14	0.64	0.48	0.71	$F(2,95) = 20.814$, $p = .000$	Discriminates between typical children and ASD diagnosed children (mean differences = -.970, $p = .000$), and also between ASD diagnosed children and children with other psyhiatric disorders (mean differences = .652, $p = .000$)

11	**Avoids direct gazing./ Does not sustain visual contact.**	**0.30**	**0.63**	**0.82**	**0.39**	**0.15**	**0.36**	$F(2,95) = 11.961$, $p = .000$ **Discriminates between typical children and ASD diagnosed children with (mean differences = -.516, $p = .001$), and also between ASD diagnosed children and children with other psyhiatric disorders (mean differences = .667, $p = .000$)**
12	**Obvious lack of interest for persons.**	**0.37**	**0.72**	**0.73**	**0.55**	**0.00**	**0.00**	$F(2,95) = 11.93$, $p = .000$ **Does not discriminate between typical children and ASD diagnosed children (mean differences = -.355, $p = .051$), but discriminates between ASD diagnosed children and children with other psyhiatric disorders(mean differences = =.727, p = .00). It discriminates also between typical children and children with other psychiatric disorders (mean differences = .372, $p = .216$).**
13	**Has motor stereotypes (waving hands, walking on his/her toes, rolling around his/her own axis)**	**0.42**	**0.66**	**0.82**	**0.39**	**0.30**	**0.46**	$F(2,95) = 6.123$, $p = .003$ **Discriminates between typical children and ASD diagnosed children (mean differences = -.400, $p = .025$), and also between ASD diagnosed children and children with other psychiatric disorders (mean differences = .515, $p = .004$)**

To investigate the convergent/divergent CS-TSA validity, we run correlation analyses between CS-TSA scores and scores obtained at other measures included in this study. Correlation matrix is shown in Table 5.

Table 5. *Correlations between scores obtained to the first section of CS-TSA and scores obtained to CBCL 1 ½ - 5 years and to M-CHAT*

	Correlation coefficient	
	CS-TSA section 1 (questions)	CS-TSA section 2 (observation)
CBCL 1 ½ - 5 years		
Pervasive Developmental Problems	0.540**	0.215*
Affective Problems	0.445**	0.036
Anxiety Problems	0.204*	0.020
Attention deficit/ Hyperactivity Problems	0.255**	0.153
Oppositional Defiant Problems	0.342**	0.099
M-CHAT	0.714**	0.243**

*** p < 0.01; * p < 0.05*

As shown, CS-TSA correlated strongly with M-CHAT, with more than 50% common variance. This correlation supports the convergent validity of CS-TSA. Although CS-TSA correlated also with CBCL subscale evaluating pervasive developmental problems, that correlation indicated only approximately 30% common variance. This is not unexpected, as this CBCL subscale does not evaluate specifically autism related problems, but rather a larger spectrum of pervasive developmental problems. Therefore, this correlation supports also CS-TSA construct validity. Notably, scores for the second section of CS-TSA did not correlated with any other CBCL subscale except for one assessing pervasive developmental problems, which further supports CS-TSA convergent validity. On the other hand, scores for the second section of CS-TSA correlated less (but still significant) with M-CHAT scores and CBCL subscale assessing pervasive developmental problems. Therefore, scores derived for the first section of CS-TSA might have greater sensitivity, while scores derived for the second section might have greater specificity.

To investigate the clinical utility of CS-TSA, we run Receiver Operating Characteristic (ROC) analysis. Because CS-TSA is expected to discriminate between ASD diagnosed children, on the one hand, and children having other psychiatric diagnoses as well as typical developing children, on the other hand, for purposes of establishing a critical cut-off point, we collapsed the last two categories (i.e., children having other psychiatric diagnoses and typical developing children) and contrasted ASDs diagnosed group with this combined group. ROC analysis indicated a cut-off point of 6 for the first section of CS-TSA. At this cut-off point, area under curve was .84, test sensibility was .89, and test specificity was .68. For the second section of CS-TSA, following ROC analysis we chose a cut-off point of 2; at this cut-off point, area under the curve was .79, test sensibility was .78, and test specificity was .79.

Discussion

This paper presented the preliminary validation data for an instrument developed specifically for early screening of ASD symptoms in general Romanian population. The instrument was aimed to be used by Romanian GPs in their current clinical practice, in an attempt of providing the formal context needed for implementation the screening process. Although dedicated screening tools for ASD have already existed in the literature, no one has been adapted for Romanian population. This was the main reason why the Romanian Health Ministry initiated this project and developed CS-TSA, designed specifically for use in the Romanian GP's offices.

Our preliminary data indicated CS-TSA has satisfactory psychometric characteristics and support the CS-TSA clinical utility. However, in terms of internal consistency, item 9 seems to be problematic. Future studies should investigate the extent to which this item adequately samples the domain of ASD symptoms and eventually consider rephrasing the item. Similarly, as analysis of variance indicated that items 3, 4, 5, and 9 did not discriminate systematically between the ASD diagnosed children, children having other psychiatric diagnoses, and typical developing children, future studies should investigate more closely the diagnostic utility of these items. Some of them might discriminate better between ASD diagnosed children and typical developing children, while others might discriminate better between ASD diag-

nosed children and children having other psychiatric disorders. Items 1, 2, and 10 from the first section of CS-TSA were shown to systematically discriminate between different categories of children, based on their diagnostic status. Therefore, these three items could be considered critical items and used as supplementary clinical information, in the sense that even if a certain child does not reach the cut-off point for CS-TSA, GP/parent may consider additional evaluation in case child obtain symptomatic score for these three items. Further evaluation should be sought out also in case the cut-off point is reached for the first section of CS-TSA, but not for the second version (or vice-versa). Normally, such situations should be rare, but not unexpected, as the cut-off point for the first section of CS-TSA has a greater sensibility compared with the cut-off point of the second section, which has a somewhat greater specificity.

CS-TSA showed psychometric properties comparable with other dedicated screening tools for ASD, e.g., M-CHAT. However, compared with M-CHAT, CS-TSA has a notable advantage: it is designed to be used in a context that ensures its utility. More specifically, CS-TSA is specifically designed to be used by the Romanian GPs, which provides the formal context for implementing large scale, early screening for ASD symptoms. Unlike M-CHAT, CS-TSA is not addressed primarily to the parents. Despite the fact that parents are excellent observators of their offspring and therefore invaluable sources of diagnostic information, they could use a screening instrument only when they are sufficiently concerned about their child. As the data in the literature suggest that usually a considerable time elapses between noticing the first symptoms and first request for aseessement (Jansdottir et al., 2011; Kishore & Basu, 2011), the moment when parents use a screening tool for ASD might be too late. Therefore, the utility of a screening instrument may be limited as long as the context for using it is not clearly established / delimitated, especially when parents do not have enough knowledge about ASD. CS-TSA is considerably shorter than M-CHAT and is not designed to be self-administered, which presumably increase the quality of the reported data. Similarly to CHAT (but unlike M-CHAT) it includes also observational items. Although the inclusion of observational items have been sometimes criticized based on the short interaction of the clinician with the child, we believe that, in the context of administering CS-TSA in the context of GP's office, keeping a formal record of the interactions with the child could help the GP

to detect more easily eventual losses of skills/developmental problems that could indicate the suspicion for developing an ASD.

The results reported here are not without limitations. First of all, our results should be replicated in larger samples. Second, some CS-TSA items might be optimized. In this sense, the section dedicated to qualitative observations made by GPs could offer insightful information. A percent of 12.8 of the GPs involved in this study provided additional comments. Therefore, a revised version of the CS-TSA could be available in the future.

To conclude, our results support the CS-TSA fidelity, validity and clinical utility as a screening instrument. However, future studies should replicate our results and may consider improving the instrument.

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Appendix

CS-TSA items

Chestionarul de Screening pentru Tulburări de Spectru Autist – CS-TSA

Questions that GP address to parent	Yes	No	Sometimes
Does your child look into your eyes when you talk to him/her?	0	2	
Have you ever thought that your child cannot hear normally?	2	0	
Is your child difficult in what regards eating? Does he/she seem to lack appetite?	2	0	
Does he/she raise his/her hands to be hold in your arms?	0	2	
Does your child oppose when you hold him/her in your arms?	2	0	
Does he/she participate to the "peek-boo" game?	0	2	
Does he/she smile when you smile to him/her?	0	2	
Does he/she use the word "mother" when he/she calls you?	0	2	
Can he/she stay alone in his bed when he/she is awake?	2	0	
Does your child always react when you call his/her name?	0	2	
GP's observations based on interacting with child in the office			
Avoids direct gazing./ Does not sustain visual contact.	1		0
Obvious lack of interest for persons.	1		0
Has motor stereotypes (waving hands, walking on his/her toes, rolling around his/her own axis)	1		0
Other GP's observations/concerns regarding child's development course/problems:			