Psychometric validation of Barkley's Adult Sluggish Cognitive Tempo (SCT) Ratings Scale -Turkish version and distinguishing SCT from attention deficit-hyperactivity disorder (ADHD) among Turkish adults

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ABSTRACT

Background & aims: SCT is characterized by sluggishness, daydreaming, lethargy/ apathy, slowed behavior/thinking, and mental confusion. For a long time these symptoms were thought to be a part of ADHD but then studies revealed that SCT is a different phenomenon in some cultures. In this study. we aimed to examine the validity and reliability of Barkley's Adult SCT Ratings Scale, and to determine if SCT is an independent factor from ADHD in Turkish adults like in other cultures.
Methods: 274 Medical School students/trainees enrolled the study (Age: 18–35, 70.4 % female). Data was collected via an online survey including SCT and ADHD rating scales.
Results: Exploratory factor analysis demonstrated that the scale consisted of two factors: Daydreaming and Sluggishness.The model demonstrated a good-fit ($\chi^2 = 43.642$, p = 0.001; $\chi^2/df = 2.425$, GFI = 0.962,RMSEA = 0.072). As expected, there were positive and significant associations between SCT total, Daydreaming, Sluggishness, and ADHD-Inattention scores (r = 0.645, 0.664, 0.382; respectively), but all SCT items loaded within SCT factors and distinquished from ADHD factors. Cronbach's alpha values were: 0.87 for SCT-total, 0.87 for Daydreaming; 0.79 for Sluggishness.
Conclusion & implications: Our study provides a valid and reliable SCT screening tool for Turkish adults and increases our confidence in the transcultural generalizability of SCT.

What this paper adds

Sluggish Cognitive Tempo (SCT) is characterized by sluggishness, excessive daydreaming, lethargy/ apathy, slowed behavior/ thinking and mental confusion. For a long time these symptoms were thought to be a part of ADHD but then studies revealed that SCT has internal and external validity and is a different phenomenon from ADHD. Previous studies addressing the distinction between SCT and ADHD were generally conducted in children- adolescents, and mostly in North America, Western Europe, South Korea, and Japan. But, the definition of a behavior as normal or disordered is influenced by cultural, social, and developmental contexts and it is necessary to investigate the influence of cultural nuances to determine the transdiagnostic validity of SCT in different cultures and age

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groups. In this study, we had two aims: to examine the validity and reliability of Barkley's Adult SCT Scale-Turkish version which is one of the most used scales all over the world and to determine if SCT is an independent factor from ADHD in Turkish adults. Our study provides a valid and reliable SCT screening tool for Turkish adults and increases our confidence in the transcultural generalizability of SCT's internal validity.

1. Introduction

Sluggish Cognitive Tempo (SCT) is characterized by sluggishness, excessive daydreaming, lethargy/ apathy, slowed behavior/ thinking, and mental confusion (Barkley, 2011, 2014; Penny, Waschbusch, Klein, Corkum, & Eskes, 2009). For a long time, these symptoms were thought to be a part of ADHD (Carlson & Mann, 2002; Garner, Marceaux, Mrug, Patterson, & Hodgens, 2010; Hartman, Willcutt, Rhee, & Pennington, 2004). Then, some of the studies revealed that high SCT symptoms were also found in non-ADHD populations of different age groups and only 40–50 % of the participants with high SCT symptoms also have high ADHD symptoms (Barkley, 2012, 2013) so researchers began to explore whether SCT is a distinct disorder than ADHD, and if so, what are the differences between these two disorders. In 2016, a meta-analysis including 73 studies from different countries examined both the factor structures of the SCT scales and the external correlations of SCT. Results demonstrated that many of the SCT construct/items loaded on a SCT factor as opposed to an ADHD factor and internal consistency, test-retest, inter-rater variability of the scales were adequate. In terms of external validity, SCT had a strong association with ADHD-Inattention (ADHD-IN) in both children- adolescents and adults but the relationship with ADHD-Hyperactivity/Impulsivity (ADHD-HI) was relatively weak. SCT was also related with significant global, social, and academic impairment but the relationship with other psychiatric symptoms is quite different from ADHD-IN: SCT was strongly associated with internalizing symptoms, and after controlled the effect of ADHD-IN, SCT has no association (or even a negative association) with externalizing behaviors. On the other hand, the inverse is not true: after controlling for SCT, ADHD-IN remains associated with externalizing behaviors. (Becker et al., 2016). In addition, recent studies demonstrated that children and adolescents with ADHD who have co-occurring SCT symptoms are less likely to respond front-line methylphenidate treatment, but may respond to atomoxetine which is also effective for anxiety (Becker, 2021; Fırat, Gul, & Aysev, 2021; Froehlich et al., 2018; McBurnett et al., 2017; Wietecha et al., 2013). But, a recent study demonstrated that adult ADHD patients reported significant benefit from usually used medication types (including only 15 % atomoxetine, 64–85 % stimulant, and/or SSRI-bupropion) for impairment in executive functioning and SCT symptoms (Gaur & Pallanti, 2020). These results highlight the importance of distinguishing SCT from ADHD and detecting comorbidity to optimize clinical care and treatment response in different age groups.

When we reviewed the literature, we found that studies addressing the distinction between SCT and ADHD were generally conducted in children and adolescents, and mostly in North America and Western Europe, except a few from South Korea and Japan. But, the definition of behavior as normal or disordered is influenced by cultural, social, and developmental contexts (Rescorla et al., 2007) and it is necessary to investigate the influence of cultural nuances to determine the transdiagnostic validity of SCT (Becker, 2020). Turkish culture is an eclectic culture that continues to interaction with Anatolian, Eastern Mediterranean, Balkans, Siberian, Central Asian, and Islamic cultures. In contrast with North America and Europe, independence and individualism are not prioritized, instead of this altruism, interpersonal harmony (in order to maintain relations such as kinship-neighborhood), solemnity, not talking much, being mature and calm, balancing competition with group conformity are appreciated as in Asian cultures (Lee, Burns, & Becker, 2018; Takeda, Burns, Jiang, Becker, & McBurnett, 2019). Due to these differences, SCTsymptoms specifically related to slowness may not be viewed as problematic among Turkish adults. In Turkey, three studies have examined the internal and external validity of SCT among children and adolescents by using the most popular SCT scales (Barkley Sluggish Cognitive Tempo Scale–Children and Adolescents (BSCTS-CA); Penny Sluggish Cognitive Tempo Scale, and Child and Adolescent Behavior Inventory (CABI)). Results provide support for the reliability and validity of the mentioned scales and also demonstrated SCT's construct validity relative to ADHD-IN among Turkish children/adolescents by parental and/or teacher ratings (Başay, Çiftçi, Becker, & Burns, 2021; Fırat, Gül, & Aysev, 2019; Gozpinar, Cakiroglu, & Gormez, 2020). On the other hand, to our knowledge, there was not any study and also there is no valid and reliable screening tool to measure SCT symptoms in Turkish adults.

In this study our aims and hypothesis were as follows:

First Aim: to examine the psychometric profile (internal consistency, factor structure, and convergent validity) of the Barkley Adult SCT Scale- Turkish version. Based on prior research (e.g., Becker et al., 2016), we hypothesized that the BAARS-IV SCT subscale would have good internal consistency and convergent validity in our sample. On the other hand, we did not have a priori hypothesis about the factor structure of the scale because a single factor structure was obtained in some of the previous studies (Becker et al., 2016; Takeda et al., 2019), while a three-factor structure was detected in Lunsford-Avery's study (Lunsford-Avery, Kollins, & Mitchell, 2021).

Second Aim: to evaluate SCT's construct validity relative to ADHD among Turkish adults. We hypothesized that SCT is an independent factor/ factors from ADHD in our sample.

2. Method

2.1. Procedure & participants

The research was approved by the Clinical Research Ethics Committee of the Ufuk University Faculty of Medicine. After permission was granted by Russell Barkley via e-mail, the scale was translated to Turkish independently by the authors and a psychologist. These translations were then back-translated into English by five medical trainees from Ufuk University Psychiatry Department who were blinded to the original English text. After reviewing original and back-translated English versions, the form was reedited. For

evaluating the understandability of the last version, a subset of participants completed the SCT measure at two-time points a week apart, and test-retest analysis was conducted. In the final version, there was not any reworded item but we added two explanations to the 6th and 9th items (Item 6 original form: I am lethargic, more tired than others; Turkish version: I am lethargic, more tired than others (I get tired faster); Item 9 original form: I don't seem to process information as quickly or as accurately as others; Turkish version: I don't seem to process/understand information as quickly or as accurately as others).

274 Medical School students and medical trainees enrolled the study (Age between 18–35, Median:23, 29.6 % male; 70.4 % female). Data was collected via an online survey between 11–20 June 2021. The online survey included a sociodemographic information form, Adult SCT Ratings Scale, and Adult ADHD Self-Report Scale (ASRS).

2.2. Measures

2.2.1. Barkley Adult SCT Scale

Adult SCT Ratings Scale was developed by Barkley in 2011 by choosing the symptom sets used in prior studies of SCT in children and adolescents. It is a self-report scale and included the following nine items: "1. Prone to daydreaming when I should be concentrating"; "2. I have trouble staying alert or awake in boring situations"; "3. I am easily confused"; "4. I am easily bored"; "5. My mind is spacey or in a fog"; "6. I am lethargic, more tired than others"; "7. I am underactive or have less energy than others"; "8. I am a slow-moving"; "9. I don't seem to process information as quickly or as accurately as others.".Barkley suggested using the number of SCT symptoms answered often or very often as a total score and 5 or higher total score as a cutoff point for having elevated SCT (Barkley, 2012). The structure of the scale which discriminates SCT from ADHD symptoms, has been confirmed in both nationally representative samples, college students, and clinical adult samples several times in the USA and in other countries (Adler et al., 2021; Barkley, 2012; Becker, Langberg, Luebbe, Dvorsky, & Flannery, 2014; Lunsford-Avery et al., 2021; Mitchell, Davis, Kollins, & Lunsford-Avery, 2020; Takeda et al., 2019).

2.2.2. Adult ADHD Self-Report Scale (ASRS)

The Adult ADHD Self-Report Scale (ASRS) is a 5-point Likert-type scale (0–4 = never, rarely, sometimes, often, very often) to identify current ADHD symptoms (Kessler et al., 2005). The scale consists 18items: nine for attention deficit (Items 1,2,3,4,7,8,9,10,11) and nine for hyperactivity/impulsivity (Items 5,6,12,13,14,15,16,17,18). Stepwise regression analysis demonstrated that 6 items of the scale could predict the diagnosis of ADHD better (Kessler et al., 2007), and these 6 items were listed under section A. Validity and reliability of the Turkish version was completed in 2009 (Dogan, Oncu, Varol-Saracoglu, & Kucukgoncu, 2009).

2.3. Statistical analysis

Data were analyzed by using SPSS 22 and AMOS 26 packages programs. The structure validity of the scale was examined by exploratory and confirmatory factor analysis. Appropriateness for factor analysis was examined by Kaiser- Meyer- Olkin (KMO) coefficient and the Bartlett Sphericity Test. KMO coefficient was 0.84 and Barlett Sphericity Test value was statistically significant ((χ^2 = 1061.73, $p < 0.001$) so we decided that the data is suitable for factor analysis. To evaluate test-retest results Paired Samples *t*-test and Pearson correlation analysis were performed in a subgroup, a week apart. For exploratory factor analysis, the maximum likelihood method, Kaiser normalization with oblique min rotation and Scree graph were used (Eigenvalues above 1.0 were determined as a factor) (Fig. 1). For confirmatory factor analysis, fit statistics were used to assess the adequacy of the model. And finally, for reliability analysis, Cronbach's alpha coefficients and item-total correlations were calculated for total and factor scores. A *p*-value <.05 was considered significant for all analyses.
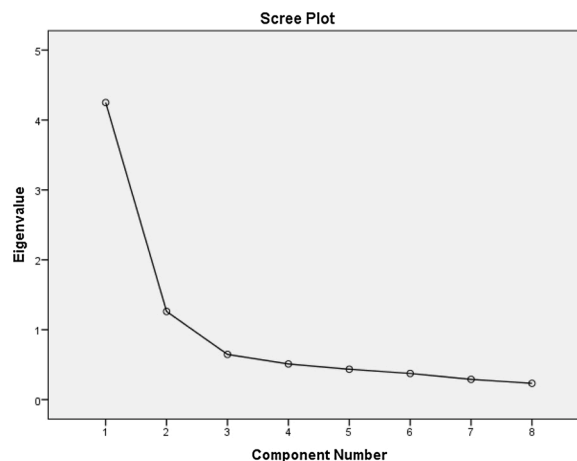

Fig. 1. Scree plot of exploratory factor analysis.

3. Results

3.1. Exploratory Factor Analysis (EFA)

Exploratory factor analysis demonstrated that the scale consisted of two factors: The first factor was composed of the first 5 items of the original form and explains 53.12 % of the variance, and the second factor was composed of the Items 6,7 and 8 and explains 15.76 % of the variance. In a previous study with Turkish children and adolescents, results demonstrated that Barkley Child SCT Scale had a two-dimensional factor structure and these factors were named ''Daydreaming'' and ''Sluggish''(Firat et al., 2018). In addition, a study with the Barkley Adult SCT scale demonstrated a three-dimensional factor structure entitled ''Slow/Daydreamy (Items: 1,3,5,9)'', ''Sleepy/ Sluggish (Items 6,7,8)'' and ''Low Initiation/ Persistence (Items 2,4)''(Lunsford-Avery et al., 2021). In the light of these studies, we named the first factor ''Daydreaming'' and the second factor ''Sluggishness''.

The factor loadings for the first 8 items ranged between 0.616−0.901. We had to exclude SCT item 9 "I don't seem to process/ understand information as quickly or as accurately as others." Because this item loaded on both factors, both of the loadings were <0.500 and the difference between factor loadings were less than 0.200 (Cudeck & O'dell, 1994)) (Table 1).

We also used exploratory factor analysis for distinguishing SCT from ADHD in our sample. We included the 8 SCT items and 18 ASRS items. Results demonstrated that the KMO coefficient was 0.92 and the Barlett Sphericity Test value was statistically significant (($\chi^2 = 4101.22, p < 0.001$). Scores of 26 items were loaded on 5 factors and these factors explained 64.29 % of the total variance. We named the factors as ADHD-Inattention (ADHD-IN), SCT-Daydreaming, ADHD-Hyperactivity (ADHD-HA), ADHD-Impulsivity (ADHD-I), and SCT-Sluggishness. All SCT items loaded within the SCT factors (the factor loadings were ranged from 0.559 to 0.891) and all ADHD items loaded within the ADHD factors (the factor loadings were ranged from 0.339 to 0.934) except ASRS-5 (this item loaded on Daydreaming factor as 0.367, while Impulsivity factor as 0.298). You can see the details in Table 2

3.2. Test–Retest reliability

We used paired samples *t*-test to compare the first and second ratings of the items. There were not any significant differences between the total scores of ratings. (N = 20, For the first 8 items: 13.70 ± 2.40 vs 13.25 ± 2.31, t = 1.917, df = 19, *p* = 0.07; For 9 items: 15.40±2.79 vs 14.90±2.63, t=1.365, df=19, *p* = 0.188). The test-retest Pearson's correlations for the subsample were .90, *p*<0.001 for the first 8 items; .82, *p*<0.001 for 9 items.

3.3. Confirmatory Factor Analysis (CFA)

We used CFA to determine the validity of the scale. The ratio of Chi-square fit index to the degrees of freedom is suggested to be below 3; the acceptable level for CFI, TLI, IFI, AGFI, and GFI indices are suggested to be above 0.90; and RMSEA is suggested to be below 0.08 (Simsek, 2007). The main results of the model are shown in Fig. 2. The model demonstrated a good-fit ($\chi^2 = 43.642, p = 0.001$; χ2/df=2.425, GFI=0.962, CFI=0.976, IFI=0.976, TLI=0.962, AGFI=0.923 and RMSEA=0.072) (90 % CI for RMSEA: Lo90=0.045, HI90=0.100, PCLOSE=0.084).

3.4. Measure-dependent validity

There were positive-strong/moderate relationships between SCT-Total, SCT-Daydreaming and ASRS-Inattention (*r* = 0.645, *r* = 0.664; respectively); ASRS-Hyperactivity-Impulsivity (*r* = 0.454, *r* = 0.514; respectively). SCT-Sluggishness scores were also positively correlated with inattention (*r* = 0.382) and hyperactivity/impulsivity (*r* = 0.186) but the correlations were weak and negligible when compared to SCT-Daydreaming. These results support the concurrent validity of the scale.

3.5. Reliability and internal consistency analysis

Cronbach's alpha value was 0.87 for total, 0.87 for Daydreaming, and 0.79 for Sluggishness factors so the results demonstrated good internal consistency among the items. Table 3 reports the details of analysis including item-total correlations and Cronbach's alpha coefficients when the item is excluded.
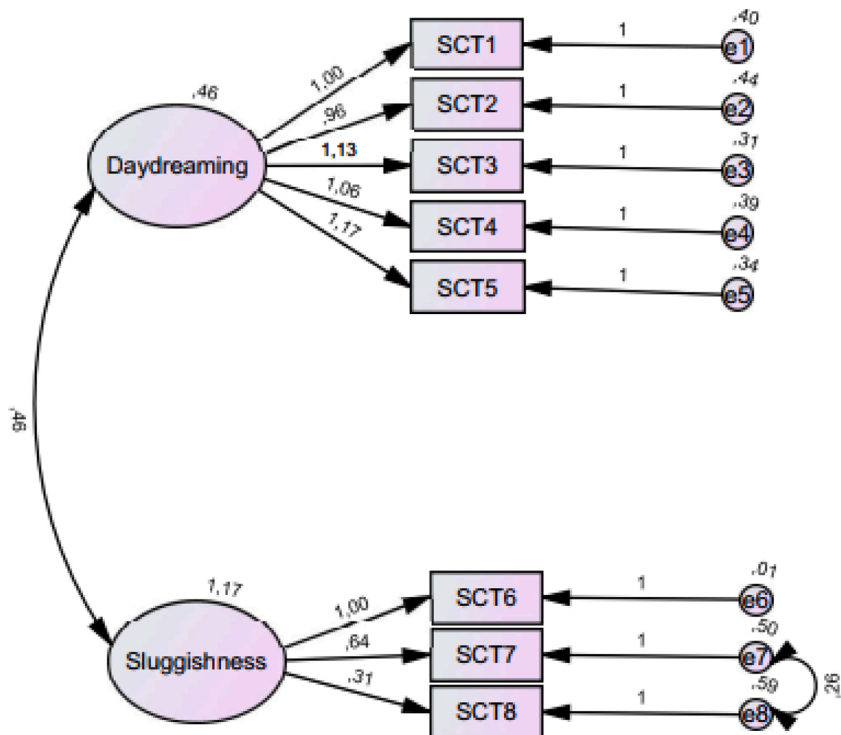
Table 1
Exploratory Factor Analysis, Factor Loadings.

Factor.1 Daydreaming		Factor.2 Sluggishness	
Item 1. Prone to daydreaming when I should be concentrating	0.825	**Item 6.** I am lethargic, more tired than others (I get tired easily).	0.616
Item 2. I have trouble staying alert or awake in boring situations	0.781	**Item 7.** I am underactive or have less energy than others	0.901
Item 3. I am easily confused	0.825	**Item 8.** I am a slow moving (I move slow)	0.867
Item 4. I am easily bored.	0.831		
Item 5. My mind is spacey or in a fog.	0.779		

Table 2
Standardized ADHD-SCT Items and Factor Loadings.

	ADHD-Inattention Factor	SCT-Daydreaming Factor	ADHD-Hyperactivity Factor	ADHD-Impulsivity Factor	SCT-Sluggishness Factor
Explained Variance (%)	40.31	9.50	6.11	4.40	3.96
SCT-1		.795			
SCT-2		.784			
SCT-3		.705			
SCT-4		.776			
SCT-5		.559			
SCT-6					.658
SCT-7					.891
SCT-8					.722
ASRS-1	.839				
ASRS-2	.934				
ASRS-3	.652				
ASRS-4	.559				
ASRS-5		.367		.298	
ASRS-6			.584		
ASRS-7	.545				
ASRS-8	.339				
ASRS-9			.395		
ASRS-10			.827		
ASRS-11			.361		
ASRS-12			.557		
ASRS-13			.641		
ASRS-14			.673		
ASRS-15				.926	
ASRS-16				.720	
ASRS-17				.555	
ASRS-18				.690	

Promax with Kaiser Normalization method was used.

Fig. 2. The Final Structural Model of Turkish Version Adult SCT Ratings Scale.

Table 3
Reliability Analysis of The Scale.

	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
İtem.1	14.7409	24.427	.639	.855
İtem.2	14.6533	24.491	.630	.856
İtem.3	15.1971	23.836	.695	.849
İtem.4	14.7044	24.180	.649	.854
İtem.5	14.9745	23.446	.709	.847
İtem.6	15.0803	22.821	.688	.850
İtem.7	15.2263	24.469	.580	.862
İtem.8	15.3942	26.672	.434	.875

3.6. SCT rate in the sample and gender differences

Seventy-three (26.6 %) of the total sample had elevated SCT levels according to Barkley's criteria (the rate was 24.9 % among females and 30.9 % among males).

There was no statistically significant differences in SCT total, SCT-Daydreaming, SCT-Sluggishness, ASRS-total, ASRS-Inattention and ASRS-Hyperactivity/Impulsivity scores and the percentage of the high SCT level between male and female groups. Age did not correlate with both SCT and ASRS scores (for all, $p > 0.05$).

4. Discussion

In this study we had two aims: First, to determine the validity and reliability of the Barkley Adult SCT Ratings Scale -Turkish version and the second to evaluate SCT's construct validity relative to ADHD among Turkish adults. Our results demonstrated that theTurkish version of the scale is a valid and reliable measure for SCT and SCT has construct validity in our sample.

Our exploratory factor analysis demonstrated that the scale has a two-dimensional structure. Our results are consistent with the studies from other cultures which demonstrated that SCT includes both daydreaming and sluggishness symptoms among adults (Barkley, 2012; Becker, 2020; Smith & Suhr, 2021) but are in contrast with the previous results which have identified a single SCT factor (for a review, see (Becker et al., 2016). In addition, there are differences between the factor structures of Barkley's Adult SCT scale in different cultures and samples. As mentioned in results section, Lunsford-Avery's study demonstrated that the Barkley Adult SCT scale had a three-dimensional structure including Slow/Daydreaming, Sleepy/Sluggish and Low Initiation/Persistence factors among American adults (Sample consisted of 124 adults who presented clinics for evaluating ADHD, aged between18−67) (Lunsford-Avery et al., 2021). There were not any differences in their Sleep/Sluggish factor and our's. On the other hand Items 2 and 4 (''Have trouble staying alert or awake in boring situations'' and ''Easily bored'') created a new factor termed Low Initiation/Persistence, while were under the Daydreaming factor in our sample. These differences may be related to sample characteristics (an adult sample with high ADHD risk vs. university students/medical trainees). It is an expected result that individuals who apply to clinics for the diagnosis and treatment of ADHD would also be sensitive about low initiation and persistence problems. On the other hand, in another study with American college students, the same 9 SCT items and 18 ADHD items were analyzed in a four-factor model and results demonstrated that SCT items has a distinct factor structure than ADHD-Inattention, ADHD-Hyperactivity, ADHD-Impulsivity, but have a single factor structure instead of two or three (Becker et al., 2014). Consistently, Takeda et.al 's study with 429 Japanese adults (26 ADHD adults age:19−50; 81 Non-ADHD adults age: 22−65; and 322 university students aged 18–27) demonstrated that the four-factor model with SCT, ADHD-IN, ADHD-HI, and Internalizing symptoms showed good fit but they had to exceed items 2,3,4 and 9 due to low factor loadings (Takeda et al., 2019).

Our results of measure dependent validity indicated that SCT Total, Daydreaming and Sluggishness factors were positively correlated with both ADHD-IN and H/I symptoms, but the correlations between SCT factors and ADHD-IN were stronger than ADHD-HI. In addition the relationship between Daydreaming-ADHD (both with Inattention and Hyperactivity/Impulsivity dimensions) was stronger than the relationship between Sluggishness-ADHD. In a recent study and a meta-analysis, the correlation coefficients between SCT and ADHD-IN were 0.73−0.72. These values are quite close to our results for SCT total and Daydreaming scores (r = 0.64 for SCT total-ADHD-IN; r = 0.66 for Daydreaming- ADHD-IN (Becker et al., 2016, 2018) but the association between Sluggishness and ADHD was weak and negligible in our sample (r = 0.382). Consistently, Lunsford-Avery's study demonstrated that Sleepy/Sluggish symptoms were not related with the ratings of Conners' Adult ADHD Rating Scale Hyperactivity/Restlessness, DSM Hyperactivity/Impulsivity, and DSM total subscale scores. These results showed three important points: First, items about sluggishness were loaded in SCT factor (s) in all studies but there were differences in the factor loadings of items related to slowness, daydreaming, low initiation and persistence. Second, sluggishness items are more clearly differentiated from ADHD and the relationship between sluggishness-ADHD is weak. However, this certainty is not observed for the items of the scale related to daydreaming, low initiation and persistence. And third, the scale may have different factor structures in different sample types from the same culture so it seems important to investigate the factor structures in both clinical and population-based samples in Non-American cultures.

We did not find an association between age, gender, and SCT in our sample. Consistently in most of the previous studies, SCT was unassociated with either age and gender, (Barkley, 2012; Becker et al., 2016). Our results support an important difference between ADHD and SCT: ADHD remains more common in males than females in adulthood (Willcutt, 2012) but there is no gender difference in

terms of SCT.

When we evaluated the utility of SCT symptoms as a distinct disorder from ADHD, we found that all SCT items loaded SCT factors (Daydreaming and Sluggishness) as separate factors from the ADHD inattention, hyperactivity, and impulsivity dimensions. These results are also consistent with the studies on internal/external validity of SCT among different age groups and cultures all over the world (Barkley, 2012; Becker et al., 2016, 2018; Belmar, Servera, Becker, & Burns, 2017; Burns, Servera, Bernad, Carrillo, & Cardo, 2013; Fırat et al., 2019; Garner et al., 2017; Lee et al., 2018).

Our analysis showed that the reliability tests (Cronbach's alpha) were in the acceptable ranges which is above 0.70 (In our study Cronbach's alpha value was 0.87 for total, 0.87 for Daydreaming and 0.79 for Sluggishness). Cronbach alpha value was 0.89 in the original form of the scale (Barkley, 2012). Although the differences between the sample characteristics in the original form of the scale and ours' (community-based vs. university students/medical trainees; age ranges of 18–89 vs. 18–35), reliability analysis demonstrated that items are measuring a similar concept. Our results can also be considered as evidence for the internal validity of the SCT in Turkish adults and the suitability of the scale for use in different groups.

4.1. Limitations

Our study has several limitations. First, the sample of this study was comprised of medical students and medical trainees which limits the potential to generalize the results. Consistent with our results, higher rates of SCT have been found in previous college students samples when compared to children and other adult samples (the percentages of SCT were 23, 28.5, and 13.1 %, respectively) (Flannery, Becker, & Luebbe, 2016; Jarrett, Rapport, Rondon, & Becker, 2017; Wood, Lewandowski, Lovett, & Antshel, 2017). As known both depression and SCT increase after childhood (Leopold et al., 2016). In addition, this study was completed during COVID-19 pandemics and a previous study demonstrated that SCT is related to burnout among medical doctors (Gül et al., 2017); so the age period (being a young adult) and potential psychological distress of pandemia on medical students/trainees may have had influences on higher SCT symptom scores. Another limitation of the study was the cross-sectional design thus our results should be considered as preliminary and reevaluated in clinical samples.

4.2. Conclusion

In conclusion, our study demonstrated that theTurkish version of the Barkleys Adult's SCT Ratings Scale is a valid and reliable measure for SCT. Future studies should consider evaluating the psychometric properties of the scale for adolescents and older adults in Turkey. Our study also increases our confidence in the transcultural generalizability of SCT.

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CRediT authorship contribution statement

Ahmet Gul: Conceptualization, Methodology, Data curation, Writing – review & editing. **Hesna Gul:** Conceptualization, Methodology, Software, Validation, Data curation, Formal analysis, Writing – review & editing.

Declaration of Competing Interest

No conflicts of interest to declare.

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