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Psychometric evaluation of social phobia and anxiety inventory for children (SPAI-C) and social anxiety scale for children-revised (SASC-R)

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Abstract The study evaluated the psychometric properties of Finnish versions of the Social Phobia and Anxiety Inventory for Children (SPAI-C) and the Social Anxiety Scale for Children-Revised (SASC-R). 352 students (M = 12.2 years) participated in the study and completed the SPAI-C and SASC-R. In addition, 68 participants (M = 12.2 years) and their parents were interviewed with the Schedule for Affective Disorders and Schizophrenia for School Aged Children (K-SADS-PL). The SPAI-C was more sensitive for identifying youth meeting criteria for social phobia (SP), whereas the SASC-R demonstrated greater specificity. The youth in this sample had lower mean total scores on the self-report questionnaires than did those in the original validitation studies of the SPAI-C and SASC-R conducted in America. These findings question whether cross-cultural differences in the expression of SP influence the clinical cut-off scores used in translated versions of social anxiety questionnaires.

Key words social anxiety – social phobia – SPAI-C – SASC-R

Introduction

Social anxiety disorder, also known as social phobia (SP), is described as a fear of humiliation and/or embarrassment in social situations, which may lead to significant avoidance of and distress in such situations [2, 38]. In children and adolescents, the expression of SP may differ according to the developmental level of the child, and may be expressed by crying, temper tantrums, fidgeting, somatic complaints, and withdrawal from social situations (e.g., school refusal) [1, 3]. SP is a chronic condition and has an average duration of 20 years. The age at onset is thought to be mid to late teen age, with an earlier age of onset in males than in females [19, 36]. More recent publications suggest that SP can onset before the age of 10 [27], and is in fact commonly diagnosed in children younger than 10 years old [3, 4, 9].

The literature reports prevalence rates for SP in children and adolescents ranging from 5–10% [11, 36, 37]. There are cross-cultural and cross-national differences in the report and expression of SP symptoms: for example studies conducted in East Asian countries reveal lower lifetime prevalence rates of SP than do Western countries (e.g. 0.5 vs. 2.6%, respectively) [35]. Studies indicate that the female to male gender ratio in SP varies between 1.5–2.0:1.0 [27, 37].

There is a growing body of research suggesting the efficacy of psychotherapeutic and pharmacological interventions in the treatment of SP [8, 33]. Despite this encouraging evidence, SP remains an often-times under-recognized and under-reported disorder, with studies indicating less than five percent of individuals

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with symptoms of SP currently seeking treatment [18, 27].

In Finland, there is no commonly used self report measure to evaluate SP symptoms in children. Recently Ranta et al. [25] studied the validity of the Finnish version of the social phobia inventory (SPIN) in a sample of 752 non-clinical adolescents (M = 14.6 years) and found it to have good properties for screening and identifying adolescents with SP. This study used higher cut-off scores (i.e. 24 vs. 19) than did the original study [6] to differentiate participants with SP from those without SP. The SPIN has been developed for adults and adolescents; in addition, it would be of great clinical utility and research import to have internationally known anxiety questionnaires available as tools in the diagnostic arsenal for younger populations within Finnish child psychiatry. Thus, we sought to translate and critically evaluate Finnish versions of two self-report measures of social anxiety in a general child and adolescent Finnish sample.

Two internationally used and psychometrically sound self-report questionnaires evaluating social anxiety symptoms in young populations are the social phobia and anxiety inventory for children (SPAI-C) [5] and the social anxiety scale for children-revised (SASC-R) [17]. Until now, these instruments had not been translated into Finnish or used in a Finnish population. The SPAI-C is a 26-item inventory, rated on a three-point Likert-type scale (i.e. 0 = Never, or hardly ever; 1 = Sometimes; 2 = Most of the Time, or Always), which addresses the frequency of feelings experienced in certain social situations (e.g. playing outside with others, going to party or a meeting). SPAI-C outcome scores range from 0 to 52; US samples have utilized a cut-off score of 18 to indicate clinically significant levels of social anxiety [5]. Cut-off scores were not differentiated by gender in the SPAI-C manual [5].

The SPAI-C is validated in US for use in children ages 8–14 years and has good psychometric properties [5]. Beidel et al. report internal consistency of 0.95 and test-retest reliability of 0.86 and 0.63 after two-weeks and ten-months, respectively [5]. In discriminant function analyses, the SPAI-C correctly classified 83% of children with SP, while 19% of non-social anxious children and 20% of children with externalizing disorders were misclassified as having SP [5]. The SPAI-C is translated into several languages, and there are many international studies of anxiety disorders in children and adolescents that have used the SPAI-C as a measure of SP [7, 13, 23, 29, 32]. However, only two publications regarding the psychometrics of translated version of the SPAI-C (German, Portuguese) are currently available [10, 22]. Results with the translated versions have differed slightly from those reported in the original studies: the clinical cut-off for SP was 20 in a German version of 481 children aged eight to 16 years [21], and the Portuguese version utilized a four factor scale versus the five factor scale used in the original English version, in sample of 1,871 non-clinical children aged nine to 14 years. Despite these differences, both translated versions of the SPAI-C demonstrated good validity and reliability as measures of SP in a younger population [10, 22].

The SASC-R is a 22-item self-report measure used with elementary school aged children, and designed to assess the construct of social-evaluative anxiety as originally conceptualized by Watson and Friend [34]. The SASC-R includes components of social-evaluative anxiety, avoidance and distress, specific to new situations or unfamiliar peers, and generally experienced avoidance and distress in the company of peers [23]. The SASC-R also includes four filler items regarding children's activity preferences. Items are rated on a five-point Likert-type scale (i.e. 1 = Not at all to 5 = All of the time). SASC-R outcome scores range from 18 to 90 and the clinical cut-off score used for boys is 50 and for girls, 54 [17]. The SASC-R is translated into many languages (e.g. Dutch, German), and several international studies that have used the SASC-R as a measure of social anxiety have reported its sound psychometric properties [15, 16, 20, 24, 26, 31].

The relationship between the SPAI-C and the SASC-R has also been studied, and variability between the two questionnaires has been demonstrated with significant correlation between total and subtotal scores [7, 23]. For example in a recent American study, Epkins et al. [7] found that as much as 37 and 58% of a non-clinical community sample (N = 178) and 58 and 42% of a clinical sample (N = 57) exceeded the clinical cut-offs published in the SPAI-C and SASC-R manuals, respectively [5, 17]. Morris and Masia [29] suggested that including both the SPAI-C and the SASC-R in assessment batteries might increase the sensitivity of classifying SP.

The aim of the current study was to examine the psychometric properties of the newly translated Finnish versions of the SPAI-C and SASC-R questionnaires, and to evaluate their clinical utility in the diagnostic process in a non-clinical sample of native Finnish language-speaking eight to 16 years olds by evaluating the sensitivity and the specificity of these two questionnaires with that of a structured diagnostic interview.

Method

Participants

Finland is a mostly homogenous Northern European country with 5.2 million inhabitants. Over 99% of inhabitants are Caucasian and 91.5% native Finnish-

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speakers [30]. Finland has compulsory education for children ages seven to 16 (i.e., grades from first to ninth). Four school classes (i.e., group of children studying in the same grade) from grades second to ninth (totalling 32 school classes, pupils aged 8–16 years) were randomly selected. Participants for this study were collected in 2006 from all mainstream compulsory education schools in the province of Oulu, Finland by using a randomized cluster sampling selection. One Swedish school and one International school were excluded from the random selection in order to increase homogeneity by native language. First graders (i.e. age 7 years) were excluded due to the possibility of underdeveloped reading skills. A total of 353 pupils participated in the study, yielding an overall participation rate of 52.6% calculated from the whole number of pupils in selected 32 school classes.

Procedure

First, we obtained approval by the ethical committee of Oulu University Hospital, Finland. Next, we obtained permission to pursue our study by the Chief of Education of Oulu, principles of the schools, and the teachers of randomly selected classes at participating schools. After informed consent was obtained from schools and administrators, a study researcher (SK) visited all selected classes and informed students about the study details. Envelopes including recruitment letters were distributed to pupils, who were asked to bring the information to their parents. The recruitment letter delineated the research project goals of studying the emotional life of children and adolescents in the general Finnish population via self-report measurement. Furthermore, parents were informed that researchers may contact participants regarding a second phase of the study that would include diagnostic clinical interviews of the parents and the child. Parental consent was obtained via signature and enclosed in an envelope, which was returned to the child's teacher. Participating children first completed the SPAI-C and SASC-R questionnaires under the supervision of the study researcher (SK) during the school lesson. Items were read aloud for the second grade pupils (i.e. eight to nine years old) to avoid possible misunderstanding due to developing reading skills.

Translation process

For this study both of the above-mentioned questionnaires were translated from English into Finnish by two research psychologists (SK, KJ) and back-translated into English by an official translator. Then, English versions were compared for inconsistencies by a native English-language speaking clinical psychologist (RPW). Additional back-translation for the SPAI-C was conducted by an official translator of Multi-Health Systems Inc.

Measures

Screening questionnaires

As described earlier, we used the SPAI-C [5] and the SASC-R [17] as screening measures for social anxiety in children and adolescents.

Diagnostic interview

The schedule for affective disorders and schizophrenia for school aged children-present and lifetime version (K-SADS-PL) [14] was used for diagnostic interviews. The K-SADS-PL is a semi-structured interview designed to assess current and past episodes of psychopathology in children and adolescents according to DSM-III-R and DSM-IV criteria via parent and child interviews. The diagnoses assessed with the K-SADS-PL included affective, psychotic, anxiety, behavioural, eating, tic and post-traumatic stress disorders as well as substance abuse and dependence. In the K-SADS-PL symptoms are rated as not present, subthreshold, or threshold. The K-SADS-PL has well-established reliability and validity [14]. Also, the children's global assessment scale (CGAS) was used to evaluate children's level of functioning in everyday life (e.g. at home, at school, with peers). CGAS scores range between 1 and 100, with higher scores indicating better functioning [28].

All clinical-diagnostic interviews and CGAS score evaluations were completed by a clinical psychologist (SK) and every tenth video-taped K-SADS-PL interview was re-rated by an educational psychologist (TH) experienced in K-SADS-PL administration and coding [12]. Inter-rater reliability for all diagnoses was 99.5% (range 98.4–100%). Cohen's kappa values also revealed good inter-rater reliability for all diagnoses (0.83).

Missing data

Missing data were handled in two ways. First, if one or two items were missing in the SPAI-C subtotals, values were replaced by the SPAI-C correction values provided in the manual [5]. Second, missing data on the SASC-R were replaced by replacing the one or two missing values with the participant's median of items 1–18. In 28 cases more items than two were missing, and those cases were excluded from data analyses.

The final sample for data analyses included 325 participants (154 boys, 171 girls).

All 53 participants who scored at or above the clinical cut-off of the SPAI-C total score published in the SPAI-C (i.e. ≥18), or boys and girls who scored at or above the clinical cut-off of SASC-R total scores published in SASC-R manual [17] (i.e. ≥50 for boys, ≥54 for girls), were labelled the "high social anxiety group" (HSA). The "low social anxiety group" (LSA) was obtained using a random selection from 272 participants who scored below the clinical cut-offs on both measures. These individuals were invited to participate in the second phase of the study, which included a K-SADS-PL interview with children and their parents. One eight-year-old immigrant boy of Arabic descent was excluded from further analyses due to his parents' poor mastery of the Finnish language. The final interview sample consisted of 68 participants (HSA, $n = 37$; LSA, $n = 31$) aged eight to 16 years (31 male, M = 11.9 years ± 2.3; 37 female, M = 12.4 years ± 2.1). The participation rate for the diagnostic clinical interviews was 74% overall, (70% for the HSA and 80% for the LSA, $\chi^2 = 0.53$, $df = 1$, P = ns). Demographic information is presented in Table 1.

Statistical methods

Analyses were performed with The Statistical Package for Social Sciences version 14.0 for Windows. Variables were not normally distributed; therefore subsequent analyses were performed using nonparametric tests (i.e. Chi-square test (χ^2), Mann–Whitney U test (Z), and Spearman's coefficient correlation). To make a diagnosis the choice of the "best" cut off we used a ROC curve (Receiver Operating Characteristic curve) which is a graphical approach to plot the sensitivity versus specificity for each possible cut off, and to join the points. The ROC method is perhaps most useful when comparing two or more competing methods. Also, area under the curve (AUC), which is a measure of the probability of correct identification is presented along with sensitivity, specificity and likelihood ratios. Internal consistency was tested using Cronbach's Alpha, and was excellent for both the SPAI-C ($\alpha = 0.95$) and SASC-R total scores ($\alpha = 0.92$).

Results

Prevalence and onset of social phobia

In the total sample of 325 youth, 53 (16.3%) participants scored in the HSA group and 272 (83.7%) participants scored in the LSA group by using the

Table 1 Demographic Information

Phase 1: Screening				Phase 2: Interview										
N: M age ± SD				HSA N: M age ± SD			LSA N: M age ± SD				Total sample in Phase 2 N: M age ± SD			
Boys	Girls	All	Boys vs. Girls z	Boys	Girls	All	Boys	Girls	All	LSA vs. HSA z	Boys	Girls	All	Phase1 vs. Phase2 z
154: 11.7 ± 2.3	171: 12.7 ± 2.1	325: 12.2 ± 2.3	−3.9*†	18: 11.0 ± 2.0	19: 11.5 ± 2.2	37: 11.3 ± 2.1	13: 13.2 ± 2.2	18: 13.4 ± 1.6	31: 13.3 ± 1.8	−3.8*†	31: 11.9 ± 2.3	37: 12.4 ± 2.1	68: 12.2 ± 2.2	−2.6†

High social anxiety *HSA*, low social anxiety *LSA*
†$P < 0.01$, *† $P < 0.001$, 2-tailed

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Table 2 Descriptive Characteristic of the SPAI-C and the SASC-R

Measure	Mean score (SD)			*z*	Participants above clinical cut-offs (*n*, %)			χ^2
	Boys	Girls	All		Boys	Girls	All	
SPAI-C	9.9 (6.8)	9.7 (7.1)	9.8 (7.0)	−0.57	20 (13%)	24 (14%)	44 (13.5%)	0.36
SASC-R	35.2 (11.0)	37.8 (11.3)	36.6 (11.2)	−2.28*	19 (12.3%)	14 (12.3%)	33 (10.2%)	0.76

*$P < 0.05$, 2-tailed

original cut-offs of SPAI-C and SASC-R questionnaires. In the interviewed sample ($n = 68$), 11 participants (M = 13.2 years, SD = 1.7) met the diagnostic criteria of DSM-IV for SP: ten participants were in the HSA group and one was in the LSA group. We estimated the prevalence of SP in the total sample by via the following calculations utilizing the participants falling within the HSA group [10] × (53/37) = 8.774] and the LSA group [11] × (272/31) = 14.324]. The prevalence of SP determined by this calculation was 7.1% (23.098/325).

The results in our sample suggest earlier, but statistically non-significant age at onset of SP for boys, and a gender ratio of 1.2 female for one male. Five boys (age range: 9.4–14.9 years) and six girls (age range: 13.2–15.4 years) ($z = -1.28$, P = ns) met criteria for a diagnosis for SP. However, according to parent report on the K-SADS-PL, the age at onset for SP may in fact be earlier. Specifically, some parents reported that their child was socially anxious or "overly shy" by the age of six. When considering both parent and child report on clinical interviews, the age at onset for SP was recalculated by asking the parents recalling, when the child showed the first time symptoms of overly shyness; the new means were 7.2 years for boys and 8.2 years for girls. Although direct report of current symptoms is the most reliable way to calculate age at onset of a particular diagnosis, and subject recall of symptoms may be met with some bias or recall errors, we chose to calculate the onset for SP based on parent-report of the initial symptoms of excessive shyness since this is a common methodology used in studies of child diagnoses, particularly since parents may have more awareness of certain behaviours that children may deny or lack insight at an early stage of development.; it should be noted that several studies report the onset of SP as earlier than mid to late teen age, and these studies rely on parent report of child symptoms [3, 4, 9, 27].

Descriptive characteristic of SPAI-C and SASC-R

For the total sample ($N = 325$) mean of the SPAI-C total score was 9.8, 9.9 for boys, and 9.7 for girls. A total of 13% of boys and 14% of girls scored on or above the original clinical cut-off of 18 of the SPAI-C. Statistically significant gender differences were not found on the mean scores of the SPAI-C. The mean of the SASC-R total score in the total sample was 36.6, with girls scoring a mean of 37.8 and boys scoring a mean of 35.2; this gender difference was statistically significant ($z = -2.28$, $P < 0.05$). 12.3% of boys and 8.2% of girls scored on or above the original clinical cut-off score (50 for boys, 54 for girls) of the SASC-R. Descriptive characteristics of the SPAI-C and the SASC-R in the total sample and relevant associated statistical values are shown in Table 2. The association of SPAI-C, SASC-R, and CGAS scores in LSA and HSA groups are shown in Table 3.

Association between self-report measures

Statistically significant levels of association between the total scores of the SPAI-C and the SASC-R were found by calculating the Spearman's correlation coefficient in the total sample ($r = 0.783$, $P < 0.01$) and separately across genders (boys: $r = 0.770$, $P < 0.01$; girls: $r = 0.825$, $P < 0.01$). The relationship between the social anxiety measurements was also analysed by calculating estimate of relative risk (OR) for participants scoring below and above SPAI-C and SASC-R clinical cut-offs. The OR for participants scoring above the clinical cut-off of the SPAI-C who also scored above the clinical cut-off on the SASC-R was 39.6 (CI: 15.9–98.5). In addition, the OR for participants who scored above the clinical cut-off of the SPAI-C were 12.8 (CI: 1.5–106.8) times more likely to meet diagnostic criteria for SP on the K-SADS-PL than were participants who scored below the SPAI-C

Table 3 High and low social anxiety groups associated with SPAI-C, SASC-R, and CGAS scores

	Anxiety group		*z*
	LSA M ± SD	HSA M ± SD	
SPAI-C Total	7.1 ± 4.7	22.7 ± 4.8	−7.0*†
SASC-R Total	33.2 ± 9.3	52.5 ± 10.4	−5.8*†
Current CGAS	79.9 ± 8.3	70.8 ± 10.5	−3.6*†
Lifetime CGAS	77.1 ± 8.4	67.1 ± 11.2	−3.7*†

LSA low social anxiety, *HSA* high social anxiety
*†$P < 0.001$, 2-tailed

Table 4 Frequencies and gender distribution of current and lifetime K-SADS diagnosis in low and high social anxiety groups

Diagnoses	Current		Lifetime	
	LSA (boys/girls)	HSA (boys/girls)	LSA (boys/girls)	HSA (boys/girls)
SP	0/1	4/6	0/0	0/0
s-SP	1/0	1/0	2/0	1/1
ANX	1/1	1/4	1/0	1/0
DEP	0/0	0/1	0/0	1/2
DIS	0/1	0/5*	0/0	0/0
mt	0/0	1/0*	0/0	5/0

LSA low social anxiety, *HSA* high social anxiety, *SP* social phobia, *s-SP* subthreshold for social phobia, *ANX* other anxiety disorders (i.e. generalized anxiety disorder, separation anxiety disorder, specific phobia), *DEP* depressive disorders (i.e. adjustment disorder with depressive mood, major depressive disorder, major depressive disorder not otherwise specified), *DIS* disruptive disorders (i.e. attention deficit disorder, attention deficit hyperactivity disorder, oppositional defiant disorder), *mt* motor tics
*$P < 0.05$, 2-tailed pairwise Fisher Exact Test

cut-off. Similarly, participants scoring above the clinical cut-off scores on the SASC-R, were 8.2 (CI: 1.9–35.2) times more likely to receive a diagnosis of SP based on the K-SADS-PL. The Frequencies and gender distribution of current and lifetime K-SADS diagnosis in LSA and HSA groups are shown in Table 4. Figure 1 shows the frequencies of current and lifetime K-SADS diagnosis in LSA and HSA groups.

Validity of measures

Discriminant validity was studied using the ROC analyses for the SPAI-C and the SASC-R total scores in relation with the K-SADS-PL. Both measures demonstrated validity in discriminating participants with SP from those without SP in the total sample (SPAI-C: AUC = 0.795, SE = 0.064, $P < 0.01$; SASC-R: AUC = 0.766, SE = 0.065, $P < 0.01$) and in the girl-sample (SPAI-C: AUC = 0.806, SE = 0.094, $P < 0.05$; SASC-R: AUC = 0.833, SE = 0.087, $P < 0.01$). However, in the boy-sample, only the SPAI-C was found to demonstrate good discriminant validity between SP and non-SP diagnoses (SPAI-C: AUC = 0.804, SE = 0.081, $P < 0.05$; SASC-R: AUC = 0.700, SE = 0.093, P = ns). ROC analyses of the SPAI-C estimated two possible cut-offs for SPAI-C total score in the total sample: 17.9 or 20.9. For the SASC-R the estimated total score in the total sample was 48.5. The ROC curves of SPAI-C and SASC-R for the total sample with estimated cut-offs for the total scores with sensitivity, specificity, and likelihood ratio are presented in the Fig. 2.

The SPAI-C cut-off score of 18 identified correctly 91% of the SP diagnoses, and missed only one SP diagnosis. However, the SPAI-C cut-off score of 18 was associated with a 40.4% false-positive rate. The original SASC-R cut-off scores (50 for boys, 54 for girls), the estimated SASC-R cut-off score (48.5), and the higher estimated SPAI-C cut-off score (20.9) each correctly identified 72.7% of SP cases, but also were associated with fewer false-positives than the SPAI-C cut-off score of 18 (24.6, 33.3, and 26.3%, respectively).

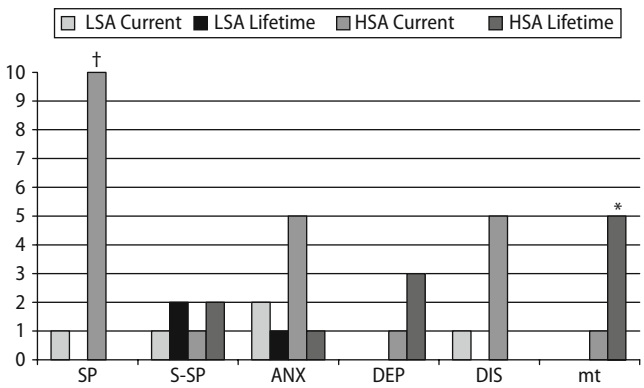

Fig. 1 Frequencies of current and lifetime K-SADS diagnosis in low and high social anxiety groups. *LSA* low social anxiety, *HSA* high social anxiety. †SP Current HSA > LSA, $P < 0.01$. *mt HSA > LSA, $P < 0.05$. *P* values based on two-sided pairwise Fisher Exact Test. *SP* social phobia, *s-SP* subthreshold for social phobia, *ANX* other anxiety disorders (i.e. generalized anxiety disorder, separation anxiety disorder, specific phobia), *DEP* depressive disorders (i.e. adjustment disorder with depressive mood, major depressive disorder, major depressive disorder not otherwise specified), *DIS* disruptive disorders (i.e. attention deficit disorder, attention deficit hyperactivity disorder, oppositional defiant disorder), *mt* motor tics

Attrition analysis

Most of the individuals, who chose not to participate in the screening phase of the study, were boys (52.8%); after the missing data were replaced the participation rates for boys and girls, respectively, were 47.4 and 52.6%; this difference was not statistically significantly different ($\chi^2 = 0.89$, $df = 1$, P = ns). In the interview phase of the study the drop-out rate in the HSA group did not differ significantly from the drop-out rate in the LSA group (respectively, 30 vs. 20%, $\chi^2 = 2.67$, $df = 1$, P = ns). Drop-out rates in the LSA group did not differ by gender (27.9% for boys, 24.5% for girls, $\chi^2 = 0.139$, $df = 1$, P = ns). However, there was a statistically significant association between gender, mean age and total score of the SPAI-C in the HSA group. Specifically, girls who did not participate were older and had lower total scores on the SPAI-C than did girls who participated in the study (M = 13.6 years vs. M = 11.5 years, $z = -2.07$; M = 19.3 points vs. M = 23.9 points, $z = -2.12$, $P < 0.05$). There were no gender differences in drop-out rates based on scores in the SASC-R.

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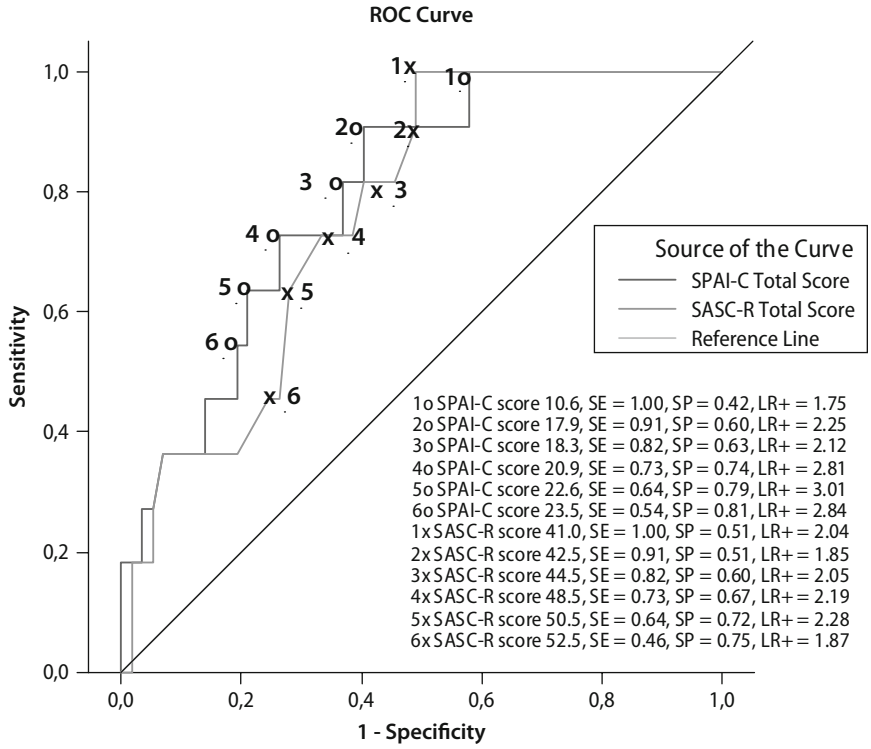

Fig. 2 The receiver operating characteristics of the SPAI-C and SASC-R in total sample with estimated total scores, sensitivity *SE*, specificity *SP*, and likelihood ratio *LR+*

Discussion

We examined the psychometric properties of the Finnish versions of the SPAI-C and the SASC-R, and evaluated their value in the clinical diagnostic procedure. The Finnish versions of the SPAI-C and SASC-R demonstrated reliability in screening for social anxiety symptoms in a general youth sample, using cut-off scores of 18 for the SPAI-C and 48.5 for the SASC-R. While the K-SADS-PL is an important albeit time consuming and labour-intensive interview procedure, the use of reliable and valid self-report questionnaires may benefit diagnostic procedures in a clinical population, and may be expedient and cost-effective screening instruments in young normal populations (e.g. elementary school students). The SPAI-C proved a more sensitive measure in screening for SP than was the SASC-R; however, the SPAI-C yielded a higher rate of false-positives than did the SASC-R. In our sample, the SASC-R proved better specifity than the SPAI-C. Analyses utilizing either original or estimated cut-off scores with both measures decreased the number of false-positives, but in doing so reduced power to correctly identify true cases than with using the SPAI-C alone. When using either the SPAI-C total score of 18 or the estimated SASC-R total score of 48.5, or both, the same accuracy for clinically-obtained SP diagnoses was achieved as with the SPAI-C 18 alone. Of note, however, more false-positives were also identified than with the SPAI-C (cut-off of 18) alone. Our results may reflect the fact that the SPAI-C and the SASC-R were developed to measure different constructs; the SPAI-C is based on the DSM-IV criteria of SP, while the SASC-R is originally based on social-evaluative anxiety.

From the clinical point of view, our results suggest using the SPAI-C measurement in screening for SP in normal child and adolescent populations, and using the SPAI-C cut-off score of 18 as an indication for more careful clinical examination. Analyses of false-positives demonstrated that high scores on either social anxiety measure without a diagnosis of SP was associated primarily with another diagnosis (37.9%) or a subthreshold diagnosis (10.3%) on the K-SADS-PL, and a low CGAS indicating functional impairment in everyday life (current mean CGAS = 74.0, lifetime mean CGAS = 70.2). This data supports the importance of utilizing more sensitive measurement in study screening phases.

The mean total score of the SPAI-C (M = 9.8) was markedly lower in our non-clinical study than it was in non-clinical studies completed in the US [5] (14.9 for boys, 18.8 for girls) or in Braszil [10] (14.6 for boys, 16.9 for girls), but was closer to the mean total scores of the German [22] (M = 12.5) and Icelandic studies [29] (M = 9.3). In our study, the gender difference on the SPAI-C total scores was not

statistically significant. Similarly, a significant gender difference was not found in a recent study of SP in a general Finnish adolescent population [25]. Moreover the mean total score of the SASC-R was almost 10 points lower (36.6 vs. 45.7) in our study-sample than it was in the original study of La Greca and Stones [17], but was comparable with that found in Norwegian [16] (M = 35.9) and Dutch studies (M = 36.5) [26]. Also, the percent of participants exceeding the clinical cut-offs of the SPAI-C and SASC-R in our study were considerably lower than that found in Epkins' community study [7] (13.5 and 10.3% vs. 37 and 58%, respectively). Although the prevalence and gender ratios were similar to those found in previous studies carried out in several international child and adolescent samples, the difference of the mean score across different translated versions of the questionnaires may indicate some cultural differences in the way anxiety symptoms are reported and expressed cross-culturally [35], ythus making it critical to assess these differences in a sensitive and appropriate manner. It is therefore of the utmost research import to conduct psychometric studies of the validity and reliability of internationally known measures as they are translated into various languages, so that we may better understand the presentation of symptoms and diagnoses in different cultures. If we merely rely on English versions of the questionnaires, we have the potential of missing data such as differences, for example, in age at onset, gender, and clustering of symptoms which may manifest heterogeneously cross-culturally.

The overall participation rate in our study was moderate (52.6%), and in the interview phase of the study, although the difference was not statistically significant, there were more dropouts in the HSA group than in the LSA group. This may suggest a more conservative estimate of SP in our sample and one that may be an underestimate of actual rates of SP that exist in the general Finnish child and adolescent population.

In summary, the present study examined the psychometric properties of two newly translated internationally used self-report measures of social anxiety (the SPAI-C and SASC-R) for use in Finnish child psychiatry and research. According to our results the SPAI-C demonstrated better reliability and validity as well as greater sensitivity for identifying SP cases. Differences in the manifestation of social anxiety symptoms cross-culturally are both interesting and important. Wider appreciation of these differences is needed, as well as strong European and American collaborative efforts to achieve a greater research and clinical understanding of the expression of anxiety symptoms and disorders cross-culturally and across the age range.

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