

Psychometric Properties of the Turkish Version of the Barratt Impulsiveness Scale-Brief in Adolescents

Fatma BENK DURMUŞ¹ , Canan YUSUFOĞLU TORLAK¹ , Leyla Ezgi TÜĞEN² , Hüseyin GÜLEÇ³ 

¹Department of Child and Adolescent Psychiatry, Erenköy Mental and Nervous Diseases Training and Research Hospital, İstanbul, Turkey

²Department of Child and Adolescent Psychiatry, Pendik Medipol University Hospital, İstanbul, Turkey

³Department of Psychiatry, Erenköy Mental and Nervous Diseases Training and Research Hospital, İstanbul, Turkey

ABSTRACT

Introduction: Barratt Impulsiveness Scale-Brief (BIS-Brief) is a self-report scale that can be used to measure impulsivity in adolescents. In this study, it was aimed to determine the psychometric properties of the Turkish version of the BIS-Brief in clinical and non-clinical adolescent samples.

Methods: The study included two groups of 116 psychiatric outpatients and 175 middle and high school students. For the re-test study, a small subgroup of the patient group (n=21) was re-applied BIS-Brief three weeks later. Socio-demographic data of the participants were collected. Aggression subscale of Childhood Behavior Checklist (CBCL), hyperactivity/impulsivity and anger control problems subscales of Conners-Wells' Adolescents Self-Report Scale-Long (CASS-L), and hyperactivity subscale of Conner's Parent Rating Scale-Short Form (CPRS-S) were administered.

Results: The mean ages of the patient and control groups were 15.22±1.58 years and 15.16±1.86 years, respectively. There were 77 (66.4%) males

in the patient group and 107 (61.1%) males in the control group. Cronbach's alphas for internal consistency were 0.78 (patient group) and 0.70 (control group). Three weeks test-retest reliability was 0.64 (patient group). We found a two-dimensional structure for the Turkish BIS-Brief. The BIS-Brief scores had a significant correlation with the scores of CBCL's aggression subscale ($r=0.48$; $p<0.01$), CASS-L's hyperactivity/impulsivity ($r=0.45$; $p<0.01$) and anger control problems subscales ($r=0.45$; $p<0.01$) and CPRS-S' hyperactivity subscale ($r=0.21$; $p<0.01$).

Conclusion: Our findings suggest that the Turkish version of the BIS-Brief is a reliable and valid measure for clinical and non-clinical adolescent samples. In addition, the results show that the BIS-Brief has a two-dimensional model in contrast to the unidimensional structure of the original scale.

Keywords: Impulsivity, Turkish Barratt Impulsiveness Scale-Brief, adolescents, validity, reliability

Cite this article as: Benk-Durmuş F, Yusufoglu-Torlak C, Tügen LE, Güleç H. Psychometric Properties of the Turkish Version of the Barratt Impulsiveness Scale-Brief in Adolescents. Arch Neuropsychiatry 2022;59:48–53.

INTRODUCTION

Impulsivity is defined as “a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individuals or others” (1). It is associated with many adolescent psychiatric disorders such as attention-deficit hyperactivity disorder (ADHD) (2), substance use disorders (3), conduct disorders, suicidal behavior (1), bipolar disorders (4), internet addiction (5), pathological gambling (6), intermittent explosive disorders (7). Therefore, interest in the investigation of impulsivity in adolescents in clinical and non-clinical studies continues to increase day by day.

Although there is no consensus on the best way to measure impulsivity in the literature, laboratory measurements and self-report scales are the most used methods to measure impulsivity (8). Barratt Impulsiveness Scale- 11 (BIS-11) is one of the most widely used and well-known self-report scales (9). The BIS-11 consists of 30 items and it has three subscales that assess the personality/behavioral construct of impulsiveness.

In recent studies, short forms of BIS-11 were conducted for ethical and practical reasons (reducing participant burden, being easier to

Highlights

- The Turkish version of the Barratt Impulsiveness Scale-Brief (BIS-Brief) is a reliable and valid measure in adolescents.
- BIS-Brief can be used in clinical and non-clinical studies.
- Impulsivity should be defined as multidimensional.

administer). One of these brief versions of the BIS-11 is BIS-Brief created by Steinberg and his colleagues in 2013. (10). BIS-Brief and BIS-11 total scores have been shown to have similar construct validity in their studies. Although BIS- 11 is frequently used in adolescents, some items such as; “I plan for job security” (item 13), “I change residences” (item 21) are not relevant for most adolescents. On the contrary to the BIS-11, all eight items of the BIS-Brief, are relevant to adolescents. For this reason, the BIS-Brief can be preferred to the BIS-11 in adolescents.

Correspondence Address: Fatma Benk-Durmuş, Department of Child and Adolescent Psychiatry, Erenköy Mental and Nervous Diseases Training and Research Hospital, İstanbul, Turkey •

E-mail: dr_drbenk@hotmail.com

Received: 11.11.2020, **Accepted:** 12.06.2021, **Available Online Date:** 11.02.2022

©Copyright 2021 by Turkish Association of Neuropsychiatry - Available online at www.noropsikiyatriarsivi.com

The Swanson, Nolan, Pelham-IV Questionnaire (SNAP-IV) (11) and Conners-Wells' Adolescents Self-Report Scale-Long (CASS-L) (12) are frequently used to assess impulsivity in clinical and epidemiological studies in adolescents in Turkish society, but both scales are not direct impulsivity scales. Also, there is no Turkish validity and reliability study of the SNAP-IV. However, all items of the BIS-Brief are related to impulsivity. The BIS-Brief has less number of items contrary to the two scales mentioned above, and it has a distracting feature because of having reverse items. The BIS-Brief comes into prominence due to all of these features. Turkish validity and reliability studies of the BIS-11 and its short versions have not been conducted in adolescents. So, in this study, it was aimed to investigate the psychometric properties of the Turkish version of the BIS-Brief in clinical and non-clinical adolescent samples for future epidemiological and clinical studies in Turkish adolescents.

METHODS

Participants and Procedure

The present study was conducted after obtaining the ethics committee approval from Erenköy Mental and Nervous Diseases Training and Research Hospital (Approval Date and Number: 07.08.2017/21). There were two groups in the study, the patient and the control group. The age range of the participants in both groups was 13–18 years.

The first group consisted of 116 patients who were admitted to the Department of Child and Adolescent Psychiatry Outpatient Clinic of Erenköy Mental and Nervous Diseases Training and Research Hospital. Verbal consent was obtained from the patients who agreed to participate in the study and written informed consent was obtained from their families. The data of the patient group were collected between March 2019 and April 2020. One hundred sixteen patients were included in the patient group. While 102 of these patients were diagnosed with ADHD, 14 of them were diagnosed with substance use disorder. These diagnoses were made by child and adolescent psychiatrists taking into consideration the clinical evaluation and patient's medical records, and full Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (13) were administered to the patients. For the re-test study, the BIS-Brief was re-applied to a small subgroup of the patient group (n=21) three weeks later.

Patients with active psychosis and manic symptoms, diagnosis with autism spectrum disorder, mental retardation; those with a history of medical illness that would interfere with the interview were excluded. Five hundred twenty patients between the ages of 13–18 with a diagnosis of ADHD and substance use disorder were evaluated in terms of being a participant in the study. Two hundred twenty four adolescents and their families were invited to the study. One hundred sixteen patients who met the study criteria constituted the sample of the study.

For the control group, it was planned to attend middle and high schools after obtaining permission from the provincial directorate of national education. However, because schools were closed due to the Coronavirus 2019 (COVID-19) pandemic, healthcare workers having children between the ages of 13–18 were reached via social media.

Parents who agreed to participate were sent an online form to obtain the first consent for the study. Study forms were filled in online by parents and adolescents. The data of the control group consisting of typically developing adolescents were collected between July and August 2020. The control group consisted of 175 adolescents.

Adolescents with a history of medical and psychiatric illness that would interfere with participating in the study and adolescents who did not complete the study forms were excluded from the control group. One

hundred eighty two adolescents and their parents agreed to participate in the study. Seven adolescents who filled out forms incompletely were excluded from the study.

Between the patient and control group, there was no statistically significant difference in terms of age ($p=0.77$), gender ($p=0.36$), monthly family income ($p=0.07$), and education level of the father ($p=0.21$). The education level of mothers was higher in the control group ($p<0.01$).

Measures

Socio-demographic form

Sociodemographic characteristics of adolescents participating in the study were evaluated using the semi-structured sociodemographic form created by researchers. In the form, age and gender of the adolescent, education level of parents, and monthly family income were questioned.

Barratt Impulsiveness Scale-Brief

The Barratt Impulsiveness Scale-Brief, which consists of eight items of the 30-item BIS-11 (9), was developed by Steinberg et al. (Items 1, 2, 5, 8, 9, 12, 14, and 19) (10). It is a self-report scale identified as measuring a single dimension of impulsivity. The Cronbach's alpha coefficient, indicating the internal consistency of the BIS-Brief, is 0.78 (10). The presence of symptoms defined in each item is evaluated on a four-point Likert scale, ranging from "never" to "almost always or always." The scale does not have a cut-off score. Increasing the BIS-Brief total score means that the impulsivity level increases. We contacted Matthew S. Stanford via e-mail, and permission was obtained for using the BIS-Brief. Turkish translation of the BIS-11 was made in the previous study (14). With the permission of the authors, the relevant items of the BIS-11 (Items 1, 2, 5, 8, 9, 12, 14, and 19) were taken and an 8-item scale was created.

Childhood Behavior Checklist (CBCL)

The CBCL was developed by Achenbach and Edenbrock in 1983 (15). The CBCL is a scale used to examine many psychiatric problems in young individuals aged 4–18 years. It is filled by parents or primary caregivers. It consists of 113 items on a three-point scale ("not correct", "sometimes or slightly correct" and "absolutely correct or often correct" are scored as "0", "1", "2", respectively) and eight subscales (attention problems, anxious/depressed, withdrawn/depressed, thought problems, somatic complaints, rule-breaking behavior, social problems, aggressive behavior). The internal consistency of the scale was calculated as 0.90. The 1991 version of the scale was translated into Turkish by Erol and Kiliç. Translations were reviewed to ensure consistency with the 1985 Turkish form (16) by Erol ve Şimşek (1998) (17). The Turkish CBCL total score's test-retest reliability and internal consistency were reported as 0.84 and 0.88, respectively. (18).

Many studies have shown a relationship between impulsivity and aggression (19, 20). So, in our study, CBCL's aggressive behavior subscale consisting of 18 items was used to evaluate the concurrent validity of the BIS-Brief.

Conners-Wells' Adolescents Self-Report Scale: Long Form (CASS-L)

This scale was developed by Conners et al. evaluates psychopathology, especially ADHD, in adolescents (12). It is a self-report scale applied to adolescents. For each item, there are four answer options with a score ranging from 0 to 3 (0=none, 1=little, 2=much, and 3=very much). It has nine subscales: Emotional Problems, Anger Control Problems, Family Problems, Cognitive Problems, Attention-Deficit/Hyperactivity Disorder Index, Hyperactivity, Conduct Problems, Diagnostic and Statistical Manual of Mental Disorders- Fourth Edition (DSM-IV) (21) Hyperactivity-Impulsive Symptoms, DSM- IV Inattentive

Symptoms. Cronbach alpha coefficients are between 0.74-0.92. Test-retest reliability values are between 0.73-0.89 (12). Cronbach's alpha coefficients for the whole group were between 0.76-0.87 in Turkish adaptation studies (22). In our study, the anger control problems subscale of CASS-L (9 items) and the DSM-IV hyperactivity-impulsivity subscale (9 items) were used.

Conner's Parent Rating Scale-Short (CPRS-S)

The CPRS-S was developed by Conners (23). CPRS-S is a 4-point Likert-type scale scored between 0 and 3 (0=none, 1=little, 2=much, and 3=very much) and consists of 48 items. Questions are answered by parents. It has five subscales: learning problems, hyperactivity, conduct disorder, anxiety disorder, and somatic disorder. The coefficients for the five parent factors are between 0.63-0.94. Parent factor correlations were found to range between 0.46-0.57. Cronbach's alpha value was found to be 0.90 in the Turkish reliability and validity study (24). In our study hyperactivity subscale was used.

Statistical Analysis

Internal consistencies of the BIS-Brief's Turkish version were determined for each group by calculating the Cronbach alpha coefficient.

Pearson correlation test was used for test-retest reliability. Principle Component Analysis (Exploratory Factor Analysis) (PCA) was used for evaluating the the factor validity of the BIS-Brief's Turkish version in patients. PCA was performed using the varimax method and those with an eigenvalue above 1 were considered as one factor. Concurrent validity was assessed through the correlation of the scores between the BIS-Brief and the CASS-L's anger control subscale and DSM-IV hyperactivity-impulsivity subscale; CBCL's aggressive behavior subscale and CPRS-S' hyperactivity subscale. The correlations were estimated using the Pearson correlation test. Discriminating power for a specific group's validity was assessed with an independent sample t-test. If the p value was less than 0.05, it was considered statistically significant. Data analysis was performed using the statistical package for social sciences version 21.0 (SPSS 21.0) (SPSS Inc., Chicago, Illinois, USA).

RESULTS

Socio-demographic Characteristics of the Sample

There were 39 (33.6%) females and 77 (66.4%) males in the patient group, 68 (38.9%) females and 107 (61.1%) males in the control group. There was no statistically significant difference between the two groups in terms of gender ($\chi^2=0.82$ and $p=0.36$). The age range of the participants was 13-18 years. The mean age of the patient group was 15.22 ± 1.58 years, and the mean age of the control group was 15.16 ± 1.86 years. There was no statistically significant difference between the two groups in terms of mean age ($t=0.29$, $p=0.77$). The sociodemographic characteristics of the patient and control groups are shown in Table 1.

Reliability

Cronbach's alpha coefficients for the total scores of the BIS-Brief were found 0.78 ve 0.70 in patient and control groups, respectively. Item total correlations are shown in Table 2 for the patient and control groups. The Cronbach's alpha coefficients were 0.67 and 0.73 for the poor self-regulation and impulsive behavior subscales of BIS-Brief, respectively, in the patient group.

BIS-Brief was readministered to 21 patients three weeks after the first administration to determine the test-retest reliability of the scale. Total BIS-Brief scores were found to be highly correlated with total re-test BIS-Brief scores ($r=0.64$; $p=0.03$).

Table 1. Sociodemographic characteristics of the participants

Participants	Patients	Control	Statistical analyses
Male	77 (66.4%)	107 (61.1%)	$\chi^2=0.82$, $p=0.36$
Female	39 (33.6%)	68 (38.9%)	
Age	15.22±1.58	15.16±1.86	Independent sample t-test $t=0.29$, $p=0.77$
Education level of father			$\chi^2=5.84$, $p=0.21$
Illiterate	1 (0.9%)	2 (1.2%)	
Primary school	36 (32.1%)	38 (23.2%)	
Secondary school	23 (20.5%)	29 (17.7%)	
High school	27 (24.1%)	38 (23.2%)	
University	25 (22.3%)	57 (34.8%)	
Education level of mother			$\chi^2=16.44$, $p=0.002$
Illiterate	4 (3.5%)	3 (1.9%)	
Primary school	38 (33%)	53 (33.8%)	
Secondary school	22 (19.1%)	22 (13.8%)	
High school	38 (33%)	33 (20.6%)	
University	13 (11.3%)	48 (30%)	
Parents who live together	93 (80.9%)	135 (86%)	$\chi^2=1.28$, $p=0.26$
Level of income (per month)			$\chi^2=6.80$, $p=0.07$
<1500 or 1500 TL	13 (11.4%)	15 (9.6%)	
1501-3000 TL	59 (51.8%)	61 (39.1%)	
3001-5000 TL	32 (28.1%)	53 (34%)	
>5000 TL	10 (8.8%)	27 (17.3%)	

TL, Turkish Lira.

Table 2. Item analysis of the Turkish version of the BIS-Brief

BIS-Brief items	Item-total correlations (Patient/Control)	Cronbach's Alpha if item deleted (Patient/Control)
1. I plan tasks carefully.	0.50/0.40	0.75/0.67
2. I do things without thinking.	0.58/0.38	0.74/0.68
3. I don't pay attention.	0.55/0.39	0.75/0.68
4. I am self-controlled.	0.43/0.33	0.76/0.69
5. I concentrate easily.	0.38/0.44	0.77/0.66
6. I am a careful thinker.	0.51/0.38	0.75/0.68
7. I say things without thinking.	0.53/0.48	0.75/0.65
8. I act on the spur of the moment.	0.41/0.36	0.77/0.68

Validity

Factor structure

An exploratory factor analysis (Principal Component Analysis- PCA) with varimax rotation was performed to examine the factor structure of the BIS-Brief scale. Tests of normality were within an acceptable range. Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was found to be 0.80 and 0.75; and Bartlett's Test of Sphericity was significant ($\chi^2(28)=602.72$, $p<0.001$ and $\chi^2(28)=190.34$, $p<0.001$ respectively) in the patient and control groups. While using the default eigenvalue cut-off 1, a two-factor structure was detected in both patient and control groups. In this case, the two-factor structure with an eigenvalue value greater than one, explained 53.98% and 46.94% of the total variance in the patient and control groups, respectively. While items 1, 5 and 6 were loading on the first factor, items 2, 3, 4, 7 and 8 were loading on the second factor in

Table 3. Factor structure of the Turkish Version of the BIS-Brief in the patient group

Variable	Poor-self regulation	Impulsive behavior
BIS-Brief items		
I plan tasks carefully (Item 1)	0.73	
I concentrate easily (Item 5)	0.75	
I am a careful thinker (Item 6)	0.74	
I am self-controlled (Item 4)		0.42
I do things without thinking (Item 2)		0.72
I don't pay attention (Item 3)		0.63
I say things without thinking (Item 7)		0.72
I act on the spur of the moment (Item 8)		0.77

BIS-Brief items loading 0.4 or above on each of two factors.

the patient group. In the light of the literature, two observed factors were labeled “poor self-regulation” (Items 1, 5, 6) and “impulsive behavior” (Items 2, 3, 4, 7, 8). These two subscales showed a moderate positive correlation with each other ($r=0.44$; $p<0.001$). The factor structure of the Turkish version of the BIS-Brief is shown in Table 3.

Discriminating power for specific group's validity

There was a significant difference between the patient and control group ($t=5.23$; $p<0.001$). BIS-Brief total scores were 19.46 ± 4.58 and 16.86 ± 3.73 in the patient and control group, respectively. Results have shown that patients performed significantly worse on the BIS-Brief total scores compared to the control group.

Concurrent validity

To evaluate the concurrent validity; CBCL's aggression subscale, CASS-L's hyperactivity/impulsivity and anger control problems subscales, and CPRS-S' hyperactivity subscale were administered to the control group. Correlations between BIS-Brief total scores and its subscales; and CASS-L's hyperactivity/impulsivity subscale and anger control problems subscale, CPRS-S's hyperactivity subscale, and CBCL's aggression subscale are shown in Table 4.

DISCUSSION

This study was designed to evaluate the psychometric properties of the BIS-Brief in a Turkish adolescent sample. Our findings show that BIS-Brief's reliability and validity were at an acceptable level, and we found in the current study that the two-dimensional model represented impulsivity better in adolescents.

Steinberg et al. (2013), developed the original 8-item BIS-Brief and defined it as a unidimensional model (10). As a result of the statistical analysis we performed, we found the factor structure of the BIS-Brief as a two-dimensional model in adolescents at risk for impulsivity. Many studies that examined the factor structure of the BIS-Brief in the patient and control groups concluded that the scale should be defined as a two-dimensional model (25–28). Morean et al. (2014) defined these two subscales as “poor self-regulation” and “impulsive behavior” in their study in which they examined the factor structure of the BIS-Brief. Poor self-regulation is defined as difficulty in focusing on goal-oriented thoughts and behaviors, while impulsive behavior is defined as a tendency to react quickly to various stimuli and the inability to restrict or prevent these responses (26). Therefore, it can be said that the effect of poor self-regulation and behavioral impulsivity on problem behavior is different. Compatible with previous studies, we found a moderate positive correlation between poor self-regulation and impulsive behavior subscales in the patient group. Moderate correlation indicates that the two subscales are similar but measure different aspects of impulsivity (25). These results are consistent with the knowledge of the literature that impulsivity is multidimensional (3, 29, 30). Many researchers have identified multiple dimensions in scales measuring impulsivity and have shown that these dimensions show different correlations with the same clinical situations. In our study, consistent with previous studies, we found a closer relationship between impulsive behavior and aggression than poor self-regulation (25). In this context, Charles (2019) found that the impulsive behavior subscale was more closely related to binge drinking frequency and self-injury than the poor self-regulation subscale (25). Morean et al. (2014) found that poor self-regulation was associated with increased smoking rates (26). Once again, these results are consistent with the multidimensionality of impulsivity. Therefore, it can be said that the contribution of both self-regulation ability and behavioral impulsivity to problem behaviors are different. This two-factor structure may allow a more detailed interpretation of impulsivity in clinical and epidemiological studies. Detailed interpretation provides information on how best to do psychological interventions.

Items 1, 4, 5, and 6 were loaded on the poor self-regulation subscale and items 2, 3, 7, and 8 were loaded on the impulsive behavior subscale in adolescent studies which are conducted by Charles and Morean et al. (25, 26). In our study, as a result of the factor analysis we performed in the patient group at risk for impulsivity, items 2, 3, 4, 7, and 8 were loaded on the impulsive behavior subscale, while items 1, 5, and 6 were loaded below the poor self-regulation subscale. The loading of item 4 (“I am self-controlled”) on a different subscale may be caused by cultural differences or a factor arising from translation or language differences.

Table 4. Correlations between the Turkish BIS-Brief and its subscales and other scales in the control group

Scales	Total BIS-Brief	BIS-Brief_Poorself Regulation	BIS-Brief_Impulsive Behavior	CASS-L-Anger Control Problems	CPRS-S-Hyperactivity	CASS-L-Hyperactivity/Impulsivity	CBCL-Aggression
Total BIS-Brief		0.80**	0.90**	0.45**	0.21**	0.45**	0.48**
BIS-Brief_Poorself Regulation			0.44**	0.20**	0.07	0.16*	0.37**
BIS-Brief_Impulsive Behavior				0.51**	0.23**	0.56**	0.42**
CASS-L-Anger Control Problems					0.36**	0.62**	0.55**
CPRS-S- Hyperactivity						0.45**	0.55**
CASS-L-Hyperactivity/Impulsivity							0.52**
CBCL-Aggression							

**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed); CPRS-S, Conners Parent Rating Scale-Short Form; CBCL, Childhood Behavior Checklist.

Turkish Total BIS-Brief's Cronbach's alpha coefficients were 0.78 and 0.7 in patient and control groups, respectively. In Steinberg's study (10), Cronbach's alpha value was 0.78. As can be seen, the findings of the two studies are very similar. Poor self-regulation and impulsive behavior subscales' Cronbach's alpha coefficients were 0.67 and 0.73 in the patient group, respectively, in our study. In the study of Morean et al., Cronbach's alpha coefficients were found to be 0.75 and 0.73, respectively (26). A Cronbach alpha coefficient greater than 0.6 indicates sufficient internal consistency (31). Therefore, total scores and subscale scores of Turkish BIS-Brief could be accepted to have sufficient internal consistency reliability.

Test-retest reliability, which indicates the stability of the measurement over time, was found to be sufficient in the current study. Mathias et al. (2018) also found a strong significant correlation between test-retest total BIS-Brief scores, as in our study (27).

As in the original BIS-Brief study, there was a significant difference in the total scores of BIS-Brief's Turkish version between patient and control groups. BIS-Brief scores were higher in the patient group. These findings strongly supported the discriminating power for a specific group's validity (10).

To evaluate the concurrent validity of the Turkish version of the BIS-Brief, we administered to the control group CASS-L's anger control problems subscale, CBCL's aggression subscale, CPRS-S's hyperactivity subscale, CASS-L's DSM-IV Hyperactivity-Impulsive Symptoms subscale, to the control group. Similar to findings in Mathias's study (27), mild-moderate significant correlations were found between scales related to impulsivity (both self-report and parental reporting scales) and the BIS-Brief total scores. In our study, it is observed that correlation coefficients between total BIS-Brief and impulsivity-related scales are slightly lower compared to the Steinberg's findings (10). This difference may be due to our study group which was a normal control group or using different scales in two studies, cultural differences. However, our findings show that the Turkish BIS-Brief has concurrent validity.

There are a few limitations in the present study. It was a cross-sectional study. So, it does not allow findings to be interpreted in a direction. We studied a specific patient group from a single region. Also, BIS-Brief is a self-report scale. So, participants may have hidden their problematic behaviors.

CONCLUSION

Although there are some limitations, our findings suggest that the Turkish version of the BIS-Brief is a reliable and valid measure, and it is useful for assessing impulsiveness in clinical and non-clinical adolescent samples. In addition, present results show that the BIS-Brief has a two-dimensional model. Our findings need to be repeated in larger groups including different patient samples from multiple regions.

Ethics Committee Approval: The present study was conducted after obtaining the ethics committee approval from Erenköy Mental and Nervous Diseases Training and Research Hospital (Approval Date and Number: 07.08.2017/21).

Informed Consent: Verbal consent was obtained from the patients who agreed to participate in the study and written informed consent was obtained from their families.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept- FBD, HG; Design- FBD, HG; Supervision- CYT, FBD, HG; Resource- CYT, FBD; Materials- (-); Data Collection and/or Processing- CYT, LET, FBD; Analysis and/or Interpretation- FBD, HG; Literature Search- FBD, LET; Writing- FBD, LET, CYT; Critical Reviews- HG.

Conflict of Interest: The authors declare that there is no conflict of interest.

Financial Disclosure: The authors declare no financial support.

REFERENCES

- Moeller FG, Barratt ES, Dougherty DM, Schmitz JM, Swann AC. Psychiatric aspects of impulsivity. *Am J Psychiatry* 2001;158:1783-1793. [Crossref]
- Nigg JT. Response inhibition and disruptive behaviors: toward a multiprocess conception of etiological heterogeneity for ADHD combined type and conduct disorder early-onset type. *Ann N Y Acad Sci* 2003;1008:170-182. [Crossref]
- de Wit H. Impulsivity as a determinant and consequence of drug use: a review of underlying processes. *Addict Biol* 2009;14:22-31. [Crossref]
- Gilbert KE, Kalmar JH, Womer FY, Markovich PJ, Pittman B, Nolen-Hoeksema S, et al. Impulsivity in Adolescent Bipolar Disorder. *Acta Neuropsychiatr* 2001;23:57-61. [Crossref]
- Cao F, Su L, Liu T, Gao X. The relationship between impulsivity and Internet addiction in a sample of Chinese adolescents. *Eur Psychiatry* 2007;22:466-471. [Crossref]
- Błaszczynski A, Nower LA. pathways model of problem and pathological gambling. *Addiction* 2002;97:487-499. [Crossref]
- Chambers RA, Potenza MN. Neurodevelopment, impulsivity, and adolescent gambling. *J Gamb Stud* 2003;19:53-84. [Crossref]
- Diemen LV, Szobot CM, Kessler F, Perchansky F. Adaptation and construct validation of the Barratt Impulsiveness Scale (BIS 11) to Brazilian Portuguese for use in adolescents. *Braz J Psychiatry* 2007;29:153-156. [Crossref]
- Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt impulsiveness scale. *J Clin Psychol* 1995;51:768-774. [Crossref]
- Steinberg L, Sharp C, Stanford MS, Tharp AT. New tricks for an old measure: The development of the Barratt Impulsiveness Scale-Brief (BIS-Brief). *Psychol Assess* 2003;25:216-226. <https://psycnet.apa.org/doi/10.1037/a0030550>
- Bussing R, Fernandez M, Harwood M, Hou W, Garvan CW, Eyberg SM, et al. Parent and teacher SNAP-IV ratings of attention deficit hyperactivity disorder symptoms: psychometric properties and normative ratings from a school district sample *Assess* 2008;15:317-328. [Crossref]
- Conners CK, Wells KC, Parker JD, Sitarenios G, Diamond JM, Powel JW. A new self-report scale for assessment of adolescent psychopathology: factor structure, reliability, validity, and diagnostic sensitivity. *J Abnorm Child Psychol* 1997;25:487-497. [Crossref]
- Kaufman J, Birmaher B, Brent D, Rao UMA, Flynn C, Moreci P, et al. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. *J Am Acad Child Adolesc Psychiatry* 1997;36:980-988. [Crossref]

Appendix: Barratt Dürtüsellik Ölçeği - Kısa Formu Türkçe versiyonu

Açıklamalar: İnsanlar farklı durumlarda gösterdiği düşünce ve davranışları ile birbirlerinden ayrılırlar. Bu test bazı durumlarda nasıl düşündüğünüzü ve davrandığınızı ölçen bir testtir. Lütfen her cümleyi okuyunuz ve bu sayfanın sağındaki, size en uygun kutucuk içine X koyunuz. Cevaplamak için çok zaman ayırmayınız. Hızlı ve dürüstçe cevap veriniz

		Nadiren/Hiçbir zaman	Bazen	Sıklıkla	Hemen hemen her zaman
1	İşlerimi dikkatle planlarım	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Düşünmeden iş yaparım	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Dikkat etmem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Kendimi kontrol edebilirim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Kolayca konsantre olurum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Dikkatli düşünen birisiyim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Düşünmeden bir şeyler söylerim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Aklıma estiği gibi hareket ederim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Güleç H, Tamam L, Yazıcı Güleç M, Turhan M, Karakuş G, Zengin M, et al. Psychometric Properties of the Turkish Version of the Barratt Impulsiveness Scale-11. *Bull Clin Psychopharmacol* 2008;18:251–258. https://app.trdizin.gov.tr/dokuman-goruntule?ext=pdf&path=CrnWZGRsXTjrLjWxD978OSUAL2jXitizhVYmCxNvH4E_rAPxuf3FJ4aCk4uv1runU3OXLuiqSV8GrPxghcc2A7d5eJp01GKpMkUb2vbBjUc1qgGgJZH_g-UzD9O2MBnsiQxSy8Z6i5ZpIMwQLLAsMrAs29_Gpp3N_bGjgdV436ovIL-N4cypNR0DMomxXPzJl6X42R4oyFYNo9bOb0CKGYSuM70plYtQDyy1WJW_BQ=&contentType=application/pdf
15. Achenbach TM, Edelbrock C. *Manual for the Child Behavior Checklist/4-e and Revised Child Behavior Profile*. Burlington VT: University of Vermont, Department of Psychiatry; 1983.
16. Akçakin M. Çocukların Davranışlarını Değerlendirme Ölçeği'nin tanıtımı ve güvenilirlik çalışması. *Türk Psikoloji Derg* 1985;5:3–6. <https://toad.halileksi.net/sites/default/files/pdf/cocuklarin-davranislarini-degerlendirme-olcegi-toad.pdf>
17. Erol N, Şimşek Z. Türkiye Ruh Sağlığı Profili: Çocuk ve Gençlerde Ruh Sağlığı: yeterli alanları, davranış ve duygusal sorunların dağılımı, 1. Baskı. Erol N, Kılıç C, Ulusoy M, Keçeci M, Şimşek Z, editörler. Ankara: Eksek Tanıtım Ltd. Şti; 1998. s.25–75.
18. Erol N, Arslan LB, Akçakin M. The adaptation and standardization of the Child Behavior Checklist among 6–18 year old Turkish children. In: Sergeant J, editor. *Eunothydix; European Approaches to Hyperkinetic Disorder*. Zurich: Fotoratar; 1995. p.97–113.
19. Fields S, Edens JF, Smith ST, Rulseh A, Donnellan MB, Ruiz MA, et al. Examining the psychometric properties of the Barratt Impulsiveness Scale-Brief Form in justice-involved samples. *Psychol Assess* 2015;27:1211–2018. [\[Crossref\]](#)
20. Houston RJ, Stanford MS. Electrophysiological substrates of impulsiveness: Potential effects on aggressive behavior. *Prog Neuropsychopharmacol Biol Psychiatry* 2005;29:305–313. [\[Crossref\]](#)
21. American Psychiatric Association (APA). *Diagnostic and statistical manual of mental disorders*, 4th ed. Printing, Arlington, VA: American Psychiatric Publishing; 1994.
22. Kaner S, Büyüköztürk Ş, İşeri E, Ak A, Özyayın L. Conners-Wells' Adolescent Self-Report Scale-Long Form: Evaluation Psychometric Properties for Turkish Adolescents. *J Clin Psychiatry* 2011;14:71–84. https://jag.journalagent.com/kpd/pdfs/KPD_14_2_71_84.pdf
23. Conners CK, Sitarenios G, Parker JD, Epstein JN. The revised Conners' Parent Rating Scale (CPRS-R): factor structure, reliability, and criterion validity. *J Abnorm Child Psychol* 1998;26:257–268. [\[Crossref\]](#)
24. Dereboy Ç, Şenol S, Şener Ş, Dereboy F. Validation of the Turkish versions of the short-form Conners' teacher and parent rating scales. *Türk Psikiyatri Derg* 2007;18:48–58. https://www.researchgate.net/profile/Ferhan-Dereboy/publication/6443492_Validation_of_the_Turkish_versions_of_the_short-form_Conners'_Teacher_and_Parent_Rating_Scales/links/56923fc108aed0aed8166333/Validation-of-the-Turkish-versions-of-the-short-form-Conners-Teacher-and-Parent-Rating-Scales.pdf
25. Charles NE, Floyd PN, Barry CT. The Structure, Measurement Invariance, and External Validity of the Barratt Impulsiveness Scale-Brief in a Sample of At-Risk Adolescents. *Assessment* 2021;28:116–127. [\[Crossref\]](#)
26. Morean ME, DeMartini KS, Leeman RF, Pearlson GD, Anticevic A, Krishnan-Sarin S, et al. Psychometrically improved, abbreviated versions of three classic measures of impulsivity and self-control. *Psychol Assess* 2014;26:1003–1020. [\[Crossref\]](#)
27. Mathias CW, Stanford MS, Liang Y, Goros M, Charles NE, Sheftall AH, et al. A test of the psychometric characteristics of the BIS-Brief among three groups of youth. *Psychol Assess* 2018;30:847–856. [\[Crossref\]](#)
28. Dunne EM, Cook RL, Ennis N. Non-planning Impulsivity But Not Behavioral Impulsivity is Associated with HIV Medication Non-adherence. *AIDS Behav* 2019;23:1297–1305. [\[Crossref\]](#)
29. Coskunpinar A, Dir AL, Cyders MA. Multidimensionality in impulsivity and alcohol use: A meta-analysis using the UPPS model of impulsivity. *Alcohol Clin Exp Res* 2013;37:1441–1450. [\[Crossref\]](#)
30. Reynolds B, Penfold RB, Patak M. Dimensions of impulsive behavior in adolescents: laboratory behavioral assessments. *Exp Clin Psychopharmacol* 2008;16:124–131. [\[Crossref\]](#)
31. Kose S, Subasi Tekintas N, Benk Durmuş F, Akin E, Sayar K. Reliability, validity, and factorial structure of the Turkish version of the Bradford Somatic Inventory (Turkish BSI-44) in a university student sample. *Psychiatry and Clinical Psychopharmacology* 2017;27:62–69. [\[Crossref\]](#)