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Body-Focused Repetitive Behaviors in Adolescents and Young Adults: Co-Occurrence Patterns, Psychiatric Comorbidities and Turkish Validity and Reliability Study of the Generic Body-Focused Repetitive Behavior Scale-8

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ABSTRACT

Objective: Body-focused repetitive behaviors (BFRBs) are common but often underdiagnosed and undertreated, with limited understanding of their development. The eight-item Generic Body-Focused Repetitive Behavior Scale-8 (GBS-8) provides a practical, transdiagnostic self-report instrument. The aim of this study was to evaluate the reliability and validity of the Turkish GBS-8 and to examine patterns of BFRBs in a clinical sample of adolescents and young adults.

Method: The sample included 362 adolescents and young adults aged 12-30 years with at least one subclinical or pathological BFRB. Adolescents completed the GBS-8, the Brief Symptom Inventory (BSI), and the Pediatric Quality of Life Inventory (PedsQL), while young adults completed the GBS-8, the BSI, and the Short Form-12 Health Survey (SF-12). Researchers completed the Clinical Global Impression-Severity subscale (CGI-S) to assess the severity of BFRBs.

Results: Participants had a mean age of 17.74 ± 5.04 years, with 78.7% identifying as female. The Turkish GBS-8 showed strong internal consistency and a well-fitting two-factor structure, including symptom severity (α = 0.853), impairment (α=0.779), and the total score (α=0.855). The test-retest reliability analysis further supported the scale's validity and reliability, with a Cronbach's alpha coefficient of 0.851. A total of 50 different BFRB patterns were identified, the most common of which were skin picking, nail biting, lip/cheek biting, and knuckle cracking (8.56%), followed by only nail biting (8.01%) and a combination of nail biting, lip/cheek biting and knuckle cracking (7.18%).

Conclusion: The findings confirm the Turkish validity and reliability of the GBS-8, supporting its utility in clinical settings. This study also highlights the need for increased awareness and tailored interventions to improve BFRBs management.

Keywords: Adolescents, body-focused repetitive behaviors, patterns, reliability, validity, young adults

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INTRODUCTION

Body-focused repetitive behaviors (BFRBs) represent a highly heterogeneous group of repetitive grooming behaviours, including hair pulling (HP), skin picking (SP), nail biting (NB), lip or cheek biting (L/CB), knuckle cracking (KC), and teeth grinding/bruxism (TG/B). When these behaviours significantly impair physical and psychosocial functioning, they are acknowledged as Body Focused Repetitive Behavior Disorders (BFRBDs) (1). The term "BFRBDs" was first introduced with the publication of DSM-5. In this context, trichotillomania (TTM) and skin picking disorder (SPD) were classified under the category "Obsessive-Compulsive and Related Disorders (OCD)," while no other behaviors were explicitly defined (2). The lack of precise categorizations for BFRBs other than TTM and SPD in classification systems limits the recognition of their clinical relevance and functional impairment, thereby restricting research in this area. Indeed, BFRBs may lead to a range of physical complications, from skin lesions, bleeding, and infections to more severe outcomes such as open wounds, ulceration, tissue necrosis, or trichobezoars (3). In addition to the physical consequences, BFRBs often cause significant impairment in psychosocial functioning. Individuals may experience feelings of inadequacy and frustration due to difficulty controlling these behaviors. Furthermore, fear of negative evaluation

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Highlights

- **The Turkish GBS-8 showed strong reliability and validity in adolescents and young adults.**
- **BFRBs show high co-occurrence.**
- **The most common BFRB pattern was skin picking, nail biting, lip/cheek biting, and knuckle cracking.**
- **BFRBs are significantly associated with psychiatric comorbidity and functional impairment.**

by others may contribute to social withdrawal, reduced self-esteem, academic or occupational difficulties, and increased internalizing symptoms (2,4).

Research on the prevalence of BFRBs remains limited, and prevalence estimates vary considerably across studies due to several factors, including differences in sample selection, population age, and assessment tools (5,6). A large community-based study of 1.481 individuals reported a lifetime prevalence of BFRBs at 97.1%, while the prevalence of BFRBDs was 24%. In the same study, NB (11.4 %) was found to be the most commonly reported behaviour, followed by SP (8.2 %) and L/CB (7.9 %) (6). In contrast to previous research, a clinical study involving 67 children and adolescents diagnosed with attention-deficit hyperactivity disorder (ADHD), anxiety-related disorders, and mood disorders found that approximately 50% of children or their parents reported the presence of BFRBs, while nearly 40% reported symptoms meeting criteria for BFRBDs. Notably, children identified NB as the most common behaviour, whereas parents reported SP as more common in their children (7). Another clinical study of pediatric sample with anxiety and/or OCD found BFRBs in 55% of participants, with 27% meeting the criteria for BFRBDs. SP was the most common BFRB (38%), followed by NB (34%) (8). Although BFRBs are common in clinical samples, most studies have focused on specific diagnostic groups. Including individuals with different psychiatric diagnoses provides a more comprehensive understanding of the prevalence of BFRBs in different clinical settings.

Shared neurobiological, genetic, and psychosocial risk factors, as well as similarities in clinical course and phenomenological features, suggest that these behaviours may represent distinct clinical manifestations of a common underlying mechanism. Supporting this argument, BFRBs tend to co-occur (1). In a study of 391 adults with BFRBs, approximately half of those with a current BFRB had more than one BFRBs, with SP and NB being the most common co-occurring behaviours (9). Similarly, a large-scale study of university students reported that 53% of participants with subclinical BFRB had more than one BFRBs (5). On the other hand, the underlying reasons for the frequent co-occurrence of certain BFRBs (e.g., TTM and SPD) remain unclear (10), highlighting the need for further research into the phenomenological aspects of BFRBs. In this context, understanding BFRBs patterns is important in clarifying their precise classification within psychiatric systems, refining clinical assessment processes, and developing effective intervention strategies.

Given the high co-occurrence of BFRBs and the negative impact of multiple forms on general functioning, assessment of these behaviours within a transdiagnostic framework is essential. Compared to symptom-specific scales, transdiagnostic measures provide important advantages, including comprehensive assessment of different symptom profiles, time efficiency, and the establishment of a more holistic treatment plan. In this context, the Generic Body-Focused Repetitive Behavior Scale-8 (GBS-8) is a short and practical assessment instrument designed to assess all BFRB symptoms. The GBS-8 has been validated in both psychiatric and non-psychiatric populations aged 18 to 75 years. The scale consists of two subscales: symptom severity and impairment, with a total score derived from the sum of these two subscales (11). In the Turkish sample, no scale with established validity and reliability currently assesses BFRBs in a transdiagnostic framework in a broader youth population. In addition, studies that comprehensively assess BFRBs across a broad spectrum of psychiatric disorders and examine BFRB patterns in detail using intersection analysis remain quite limited.

Therefore, the primary aim of this study was to evaluate the psychometric properties, including factor structure, reliability, and divergent validity, of the Turkish version of the GBS-8. The secondary objective was to explore the relationships between BFRBs and comorbid psychiatric symptoms, quality of life (QoL) parameters, and clinician-rated symptom severity scale. Additionally, we sought to characterize BFRB patterns using intersectional analysis. We hypothesized that the GBS-8 would be a valid and reliable psychometric tool for BFRBs in the Turkish sample. We also predicted that the symptom severity and impairment subscales, as well as the total GBS-8 score, would be positively correlated with the clinician-rated symptom severity, comorbid psychiatric symptoms, and quality of life parameters. Finally, we expected that multiple BFRBs would be reported at high rates and that specific combinations of BFRBs, such as SP and NB, would co-occur more frequently.

METHOD

Participants

This multicenter study included 362 adolescents and young adults from seven hospitals in five regions of Turkey. Inclusion criteria were: (1) age 12–30 years; (2) current psychiatric diagnosis per DSM-5; (3) at least one current BFRB; and (4) voluntary participation and completion of measures. Exclusion criteria were intellectual disability, autism spectrum disorder, schizophrenia spectrum disorders, refusal of informed consent, and insufficient Turkish proficiency. Forty-three participants were excluded (27 due to subthreshold psychiatric symptoms and 16 due to incomplete responses). The final sample included 362 individuals.

Although BFRBs have a bimodal age of onset distribution, with peaks in both childhood and adolescence, studies have suggested that adolescent-onset cases are associated with greater symptom severity and a more unfavorable clinical course (12). In addition, these symptoms may remain clinically relevant into young adulthood; however, a decline in both frequency and severity tends to occur after the age of 35-40 years (6). Although the age ranges in previous studies vary considerably due to heterogeneous sampling, adolescents and young adults are commonly included (5-7). This further supports the importance of a valid and reliable assessment tool tailored to this developmental period. Accordingly, the selection of the 12–30 age group in the present study represents a clinically and methodologically appropriate approach based on existing evidence.

Procedures

Permission to adapt the scale for Turkish adolescents and young adults was obtained from original authors of the scale via email. The scale was independently translated into Turkish by two bilingual Turkish psychiatrists. Following review, discrepancies were resolved by consensus among the authors and translators, and minor modifications were made to enhance clarity and relevance, such as including school-related references and a detailed introduction on BFRBs. A professional translator with no prior knowledge of the scale performed a back-translation into

English, which was then approved by the original developers. Afterward, a pilot study with 10 participants ensured comprehensibility, with final adjustments made accordingly.

The sample included adolescents aged 12–18 referred to Child and Adolescent Psychiatry outpatient clinics and young adults aged 19–30 attending Psychiatry outpatient clinics between November 21, 2024, and February 21, 2025. Participants received detailed verbal and written information about the study's purpose, methodology, benefits, risks, data confidentiality, and researcher contact details. Written informed consent was obtained from all participants and from parents of adolescents. Adolescents were assessed alongside their families, whereas young adults were interviewed individually. Assessments included sociodemographic data, personal/family medical and psychiatric history, current psychiatric complaints, and functioning levels (school for adolescents; work for adults). Psychiatric diagnoses were determined according to DSM-5 criteria. Researchers completed the sociodemographic form and the Clinical Global Impression-Severity (CGI-S) scale of whole sample. Adolescents completed the GBS-8, Brief Symptom Inventory (BSI), and Pediatric Quality of Life Inventory (PedsQL), while young adults completed the GBS-8, BSI, and Short Form-12 (SF-12).

For test-retest reliability, 100 participants were randomly selected and invited to retake the GBS-8 after two weeks; however 65 participants (65%) completed the retest.

Measures

The sociodemographic and clinical data form, developed by the researchers, assesses demographic characteristics of adolescents and young adults, including age, gender, family structure, education duration, parental age, education, and occupational status. It includes sections on personal and family medical and psychiatric histories, capturing previous psychiatric admissions, psychotropic medication use, family psychiatric disorders, and diagnoses of affected family members. Additionally, the form covers clinical data on BFRBs, such as type and duration, comorbid psychiatric disorders, and details of psychotropic medication use, including medication names.

The Generic Body-Focused Repetitive Behavior Scale-8 (GBS-8) developed by Moritz et al. (2022), is a self-report instrument assessing BFRBs from a transdiagnostic perspective, adapting from the Skin Picking Scale-Revised (13). It was originally validated in a sample of adults aged 18 to 75. It consists of eight items rated on a five-point Likert scale, measuring frequency, intensity, time spent, control, emotional distress, functional impact, avoidance, and physical damage. The GBS-8 comprises two subscales: Symptom Severity (Items 1–4) and Impairment (Items 5–8). The total score is the sum of both subscales, with higher scores reflecting greater severity of BFRBs in terms of both symptom severity and impairment. No cut-off value is defined for the scale. In the original study, internal consistency of the GBS-8 was reported as $\alpha = 0.84$ for the total score, $\alpha = 0.77$ for Symptom Severity, and $\alpha = 0.82$ for Impairment (11). The Turkish GBS-8 showed strong internal consistency and a well-fitting two-factor structure, including symptom severity ($\alpha = 0.853$), impairment ($\alpha = 0.779$), and the total score ($\alpha = 0.855$).

The Clinical Global Impression Scale (CGI) is a clinician-rated tool that assesses psychiatric disorders across all ages (14). It comprises three subscales: Severity of Illness, Improvement, and Side Effects. In this study, only the CGI-S (Clinical Global Impression – Severity), a single-item scale ranging from 1 (normal) to 7 (among the most extremely ill), was used as an indicator of BFRBs symptom severity. Since it consists of only one item, Cronbach's alpha coefficients are not applicable.

The Brief Symptom Inventory (BSI) is a self-report measure assessing psychiatric symptoms via a 4-point Likert scale (15), whose Turkish version's reliability and validity were confirmed by Hisli Şahin and Durak (16). It includes 53 items across 9 subscales (somatization, OCD, interpersonal sensitivity, depression, anxiety disorder, hostility, phobic anxiety, paranoid ideation, psychoticism) and three global indices: Global Severity Index (GSI), Positive Symptom Total (PST), and Positive Symptom Distress Index (PSDI). The BSI was originally validated with a sample of university students aged 17 to 26. However, a subsequent study by Şahin et al. (17) with adolescents aged 13-17 years showed that the factor structure and psychometric properties were very similar to those of the adult version, with the number of items and content remaining unchanged. Based on these findings, the use of the BSI with both young adult and adolescent samples in the present study is considered theoretically and methodologically appropriate. In this study, Cronbach's alpha was 0.957.

The Pediatric Quality of Life Inventory (PedsQL) is a self-report measure assessing health-related quality of life in children and adolescents aged 2–18 (18), with validity and reliability confirmed for the Turkish version by Cakin Memik et al. (19) in a sample of adolescents aged 13–18. It consists of 23 items across three subscales: general health, physical health, and psychosocial health. Higher total scores indicate better perceived quality of life. In this study, Cronbach's alpha was 0.849.

The Short Form-12 Health Survey (SF-12), is a self-report instrument assessing general health and health-related quality of life in adults (20), with validity and reliability of the Turkish version confirmed by Soylu and Kütük (21) in a sample including young adults aged 18–29 and older adults aged 60–80. It consists of 12 items across 8 subscales: physical functioning, role physical, bodily pain, general health, role emotional, mental health, social functioning, and vitality. Total scores range from 0 to 100, with scores ≥50 indicating better perceived health status and quality of life. In this study, Cronbach's alpha was 0.773.

Statistical Analysis

The sample size for the validity and reliability analyses of the scale was determined based on recommendations in the literature. Confirmatory factor analysis, Cronbach's alpha reliability analysis, and test-retest analyses were conducted for the GBS-8, which consists of eight items and two factors. The literature on confirmatory factor analysis recommends that the sample size should be at least 10 times the number of items and include a minimum of 200 participants (22, 23). The sample size of 362 participants in our study exceeds this requirement. In addition, the minimum sample size of 100 participants recommended for reliability analyses was also met. It is also stated that a minimum of 30 participants is sufficient for test-retest analyses (24); accordingly, follow-up data were collected from a sufficient number of participants ($n = 65$). Taken together, these criteria indicate that the sample size was sufficient to obtain valid and reliable results.

All analyses were conducted using R (v4.4.2; packages: lavaan, psych, haven) and IBM SPSS Statistics (v30). Twenty-six expert ratings of item relevance evaluated content validity. Construct validity was assessed via Confirmatory Factor Analysis (CFA), with model fit evaluated using the Comparative Fit Index (CFI; > 0.90 acceptable, > 0.95 excellent), Tucker-Lewis Index (TLI; > 0.90 acceptable, > 0.95 excellent), and Root Mean Square Error of Approximation (RMSEA; < 0.08 acceptable, < 0.05 excellent). Modification indices guided covariance additions between specific items to enhance fit without compromising theoretical structure. Internal consistency was calculated using Cronbach's alpha for subscales and the total scale. Test-retest reliability was measured by Intraclass Correlation Coefficients (ICCs; two-way mixed-effects, absolute agreement) with 95% confidence intervals. Discriminant validity was assessed using Spearman correlation coefficients between GBS-8, CGI-S, PedsQL, SF-12, and psychiatric symptoms (BSI), as the assumptions for parametric testing were not met. Frequency distributions and descriptive statistics explored the prevalence and co-occurrence of BFRBs. Cross-tabulations, heatmaps, and intersection graphs visualized relationships and identified behavioural clusters. Statistical significance was set at $p<0.05$.

RESULTS

Demographic Characteristics of the Sample

The study included 362 participants (mean age = 17.74 ± 5.04 years), predominantly female. Most were from nuclear families, nearly half had prior psychiatric admissions or family psychiatric history. Mothers had lower education and employment rates than fathers. Common family psychiatric diagnoses were depression and anxiety disorders; other conditions were less frequent. Additionally, 6.1% reported medical conditions. The mean BFRB duration was 49.68 months, with onset at 16.60 years. Detailed demographics and clinical characteristics are presented in Table 1.

Reliability and Validity Analysis of the GBS-8

Content Validity

Content validity was assessed by 26 experts rating 8 items on relevance (1 = essential, 2 = useful, 3 = unnecessary). The item-level Content Validity Index (I-CVI) was calculated as CVI = [(G/N/2)] - 1, where G is the number of experts rating the item essential, and N is the total experts. The overall scale CVI (S-CVI/Ave) was 0.76, indicating that 76% of experts considered items essential on average. These results support the scale's content validity, confirming item representativeness.

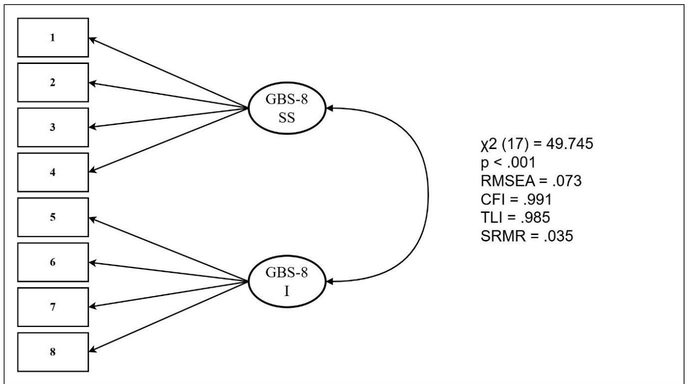

Figure 1. Confirmatory Factor Analyses and Goodness of Fit Indices of GBS-8

Construct Validity

The construct validity of the GBS-8 scale was evaluated using CFA,

Table 1. Demographic and Clinical Characteristics of the Participants (n = 362)

Age *(years)*, mean (SD)			17.74 (5.04)	Previous Psychiatric Admission	180 (49.7%)
Gender	Female		285 (78.7%)		
	Male		77 (21.3%)	History of Psychotropic Medication Use	141 (39.0%)
Family Structure	Nuclear		326 (90.1%)		
	Extended		36 (9.9%)	Family History of Psychiatric Illness	149 (41.4%)
Parental Status	Together		288 (79.6%)		
	Separated		54 (14.9%)	Diagnosis of the Family Member with Psychiatric Illness	
	Deceased		20 (5.5%)	DD	49 (13.54%)
Mother	Age *(years)*, mean (SD)		44.94 (6.66)	AD	43 (11.88%)
	Education *(years)*, mean (SD)		9.43 (4.15)	OCD	15 (4.14%)
	Occupation	Unemployed	227 (62.7%)	BAB	10 (2.76%)
		Worker	45 (12.4%)	Psychosis and Related Dis.	8 (2.21%)
		Civil Servant	45 (12.4%)	Suicide	5 (1.38%)
		Merchant	8 (2.2%)	ADHD	4 (1.10%)
		Other	33 (9.1%)	ASD	3 (.83%)
Father	Age *(years)*, mean (SD)		47.96 (6.80)	Alcohol Use Disorder	3 (.83%)
	Education *(years)*, mean (SD)		10.90 (4.07)	Intellectual Disability	3 (.83%)
	Occupation	Unemployed	5 (1.4%)	Dementia	2 (.55%)
		Worker	94 (26.0%)	PTSD	1 (.28%)
		Civil Servant	86 (23.8%)	TTM	1 (.28%)
		Merchant	60 (16.6%)	Nail Biting	1 (.28%)
		Other	106 (29.3%)	FND	1 (.28%)
Grade (if only < 18) *(years)*, mean (SD)			9.58 (1.93)		
Medical condition			22 (6.1%)		

DD: Depressive Disorders; AD: Anxiety Disorders; OCD: Obsessive Compulsive Disorder; BAB: Bipolar Affective Disorders; ADHD: Attention Deficit Hyperactivity Disorder; ASD: Autism Spectrum Disorders; PTSD: Post-Traumatic Stress Disorder; TTM: Trichotillomania; FND: Functional Neurological Symptom Disorder; M: mean; SD: standard deviation.

confirming its two-factor structure: Symptom Severity (items 1–4) and Impairment (items 5–8). Modification indices were examined to identify potential model improvements. Based on these indices, covariances were added between Items 4 and 5 and Items 6 and 7, reflecting inter-item relationships that improved the model fit without compromising the theoretical structure. Following these modifications, the model demonstrated excellent fit with χ^2 = 49.745 (df = 17, p<0.001), CFI = 0.991, TLI = 0.985, RMSEA = 0.073, and SRMR = 0.035.

The factor loadings are shown in Table 2. Loadings ranged from 0.651 to 0.883 for Symptom Severity, and 0.666 to 0.791 for Impairment; all were statistically significant (p<0.001). These results indicate strong item-construct associations, supporting construct validity. Explained variance (R^2) ranged from 0.423 (Item 4) to 0.780 (Item 2), with Items 2 (0.780) and 1 (0.765) being the highest. Additionally, a strong covariance between Symptom Severity and Impairment (0.680, p<0.001) suggests these constructs are interrelated, justifying a total score for overall measurement. Covariances added between Items 4–5 (0.232, SE =

Table 2. Factor Loadings For The Generic Body-Focused Repetitive Behavior Scale-8 (GBS-8)

Items	Factor 1: Symptom Severity	Factor 2: Impairment	p value
1	0.875 (0.017)	-	<0.001
2	0.883 (0.016)	-	<0.001
3	0.836 (0.021)	-	<0.001
4	0.651 (0.034)	-	<0.001
5	-	0.791 (0.032)	<0.001
6	-	0.706 (0.040)	<0.001
7	-	0.666 (0.045)	<0.001
8	-	0.673 (0.040)	<0.001

Factor loadings are presented with standard errors in parentheses.

Table 3 . Correlation Between GBS-8, CGI-S, and Quality of Life Measures

		GBS-8			CGI-S	PedsQL[1]			SF-12[2]							
		SS	I	T		Total	Physical Health Summary Score	Psychosocial Health Summary Score	Physical Function	Physical Role	Pain	General Health	Vitality	Social Function	Emotional Role	Mental Health
GBS8	SS	1.000														
	I	0.549**	1.000													
	T	0.866**	0.882**	1.000												
CGI-S		0.362**	0.485**	0.482**	1.000											
PedsQL	Total	-0.336**	-0.434**	-0.446**	-0.354**	1.000										
	Physical Health Summary Score	-0.304**	-0.354**	-0.379**	-0.280**	0.880**	1.000									
	Psychosocial Health Summary Score	-0.333**	-0.447**	-0.451**	-0.367**	0.961**	0.725**	1.000								
SF12	Physical Function	-0.287**	-0.268**	-0.301**	-0.165	.	.	.	1.000							
	Physical Role	-0.407**	-0.447**	-0.463**	-0.288**	.	.	.	0.526**	1.000						
	Pain	-0.100	-0.021	-0.086	-0.002	.	.	.	-0.104	-0.093	1.000					
	General Health	-0.012	-0.022	0.002	0.006	.	.	.	-0.126	-0.119	0.279**	1.000				
	Vitality	-0.016	-0.116	-0.072	-0.088	.	.	.	-0.014	0.133	0.032	0.227*	1.000			
	Social Function	-0.403**	-0.434**	-0.468**	-0.375**	.	.	.	0.294**	0.366**	0.091	-0.163	0.045	1.000		
	Emotional Role	-0.335**	-0.352**	-0.374**	-0.228*	.	.	.	0.448**	0.497**	-0.023	-0.018	-0.026	0.540**	1.000	
	Mental Health	-0.223*	-0.507**	-0.386**	-0.445**	.	.	.	0.175	0.349**	0.094	0.108	0.361**	0.421**	0.333**	1.000

GBS-8: Generic Body-Focused Repetitive Behavior Scale-8; SS: symptom severity; I: impairment; T: total; PedsQL: Pediatric Quality of Life Inventory; SF-12: Short Form-12 Health Survey; CGI-S: Clinical Global Impression Scale. Spearman correlation was used. ** p<0.010, *p<0.050. A total of 248 individuals under the age of 18 completed the PedsQL form to assess quality of life, while 114 individuals over the age of 18 completed the SF-12 form.

Table 4. Correlation Between GBS-8 and BSI

		GBS-8			BSI											
		SS	I	T	Somatization	Obsessive-Compulsive	Interpersonal Sensitivity	Depression	Anxiety	Hostility	Phobic Anxiety	Paranoid Ideation	Psychoticism	GSI	PSDI	PST
GBS8	SS	1.000														
	I	0.549**	1.000													
	T	0.866**	0.882**	1.000												
BSI	Somatization	0.352**	0.418**	0.437**	1.000											
	Obsessive-Compulsive	0.376**	0.409**	0.450**	0.653**	1.000										
	Interpersonal Sensitivity	0.367**	0.407**	0.433**	0.603**	0.682**	1.000									
	Depression	0.381**	0.421**	0.450**	0.670**	0.740**	0.769**	1.000								
	Anxiety	0.401**	0.443**	0.479**	0.804**	0.744**	0.723**	0.790**	1.000							
	Hostility	0.385**	0.423**	0.454**	0.712**	0.638**	0.621**	0.721**	0.753**	1.000						
	Phobic Anxiety	0.333**	0.447**	0.439**	0.656**	0.701**	0.695**	0.690**	0.726**	0.636**	1.000					
	Paranoid Ideation	0.351**	0.438**	0.446**	0.652**	0.673**	0.742**	0.747**	0.724**	0.720**	0.690**	1.000				
	Psychoticism	0.354**	0.426**	0.442**	0.649**	0.740**	0.750**	0.807**	0.750**	0.670**	0.722**	0.776**	1.000			
	GSI	0.417**	0.483**	0.510**	0.838**	0.839**	0.830**	0.899**	0.908**	0.836**	0.823**	0.855**	0.880**	1.000		
	PSDI	0.418**	0.483**	0.510**	0.838**	0.839**	0.831**	0.899**	0.908**	0.836**	0.824**	0.855**	0.880**	1.000**	1.000	
	PST	0.407**	0.464**	0.493**	0.744**	0.818**	0.783**	0.855**	0.852**	0.795**	0.750**	0.782**	0.800**	0.930**	0.930**	1.000

GBS-8: Generic Body-Focused Repetitive Behavior Scale-8; SS: symptom severity; I: impairment; T: total; BSI: Brief Symptom Inventory; GSI: Global Severity Index; PSDI: Positive Symptom Distress Index; PST: Positive Symptom Total. Spearman correlation was used. ** p<0.010 , N= 362.

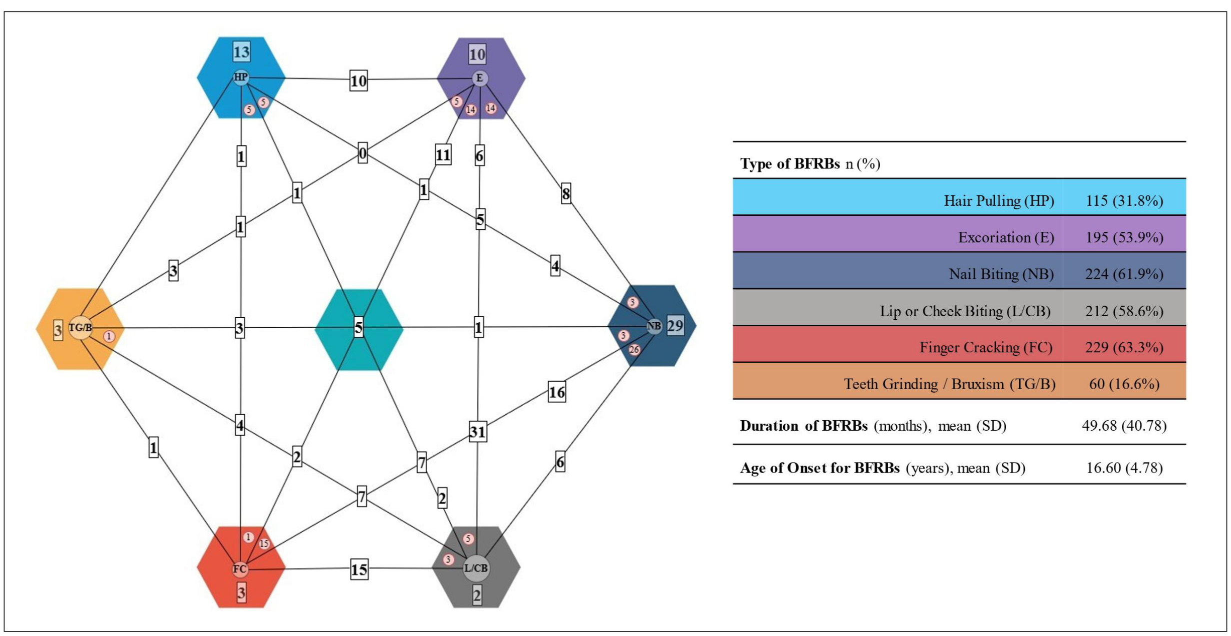

Figure 2. BFRB Subtypes and Their Interrelations

Note: Figure 2 illustrates the co-occurrence patterns of body-focused repetitive behaviors (BFRBs) observed in the sample. Each hexagonal node represents a specific BFRB subtype: Hair Pulling (HP), Excoriation (E), Nail Biting (NB), Lip or Cheek Biting (L/CB), Finger Cracking (FC), and Teeth Grinding/Bruxism (TG/B). The color coding of the nodes corresponds to the prevalence data shown in the legend on the right.

The numbers displayed at the connection points (nodes or intersections) indicate the number of participants exhibiting the behavior patterns located at the ends of the connecting lines. For example, the central number "5" represents five participants who reported experiencing all six BFRB types simultaneously—this is illustrated by lines extending from the central node to each behavior-specific node. Similarly, an edge labeled "31" between Nail Biting and Lip/Cheek Biting shows that 31 participants reported both behaviors.

The detailed combinations of these patterns are presented in Supplementary Table S1. This network visualization highlights not only the frequency but also the complexity of co-occurring BFRB subtypes in the study population.

0.069, p<0.001) and Items 6–7 (0.255, SE = 0.073, p = 0.004) significantly improved model fit, capturing nuanced item relationships and enhancing construct validity.

Discriminant Validity

Table 3 shows Spearman correlations between GBS-8 (Symptom Severity and Impairment), CGI-S, and quality of life (PedsQL, SF-12). GBS-8 total scores negatively correlated with PedsQL Total (r = -0.446, p<0.010) and Psychosocial Health Summary (r = -0.451, p<0.010). Similarly, negative correlations emerged between GBS-8 and SF-12 domains, including Physical Role (r = -0.463, p<0.010) and Social Function (r = -0.468, p<0.010). Table 4 presents correlations between GBS-8 and BSI symptom dimensions. All correlations were positive and significant, strongest with GSI (r = 0.510, p<0.010). Notably, Depression (r = 0.450), Anxiety (r = 0.479), and Obsessive-Compulsive (r = 0.450) subscales correlated strongly with GBS-8 (all p<0.010).

Reliability

Internal consistency of the GBS-8 was assessed using Cronbach's alpha. The Symptom Severity subscale (Items 1–4) showed excellent reliability (α = 0.853), and the Impairment subscale (Items 5–8) demonstrated good reliability (α = 0.779). The total scale (Items 1–8) also exhibited excellent internal consistency (α = 0.855). Test-retest reliability assessed via ICC (two-way mixed-effects, absolute agreement) indicated excellent temporal stability for Symptom Severity (ICC = 0.968, 95% CI: 0.948–0.980), Impairment (ICC = . 0. 964, 95% CI: 0.941–0.978), and the total scale (ICC = 0.969, 95% CI: 0.949–0.981).

BFRB Pattern in the Sample

The analysis identified 50 distinct BFRB patterns (Supplementary Table S1). The most frequent pattern included SP, NB, L/CB, and KC (n = 31, 8.56%), followed by NB alone (n = 29, 8.01%) and a combination of NB, L/CB, and KC (n = 26, 7.18%). Single behaviours, such as TG/B, were rare (n = 3, 0.83%). Figure 2 illustrates the distribution and co-occurrence of BFRBs, with each hexagonal node representing a specific behaviour and participant count. NB was most common as an isolated behaviour, whereas L/CB rarely occurred alone. Notably, HP and TG/B never co-occurred, suggesting different underlying mechanisms.

Table 5 summarizes psychiatric disorders identified in the sample (n = 362). The most common diagnoses were Major Depressive Disorder (n = 139, 38.4%), SPD (n = 67, 18.5%), TTM and generalized anxiety disorder (GAD) (each n = 58, 16.0%), ADHD (n = 52, 14.4%), social anxiety disorder (n = 42, 11.6%), OCD (n = 34, 9.4%), and performance anxiety (n = 32, 8.8%). Disorders occurring in ≤5% included panic disorder, smoking/tobacco use, dissociative disorders, and separation anxiety disorder. Rare disorders (<1%) included cyclothymia, speech disorders, tic disorders, enuresis nocturna, encopresis, PTSD, borderline personality disorder, specific learning disorders, and bipolar affective disorder, each affecting one or two participants.

Figure 3 illustrates intersections between various BFRBs. The left panel's line graph highlights overlap trends among behaviours, while the heatmap on the right quantifies these intersections. Heatmap diagonals represent individuals exhibiting single behaviours, with FC most common (n = 229), followed by NB (n = 224) and L/CB (n = 212). HP and SP affected 115 and 195 participants, respectively, while TG/B was the least common (n = 60). Off-diagonal cells indicate behaviour co-occurrences; notably, KC and NB (n = 162), SP and NB (n = 127), and L/CB and KC (n = 162) frequently overlapped. The line graph emphasizes variability in co-occurrence, indicating NB and L/CB often coincide with other behaviours, whereas TG/B rarely does.

DISCUSSION

This study examined the validity and reliability of the Turkish version of the GBS-8 in adolescents and young adults while also exploring BFRB patterns in clinical samples within this age group. A multi-step procedure validated the Turkish version of the scale. First, experts confirmed content validity, ensuring the items represented the target construct. The I-CVI score indicated that the scale was concise, coherent, and understandable. Second, CFA confirmed construct validity, showing that the two-factor model and eight-item Turkish GBS-8 provided an acceptable structure (CFI = 0.991, RMSEA = 0.073). Factor covariances and correlations between the Symptom Severity and Impairment subscales were significant, suggesting the scale effectively assesses both dimensions (25). The original study did not use CFA, and its authors recommended its application for validation (11). This study further supports the strong psychometric properties of the GBS-8.

Table 5. Psychiatric Disorders in the Sample (n = 362)

Major Depressive Disorder	139 (38.4%)	Insomnia	6 (1.7%)
Skin-Picking Disorder	67 (18.5%)	Night Terror	5 (1.4%)
Trichotillomania	58 (16.0%)	Agoraphobia	3 (.8%)
Generalized Anxiety Disorder	58 (16.0%)	Bulimia Nervosa	3 (.8%)
Attention Deficit Hyperactivity Disorder	52 (14.4%)	Speech Disorders	2 (.6%)
Social Anxiety Disorder	42 (11.6%)	Cyclothymia	2 (.6%)
Obsessive Compulsive Disorder	34 (9.4%)	Oppositional Defiant Disorder	2 (.6%)
Performance Anxiety	32 (8.8%)	Specific Learning Disorders	2 (.6%)
Other Depressive Disorders	26 (7.2%)	Borderline Personality Disorder	2 (.6%)
Panic Disorder	20 (5.5%)	Tic Disorders	1 (.3%)
Smoking/Tobacco	22 (6.1%)	Enurezis Nocturna	1 (.3%)
Dissociative Disorders	14 (3.9%)	Encopresis	1 (.3%)
Somatic Symptom Disorder	11 (3.0%)	Other Eating Disorders	1 (.3%)
Functional Neurological Symptom Disorder	9 (2.5%)	Bipolar Affective Disorder	1 (.3%)
Separation Anxiety Disorder	11 (3.0%)	Post-Traumatic Stress Disorder	1 (.3%)
Specific Phobia	7 (1.9%)	Dysthymia	1 (.3%)
Alcohol Use Disorders	8 (2.2%)	Conduct Disorder	1 (.3%)
Other Sleep Disorders	6 (1.7%)		

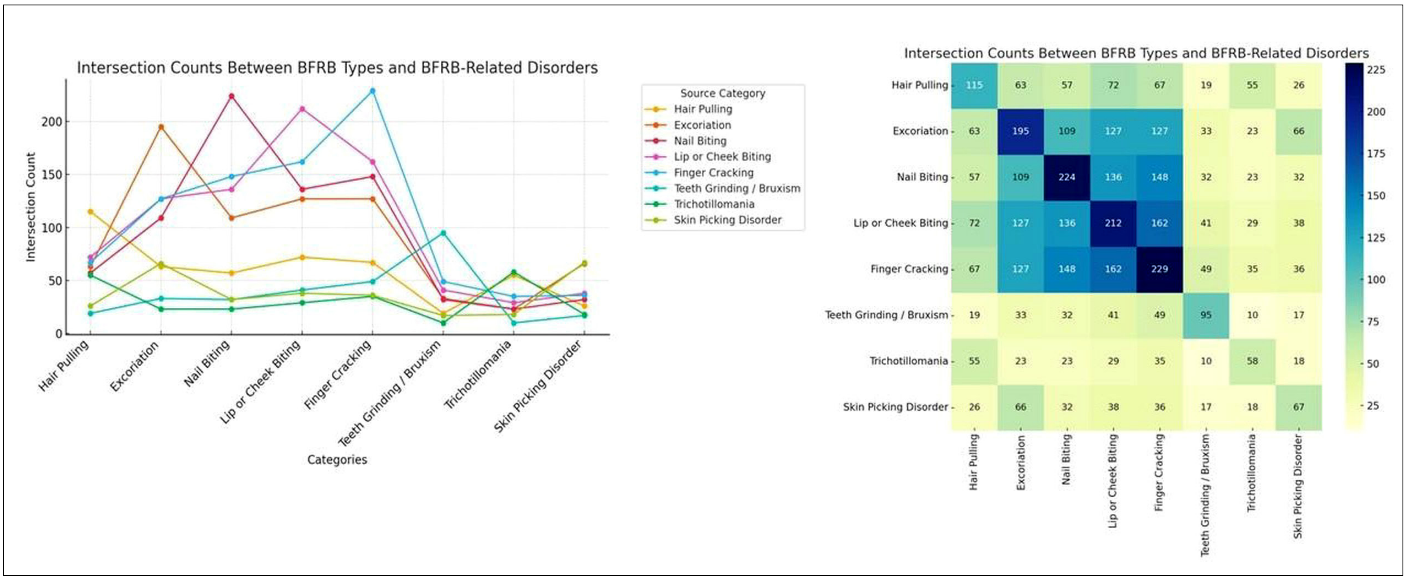

Figure 3. Intersection Counts Between BFRB Types and BFRB-Related Disorders

In the reliability analysis of the Turkish GBS-8, results indicated good internal consistency and test-retest reliability. Previous research on adult populations reported reliability coefficients of 0.84, 0.77, and 0.82 for the Symptom Severity subscale, Impairment subscale, and total score, respectively (11). Our findings showed that the Turkish version exhibited similar reliability coefficients (Total: α = 0.855; Symptom Severity: α = 0.853; Impairment: α = 0.779), confirming adequate internal consistency (26). Furthermore, a two-week test-retest assessment on a random subsample indicated strong correlations between the GBS-8 total and subscale scores, mirroring the original study's findings (11). Overall, these results suggest that both the subscales and the total scale reliably capture the intended constructs, thereby supporting their use in research and clinical settings, given the stability and consistency of responses over time.

As hypothesized, the Symptom Severity and Impairment subscales and the overall GBS-8 score demonstrated moderate positive correlations with the CGI-S. In this study, the CGI-S was employed to assess the severity of BFRBs due to its well-established psychometric properties and sensitivity to change. It is widely utilized in research to evaluate both symptom severity and treatment outcomes in BFRBDs (27). Notably, higher GBS-8 scores were indicative of greater overall BFRB severity. This correlation between the GBS-8 total and subscale scores and the CGI-S further supports the scale's validity and applicability in both research and clinical settings. Specifically, these findings reinforce the utility of the GBS-8 in comparing symptom profiles, identifying underlying pathogenetic mechanisms, and evaluating treatment effects across different BFRB populations.

The requirement that BFRBs result in clinically significant distress or functional impairment has been debated, particularly regarding its operationalization (28). QoL is widely recognized as a measure of impairment, encompassing physical, psychological, and social domains (29). Studies on QoL in different BFRB subtypes have yielded mixed results. Some found no significant differences between individuals with HP and healthy controls (30), while others reported significantly lower QoL in individuals with HP, SPD, and NB (10,31). Preliminary evidence suggests depressive symptoms are key determinants of QoL impairment in HP (32,33). A population-based study found that individuals with BFRBs, including L/CB, had significantly lower QoL than controls across multiple domains (34). Similarly, the present study observed higher GBS-8 scores associated with decreased health-related QoL, notably in emotional well-being, social functioning, and physical health. These results contrast with Moritz et al. (11), which found only weak negative correlations, possibly due to the inclusion of an adolescent sample in the current study. Developmental factors and heightened social pressures in adolescence may amplify the functional impact of BFRBs. Variability in co-occurring depressive and anxiety symptoms may also influence QoL differences. Future longitudinal research should clarify the direct effects of BFRBs on QoL while controlling for mood and anxiety disorders. Studies should include diverse clinical and community samples spanning childhood to late adulthood better to understand the developmental trajectories and long-term impacts of BFRBs.

This study identified significant associations between BFRB symptoms and depression, anxiety, and obsessive-compulsive symptoms, aligning with prior research conducted on both clinical and non-clinical populations (29,35). For example, studies on community samples reported a notable relationship between pathological skin picking and anxiety, depression, and OCD symptoms (36). Similarly, research on adults indicated significant overlaps between HP behaviours, depression, anxiety, addictive behaviours, and other BFRBs (35). Recently, a study demonstrated that the presence of BFRBs, including NB and L/CB, increased the risk of significant mental health symptoms by 2 to 4 times across all examined constructs. They also highlighted that HP, NB, and L/CB exhibited similar associations with anxiety, depression, and OCD symptoms, while SP presented as the most severe BFRB subtype (34). Conversely, studies indicate a higher prevalence of BFRBs among individuals with OCD and anxiety disorders (8). Due to the cross-sectional nature of the study, the directionality of these associations remains unclear; whether BFRBs contribute to developing mental health issues or if existing psychiatric disorders predispose individuals to engage in these behaviours is uncertain. It has been proposed that individuals experiencing anxiety or mood symptoms might engage in BFRBs as emotional regulation strategies (37). Future longitudinal research should clarify the temporal relationship between BFRBs and psychiatric symptoms, exploring whether BFRBs act as risk factors for psychiatric disorders or arise as maladaptive coping strategies, informing early intervention and targeted treatment approaches.

Patterns in the clinical sample screened with GBS-8 reveal significant overlaps among less commonly studied BFRBs, such as NB, L/CB, and KC. NB and L/CB frequently co-occur with KC and SP, suggesting shared psychological or environmental factors. In contrast, the lack of co-occurrence between HP and TG/B indicates that some BFRBs may operate independently, influenced by distinct triggers. These findings highlight the interconnected nature of specific BFRBs, with clusters like NB and L/CB being particularly prevalent. The complexity and overlap of behavioural patterns emphasize the need to integrate transdiagnostic measures like the GBS-8 alongside symptom-specific scales. This study underscores the heterogeneity of BFRBs and the importance of tailored interventions addressing both overlapping and isolated behaviours. Future research should examine whether these behavioural clusters correspond to distinct treatment responses or psychopathological profiles, aiding in developing more personalized therapeutic approaches (2).

This study has several limitations. Reliance on self-report measures may introduce response biases due to shame and reluctance to disclose BFRB symptoms. Multi-informant assessments (e.g., parent or clinician reports) could improve symptom evaluation accuracy. Additionally, the absence of structured diagnostic interviews limits conclusions about the GBS-8's diagnostic validity. Future research should integrate structured clinical assessments for improved accuracy. The study sample, predominantly female and help-seeking, may limit generalizability. Research in community-based and diverse populations is needed to confirm the GBS-8's robustness. Cultural factors should also be considered, as symptom expression and healthcare-seeking behaviours vary across contexts. Investigating cultural influences on self-reporting and BFRB prevalence is crucial. Despite these limitations, this study has key strengths. It validates the GBS-8 in an adolescent population, where BFRBs are common, enhancing clinical relevance. Using CFA to assess factor structure and include a diverse youth sample from various Turkish regions improves methodological rigour. Additionally, screening multiple BFRB subtypes (NB, KC, LC/B, TG/B) strengthens the generalizability and comprehensive evaluation of the GBS-8 across different presentations.

As a results, this study confirms the validity and reliability of the Turkish GBS-8 in adolescents and young adults, validating its factor structure and clinical utility in assessing BFRB severity. The findings highlight behavioural patterns and co-occurrence, emphasizing the need for transdiagnostic assessments. The GBS-8 is an efficient tool for primary care, psychiatry, and psychology clinicians, aiding in screenings, symptom tracking, and treatment evaluations. Its brief format enhances usability across clinical settings. Future research should explore its role in the early identification of high-risk individuals and its effectiveness in distinguishing BFRB subtypes.

Ethics Approval: The study was approved by the Uşak University Medical Ethics Committee for Clinical Studies (November 7, 2024 / No: 468-468-15).

Informed Consent: Written informed consent forms were obtained from each participant and, for adolescents, also from their families.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept- HGO, MEÖ; Design- HGO, MEÖ MK, ASYM, NMK, YSÇ, İYS; Supervision- SM, HGO; Resource- HGO; Materials- HGO; Data Collection and/or Processing- HGO, MEÖ MK, DS, BO, ASYM, NMK, YSÇ, İYS; Analysis and/or Interpretation- MEÖ, MK, İK; Literature Search- HGO, MEÖ MK, DS, BO; Writing- HGO, MEÖ, MK; Critical Reviews- MK, SM.

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Note: *Artificial intelligence tools were not used in this article.*

SUPPLEMENTARY TABLE

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