

# Barkley Child Attention Scale Validity and Reliability Study

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## ABSTRACT

### Barkley Child Attention Scale validity and reliability study

**Objective:** The purpose of this study is to examine the psychometric properties of the Barkley Child Attention Scale (BCAS) for 6- to 12-year-old children.

**Method:** This study was conducted with 291 children (of an age of 6-12 years) with a clinically normal level of intelligence and a diagnosis of attention-deficit/hyperactivity disorder (ADHD). The structure validity of the scale was studied by exploratory and confirmatory factor analyses. In order to evaluate the measure-dependent validity of the scale, Child Behavior Checklist for ages 6-18 and Swanson, Nolan and Pelham Questionnaire (SNAP-IV) parental form were used. Reliability of the scale was measured by Cronbach's alpha coefficient.

**Results:** As a result of the exploratory factor analysis, the scale consists of two factors called "daydreaming" and "sluggish," as is the case in its original form. Confirmatory factor analysis indicated that the fit indices of the scale were at an acceptable level. The correlation analysis study for the criterion-related validity study of the scale revealed that Sluggish Cognitive Tempo (SCT) had a positive correlation with ADHD-IN and internalization problems, a negative correlation with attention deficit hyperactivity disorder/hyperactivity-impulsivity (ADHD-HI), and no correlation with externalization problems. Cronbach's alpha coefficient of the BCAS is 0.86 and the scale is seen to be reliable.

**Conclusion:** It can be said that the BCAS is a valid and reliable scale that can measure sluggish cognitive tempo symptoms of 6- to 12-year-old children.

**Keywords:** Children, sluggish cognitive tempo, reliability, validity

## ÖZ

### Barkley Çocuk Dikkat Ölçeği'nin geçerlilik güvenilirlik çalışması

**Amaç:** Bu çalışmanın amacı, Barkley Çocuk Dikkat Ölçeği (BÇDÖ)nin, 6-12 yaş aralığındaki çocuklar için psikometrik özelliklerini incelemektir.

**Yöntem:** Araştırmaya 6-12 yaş aralığında, klinik olarak zekası normal, Dikkat Eksikliği Hiperaktivite Bozukluğu (DEHB) olan 291 çocuk katılmıştır. Ölçeğin yapı geçerliliği, açıklayıcı ve doğrulayıcı faktör analizleri kullanılarak incelenmiştir. Ölçeğin ölçüt bağlantılı geçerliliğini saptamak için 6-18 yaş arası Çocuklar için Davranış Değerlendirme Ölçeği (ÇDDÖ) ve Swanson, Nolan and Pelham Ölçeği -IV (SNAP-IV) ebeveyn ölçeği kullanılmıştır. Ölçeğin güvenilirliğine bakmak için Cronbach alfa katsayısı kullanılmıştır.

**Bulgular:** Açıklayıcı faktör analizi sonucunda, ölçek özgün formunda olduğu gibi "hayallere dalma" ve "yavaşlık" şeklinde isimlendirilen iki faktörden oluşmaktadır. Doğrulayıcı faktör analizine göre ölçeğin uyum indekslerinin kabul edilebilir düzeyde olduğu belirlenmiştir. Ölçeğin ölçüt bağlantılı geçerliliği çalışması için yapılan korelasyon analizi sonucunda Yavaş Bilişsel Tempo, Dikkat Eksikliği Hiperaktivite Bozukluğu/Dikkat dağınıklığı (DEHB/D) ile pozitif yönde, Dikkat Eksikliği Hiperaktivite Bozukluğu/Hiperaktivite-Dürtüsellik (DEHB/HD) negatif yönde, içselleştirme sorunları ile pozitif yönde ilişkili olduğu, dışlaşılma sorunları ile ilişkisinin olmadığı saptanmıştır. BÇDÖ'nin Cronbach alfa katsayısı 0.86'dır ve ölçeğin güvenilir olduğu görülmektedir.

**Sonuç:** BÇDÖ'nin 6-12 yaş aralığındaki grupta yavaş bilişsel tempo belirtilerini geçerli ve güvenilir bir şekilde ölçtüğü söylenebilir.

**Anahtar kelimeler:** Çocuklar, yavaş bilişsel tempo, geçerlilik, güvenilirlik



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## INTRODUCTION

Sluggish cognitive tempo (SCT) is a kind of Attention disorder with motor and cognitive dimensions that occurs in childhood. While motor problems of the disorder include such symptoms as slow or decreased movement and sluggishness, cognitive problems include dreaming, sleepiness, absent-mindedness, and mental confusion (1). Currently, SCT has not been defined in any classification system with clearly identified diagnostic criteria (2).

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by a shortened period of attention, distractibility, and chaotic mobility and temperament, whose symptoms most often last lifelong (3). ADHD is characterized by three subtypes: hyperactivity/impulsivity (ADHD-HI), inattentive (ADHD-IN), and combined type (ADHD-C) (3). The categorical representation of ADHD subtypes is controversial because the evidence indicates that the subtypes are heterogeneous (4,5) and that the diagnostic symptoms have developmental appearances changing over time (6,7).

It was initially thought that SCT might be a subtype of ADHD-IN (8). Though the definition of SCT produced positive results in distinguishing ADHD subtypes in some studies (9), most studies showed that SCT did not markedly increase the validity of the subtypes. SCT may be seen in ADHD-IN, ADHD-C, and other medical conditions as well (10,11). This led to the development of a second approach to SCT, i.e., the evaluation of SCT as a separate concept (12).

In studies performed using factor analysis in clinical and non-clinical samples at various stages of development, it was revealed that SCT fell into a cluster different from the ADHD-IN and ADHD-HI subtypes in DSM-IV (10,13-22). Internal validity of SCT was also supported by a meta-analysis (23).

Studies on the external validity of the SCT concept indicate that the condition may become more prevalent with increasing age, that it may be associated with a low socioeconomic level, that it is moderately more common in boys than in girls, though it does not show any sex

difference in adults (23). It was reported that SCT was more strongly related to ADHD-IN than ADHD-HI, and similarly, that it had a stronger relationship with internalization problems than externalization problems. SCT was also found to be associated with deterioration in social and academic areas (23). However, findings related to the relationship between SCT and academic deterioration in the literature remain controversial. While some studies reported no or a relatively weak correlation to academic achievement test scores after adjusting according to the symptoms of ADHD and intelligence (24), some others reported SCT to be a risk for academic achievement (17,19,20). Although SCT is reported to be associated with impaired processing speed, continuous attention, and metacognition, the relationship with neuropsychological functions has not been sufficiently clarified (23). There is a limited number of studies on the etiology of SCT. Some of these studies indicate that SCT is inheritable (25). The number of studies into the treatment of SCT is also very limited. One of those studies reported that children with SCT symptoms had benefited from the Child Life and Attention Skills program (CLAS) developed to achieve behavior modification (26). In another study, atomoxetine, a pharmacological agent for the treatment of ADHD, was found to be effective in reducing the symptoms of SCT in patients with ADHD alone, in those with dyslexia alone, in those where these two conditions co-existed (27). On the contrary, there was no effect on SCT symptoms in the response to methylphenidate treatment in ADHD-IN patients (28).

The sum of this information indicates that it is important to study the internal and external validity of the SCT construct. In fact, many scales have been developed to describe the condition best. The most commonly discussed symptoms in those studies include "daydreaming," "confusion," "slowness," "unwillingness," and "absent-mindedness" (19). In order to reduce this uncertainty, a study was conducted by Penny et al. in 2009 aiming to identify potential symptoms of SCT. A scale was prepared by selecting 14 out of 26 symptoms, which was confirmed to be a valid measurement tool by the analysis of its

psychometric properties (21). This scale also greatly contributed to the development of Barkley's scale. The results of Barkley's (13) study with the aim to develop a scale and to investigate its psychometric properties are as follows: fourteen symptoms that Barkley thought describe SCT well plus 18 symptoms of ADHD were investigated in a population-based sample of age 6-17 years. In this study, the main components were analyzed by using promax rotation in exploratory factor analysis, and four main factors were determined: The first factor contained 9 of the inattention symptoms of ADHD and 2 of 14 SCT symptoms (slowness in completing tasks, low level of initiating), explaining 20.9% of the variance. The second factor included nine of the hyperactivity-impulsivity symptoms of ADHD, accounting for 19.8% of variance. The third factor comprised the sluggishness dimension of SCT with 7 symptoms including decreased activity, lethargy, and slowness of behavior, accounting for 17.9% of the variance, and the fourth factor was the daydreaming dimension with 5 symptoms including daydreaming, absent-mindedness, and mental confusion, accounting for 9.9% of the variance. Since 2 items of SCT were ascribed to ADHD-IN, it was decided to remove them from the SCT scale. Therefore, the SCT scale created by Barkley is composed of two main dimensions: daydreaming and sluggishness. Internal consistency (Cronbach's alpha) of the SCT scale was calculated to be 0.934, and re-test reliability was  $r=0.4$  (13). The total score of the sluggishness symptoms was well correlated with the total score of the daydreaming symptoms ( $r=0.75$ ,  $p<0.001$ ) and moderately correlated with the total score of the ADHD-IN ( $r=0.56$ ,  $p<0.001$ ) and ADHD-HI symptoms ( $r=0.47$ ,  $p<0.001$ ). The total score of daydreaming was moderately correlated with the total score of the ADHD-IN ( $r=0.65$ ,  $p<0.001$ ) and the total score of the ADHD-HI symptoms ( $r=0.59$ ,  $p<0.001$ ). The SCT total score was moderately correlated with the total ADHD score ( $r=0.56$ ,  $p<0.001$ ). Each item of SCT is scored between 1 and 4, where (1) corresponds to "never or rarely" and (4) to "very often."

The aim of this study was to perform analyses of the Turkish validity and reliability of Barkley Children's

Attention Scale (BCAS), which was created by Barkley, in children between the ages of 6 and 12 years.

## METHOD

A total of 310 children who were between 6 and 12 years old were enrolled in the study with their families if they had an established diagnosis of ADHD without medical therapy or a new diagnosis of ADHD after having reported to the outpatient clinic of the Child and Adolescent Psychiatry Departments of Ankara and Ege Universities between January 2016 and January 2017. Nineteen children were excluded due to a lack of data. The study sample consisted of 291 children and their families who met the inclusion criteria and agreed to participate in the study. Participants and their families were given detailed information about the survey and written informed consent was obtained from the participants asserting that they voluntarily agreed to participate in the survey. The research was evaluated and approved by the Clinical Research Ethics Committee of the Faculty of Medicine of Ankara University. The study group included child volunteers and their families; the children were 6-12 years old and had a clinically normal level of intelligence, a diagnosis of ADHD according to DSM-IV criteria, and had not used medications for at least two consecutive days. Patients who were clinically assessed as having mental retardation, had a diagnosis of or were suspected to have a specific learning difficulty, were in an episodic phase of bipolar disorder, autism, and psychosis, and those who suffered from chronic conditions (such as epilepsy, asthma, or physical disability) were excluded from the sample. Seventy-seven percent of the sample consisted of male subjects, while the remaining 23% were female subjects.

## Measures

**Sociodemographic Information Form:** Prepared by the investigator, this form included socio-demographic characteristics of the children and their families (such as age, gender, duration of education, parents' age, education level, and occupation, family structure, monthly income, residence status, number

of siblings, age rank of the child among the siblings, school achievement, perinatal history).

**The Kiddie Schedule for Affective Disorders and Schizophrenia for School-Aged Children – Present and Lifetime Version (K-SADS-PL):**

K-SADS-PL is a semi-structured diagnostic interview that was developed to detect past and present psychopathologies of children and adolescents according to DSM-III and DSM-IV diagnostic criteria. It was adapted from K-SADS-P by Kaufman et al. in 1997 (29). The validity and reliability study for the Turkish adaptation was made in 2004 by Gokler et al. (30). Parents and children are interviewed and assessed in the light of information from all available sources. Assessing both current and past situations, present and past diagnoses are established. Following the initial unstructured interview, diagnostic screening interviews are conducted in 20 different areas. If any symptoms emerge during the screening interview, the corresponding supplementary checklist is administered. The main diagnosis groups that are investigated by K-SADS-PL are mood disorders, psychotic disorders, anxiety disorders, behavioral disorders, explosive disorders, eating disorders, alcohol and substance abuse disorders, conduct disorders, and tic disorders. Children who participated in the study were given the K-SADS-PL to determine their present psychiatric diagnoses according to the diagnostic criteria of DSM-IV (31).

**Child Behavior Checklist (CBCL/6-18):** The scale evaluates problem behaviors of children and adolescents in the age group 6-18 years according to information obtained from their parents or caregivers (32,33). The scale consists of 113 problem items. Problem behaviors are graded 0, 1, and 2 according to the frequency of occurrence in the last 6 months, and the items are grouped into various subscales. Two different behavior symptom scores are obtained from the scale: “introversion” and “extroversion”. The introversion spectrum is composed of the sum of subscale points for “anxiety/depression,” “social introversion/depression,” and somatic complaints,”

and extroversion is composed of that of “disobedience” and “aggressive behaviors.” In addition, there are subtests for “social problems,” “thought problems,” and “attention problems” that do not exist in both groups. The “total problem” score is obtained from the entire scale. The scale also includes a competency section that assesses the child’s activity, sociality, and school condition. Test-retest reliability of the scale was 0.84 for total problem and 0.88 for internal consistency (34). The validity study performed using confirmatory factor analysis showed that 99% of the items were able to measure the investigated symptoms satisfactorily and positively and with high significance ( $p < 0.01$ ) (35,36).

**Teacher’s Report Form (TRF/6-18):** It is a scale that evaluates school-aged (6-18 years old) children’s school compliance and problem behaviors in a standardized manner based on information obtained from their teachers (32,37). The scale is in line with CBCL/6-18. The scale also includes a competency section that assesses children’s levels of learning, happiness, and studying. Based on confirmatory factor analysis results using clinical and normal samples, the scale was found to be appropriate for an 8-factor structure (RMSEA=0.07). Test-retest reliability of the scale was 0.88 and internal consistency was found to be 0.87 (36).

**Swanson, Nolan and Pelham Questionnaire (SNAP-IV):**

Swanson, Nolan and Pelham Questionnaire (SNAP-IV) is an 18-item measure for ADHD based on DSM-IV. The scale is filled in by a parent and a teacher. Each item is scored from 0 to 3: 0 means “not at all,” 1 means “just a little,” 2 means “quite a bit,” and 3 means “very much.” There are 9 items for inattention and 9 items for hyperactivity/impulsivity. SNAP is used as an outcome measure in community-based studies (38) and clinical trials (39) to identify children with probable ADHD. In parental evaluation, internal consistency for total score, inattention, and hyperactivity were 0.94, 0.90, and 0.79, respectively. In teacher evaluation, the respective values were 0.97, 0.96, and 0.92 (38). DSM-IV-based ADHD measuring scales

such as SNAP-IV are widely used in the practice of child and adolescent psychiatry in Turkey. A Turkish validity study has not yet been published. However, the scale was used in recently published large community-based studies in Turkey (40). The mean threshold value of 1.5 SD for each item is similar to that in American community-based studies (38).

**Barkley Child Attention Scale (BCAS):** Created by Barkley (13), the scale consists of 12 items and two subdimensions. One of the subdimensions is sluggishness, while the other one is daydreaming. The first factor comprises the sluggishness dimension of SCT with a total of seven symptoms including decreased activity, lethargy, and slowness of behaviors; and the second factor is the daydreaming dimension with a total of five symptoms including daydreaming, absent-mindedness, and mental confusion. Internal consistency (Cronbach alpha) of the SCT scale was 0.934, and test-retest reliability was calculated to be  $r=0.84$  (13). Each item of SCT is scored between 1 and 4, where (1) corresponds to “never or rarely” and (4) to “very often.”

A Turkish translation of BCAS was made by three physicians with a good command of English. The investigators translated the scale from English to Turkish while discussing each item of the test. The Turkish scale, was back-translated into English by two physicians with a good level of English who were blinded to the original English text of the scale. After reviewing original and back-translated English versions of the scale, the Turkish translation of the form was reedited.

### Statistical Analysis

Participant volunteers were interviewed separately by the investigator after signing an informed consent form. During the first interview, the investigator administered the K-SADS-PL to children and adolescents to confirm their ADHD diagnoses according to DSM-IV. Parents were asked to complete the CBCL-6/18, Barkley Children’s Attention Scale, SNAP-IV parent scale, and the Sociodemographic Information Form, reporting the conditions of their children when they were not using medication for ADHD.

The validity of the scale was determined by the main component analysis of exploratory factor analysis, confirmatory factor analysis, and measure-dependent validity. Cronbach’s alpha coefficient was used for reliability analysis. Item analysis was further performed. Obtained data were analyzed with SPSS 22 and AMOS 24 packages.

## RESULTS

**Structure validity:** The structure validity of BCAS was examined by exploratory and confirmatory factor analysis. The scale’s appropriateness for factor analysis was examined by Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett Sphericity Test. A KMO coefficient of 0.86 and the statistical significance of Bartlett Sphericity Test ( $\chi^2=1296.93$ ,  $p<0.001$ ) suggest that the data are suitable for factor analysis.

**Exploratory factor analysis:** Statistical analyses were performed with IBM SPSS Statistics for Windows 22.0. An analysis of the main components of the exploratory factor analysis was used. The maximum likelihood method and Kaiser normalization with promax rotation were used to determine the factors. The factor by which the curve of the Scree graph markedly changed was determined to identify the number of factors. Factors were detected to be significantly based on eigenvalues above 1.0. Exploratory factor analysis showed the scale to consist of two factors. It was determined that the total variance explained 40.23% of daydreaming and 13.83% of sluggishness. The two factors constituted 54.06% of the variance explained on the scale. The factor loadings of the items in the first factor of the scale ranged

**Table 1: Results of exploratory factor analysis**

Factor 1 (Daydreaming)		Factor 2 (Sluggishness)	
Item 1	0.776	Item 6	0.822
Item 2	0.540	Item 7	0.931
Item 3	0.760	Item 8	0.829
Item 4	0.744	Item 10	0.457
Item 5	0.716	Item 11	0.507
Item 9	0.535		
Item 12	0.732		

**Table 2: Results of confirmatory factor analysis**

Factor 1 (Daydreaming)		Factor 2 (Sluggishness)	
Item 1	0.469	Item 6	0.660
Item 2	0.596	Item 7	0.679
Item 3	0.801	Item 8	0.846
Item 4	0.718	Item 10	0.565
Item 5	0.616	Item 11	0.572
Item 9	0.612		
Item 12	0.642		

between 0.535 and 0.776 and the second factor ranged from 0.457-0.931 (Table 1).

**Confirmatory factor analysis:** The AMOS 24 program was used for confirmatory factor analysis. Fit statistics were used to assess the adequacy of the model obtained from confirmatory factor analysis. When the goodness-of-fit indices were examined according to confirmatory factor analysis, the ratio of Chi-square fit index to the degrees of freedom was 2.82 (141.043, 141.043/50=2.821). When this ratio is less than 3, it shows the model to be good, corresponding to an excellent fit. Other model-related fit indices revealed that RMSEA was 0.079. It was further detected that GFI was 0.926, NFI was 0.893, RFI was 0.859, CFI was 0.927, and IFI was 0.928 (Table 2).

**Measure-dependent validity:** The SNAP-IV parental assessment form and rule-breaking behavior, aggressive behavior, anxiety-depression, social introversion, and social problems subscales of CBCL/6-18 were used to determine the measure-dependent validity of the scale. Measure-dependent validity of the scale showed that SCT was found to be positively correlated with ADHD-IN ( $r=0.254$ ), negatively correlated with ADHD-HI ( $r=-0.155$ ), positively correlated with social introversion ( $r=0.463$ ), positively correlated with anxiety-depression ( $r=0.316$ ), and positively correlated with social problems ( $r=0.174$ ) (Table 3). No significant associations were detected with rule-breaking behavior ( $p=0.393$ ) and aggressive behavior ( $p=0.734$ ), (Table 3).

**Reliability studies:** The reliability of the scale was examined with Cronbach's alpha coefficient.

**Table 3: Correlation of total BCAS scores with CBCL subscales and SNAP-IV inattention / hyperactivity-impulsivity total scores**

Subscales	Results of correlation analysis
<b>Social introversion</b>	
r	0.463*
p	<0.001
n	288
<b>Social problems</b>	
r	0.174*
p	0.003
n	288
<b>Anxiety-Depression</b>	
r	0.316*
p	<0.001
n	288
<b>Rule-breaking behaviors</b>	
r	0.050
p	0.393
n	288
<b>Aggressive behaviors</b>	
r	-0.020
p	0.734
n	288
<b>SNAP-IV inattention total score</b>	
r	0.254*
p	<0.001
n	287
<b>SNAP-IV hyperactivity-impulsivity total score</b>	
r	-0.155*
p	0.009
n	287

\*Spearman's correlation analysis was performed. BCAS: Barkley Child Attention Scale, CBCL: Child Behavior Checklist, SNAP-IV: Swanson, Nolan and Pelham Questionnaire

**Internal consistency analysis:** Cronbach's alpha coefficient obtained for the reliability study of BCAS was calculated to be 0.86, with 0.83 for the daydreaming and 0.80 for the sluggishness dimension. In addition, item total correlations and Cronbach's alpha coefficients were calculated for each item by stepwise backward-elimination technique (Table 4).

## DISCUSSION

The purpose of this study was to test the validity and reliability of the BCAS in a sample of 6- to 12-year-old children with ADHD. Exploratory factor analysis made within the scope of structure validity showed that the scale consisted of two factors. This finding is consistent with the study performed with the original form of the scale. In line with the original study, these

**Table 4: Results of item and reliability analysis of BCAS**

	Mean of the scale when the item is excluded	Variance of the scale when the item is excluded	Item total correlation	Cronbach's alpha coefficient when the item is excluded
<b>BCAS-1</b>	7.5052	34.720	0.425	0.860
<b>BCAS-2</b>	7.8076	33.915	0.558	0.852
<b>BCAS-3</b>	7.6701	32.898	0.632	0.847
<b>BCAS-4</b>	7.7113	33.178	0.580	0.850
<b>BCAS-5</b>	6.9519	33.225	0.518	0.854
<b>BCAS-6</b>	7.7663	34.131	0.507	0.855
<b>BCAS-7</b>	7.9038	34.963	0.460	0.857
<b>BCAS-8</b>	7.6014	31.978	0.611	0.848
<b>BCAS-9</b>	7.2543	32.852	0.572	0.850
<b>BCAS-10</b>	7.9347	34.613	0.533	0.853
<b>BCAS-11</b>	7.5739	33.611	0.534	0.853
<b>BCAS-12</b>	7.6838	33.051	0.587	0.849

BCAS: Barkley Child Attention Scale

two factors were named “sluggishness” and “daydreaming.” However, unlike the original study, the items “has difficulty to stay awake or to initiate for act” and “appears not to understand questions or directives as fast and accurate as others” were loaded on the “daydreaming” factor rather than on the “sluggishness” factor. This difference was thought to emerge from the effects of the sample type (community sample vs. clinical sample), sample age range (6-17 years vs 6-12 years), and cultural differences.

When discussing the results of our study, we first need to consider where they differ from the study that created the scale. It is well known that hyperactivity and impulsivity signs of ADHD decrease during adolescence (41). Therefore, symptoms that express sluggishness during adolescence may be more clearly defined by the evaluators. The main difference from the original study is the age range of the sample. The fact that our sample consists largely of child subjects, including only the very early years of adolescence, and that our sample consists of children and adolescence with a diagnosis of ADHD may all lead to poor assessment of sluggishness symptoms due to the presence of hyperactivity/impulsivity signs. In Barkley’s sample, on the other hand, we might think that the enrollment of both a community-based group and a 6-17-year-old group allowed the inclusion of a higher number of adolescents with consequently a better description of sluggishness symptoms. Another important issue regards cultural differences.

Sluggishness may not be considered as a negative situation in the Turkish community and hence the symptoms perceived as problems may be loaded on the daydreaming factors. It would be appropriate to test this hypothesis in future studies.

Our analysis shows that the factor loadings of the items on the scale ranged between 0.457 and 0.931. Buyukozturk reported factor loading values of 0.45 and higher to be a good measure of choice (42), and our results indicate that this measure has been met.

Another important area covers confirmatory factor analysis and model-fit index. The fact that confirmatory factor analysis indicates the ratio of Chi-square fit index to the degrees of freedom to be below 3 reveals that the model is good and that it provides an excellent fit (43). In our study, the ratio of Chi-square fit index to the degrees of freedom was 2.82 (141.043, 141.043/50=2.821). This shows that it has a relatively good fit. When other model-related fit indices are examined, it is thought that an RMSEA equal to or lower than 0.05 corresponds to an excellent fit while values up to 0.08 are acceptable (44). On the other hand, an excellent fit is accepted when GFI, NFI, RFI, CFI, and IFI indices are equal to and above 0.95, a good fit if they are equal to 0.90 and above (45). When fit indices of the model were examined in our study, the RMSEA was found to be 0.079, GFI 0.926, NFI 0.893, RFI 0.859, CFI 0.927, and IFI 0.928. These fit indices also suggest an acceptable level regarding our study.

Measure-dependent validity of the scale demonstrated SCT to have positive associations

with ADHD-IN, social introversion, anxiety depression, and social problems, and a negative association with ADHD-HI. It has no significant correlation with either rule-breaking behavior or aggressive behavior. This may suggest that SCT is positively associated with internalization problems with no association to externalization problems. These results also seem to be consistent with the literature (8,10,16,17,19,21,46-49).

Reliability analysis showed Cronbach's alpha coefficient of BCAS to be 0.86 for the entire scale, 0.83 for the daydreaming dimension, and 0.80 for the sluggishness dimension. Investigators consider a Cronbach's alpha coefficient of 0.70 and above as being indicative of the reliability of the scale (42,50). The total correlations of the items of the BCAS were detected to be 0.425 and higher. These results show that the items exemplify similar behaviors and the internal consistency of the test is high.

In conclusion, our findings show that BCAS validly and reliably measures SCT in 6- to 12-year-old Turkish children. Nevertheless, it is important to keep in mind that these outcomes are achieved by a sample consisting of 6-12-year-old children with a diagnosis of ADHD, and to assess the psychometric validity of the BCAS scale in a

wider age range with a community-based and controlled setting still remains to be studied.

Contribution Categories		Author Initials
Category 1	Concept/Design	S.F., G.U.B, H.G.
	Data acquisition	S.F., G.U.B, H.G., B.K., M.B.B.
	Data analysis/Interpretation	S.F., H.G., A.A., E.S.S.
Category 2	Drafting manuscript	S.F., G.U.B, H.G., B.K., M.B.B., A.A., E.S.S.
	Critical revision of manuscript	S.F., G.U.B, H.G., B.K., M.B.B., A.A., E.S.S.
Category 3	Final approval and accountability	S.F., G.U.B, H.G., B.K., M.B.B., A.A., E.S.S.
Other	Technical or material support	S.F., G.U.B, H.G., B.K., M.B.B., A.A., E.S.S.
	Supervision	H.G., A.A., E.S.S.
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