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A Comparison between School and Home Rating Scales and Reliability-Validity of the Scales-the Scales for Diagnosing Attention-Deficit/Hyperactivity Disorder

Scales-Dikkat Eksikliği Hiperaktivite Bozukluğu Okul ve Ev Derecelendirme Ölçeklerinin Karşılaştırılması ve Geçerlik-Güvenirlik Çalışması

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ABSTRACT

Introduction: The purpose of the present research is to compare the Turkish translations of school and home versions of the Scales for Diagnosing Attention-Deficit/Hyperactivity Disorder (SCALES) developed by Ryser and McConnell with respect to age and gender and to examine the correlation between the two scales.

Method: The research was conducted with 102 teachers and parents of 891 children aged between 5.0 and 14.11 years. 656 scale forms of parents returned to us were included in the study. The teachers filled in teacher information form, child information form, SCALES-School Rating Scale and the Turkish version of Conners' Teacher Rating Scale. The parents filled in family information form, child information form and SCALESHome Rating Scale and the Turkish version of the Conners' Home Rating Scale.

Results: When SCALES-Home Rating Scale and SCALES-School Rating Scale scores of each age group were compared using t-test, it was observed that the difference in all sub-scale scores in the 5-9 age group was significant and it was also observed that in the 10-13 and 13+ age groups, the difference was significant only in the hyperactivity field. The correlation between SCALES-School Rating Scale and SCALES-Home Rating Scale was investigated. The correlation between sub-scales measuring the same abilities was found to be between 0.1 and 0.26.

Conclusion: We assume that the Turkish version of the SCALES is a valid and reliable instrument for diagnosing ADHD. Since SCALES-Home Rating Scale scores were higher than SCALES-School Rating Scale scores and the correlation between the two scales was low, we assume that the objectivity of parents' ratings was limited. Future validity studies on diagnosed children are needed. *(Archives of Neuropsychiatry 2014; 51: 195-204)*

Key words: Attention-deficit/hyperactivity disorder, diagnosing, rating scale

Conflict of Interest: The authors reported no conflict of interest related to this article.

ÖZET

Giriş: Bu araştırmanın amacı; Ryser ve McConnell'ın geliştirmiş olduğu SCALES-Scales for Diagnosing Attention-Deficit/Hyperactivity Disorder okul formu ve ev formunun Türkçe uyarlamasının geçerlik ve güvenirliklerinin belirlenmesi, yaş ve cinsiyet açısından karşılaştırılması ve iki ölçek arasındaki korelasyonunun incelenmesidir.

Yöntem: Araştırma 5,0-14,11 yaş grubundaki 891 çocuğun 102 öğretmeni ve anne babaları ile gerçekleştirilmiştir. Anne baba ölçeklerinden geri dönen 656 tanesi çalışmaya alınmıştır. Öğretmenler, Öğretmen Bilgi Formu, Çocuk Bilgi Formu, SCALESDikkat Eksikliği Hiperaktivite Bozukluğu-Okul Derecelendirme Ölçeği (SCALES-ODÖ) ve Conners Öğretmen Derecelendirme Ölçeği Türkçe formlarını doldurmuştur. Anne babalar; Aile Bilgi Formu, Çocuk Bilgi Formu ile SCALES -Dikkat Eksikliği Hiperaktivite Bozukluğu- Ev Derecelendirme Ölçeği (SCALES-EDÖ) ve Conners Ev Derecelendirme Ölçeği Türkçe formlarını doldurmuştur.

Bulgular: SCALES-ODÖ ve SCALES-EDÖ'de yaşlara ait puanlar t-testi ile karşılaştırıldığında, 5-9 yaş aralığında tüm alt ölçeklerdeki farkın anlamlı olduğu, 10-13 ve 13+ yaş grubunda sadece hiperaktivite alanındaki farkın anlamlı olduğu görülmüştür. SCALES-ODÖ ve SCALES-EDÖ arasındaki korelasyon incelenmiştir. Ölçeklerin aynı becerileri ölçen alt ölçekleri arasındaki korelasyon 0,1 ile 0,26 arasında bulunmuştur.

Sonuç: Çalışma, ölçeğin Türkçe versiyonunun DEHB'yi taramak amacıyla kullanılabilecek geçerli ve güvenilir bir ölçek olduğunu düşündürmüştür. SCALESEDÖ puanlarının ODÖ puanlarından yüksek olması dolayısıyla iki ölçek arasında korelasyon düşük bulunmuş, bu durum ailelerin değerlendirmelerinde objektif olma konusunda sınırlılıkları olduğunu düşündürmüştür. Tanı koyulmuş çocuklarla yapılacak çalışmalarla da ölçeğin geçerliliğinin kanıtlanması gerekmektedir. *(Nöropsikiyatri Arşivi 2014; 51: 195-204)*

Anahtar kelimeler: Dikkat eksikliği, hiperaktivite bozukluğu, tanılama, derecelendirme ölçeği

Çıkar Çatışması: Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemişlerdir.

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Introduction

Attention-deficit hyperactivity disorder (ADHD) is one of the most common disorders that generally manifests with main symptoms of attention deficit (AD), hyperactivity (HA), and impulsivity (1,2,3,4,5).

The APA (6) stated that 3–7% of school-age children have ADHD (7). In a different study, this rate was reported to be 5–10%. It was reported that 2,5–4 million children were diagnosed with ADHD among general education classes in USA (8). Note to Author: Please provide a reference number at this instance. The other common prevalences are 3% and 5% (10). In addition, it was reported that more than 40% of referrals to clinics are because of ADHD (11). In our country, it was concluded that 3–6% of school-age children have ADHD and that it is more prevalent in boys than in girls, similar to the results of studies conducted in other countries (12). In another study conducted in our country, its prevalence in urban areas was reported to be 5% (13).

When the prevalence of ADHD is examined terms of gender, it is found that it is 3 times more prevalent in boys than in girls (14). However, in another study, it was reported that girls had ADHD with similar rates as boys, but they were not recognized because the severity of the disease was lower in girls and they were diagnosed with a lower rate (15). In another study, the reason for this is that ADHD is missed in girls because it is mostly characterized with cognitive disorders and AD in girls and impulsivity is observed less frequently (16). Kaplan and Sadock (17) emphasized that AD, HA, and impulsivity are included in the definition and should be observed in two (school and home) or more settings. According to DSM-IV-TR, symptoms should be observed in different settings and by different people (6).

ADHD assessment scales enable the assessment of children in different settings by different people. In our country, there is a considerably limited number of scales to assess children with ADHD. The Turgay Disruptive Behavior Disorder Screening Scale is a scale presented to families in relation to ADHD and oppositional defiant disorder (ODD) (18).

The Hacettepe Attention Deficit Hyperactivity Scale is a scale prepared for targeting parents to determine children with ADHD. Öktem and Semerci (19) examined the value of certain symptoms for ADHD in three groups (children diagnosed with ADHD, those observed to have psychological symptoms, and those who showed normal development). It was reported that this scale is a reliable scale in identifying children with ADHD, in making the diagnosis, and in the follow-up of treatment (19).

The most commonly used scales include the Conners' Teacher Rating Scale (CTRS) and Conners' Parent Rating Scale (CPRS) (20,21,22,23). The Turkish adaptation of CTRS was performed by Şener, Dereboy, and Sertcan (24) for use in our country. The high Cronbach's alpha value obtained in the study and item-total correlations demonstrated that the reliability of the scale was high. It was necessary to reinvestigate to what extent the factors observed were compatible with the item content of the original subscales, if the subscales should be adapted to the conditions of our country, and the effects of socioeconomic variables on assessments. The data suggested that some adaptations should be made in all original subscales considering the conditions of our country (24).

In the study by Dereboy et al. (25) in which the validity of the Conners' Short Form Teacher and Parent Rating scales was examined, it was found that the factor analysis data of the samples composed of children with normal development supported the structural validity of the scales for CPRS-48. As a result of the assessment of item contents of the related subscales of clinical criterion scores including diagnosis classifications, it was found that all subscales should be adapted except for CPRS-48 Impulsivity/HA (25).

The SCALES-Scales for Diagnosing Attention-Deficit/Hyperactivity Disorder is a scale prepared to assess children and individuals between 5 years and 0 months and 18 years and 11 months in school and home settings (26,27). This 39-question scale includes home and school rating scales. In contrast to the scales used in our country, 39 items found in this scale are contained in three subscales including AD, HA, and impulsivity. A separate part providing comparison of these items with DSM IV is present. In this part, the scale items corresponding to the DSM IV items are grouped. After these items are scored, it is easy to predict the type of disorder (AD, HA–impulsivity, or ADHD) the child possesses.

There is a considerably limited number of assessment tools used to assess ADHD in our country. It could be beneficial to enable the use of new tools in our country. The aim of this study was to determine the validity and reliability of the school and home forms of the SCALES-Scales for Diagnosing Attention-Deficit/Hyperactivity Disorder developed by Ryser and McConnel, to compare these scales in terms of age and gender, and to examine the correlation between the two scales.

Methods

Sample

The study was conducted in 9 schools selected among primary schools affiliated to the Ministry of Education and in the central counties of Altındağ, Mamak, Keçiören, Çankaya, Yenimahalle, Etimesgut, Sincan, and Gölbaşı in the province of Ankara and in 6 institutions selected from among private nursery schools with 102 teachers part of and 891 parents of 891 children attending these institutions aged between 5 years and 0 months and 14 years and 11 months. Six hundred fifty-six parent/home scales returned were included in the study.

Tools

In the study, the teacher, child, and parent information form, the SCALES Attention-Deficit Hyperactivity Disorder-School Rating Scale (SCALES-SRS) adaptation, SCALES Attention-Deficit Hyperactivity Disorder-Home Rating Scale (SCALES-HRS)

adaptation, and Conners' School Rating Scale (CSRS) and Conners' Home Rating Scale (CHRS) were used.

Teacher Information Form: This form was composed of open-ended questions about the time of professional experience of the teachers, the number of years of working in the current school, and the number of years spent teaching the selected class.

Child Information Form: This is a form composed of multiple-choice and open-ended questions about how long the teacher knows the child, the sitting position of the child in class, if he/she has friends, if he/she participates in plays, and if he/she attends school regularly. In addition, items included in the diagnostic criteria of ADHD were added to the form in DSM-IV-TR in such a way that teachers can easily understand.

Parent Information Form: This is a form composed of multiple-choice questions about the education and income levels of the parents, house of residence, order of birth of the child, and if there is a mobile person around.

SCALES-SRS and SCALES-HRS: SCALES-SRS (SCALES-HRS) is a Likert-type scale composed of 40 items graded in 4 points. Because an item of SCALES-SRS is originally composed of 39 questions that was thought to be not appropriate for our culture, a new item corresponding to the same skill was added. There are figures beside each item for teachers to mark (0: never, 1: rarely, 2: frequently, 3: always) and three columns including AD, HA, and impulsivity for investigators to use when evaluating the results of the scale.

There is a separate form used in the evaluation/interpretation of the scale results by investigators. This form is composed of 5 parts; these parts comprise the introductory information part including the name, school, and class of the individual (child/adolescent), test date, birth date, the name of the individual, and the names of the parents; score summary part including raw score, standard score, percentage score, and total standard score; score profile part including the graphical demonstration of scores; DSM-IV-TR results part showing the type of disorder indicated by the results according to DSM-IV-TR diagnostic criteria; and the part including the interpretation of the results and recommendations.

A separate form was developed to compare item performances with DSM-IV-TR. In this part, the investigator interprets the scale using DSM-IV-TR diagnostic criteria.

CSRS: The scale, which is composed of 28 questions, has 3 subscales. The questions are answered on a 4-point Likert scale (0: never, 1: rarely, 2: frequently, and 3: always). The first subscale, AD/passiveness, includes 8 questions; the second subscale, HA, includes 6 questions; and the third subscale, behavioral problem, includes 5 questions. When the total score of the AD/passiveness subscale exceeds 18, the total score of the HA subscore exceeds 16 and that of the behavioral problem subscore exceeds 18, the child is considered to have ADHD.

CHRS: The scale, which is composed of 48 questions, has 4 subscales. The questions are answered on a 4-point Likert scale (0: never, 1: rarely, 2: frequently, 3: always). There are 5 items screening AD, 4 items screening HA, 5 items screening ODD, and 11 items screening behavioral disorder (BD). When the total score for the AD subscale exceeds 5, the total score for the HA subscale exceeds 6, the total score for the ODD subscale exceeds 7, and the total score for the BD subscale exceeds 18, the child is considered to have ADHD.

Process

In the initial phase of the study, the opinions of experts in the area who had full command of English were obtained for the translation of the scale to our language. A common text was created by examining the translations received from referees. Subsequently, this form was back-translated to English and compared with the original statements. Fourteen child psychiatrists, psychologists, and academicians who worked with children with ADHD were referred for their opinions, and they were asked to evaluate if each item it was comprehensible and to report their recommendations for incomprehensible items. As a result of the opinions obtained from these experts, it was demonstrated that the 32nd item was incomprehensible. In accordance with the consensus received from the experts, this item was adjusted in a comprehensible way. It was thought that the 2nd item in SCALES-HRS was not compatible with our culture, and a new item corresponding to this item was added to the scale.

Scores obtained from SCALES-SRS and SCALES-HRS were separately compared for each gender and age group using a t-test. Gender and age interactions in the scales were investigated using the t-test. The relation between the scales was examined using correlation analysis. Statistical analyses were performed using appropriate subprograms of SPSS.

Results

Reliability

The distribution of Cronbach's alpha reliability coefficients belonging to the SCALES-SRS subscales and total standard scores according to age groups was examined. Accordingly, it was found that the reliability coefficients ranged between .92 and .98. The reliability coefficients of the SCALES-SRS subscales and total standard scores were found to range between .92 and .97 for girls and between .93 and .97 for boys. The distribution of standard error values by age for the SCALES-SRS subscales was found to range between .44 and .86.

The distribution of Cronbach's alpha reliability coefficients by age for the SCALES-HRS subscales was found to range between .77 and .92. The reliability coefficients of the SCALES-HRS Subscales were found to range between .78 and .91 for girls and between .75 and .91 for boys. The distribution of standard error values by age for the SCALES-HRS was examined. It was found that the standard error value ranged between .13 and .42 for the subscales.

Validity

The correlation between the SCALES-SRS subscales was examined. Accordingly, the correlation of the AD subscale with the HA subscale was found to be .68. The correlation of the AD subscale with the impulsivity subscale was found to be .64 and that of the HA subscale with the impulsivity subscale was found to be .91.

The factor loadings of the SCALES-SRS items according to factor analysis were examined (Table 1). In the principal component factor analysis, 2 factors with an eigenvalue above 1 emerged because of varimax rotation. The eigenvalues of factors 1 and 2 were found to be 20,116 and 4,299, respectively. The AD factor explained 32.43% of the variance, whereas the HA/impulsivity factor explained 29.99% of the variance. In total, 62.42% of the property defined with this scale could be explained with this tool.

The correlations between the SCALES-HRS subscales were examined. Accordingly, the correlation of the AD subscale with the HA subscale was found to be .68. The correlation of the AD subscale with the Impulsivity subscale was found to be .67 and that of the HA subscale with the impulsivity subscale was found to be .76.

The factor loadings of the SCALES-HRS items according to factor analysis were examined (Table 2). In the principal component factor analysis, 2 factors with an eigenvalue above 1 emerged because of varimax rotation. The eigenvalues of factors 1 and 2 were found to be 13,697 and 2,340, respectively. The AD factor explained 20.21% of the variance, whereas the HA/impulsivity factor explained 19.88% of the variance. In total, 40.09% of the property defined with this scale could be explained with this tool.

However, in the original SCALES-HRS, an item loaded on the HA/impulsivity factor was loaded on the AD factor with a low factor loading (.36). Büyüköztürk (28) reported that a factor loading value of .45 and above was a good measure for selection

Table 1. Factor loadings of the ADHD-SRS items according to factor analysis

Factor 1 Attention deficit	Factor loading	Factor 2 Hyperactivity/Impulsivity	Factor loading
9. has difficulty in devoting himself/herself to school work or homework	.86	30. talks free of turn	.84
29. has difficulty in arranging and creating assignments	.84	14. is restless	.80
25. cannot give full attention to school work	.83	7. cannot wait for his/her turn(for example in the food line or bathroom)	.80
19. has difficulty in completing duties given to himself/herself	.82	28. continuously moves	.80
32. idles instead of taking care of work	.79	13. has difficulty in playing silently	
26. although able to comprehend what is asked for, he/she daydreams in class instead of doing school work	.79	31. chatters or makes noise so that others are distracted	.79
3. completes only a part of his/her assignments	.78	37. breaks into the conversation of others during daily conversations	.78
10. he/she easily becomes distracted	.78	22. has difficulty in waiting for his/her turn while playing	.78
21. has difficulty in following consecutive instructions	.77	17. talks at inappropriate times	
33. gets low marks because of errors as a result of attention deficit	.77	4. tries to answer without waiting for his/her teacher or others to com plete a question	.77
1. loses homework given	.74	34. asks question without waiting for the instruction to be completed	.73
16. forgets bringing important letters from school to home o giving them to his/her parents	.74	23. has difficulty in sitting in his/her place during special events including presentations, ceremonies, or shows	.70
27. looks as if his/her mind is elsewhere when someone is talking to him/her	.71	39. rocks, moves, and sits on the edge of his/her desk	.70
5. looks around or pays attention to what others are doing instead of concentrating on his/her own work in class	.69	15. grabs objects or toys from others	.70
11. switches to a new activity without completing an activity	.68	36. runs in the corridor when passing from one class to another	.69
6. loses school materials	.61	2. walks around in class without permission	.66
38. his/her book, desk, and working area are untidy and messy	.54	20. is an intruder in social settings	.65
12. answers without thinking	.55	18. has difficulty in getting calm or relaxing	.53
		24. gets excited easily	.47
Eigenvalue	20,116	Eigenvalue	4,229

but that this cut-off value could be lowered up to .30 for a few items in practice. In our study, it may be appropriate to remove the item loaded to the AD factor with a low value from the scale.

Criterion Prediction Validity: To determine at what level the scale measured the behaviors that were desired to be measured, CTRS, which is used to measure ADHD in our country, and DSM-IV-TR diagnostic criteria were compared with SCALES-SRS. The correlation between the subscales measuring the same skills in CTRS and SCALES-SRS was found to range between .84 and .73 and that between the subscales measuring the same skills in DSM-IV-TR and SCALES-SRS ranged between .82 and .72.

In comparison between SCALES-HRS and CTRS and DSM-IV-TR diagnostic criteria, the correlation between the subscales measuring the same skills in CTRS and SCALES-HRS was found to range between .64 and .61 and that between the subscales measuring the same skills in DSM-IV-TR and SCALES-HRS ranged between .69 and .63.

The scores of the girls in the subscales in SCALES-SRS and SCALES-HRS were compared by the t-test to compare SCALES-SRS and SCALES-HRS (Table 3). Accordingly, it was found that the difference between the two mean values was significant in all subscales.

The scores of the boys in the subscales in SCALES-SRS and SCALES-HRS were compared by the t-test (Table 4). Accordingly, it was found that the difference between the two mean values was significant in the HA subscale and that the difference between the two mean values was not significant in the AD and impulsivity subscales.

Table 2. Factor loadings of the ADHD-SRS items according to factor analysis

Factor 1 Attention deficit	Factor loading	Factor 2 Hyperactivity/Impulsivity	Factor loading
1. loses homework	.56	2. stands up without permission at mealtimes	.49
4. completes only a part of homework or housework	.48	3. stands up without eating his food completely	.46
6. looks around or pays attention to what others are doing instead of concentrating on his/her own homework	.67	5. tries to answer without waiting for his/her teacher or others to complete a question	.59
7. loses his/her school materials	.44	8. cannot wait for his/her turn(for example in the food line or bathroom)	.53
9. hits his/her fingers, pencil, or other objects on the table	.36	13. replies without thinking	.49
10. has difficulty in concentrating on homework or housework	.70	14. has difficulty in playing silently	.58
11. easily distracted	.61	15. is restless	.70
12. switches to a new activity without completing an activity	.57	16. grabs objects or toys from others	.48
17. forgets bringing important letters from school to home or forgets giving them to parents/teachers	.53	18. talks at inappropriate times	.57
20. has difficulty in completing duties given to himself/herself	.68	19. has difficulty in getting calm or relaxing	.43
22. has difficulty in following consecutive instructions (for example, take dishes, then forks, and then spoons to the table)	.48	21. is an intruder in social settings	.48
26. cannot give his/her full attention to school work	.70	24. has difficulty in sitting in his/her place during special events including presentations, ceremonies, or shows	.51
27. although able to comprehend what is asked for, he/she daydreams in class instead of doing school work	.69	25. gets excited easily	.46
28. appears as if he/she is not listening when one is talking to him/her	.54	29. moves continuously	.66
30. has difficulty in arranging his/her homework or other school materials	.60	31. talks without waiting for his/her turn	.76
33. idles instead of taking care of work	.75	32. chatters or makes noise so that others are distracted	.60
34. gets low marks because of errors as a result of attention deficit	.64	35. asks questions without completing teachers'/ parents' instructions	.53
36. does not put his/her pens and papers in place at home or at school	.54	37. runs about at home or throws about	.58
39. his/her books, desk, and working area are untidy and messy	.49	38. breaks into the conversation of others during daily conversations	.69
		40. rocks, moves, and sits on the edge of his/her desk	.49
Eigenvalue	13,697	Eigenvalue	2.340

Table 3. Comparison of scores belonging to the girls in SCALES-ADHD SRS and HRS by t-test

SCALES		n	X	S	SH	sd	t	p
Attention deficit	SCALES-SRS	347	9.08	2.84	.15	346	–2.32	.021*
	SCALES-HRS	347	9.48	2.32	.12			
Hyperactivity	SCALES-SRS	347	9.33	2.87	.15	346	–9.23	.00*
	SCALES-HRS	347	11.03	2.6	.14			.00*
Impulsivity	SCALES-SRS	285	9.63	2.38	.14	284	–4.6	.00*
	SCALES-HRS	285	10.4	2.26	.13			
Total	SCALES-SRS	347	102.32	14.89	.8	346	–1.7	.89
	SCALES-HRS	347	104.1	14.76	.8			

*p<,05

Table 4. Comparison of scores belonging to the boys in SCALES-ADHD SRS and HRS by t-test

SCALES		n	X	S	SH	sd	t	p
Attention deficit	SCALES-SRS	307	8.75	2.86	.16	308	.41	.681
	SCALES-HRS	307	8.67	2.3	.13			
Hyperactivity	SCALES-SRS	309	8.93	3.14	.18	308	–5.3	.00*
	SCALES-HRS	309	10.07	2.56	.14			
Impulsivity	SCALES-SRS	247	8.97	2.51	.16	246	–1.78	.076
	SCALES-HRS	247	9.32	2.07	.13			
Total	SCALES-SRS	309	99.7	15.7	.89	308	–1.09	.276
	SCALES-HRS	309	98.4	14.76	.82			

*p<.05

The scores belonging to ages in SCALES-SRS and SCALES-HRS were compared using the t-test (Table 5). Accordingly, the difference was found to be significant in all subscales in the 5–9-year age group. It was found that the difference in the HA subscale was significant in the 10–13-year and 13 and above age groups.

The scores belonging to gender in SCALES-SRS and SCALES-HRS were compared using the t-test (Table 6). Accordingly, the difference between the scores of the girls in the 5–9-year age group was found to be statistically significant in all subscales. In the 5–9-year age group, the difference between the scores of the boys was found to be significant in the HA subscale and insignificant in the other subscales. In the 10–13–year and 13 and above age groups, the difference between the scores of the girls and boys was found to be significant in the HA subscale and insignificant in the other subscales.

The correlation between SCALES-SRS and SCALES-HRS was examined (Table 7). The correlation between the subscales measuring the same skills in SCALES-SRS and SCALES-HRS was found to range between .1 and .26.

Discussion

In this study, the Turkish translations of the SCALES (Scales for Diagnosing Attention Deficit/Hyperactivity Disorder) school and house forms were compared in terms of age and gender; the correlation between the two scales was examined. The internal consistency reliability of the items in the subscales of SCALES-SRS was examined with Cronbach's alpha coefficient; it was observed that the alpha coefficients of the subscales of SCALEC-SRS and total standard scores were large enough to support the internal consistency of the scale. The measurement standard error provided a confidence interval framing a certain test result.

Criterion predictive validity compares the test performance with other criteria that directly or indirectly measure the thing for which the test was designed to measure (25). The correlation of SCALES-SRS with CTRS and DSM-IV-TR was examined. It was found that the correlation of SCALES-SRS with CTRS was generally higher than the correlation of the original scale with Conners' Rating Scale. The results showed that SCALES-SRS could measure properties measured by CTRS, which is used to evaluate ADHD in our country. It is known that DSM-IV diagnostic criteria should be met to make a diagnosis of ADHD in children. The high correlation of the SCALES-SRS subscales with DSM-IV-TR indicates that the scale can measure the properties stated in DSM-IV-TR.

It was observed that the alpha values of the SCALES-HRS subscales were large enough to support the internal consistency of the scale. Reliability should also be proven in subgroups as well as in the general population to state that SCALES-HRS is a reliable tool for measuring ADHD. Therefore, the reliability coefficient for gender, which is an important variable for ADHD, was also examined. The results obtained showed that the scale is a reliable tool for both genders.

To prove that SCALES-HRS is a valid scale, its correlations with CTRS and DSM-IV-TR were examined. The correlation of SCALES-HRS with CTRS is high enough to show that the two scales can be correlated with each other. The results showed

Table 5. Comparison of scores according to different age groups in SCALES-ADHD SRS and HRS

SCALES		n	X	S	SH	sd	t	p
5–9 years								
Attention deficit	SCALES-SRS	315	9.21	2.99	.17	314	–2.01	.045*
	SCALES-HRS	315	9.58	2.35	.13			
Hyperactivity	SCALES-SRS	315	9.01	3.21	.18	314	–7.59	.00*
	SCALES-HRS	315	10.64	2.65	.15			
Impulsivity	SCALES-SRS	284	9.16	2.49	.15	283	–4.55	.00*
	SCALES-HRS	284	9.98	2.35	.14			
Total	SCALES-SRS	315	101	16.16	.91	314	–3.01	.03
	SCALES-HRS	315	104.44	14.53	.82			
10-13 years								
Attention deficit	SCALES-SRS	241	8.67	2.87	.18	240	1.04	.299
	SCALES-HRS	241	8.46	2.24	.14			
Hyperactivity	SCALES-SRS	241	9.21	2.9	.19	240	–5.28	.00*
	SCALES-HRS	241	10.42	2.76	.18			
Impulsivity	SCALES-SRS	177	9.62	2.57	.19	176	–1.15	.25
	SCALES-HRS	177	9.87	2.08	.16			
Total	SCALES-SRS	241	101.29	15.25	.98	240	2.37	.019
	SCALES-HRS	241	98.26	14.81	.95			
13 and above								
Attention deficit	SCALES-SRS	100	8.63	2.22	.22	99	–1.67	.097
	SCALES-HRS	100	9.12	2.21	.22			
Hyperactivity	SCALES-SRS	100	9.4	2.52	.25	99	–4.48	.00*
	SCALES-HRS	100	10.79	2.18	.22			
Impulsivity	SCALES-SRS	71	9.24	1.98	.23	70	–1.17	.247
	SCALES-HRS	71	9.65	2.14	.25			
Total	SCALES-SRS	100	100.86	12.67	1.27	99	.68	.498
	SCALES-HRS	100	99.52	14.42	1.44			

*p<.05

that SCALES-HRS could measure properties measured by CTRS, which is used to measure ADHD in our country. The high correlation of the SCALES-HRS subscales with DSM-IV-TR indicates that the scale can measure properties stated in DSM-IV-TR.

Because SCALES-SRS was strongly correlated with DSM-IV-TR diagnostic criteria for ADHD, 2 factors, one of which measured AD and the other measured HA/impulsivity, were determined as in DMS-IV-TR. As a result of the factor analysis, 2 significant factors with eigenvalues above 1 emerged. It was observed that all items in the AD subscale in the original culture created a factor with higher loadings compared with the factor loadings in the original culture and that HA/impulsivity items created a factor with high factor loadings inter se.

It was observed that the item added to the 2nd item of the original scale after translation was loaded on the same factor with a loading close to the 2nd item. Thus, it is thought that the additional item, which is more compatible with our culture, can be used to measure the behavior which the item wants to measure.

In the study by Ryser et al. (27), the factor structure of scales were tested predicting a 2-factor model defined in DSM-IV-TR. Accordingly, the authors found that the factor structure used in SCALES form an association (in the best way) with DSM-IV-TR diagnostic criteria that did not create any diagnostic difference between HA and impulsivity.

The scores of the girls in the SCALES-SRS and SCALES-HRS subscales were compared. Accordingly, the difference between SCALES-SRS and SCALES-HRS was found to be significant in all subscales. It was observed that the scores given by the parents were higher than the scores given by the teachers. These results are compatible with the expectation in our culture that girls should be calmer and thus, more attentive. It was thought that teachers did not make any gender discrimination and therefore, a difference occurred between the evaluations of parents and teachers.

In comparison with the scores of the boys in the SCALES-SRS and SCALES-HRS subscales, the difference in HA subscale was found to be significant. The scores given by the parents

Table 6. Comparison of scores according to gender and different age groups in SCALES-ADHD SRS and HRS

SCALES		n	X	S	SH	sd	t	p
5–9 years								
Attention deficit	SCALES-SRS	157	9.47	3.06	.17	314	–2.01	.04
	SCALES-HRS	157	10.06	2.36	.13			
Hyperactivity	SCALES-SRS	157	9.2	3.11	.18	314	–7.59	.00*
	SCALES-HRS	157	11.21	2.74	.15			
Impulsivity	SCALES-SRS	143	9.59	2.46	.15	283	–4.55	.00*
	SCALES-HRS	143	10.74	2.38	.14			
Total	SCALES-SRS	157	102.7	16.16	.91	314	–3.01	.03
	SCALES-HRS	157	108.1	14.8	.82			
Males								
Attention deficit	SCALES-SRS	241	8.67	2.91	.23	157	–.66	.51
	SCALES-HRS	241	8.46	2.26	.18			
Hyperactivity	SCALES-SRS	241	9.21	3.32	.26	157	–4.16	.00*
	SCALES-HRS	241	10.42	2.43	.19			
Impulsivity	SCALES-SRS	177	9.62	2.45	.21	140	–1.89	.06
	SCALES-HRS	177	9.87	2.06	.17			
Total	SCALES-SRS	241	101.29	16.04	1.28	157	–.94	.35
	SCALES-HRS	241	98.26	13.33	1.06			
10–13 years Females								
Attention deficit	SCALES-SRS	127	8.66	2.83	.25	126	–3.2	.75
	SCALES-HRS	127	8.75	2.16	.19			
Hyperactivity	SCALES-SRS	127	9.28	2.74	.24	126	–5.27	.00*
	SCALES-HRS	127	10.79	2.72	.24			
Impulsivity	SCALES-SRS	98	9.81	2.46	.25	97	–1.17	.24
	SCALES-HRS	98	10.1	2.09	.21			
Total	SCALES-SRS	127	101.62	14.63	1.3	126	.62	.53
	SCALES-HRS	127	100.66	13.73	1.22			
Males								
Attention deficit	SCALES-SRS	114	8.68	2.92	.27	113	1.79	.08
	SCALES-HRS	114	8.14	2.29	.21			
Hyperactivity	SCALES-SRS	114	9.15	3.09	.29	113	–2.4	.00*
	SCALES-HRS	114	10.01	2.75	.26			
Impulsivity	SCALES-SRS	79	9.39	2.7	.3	78	–5.1	.61
	SCALES-HRS	79	9.58	2.05	.23			
Total	SCALES-SRS	114	100.93	15.96	1.49	113	2.57	.01
	SCALES-HRS	114	95.56	15.56	1.46			

Table 6. Continued

13 and above Females								
Attention deficit	SCALES-SRS	63	8.94	2.09	.26	62	–1.58	.12
	SCALES-HRS	63	9.51	2.15	.27			
Hyperactivity	SCALES-SRS	63	9.79	2.45	.31	62	–3.83	.00*
	SCALES-HRS	63	11.09	1.9	.24			
Impulsivity	SCALES-SRS	44	9.39	1.92	.29	43	–1.34	.19
	SCALES-HRS	44	9.95	2.1	.32			
Total	SCALES-SRS	63	102.79	12.02	1.51	62	.68	.5
	SCALES-HRS	63	101.11	14.43	1.82			
Males								
Attention deficit	SCALES-SRS	37	8.11	2.37	.39	36	–.69	.49
	SCALES-HRS	37	8.46	2.17	.36			
Hyperactivity	SCALES-SRS	37	8.73	2.53	.42	36	–2.52	.02*
	SCALES-HRS	37	10.27	2.55	.42			
Impulsivity	SCALES-SRS	27	9	2.09	.4	26	–2.4	.81
	SCALES-HRS	27	9.15	2.16	.42			
Total	SCALES-SRS	37	97.57	13.24	2.17	36	.23	.82
	SCALES-HRS	37	96.81	14.18	2.33			

*p<.05

Table 7. Examination of the correlation between ADHD-SRS and ADHD-HRS

	SCALES-HRS		
	Attention deficit	**Hyperactivity**	**Impulsivity**
SCALES-SRS	r	r	r
Attention deficit	.26**	.13**	.1*
Hyperactivity	.14**	.2**	.18**
Impulsivity	.17**	.18**	.19**

*: p<.05,
**: p<.01

were found to be higher than those given by the teachers. It was thought that there was a significant difference between the scores given by the parents and teachers because the class setting was more regular and the children had to wait calmly between classes, whereas they could behave freely in the home setting.

In the comparison of the SCALES-SRS and SCALES-HRS subscales for the 3 different age groups, the difference was found to be significant in all subscales in the 5–9-year age group. In all subscales, the scores given by the parents were higher than those given by the teachers. The school setting is more regular than the home setting and requires being more attentive than in the home setting. In addition, the teachers see many children of the same age together, and it was thought that they might have been more tolerant during evaluation than the parents.

In the 10–13-year and 13 and above age groups, the difference between the scores was found to be significant in the HA subscale. The scores given by the parents were higher than those given by the teachers in this age group also. This may again be explained with the fact that children behave in accordance with rules in the class setting, which is a structured and regular setting.

In comparison of the scores belonging to the girls and boys in the SCALES-SRS and SCALES-HRS subscales by age groups, it was observed that the scores of the girls in the 5–9-year age group were higher than those of the boys in all subscales. These data may be related with high expectations of families from their daughters and the idea that "boys are always active and naughty." In the 10–13-year and 13 and above age groups, the difference in the HA subscale was found to be significant. This may also be explained by the regular class setting. Disappearance of the difference in the subscales of AD and impulsivity in girls as they grow may be explained by the fact that girls adapt themselves to social norms as they grow and adjust their behaviors accordingly.

The correlation between SCALES-SRS and SCALES was examined. Büyüköztürk (28) reported that a correlation coefficient of .30-.00 might define a low correlation. In the original study, the correlation coefficients were found to range between .64 and .69 (26). In a study performed by Montague (29) in which children with ADHD were evaluated with different methods, it was reported that parent and teacher rating scales generally had a low correlation.

Different studies (30,31,32) assumed that the reliability between evaluators was low–moderate for evaluations in different settings. It was thought that this was related to the lack of an opportunity of evaluators to observe targeted behaviors, the fact that behaviors differ from setting to setting, and with the presence of observer effects (27). One study conducted with twins showed that parents and teachers observed different

ADHD symptoms (33). Ryser et al. (27) interpreted the reason for this in the following way: teachers have a large normal sample group in which they can compare children by observing ADHD symptoms, and the behavior patterns expected in the school setting are different from those in the home setting.

As a result of the statistical analyses, SCALES was found to be a reliable and valid scale. In this context, it is thought that this scale can be used in our country with the objective of pre-assessment, preparation of an intervention program, and final assessment with the aim of measuring program efficiency. In addition, it is thought that performing a study with children with a clinical diagnosis of ADHD will save our country a scale that can be used in identifying children with ADHD, preparing an individualized education plan and making changes in this plan, recording the advance in education, and measuring ADHD in research projects.

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