Original Article

Validation of the German Beliefs in Trichotillomania Scale (BiTS-D)

Linda Hollatz and Alexander L. Gerlach

Clinical Psychology and Psychotherapy, University of Cologne, Germany

Abstract: Trichotillomania (TTM), a body-focused repetitive behavior disorder characterized by pathological hair pulling, remains under-researched. The Beliefs in Trichotillomania Scale (BiTS) is a self-report instrument assessing the cognitions of negative self-belief, low coping efficacy, and perfectionism. This study evaluated the psychometric properties of the German version of the BiTS (BiTS-D). In a cross-sectional study, the BiTS-D was administered to 163 participants with TTM (M = 32.3; SD = 10.7; age range = 18–79 years). The psychometric evaluation included confirmatory factor analysis (CFA), reliability analyses (Cronbach's α, item properties), and correlation analyses with related instruments. CFA replicated the original three-factor structure. Reliability analyses, including inter-item and Spearman correlations, supported the construct, content, and convergent validity of the BiTS-D. The BiTS-D demonstrated strong reliability and validity, establishing it as a robust instrument for assessing TTM-related cognitions in German-speaking populations.

Keywords: trichotillomania, the Beliefs in Trichotillomania Scale (BiTS), confirmatory factor analysis hair-pulling disorder

Die Validierung der deutschen Beliefs in Trichotillomania Scale (BiTS-D)

Zusammenfassung: Die körperbezogene repetitive Verhaltensstörung Trichotillomanie (TTM), definiert durch pathologisches Haareziehen, ist bisher vergleichsweise wenig erforscht. Die Beliefs in Trichotillomania Scale (BiTS) ist ein Selbstauskunftsverfahren zur Erfassung der Kognitionen negative Selbstüberzeugungen, geringe Bewältigungswirksamkeit und Perfektionismus. Ziel dieser Studie war es, die psychometrischen Eigenschaften der deutschen Version der BiTS (BiTS-D) zu untersuchen. Im Rahmen einer Querschnittsstudie wurde die BiTS-D bei 163 von TTM betroffenen Personen (M = 32,3; SD = 10,7; Altersbereich = 18–79 Jahre) eingesetzt. Die psychometrische Evaluation umfasste eine konfirmatorische Faktorenanalyse (CFA), Reliabilitätsanalysen (Cronbachs Alpha, Item-Eigenschaften) sowie Korrelationen mit anderen Instrumenten. Die CFA replizierte die Faktorenstruktur der Originalskala. Sowohl die Reliabilitäts- und Itemanalysen als auch die Spearman-Korrelationen und Inter-Item-Korrelationen bestätigten die Konstrukt-, Inhalts- und konvergente Validität der BiTS-D. Zusammenfassend erweist sich die BiTS-D als ein zuverlässiges und valides Instrument zur Erfassung von TTM-spezifischen Kognitionen im deutschsprachigen Raum.

Schlüsselwörter: Trichotillomanie, The Beliefs in Trichotillomania Scale (BiTS), konfirmatorische Faktorenanalyse Trichotillomania, Hair Pulling Disorder, Confirmatory Factor Analysis

Trichotillomania (TTM), also known as hair-pulling disorder (HPD), is characterized by a compulsive urge to pull out, manipulate, or ingest one's hair. This behavior is not performed for cosmetic reasons but serves as a means to alleviate tension, stress, or anxiety (American Psychological Association, 2020). The disorder affects an estimated 1.7% of the population (Grant et al., 2020) but remains underdiagnosed and under-researched due to high comorbidity rates and limited awareness (Roodt, 2020).

TTM is classified as a body-focused repetitive behavior disorder (BFRBD) in both the *International Classification of Diseases 11th Revision* (ICD-11; World Health Organization, 2019) and the *Diagnostic and Statistical Manual of Mental Disorders Fifth Edition* (DSM-5; American Psychiatric Association, 2013). It is grouped alongside excoriation (or skin picking) disorder (SPD), obsessive-compulsive disorder (OCD), and related conditions. Unlike OCD, BFRBDs are not typically preceded by obsessive-compulsive thoughts, are associated with lower overall impairment, and are often experienced as pleasant or tension-relieving (Gallinat & Schmidt, 2024). For an overview regarding TTM, compare the work by Gallinat et al. (2022).

The cognitive aspects of TTM have garnered increasing attention, as cognitions play a significant role in the development, maintenance, and treatment of various psychological disorders (Wells, 2007). Dysfunctional cognitions can act as triggers for pathological behaviors, maintain these behaviors through negative reinforcement, or, conversely, inhibit them when addressed through cognitive restructuring (Mansueto et al., 1997; O'Connor et al., 2014).

The cognitions of TTM often revolve around self-beliefs, control, coping efficacy, and perfectionism. Thought patterns such as "My hair is imperfect" or "I will never stop pulling" are common and may perpetuate the behavior.

Specifically, Rehm (2016) identified six dysfunctional cognitive domains in eight women with TTM: negative self-beliefs, control beliefs, coping beliefs, beliefs about negative emotions, permission-giving cognitions, and perfectionistic standards. Rehm's qualitative research study laid the foundation for the subsequent identification of three key cognitive factors – low coping efficacy (LCE), negative self-beliefs (NSB), and perfectionism (P) – which significantly correlate with TTM severity (Rehm et al., 2019).

To date, the Beliefs in Trichotillomania Scale (BiTS) has only been utilized in a study conducted by Rehm et al. (2024), examining dysfunctional beliefs by comparing a clinical sample (N = 20) with a nonclinical adult sample (N = 43). The results included a significant correlation between TTM severity and the factors of *self-belief* and *low coping efficacy*, but not *perfectionism*. Rehm et al. (2024, p. 1) concluded, "*The BiTS psychometric properties demonstrated good internal consistency and differentiated clinical from nonclinical participants, with clinical participants endorsing greater negative self-beliefs, lower coping efficacy, and greater perfectionism compared with control participants.*"

The authors did not anticipate the nonsignificant relationship between TTM severity and perfectionism, attributing this result, in part, to the small sample size. Since these findings were published after the conclusion of our study, we did not hypothesize but instead retrospectively compared our results.

Perfectionism is particularly relevant to TTM and other BFRBDs, as it often drives behaviors aimed at "correcting" perceived imperfections, such as removing uneven or undesirable hairs. Noble et al. (2017) investigated the relationships between perfectionism, shame, and TTM symptom severity in two groups: a nonclinical sample of 284 college students and a clinical sample of 125 individuals with TTM. Their findings revealed significantly higher levels of maladaptive perfectionism in the clinical sample. Rehm et al. (2024) found that perfectionism does not directly correlate with symptom severity, but it remains a significant cognitive domain when considered alongside other factors.

Addressing perfectionism in therapeutic interventions for treating TTM has shown promise. For example, in a detailed single-case study, Pélissier and O'Connor (2004) demonstrated that combining cognitive modification of perfectionist beliefs with habit-reversal techniques significantly reduced hair-pulling behavior. Additionally, OCDs, which are comorbid with TTM, are linked to perfectionism, low self-esteem, and poor coping abilities (Miegel et al., 2020).

In addition to perfectionism, disgust has emerged as a potentially important cognitive factor in TTM, although it remains less studied than in SPD (compare Schienle et al., 2020). Disgust and perfectionism have been linked to other mental health conditions, such as OCD, but also, for example, eating disorders (Musumeci et al., 2022). The core emotion of disgust involves cognitive mechanisms aimed at avoiding toxins and pathogens and eliminating perceived harmful elements (Oaten et al., 2009). Bodily fluids, such as saliva, blood, or sweat, often evoke disgust once outside the body (Curtis & Biran, 2001). This makes it understandable why skin imperfections might trigger disgust and a perceived lack of perfection (Schienle et al., 2018).

Individuals with TTM often report disgust toward specific hairs, detached hair, or even self-disgust resulting from their behavior. These disgust-related cognitions may trigger hair pulling or exacerbate its emotional impact. Moreover, Curtis and Biran (2001) proposed that hair pulling may represent an exaggerated grooming behavior, driven by an instinctual urge to detect and remove parasites from the skin – a behavior grounded in disgust, an emotion associated with disease prevention (Olatunji & McKay, 2007). This aligns with findings in SPD, where disgust-related measures have been shown to play a role (Schienle et al., 2018). Including disgust in the assessment of TTM through the Scale for Assessing Disgust Sensitivity (SADS; Schienle et al., 2010), as well as the subscale of the original Questionnaire for Assessing Self-Disgust (QASD; Schienle et al., 2014), could therefore provide a more nuanced understanding of the disorder's affective dimensions.

Only a few self- and clinician-related TTM measures have been validated and implemented. The most widely used measure for adults is the self-rated Massachusetts General Hospital Hairpulling Scale (MGH-HPS; Keuthen et al., 1995), which measures the frequency and intensity of symptomatic behavior and serves an international community.

The self-rated Hairpulling Distress and Impairment Scale (HDIS; Larson, 2007) assesses the affected individual's experience of the hair-pulling behavior. A German version of this instrument was recently presented (Gallinat & Schmidt, 2024).

The clinician-rated Yale-Brown Obsessive-Compulsive Scale for Trichotillomania (Y-BOCS-TTM), adapted from the Yale-Brown Obsessive-Compulsive Scale, also measures the frequency and intensity of symptomatic behavior but is rarely used (Kłosowska et al., 2024).

Flessner et al. (2007) published the Milwaukee Inventory for Subtypes of Trichotillomania-Adult version

(MIST-A), a self-rated measure to differentiate focused versus automatic hair pulling. The MIST-A has already been translated and introduced to German researchers by Gallinat and Schmidt (2024). Finally, Rehm et al. (2019) published the Beliefs in Trichotillomania Scale (BiTS), a self-rated measure intended for clinical diagnosis to establish TTM affectedness and specifically to learn about possible links between an individual's symptomatic behavior and the cognitions of self-belief, self-efficacy, and perfectionism.

The present study aimed to introduce a more comprehensive diagnostic tool for German-speaking clinicians, addressing the complexity and variability of TTM. The translated measure is expected to improve the understanding and treatment of this poorly understood disorder. The validation of the German version of the BiTS (BiTS-D) sought to tackle the multifaceted nature of TTM by offering a reliable instrument to assess TTM-specific cognitions in German-speaking populations. Retaining its original three-factor structure (LCE, NSB, P), the BiTS-D was evaluated for reliability and construct validity. Correlations with other measures, including those assessing disgust, were examined to ensure robust diagnostic capabilities.

Specifically, we hypothesized that the BiTS-D will demonstrate a reliable three-factor structure, effectively measuring distinct cognitive domains related to TTM. The psychometric evaluation assessed the ability of the items to differentiate between varying levels of the construct (selectivity). To establish construct, content, and convergent validity, correlations were drawn between the BiTS-D subscales and other established questionnaires addressing TTM and related constructs, such as disgust. This step aimed to determine how accurately the BiTS-D reflects the underlying psychological constructs it is intended to measure.

We hypothesized that the BiTS would positively correlate with the MGH-HPS, MIST-A, SADS, and QASD. Additionally, the sample was divided into two groups: individuals most likely meeting the diagnostic criteria for TTM and a subclinical group (i.e., those demonstrating pathological hair-pulling behaviors but scoring below the MGH-HPS cut-off). Finally, we examined whether the BiTS can effectively differentiate between these groups.

Method

Procedure

Recruitment was for individuals who were – according to their assessment – affected by hair-pulling disorder. Participation took place in the German-speaking countries Austria, Germany, and Switzerland from March 1, 2021, to May 1, 2023. The study was announced in magazine articles, podcasts, conferences, self-help groups, academic networks, and public and private social media accounts. The inclusion criteria for participation in this study were a minimum age of 18 years and the self-reported hair-pulling behavior had to include the scalp hair. The survey was implemented on the Qualtrics survey platform. After potential participants clicked on the study link, which they had received via social media, flyers, and emails, they were provided with information about the survey. They were explicitly informed that the data collection was anonymous, that the study could be terminated at any time without giving reasons, and that an evaluation for research purposes was planned. This study was approved by the ethics committee of the Faculty of Human Sciences of the University of Cologne (Identification number: LHHF0092), and all participants provided informed consent.

Sample

The sample was recruited based on self-selection. Specifically, individuals were recruited in self-help online forums for people struggling with pulling hair. On the basis of this selection, individuals are likely to fulfill the clinical criteria of TTM. However, participants were not diagnosed formally.

The demographic data (age, gender, native language, family status, years of formal education, professional status, highest academic degree, zip code) were collected at the beginning of the survey.

The final sample consisted of 154 female and nine male participants. The age range was 18–79, with a mean of 32.3 years (SD = 10.7). The sample included 140 single, 40 married, two married and living apart, and six divorced or widowed participants. Almost all participants (n = 153) selected German as their native language. A German zip code was selected by 148 participants, while 15 participants entered zip codes from Switzerland, Austria, or Luxembourg. The sample reported formal education with a mean of 11.38 years. The sample included 84 self-employed individuals, 43 students, nine homemakers, and five unemployed individuals. Four participants were still in school, three were in vocational training, and two were retired. Additional entries included four participants who were disabled, three on maternity/paternity leave, four working as officers, one studying and working, and two volunteering during a social-service year. The question regarding the highest academic degree was completed by 91 participants: 29 had a general higher educa-

tion entrance qualification (*Abitur* or *Matura*), 20 held a bachelor's degree, 17 had a master's degree, 12 had other college or associate degrees, eight had certificates after Grades 9 or 10, two had degrees from vocational schools, and two held doctoral degrees.

The Massachusetts General Hospital Hairpulling Scale (MGH-HPS)

The MGH-HPS, initially developed by Keuthen et al. (1995) and later adapted into German by Bohne (2009), is a widely recognized tool for identifying symptoms of TTM. It is considered the gold standard for assessing TTM through self-reported questionnaires (Farhat et al., 2019). The MGH-HPS comprises seven items, which measure the frequency of urges, intensity of urges, ability to control the urges of hairpulling, attempts to resist hairpulling, control over hairpulling, and associated distress. For example, the question for the intensity of urges is: "On an average day, how intense or 'strong' were the urges to pull your hair?" The severity of the behavior is estimated on a 5-point summative Likert-type scale (0–4) for the preceding 7 days. Higher total values (range = 0–28) indicate a stronger expression of TTM (Bohne, 2009).

The psychometric properties of the original version show an internal consistency of α = .89 (Keuthen et al., 1995). The discriminant and convergent validity are acceptable (O'Sullivan et al., 1995). The cut-off value of the MGH-HPS for the construct validation of the BiTS-D in this study was set at a sum score of ≥ 17. Individuals with a score ranging from 0 to 16 are not likely to receive a clinical diagnosis of TTM. For the English version of the MGH-HPS, a cut-off of ≥ 17 is commonly recommended (see, e.g., Solley & Turner, 2018; Subki et al., 2022). However, to our knowledge, this cut-off has not been formally validated for the English version. By contrast, sensitivity and specificity data are available for a Turkish version (Pirdoğan et al., 2023), where a cut-off of 17 achieves a specificity of 98%. Similarly, for the Polish version (Kłosowska et al., 2024), the specificity at a cut-off of 17 is 87%.

Given that our recruitment was conducted online and diagnoses were not formally confirmed, we decided to use the MGH-HPS to increase the likelihood that participants met the criteria for a TTM diagnosis. Therefore, applying a strict cut-off of 17 (i.e., increasing the sample's specificity for a TTM diagnosis) is a reasonable choice based on the available data. We selected the MGH-HPS as the primary diagnostic instrument and positioned it at the beginning of the survey to establish the likelihood of TTM affectedness before potential dropouts. We chose it over the HDIS (Larson, 2007) because the MGH-HPS is the only German instrument that has been translated and sufficiently validated and so as to minimize the number of questionnaires imposed on the study participants.

The Hair Care Inventory for Trichotillomania (HCI-T)

The HCI-T developped by the authors is a questionnaire regarding the experience and significance of hair care for individuals with TTM (unpublished work by Hollatz & Gerlach, 2021). Five thematic blocks comprise 73 items, including multiple-choice, ranking, and open-ended questions. The following contents are covered: onset, recognition, and description of the disorder; condition and health of hair and scalp; hair and scalp care; the habits and experiences regarding touching hair and scalp; and a free section allowing for comments. The results will be published in a separate article. This information about the HCI-T is provided solely to allow the reader to understand the context in which this study was conducted.

The Milwaukee Inventory for Subtypes of Trichotillomania-Adult (MIST-A)

The Milwaukee Inventory for Subtypes of Trichotillomania-Adult (MIST-A; Flessner et al., 2007) consists of 15 items, which assess the level of TTM behavior regarding "focused" versus "automatic" hair pulling. A sample item for measuring automatic hair pulling would be: "I am in an almost 'trance-like' state when I pull my hair." A sample item for measuring focused hair pulling would be: "I pull my hair while looking in the mirror." The two constructs are estimated on a 10-point summative Likert-type scale, visually divided by three statements: "not true for any," "true for about half," and "true for all of my pulling." The MIST-A has been validated with a sizeable survey-based study (n = 1697), with participants reporting hair-pulling behavior. Internal consistency coefficients (Cronbach α values) were obtained for scores from the two subscales, focused and automatic pulling. Results indicated that both the focused pulling (α = .77) and automatic pulling (α = .73) scales demonstrated adequate internal consistency (Flessner et al., 2007; Nunnally & Bernstein, 1994). We selected the MIST-A because it has been more widely used than the BiTS. Research has considered its two-factor structure, and the differentiation between focused and automatic hair-pulling behavior has proven helpful in self- and clinical diagnoses (Gallinat et al., 2024).

The Scale for Assessing Disgust Sensitivity (SADS)

The SADS (Schienle et al., 2010) explores an individual's sensitivity to disgust. The SADS consists of seven items on a 5-point summative Likert-type scale, such as, "Feeling disgust is a burden for me." The SADS shows good internal consistency (α = .85) and moderate correlations with the tendency to experience disgust (disgust propensi-

ty, r = .35), fear of injections (r = .20), and social phobia tendencies (r = .28). The SADS was selected as an instrument to evaluate cognitions and explore the study participants' sensitivity to disgust, potentially providing insights into the relationship between disgust sensitivity, repetitive body-focused behaviors (Schienle et al., 2018), and TTM.

The Questionnaire for Assessing Self-Disgust (QASD)

The QASD (Schienle et al., 2014) consists of 20 items measuring person- and behavior-related disgust. For this study, we used only the nine items of the QASD that assess the disgust-related self-concept (QASD-SC), rated on a 5-point Likert scale. An example item is: *"I hate some of my personality traits."* This subscale demonstrates good internal consistency (α = .91; Schienle et al., 2018).

The Translation Process of the BiTS Into German

First, the BiTS was translated into German and then translated back by another individual unfamiliar with the original scale, following the suggestions by Brislin (1970) and Gudmundsson (2009). After comparing the two versions and a discussion between the two translators, an updated version was submitted to a third and fourth language expert. The final version of the German BiTS was completed after a final discussion and agreement among the two original translators.

Participants completing the original BiTS respond to the 14 items on a 7-point Likert-type scale with the anchors *disagree very much*, *disagree moderately*, *disagree a little*, *neither agree nor disagree*, *agree a little*, *agree moderately*, and *agree very much*. The literal translation of these response options into German would have been too long and complicated to read. Consequently, the 7-point Likert-type scale was retained; however, only three anchor points were used: *disagree very much* (value 1), *neither agree nor disagree* (value 4), and *agree very much* (value 7). The 14 items were translated as closely to the original as possible. A copy of the BiTS-D, as well as the translation comparison for the 7-point Likert-type scale, is included in the appendices (see Appendix A and B).

Participation Flow

The decision to use a sample size of at least 150 is justified by the usual requirements for the psychometric examination of the questionnaires, in particular for the necessary confirmatory factor analyses (e.g., Morgado et al., 2018; Lakens, 2022; Giner-Sorolla, 2024). Responding to recruitment efforts, 341 individuals clicked on the survey's introductory page. The final sample size for the psychometric validation of the BiTS-D was N = 163.

Survey dropout rates may be attributed to diverse reasons, such as technical difficulties, loss of interest, or the survey length. Figure 1 depicts the participation flow.

Data Analysis

Data analyses were conducted using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., 2020) and Mplus Version 5.1 (Muthén & Muthén, 2008). The data were assumed to be on an ordinal scale (Jamieson, 2004; Wu & Leung, 2017). The goal was to replicate the published three-factor structure of the BiTS and check the psychometric properties of the respective models. The mean- and variance-adjusted method of weighted least squares (WLSMV) was employed as the estimator for the confirmatory factor analysis. In addition to the chi-square test, the comparative fit index (CFI), the Tucker–Lewis incremental fit index (TLI), and the root mean square error of approximation (RMSEA) are reported. The chi-square test alone would not be suitable as it can be prone to violations of various conditions (Schermelleh-Engel et al., 2003). Following the recommendations of Weston and Gore (2006), in cases where the sample size is below 500 and clinical constructs involve more significant variability or heterogeneity, strict cut-offs may be less appropriate. Therefore, we aimed for CFI and TLI values above .90 and RMSEA below .10 (e.g., Hu & Bentler, 1995).

Next, the internal consistency of the subscales and the intercorrelations between the subscales were examined. Cronbach' α coefficient, recommended as the standard estimator of the internal consistency for homogeneous level tests (Bühner, 2006; Lienert & Raatz, 1998), was used for the consistency analysis. Furthermore, the power of discrimination, difficulty, and variance were calculated for each item, as well as for each subscale and each of the three groups. Convergent validity was checked by comparing Spearman's rank correlation coefficient for the BiTS-D, its three factors, and the four other TTM self-report instruments. Moreover, the sample was divided into two groups (likely TTM vs. subclinical TTM, see sample description), and mean values on the BiTS-D and its three subscales were compared between the two groups using t tests.

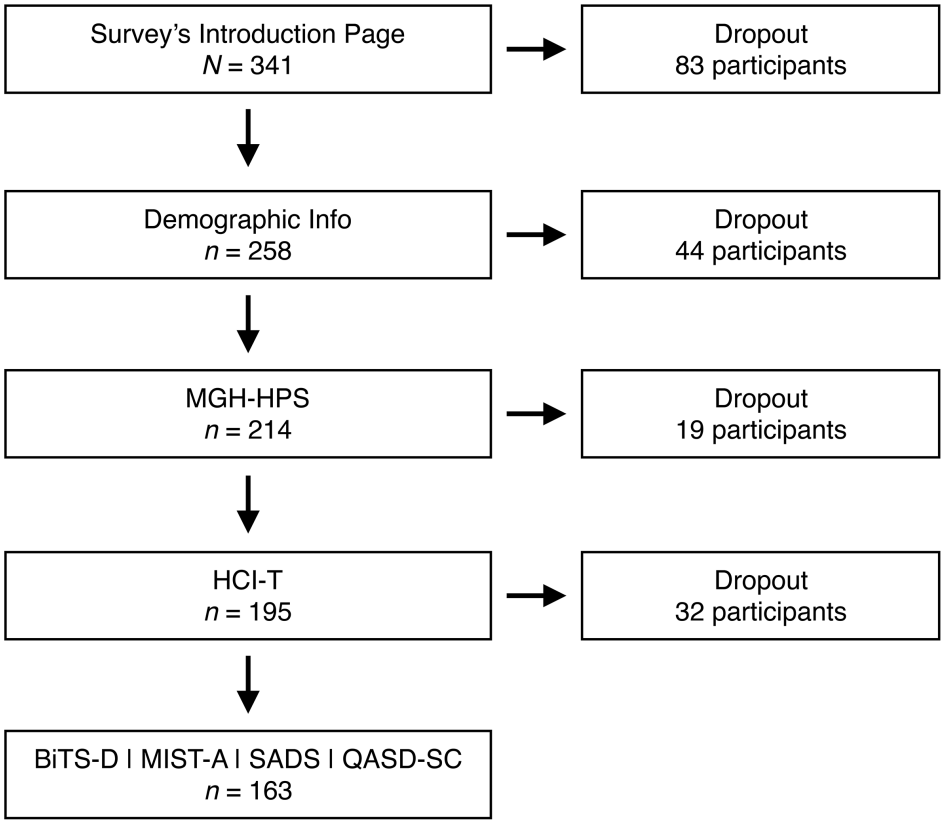

Figure 1. *Participation flow.* MGH-HPS = The Massachusetts General Hospital Hairpulling Scale; HCI-T = Hair Care Inventory for Trichotillomania; BiTS-D = Beliefs in Trichotillomania Scale German Version; MIST-A = Milwaukee Inventory for Subtypes of Trichotillomania-Adult; SADS = Scale for Assessing Disgust Sensitivity; QASD-SC = Questionnaire for Assessing Disgust, subscale disgust related self-concept.

Results

Confirmatory Factor Analyses

The three-factor model demonstrated an acceptable fit, as evidenced by $\chi^2(df = 74) = 171.31$ ($p < .001$), RMSEA = 0.09, CFI = 0.92, and TLI = 0.91. Inspection of the modification indices provided by MPlus suggested no further adjustments to the factor structure or additional covariations between items. Furthermore, the three subscales showed significant correlations (see Table 1).

Table 1. Confirmatory factor analysis inter-subscale correlation

BiTS Variable	BiTS-LCE	BiTS-P
BiTS-NSB	.5	.71
BiTS-LCE	–	.54

Notes. BiTS = Beliefs in Trichotillomania Scale; BiTS-LCE = low coping efficacy; BiTS-NSB = negative self-beliefs; BiTS-P = perfectionism.

Internal Validity and Reliability

Means, standard deviations, and Cronbach α values of the BiTS-D were calculated for the entire sample and the two subgroups the MGH-MPS defined (see Table 2). All Cronbach αvalues were in the acceptable range (α = .61–.89) across the three groups and three subscales. Given that some subscales contain only a few items, we also calculated the McDonald's omega (ω) to complement the reliability analysis. For illustrative purposes, we present the means (*M*), standard deviations (*SD*), and Cronbach α values for the sample in the original study by Rehm et al. (2019). In comparing the two subgroups, participants with a likely diagnosis of TTM ($n = 102$) scored significantly higher than the subclinical group ($n = 61$) on the BiTS-NSB, $t(161) = 2.4$, $p = .017$, BiTS-LCE, $t(161) = 3.7$, $p < .001$, BiTS-P, $t(161) = 2.4$, $p = .019$, and the BiTS total score, $t(161) = 3.4$, $p < .001$. Means and standard deviations (see Table 3) were calculated, along with the item properties: item difficulty *(p)*, *p* value, item selectivity, *rit* (rit value), and s^2 (variance; see Table 4), for each of the 14 items across the three subscales. The item properties can be considered acceptable.

The range of item difficulty is .51–.87. Item selectivity exceeded .3 for all items, except for item 14, "I do not have any choice but to act upon my urges or impulses when they occur," in the group likely to have higher TTM severity. The variance ranged from 2.58 to 4.33 for all items, except for item 14, which showed a lower range from 1.65 to 2.58 across the three groups. The total sample

Table 2. Comparison of the original and German BiTS total and subscales with likely vs. subclinical TTM regarding means (*M*), standard deviations (*SD*), Cronbach's alpha (α), McDonald's omega (ω), and Cohen's *d*

	BiTS (Rehm et al., 2019)	BiTS-D			
		N = 163	*n* = 102 Likely diagnosis of TTM	*n* = 61 Subclinical TTM	Likely TTM vs. subclinical
Subscale	*M (SD);* α	*M (SD);* α; ω	*M (SD);* α; ω	*M (SD);* α; ω	Cohen's *d*
BiTS-NSB	4.6 (1.6); .88	4.2 (1.5); .78; .79	4.38 (1.4); .77; .77	3.82 (1.5); .79; .83	1.4
BiTS-LCE	4.0 (1.3);.78	4.1 (1.1);.66; .67	4.29 (1.1); .65; .66	3.66 (1.5); .61; .66	1.1
BiTS-P	4.7 (1.5); .76	4.3 (1.5);.72; .74	4.5 (1.5); .74; .74	3.95 (1.5); .68; .76	1.5
BiTS-Total	4.4 (1.2); .89	4.15 (1.2); .86; .86	4.37 (1.1); .86; .86	3.78 (1.5); .83; .83	1.1

Notes. BiTS-D = Beliefs in Trichotillomania Scale (German version); BiTS-D-LCE = low coping efficacy; BiTS-D-NSB = negative self-beliefs; BiTS-D-P = perfectionism; TTM = trichotillomania.

Table 3. Comparison of the items with likely vs. subclinical TTM regarding means (*M*) and standard deviations (*SD*)

Items	*M (SD)*		
	N = 163	*n* = 102	*n* = 61
BiTS-D-LCE			
Item 1	4.03 (1.92)	4.29 (2.01)	3.57 (1.67)
Item 4	3.69 (1.80)	3.71 (1.82)	3.67 (1.78)
Item 6	4.63 (1.79)	4.9 (1.77)	4.16 (1.73)
Item 9	4.94 (1.94)	5.19 (1.91)	4.52 (1.94)
Item 11	3.04 (1.82)	3.3 (1.9)	2.59 (1.61)
Item 14	4.03 (1.5)	4.37 (1.51)	3.44 (1.29)
BiTS-D-NSB			
Item 2	4.73 (2.08)	5.1 (2.0)	4.11 (2.08)
Item 5	3.84 (2.0)	4.04 (1.95)	3.51 (2.01)
Item 7	5.01 (2.01)	5.04 (1.99)	4.97 (2.07)
Item 10	3.76 (2.06)	4.0 (2.06)	3.36 (2.01)
Item 13	3.52 (2.0)	3.75 (1.94)	3.13 (1.98)
BiTS-D-P			
Item 3	4.72 (1.84)	5.0 (1.81)	4.26 (1.83)
Item 8	4.12 (1.86)	4.35 (1.85)	3.74 (1.81)
Item 12	4.04 (1.86)	4.17 (1.86)	3.84 (1.85)

Notes. BiTS = Beliefs in Trichotillomania Scale; BiTS-LCE = low coping efficacy; BiTS-NSB = negative self-beliefs; BiTS-P = perfectionism; TTM = trichotillomania.

was divided into two subsamples based on a cut-off value distinguishing individuals who were likely clinically affected by TTM from those subclinically affected. We presented the results for the total sample and its subsamples to highlight differences within the sample. These findings demonstrate that the BiTS-D effectively differentiates between individuals with varying levels of TTM severity.

The convergent validity was assessed by calculating Spearman's rank correlation coefficient for the three BiTS-D factors, both with each other and the four TTM self-report instruments (see Table 5).

Discussion

Driven by the goal of expanding diagnostic tools and deepening the understanding of the under-researched condition of TTM, we selected the BiTS – the first self-report instrument specifically designed to assess cognitions related to negative self-belief, low coping efficacy, and perfectionism in individuals affected by TTM. This study aimed to evaluate the psychometric properties of the German version of the BiTS (BiTS-D) to ensure its suitability for German-speaking populations.

Table 4. Items difficulty, selectivity, and variance

Items	*(p)*			*rit*			S^2		
	N = 163	*n* = 102	*n* = 61	*N* = 163	*n* = 102	*n* = 61	*N* = 163	*n* = 102	*n* = 61
BiTS-D-LCE									
Item 1	.67	.72	.6	.41	.33	.48	3.67	4.03	2.78
Item 4	.62	.62	.61	.31	.30	.38	3.24	3.32	3.16
Item 6	.77	.82	.69	.46	.44	.42	3.19	3.12	3.01
Item 9	.82	.87	.75	.4	.46	.2	3.76	3.64	3.75
Item 11	.51	.55	.43	.4	.44	.23	3.32	3.6	2.58
Item 14	.67	.73	.57	.4	.34	.38	2.25	2.3	1.65
BiTS-D-NSB									
Item 2	.79	.85	.69	.56	.52	.59	4.33	4.01	4.34
Item 5	.64	.67	.59	.49	.45	.51	3.93	3.8	4.02
Item 7	.84	.84	.83	.52	.64	.38	4.05	3.96	4.27
Item 10	.63	.67	.56	.64	.57	.72	4.23	4.24	4.03
Item 13	.59	.63	.52	.59	.51	.68	3.9	3.78	3.91
BiTS-D-P									
Item 3	.79	.83	.71	.47	.45	.46	3.4	3.27	3.33
Item 8	.69	.73	.71	.63	.67	.53	3.44	3.44	3.26
Item 12	.67	.70	.71	.59	.57	.49	3.45	3.47	3.41

Notes. BiTS = Beliefs in Trichotillomania Scale; BiTS-LCE = low coping efficacy; BiTS-NSB = negative self-beliefs; BiTS-P = perfectionism; *rit* = part-whole corrected item-total correlation.

Table 5. Spearman's rank correlation coefficient (*r*) for the BiTS-D, its three factors and five TTM self-report instruments

Sample *N* =163	BiTS-D	BiTS-D-NSB	BiTS-D -LCE	BiTS-D -P	MGH-HPS	MIST-A-F	MIST-A-A	SADS	QASD-SC
BiTS-D	1								
BiTS-D-NSB	.89***	1							
BiTS-D-LCE	.89***	.69***	1						
BiTS-D-P	.69***	.44***	.49***	1					
MGH-HPS	.29***	.24**	.31***	.15	1				
MIST-A-F	.26**	.24**	.27***	.14	.2	1			
MIST-A-A	.23**	.19*	.23**	.2*	.24**	.18*	1		
SADS	.47***	.40***	.40***	.33***	.3***	.32***	.17*	1	
QASD-SC	.63***	.65***	.51***	.35***	.21**	.29***	.07	.58***	1

Notes. BiTS-D = German Beliefs in Trichotillomania Scale; BiTS-D-LCE = low coping efficacy; BiTS-D-NSB = negative self-beliefs; BiTS-D-P = perfectionism; MGH-HPS = The Massachusetts General Hospital Hairpulling Scale; MIST-A-F = Milwaukee Inventory for Subtypes of Trichotillomania-Adult, focused pulling subscale; MIST-A-A = Milwaukee Inventory for Subtypes of Trichotillomania-Adult, automatic pulling subscale; SADS = Scale for Assessing Disgust Sensitivity; QASD-SC = Questionnaire for the Assessment of Self-Disgust, subscale disgust related self-concept; TTM = trichotillomania. *** $p < .001$. ** $p < .01$. * $p < .05$.

Despite several limitations, the results indicate satisfactory psychometric properties, including replication of the original BiTS factor structure, appropriate intercorrelations, and strong internal consistency among the three factors. Furthermore, correlations of the BiTS-D and its subscales with other measures were either successfully replicated (e.g., MGH-HPS) or provided new insights (e.g., MIST-A, SADS, and QUASD).

The three-factor structure of the original BiTS, as postulated by Rehm et al. (2019), could be replicated in the BiTS-D. The fit indices are acceptable and consistent with the benchmarks suggested by Bollen (1989), Browne and Cudeck (1993), and Kelloway (1998). The intercorrelations of the three factors suggest some content overlap, but each factor also assesses unique, content-related aspects. We deem the internal consistency of the individ-

ual subscales to be acceptable, particularly given the small number of items for each subscale.

Additionally, our results confirmed the findings of Rehm et al. (2024) that the BiTS *perfectionism* factor was not significantly correlated with TTM severity ($r = .15$).

The results of the convergent validity check of the total sample ($N = 163$) show medium correlations between the three subscales of the BiTS-D and the other self-report measures of TTM. Note that the relatively low correlation with the MGH-HPS is consistent with the findings from the original study by Rehm et al. (2016; see Table 2). The MGH-HPS measures the frequency, urges, control, and execution of hair pulling and the associated distress. By contrast, the BiTS-D primarily evaluates individuals' thoughts and feelings about themselves, their approach to life challenges, and their reactions to perceived imperfections. In other words, while these may be factors that contribute to pulling behavior, they are not necessarily tied directly to the burden of TTM itself. Arguably, this also means that the BiTS-D may not be a measure exclusively tied to TTM but should rather be considered a transdiagnostic measure – relevant, for example, to the assessment of obsessive-compulsive and related disorders, such as excoriation disorder, body dysmorphic disorder, or hoarding disorder. This issue, however, is beyond the scope of the present data set.

The BITS-D-NSB and the BiTS-D-LCE were significantly correlated with the MGH-HPS, whereas the BITS-D-P was not. Similarly, only the BiTS-D-NSB and the BITS-D-LCE were significantly correlated with the two MIST-A subscales (focused vs. automatic pulling). These findings suggest that individuals who are self-critical and doubt their ability to cope with challenging situations may be more prone to engage in hair pulling as a maladaptive coping mechanism. This also emphasizes the importance of targeting low coping efficacy and negative self-beliefs in the treatment of TTM.

Finally, using a conservative cut-off value of ≥ 17, we divided the sample into two groups: one with a likely TTM diagnosis and one with subclinical TTM. Our results confirmed the ability of the BiTS-D to assess a construct relevant to TTM. Individuals most likely suffering from TTM had much higher values on all three subscales of the BiTS-D, as evidenced by the large effect sizes (Cohen's d between 1.1 and 1.5) and the significant t-test results. Nonetheless, reliability measures (Cronbach's α and McDonald's ω) were in the acceptable range for both subgroups.

The SADS and QASD, instruments measuring disgust sensitivity and self-disgust, respectively, demonstrated strong correlations with the BiTS-D subscales. These findings enhance our understanding of the cognitive mechanisms in individuals with TTM, suggesting that they often critically appraise the condition of their hair, perceiving it as flawed, unhealthy, or abnormal. Hair deemed most imperfect may provoke feelings of disgust, which are strongly tied to the urge to remove it. Interestingly, Schienle et al. (2018) identified a noteworthy pattern: Self-concept-related disgust and overall disgust sensitivity were more strongly associated with focused pulling than automatic pulling, as indicated by the two MIST-A subscales. A similar pattern can be observed in the present data set (see Table 5). In summary, our findings highlight the need to address self-deprecating emotions in the treatment of BFRBs, as such feelings may significantly contribute to the pathology of the disorder.

The BiTS-D can be utilized as a (transdiagnostic) assessment tool for TTM and related disorders, providing a more comprehensive understanding of an individual's unique experiences and manifestations of the condition. By focusing on three core cognitive factors – negative self-beliefs, low coping efficacy, and perfectionism – the BiTS-D may allow clinicians to gain deeper insights into the cognitive mechanisms underlying the behavior. In this context, Rehm et al. (2019) suggest:

> Tracking changes to BiTS subscale scores, TTM severity, and negative affect over the course of psychological treatment may help determine the role these beliefs have in the maintenance of the disorder, which could facilitate novel developments in its cognitive-behavioral conceptualization and treatment. (p. 400)

The three factors represent fundamental beliefs that individuals with TTM are likely to have internalized and repeatedly reinforced: Negative self-beliefs, low coping efficacy, and perfectionism reflect a persistent inner struggle about feelings of self-worth and perceptions about one's abilities to succeed and exert control. Each subscale can be illustrated by one of the following selected items: "There is something wrong with me" (negative self-belief), "I am unable to stop this behavior" (low coping efficacy), and "I experience strong urges to fix anything that I perceive to be wrong, imperfect, or not-quite-right" (perfectionism). However, it remains unclear to what extent these factors relate to the perceived and actual condition of an affected individual's hair. For instance, a perceived sense of ugliness may intensify negative self-belief; failing to stop the symptomatic behavior may increase cognitions of low coping efficacy; and setting a high standard for healthy hair may amplify the tendency to identify and remove perceived imperfections. A desire for flawlessness could provide a compelling justification for pulling behavior. For individuals with TTM, the urge to eliminate what they see as imperfect hair perpetuates a self-reinforcing cycle of pulling. This interplay highlights the critical importance of addressing the cognitive and behavioral dimensions of the disorder. Although the

perfectionism scale in our study did not show a significant correlation, we believe that further investigation into the extent to which maladaptive perfectionism is linked to physical appearance – and whether it represents a resistant factor in treatment – would be highly valuable. This could help identify the need for targeted interventions to effectively address and disrupt perfectionism during therapy (Noble et al., 2017).

Limitations

The study has several limitations. First, the sample size (N = 163) is relatively small, which may limit the generalizability of the findings. Second, participant selection relied solely on self-reports, making identifying TTM cases preliminary. As such, the "caseness" defined in this study cannot be directly equated to diagnoses established through clinical interviews. While the original BiTS has demonstrated robust psychometric properties in clinical and nonclinical samples (Rehm et al., 2019), the exclusive reliance on self-reported data in this study introduces a degree of uncertainty that even a conservative cut-off value cannot fully mitigate. Moreover, our study would have profited from a measure that facilitates illustrating the divergent validity of the BiTS-D.

In addition, due to the length of this manuscript, we decided against testing for measurement invariance. Confirmation of measurement invariance would clearly have strengthened the interpretation of the differences found between groups. Note, however, that mean comparisons using t tests are generally robust, and group differences primarily stem from variations in the means of the observed items rather than differences in the measurement models.

Furthermore, comorbidity was not assessed, leaving the impact of overlapping conditions unexamined. This is a significant limitation, given that other disorders, such as obsessive-compulsive disorder, are regularly comorbid with TTM and are also known to be associated with perfectionism, low self-esteem, and low coping ability (Miegel et al., 2020). Lastly, no additional questionnaires on psychopathology, which could have pointed to potentially significant influencing factors, were added.

Future research could address this by recruiting participants through comprehensive clinical interviews that assess for co-occurring conditions such as anxiety disorders, affective disorders, or obsessive-compulsive and related disorders.

Incorporating additional instruments, such as the Rosenberg Self-Esteem Scale (Rosenberg, 1965) to measure self-esteem or the Frost Multidimensional Perfectionism Scale (Frost et al., 2014) to assess perfectionism, could have enhanced the validation of the BiTS-D by providing deeper insight into its convergent validity and broader applicability across psychological dimensions.

Conclusion

The BiTS-D represents a valuable addition to the therapeutic toolkit, allowing for the assessment of cognitive processes relevant to TTM. It is a complementary instrument to the MGH-HPS, the most commonly used measure of TTM in German-speaking countries. With solid psychometric properties and a factor structure aligned with the original BiTS, the BiTS-D is promising for informing transdiagnostic TTM assessment. It can potentially enhance treatment by broadening or refining the clinician's focus on cognitive aspects that are only indirectly associated with TTM. Additionally, the BiTS-D may function as a continuous monitoring tool, tracking therapeutic progress by addressing etiological cognitive factors and providing valuable support for clinicians and patients throughout psychotherapy.

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ORCID

Linda Hollatz
https://orcid.org/0009-0005-4468-0399
Alexander L. Gerlach
https://orcid.org/0000-0001-6794-5349

Dipl.-Psych. Linda Hollatz
Department of Clinical Psychology and Psychotherapy
University of Cologne
Pohligstr. 1
50969 Cologne
Germany
research@lindahollatz.de

Appendix A

Table A1. Translation comparison for 7-point Likert-type scale

Scale Point	English Original	German Translation—literal	—optional	—final
1 (lowest)	Disagree very much	Stimme damit überhaupt nicht überein	Trifft überhaupt nicht auf mich zu	Trifft überhaupt nicht auf mich zu
2	Disagree moderately	Stimme damit mäßig nicht überein	Trifft mäßig nicht auf mich zu	
3	Disagree a little	Stimme ein bisschen nicht überein	Trifft ein bisschen nicht auf mich zu	
4 (neutral)	Neither agree nor disagree	Stimme weder zu noch stimme ich nicht zu	Trifft weder zu noch nicht zu	Trifft weder zu noch nicht zu
5	Agree a little	Stimme damit etwas überein	Trifft ein bisschen auf mich zu	
6	Agree moderately	Stimme damit mäßig überein	Trifft mäßig auf mich zu	
7 (highest)	Agree very much	Stimme damit sehr überein	Trifft sehr auf mich zu	Trifft sehr auf mich zu

Appendix B

Deutsche Version der Beliefs in Trichotillomania Scale (BiTS-D)

(Originalversion: Rehm, Nedeljkovic, Moulding & Thomas, 2018)
Anleitung: Bitte bewerten Sie die folgenden Aussagen, indem Sie die Zahl auswählen, die am besten Ihrer Zustimmung entspricht. Antworten Sie entsprechend dem, was sich für Sie richtig anfühlt.

Table B1. Deutsche Version der Beliefs in Trichotillomania Scale (BiTS-D)

	Trifft überhaupt nicht auf mich zu			Trifft weder zu noch nicht zu			Trifft sehr auf mich zu
1. Zu versuchen, meine Probleme zu lösen, wird für mich noch mehr Stress und Verletzungen auslösen.	1	2	3	4	5	6	7
2. Ich fühle mich nicht wohl, so wie ich bin.	1	2	3	4	5	6	7
3. Ich bin nie mit ‚gut genug' zufrieden.	1	2	3	4	5	6	7
4. Alles in meinem Leben sollte vorhersagbar sein.	1	2	3	4	5	6	7
5. Ich mag nicht über meinen Selbstwert nachdenken.	1	2	3	4	5	6	7
6. Ich kann nicht mit Stress umgehen.	1	2	3	4	5	6	7
7. Ich denke nicht, dass ich normal bin wie alle anderen.	1	2	3	4	5	6	7
8. Wenn ich nicht in der Lage bin, etwas so zu reparieren, dass es perfekt ist, bin ich nicht in der Lage aufzuhören daran zu denken oder mich damit unwohl zu fühlen.	1	2	3	4	5	6	7
9. Ich denke, dass ich negative Emotionen intensiver erlebe als andere es tun.	1	2	3	4	5	6	7
10. Ich denke, dass mir viele positive Qualitäten fehlen oder sie nicht ausreichend vorhanden sind.	1	2	3	4	5	6	7
11. Ich will mich nicht um meine Probleme kümmern.	1	2	3	4	5	6	7
12. Ich empfinde starke Dränge all das zu reparieren, was ich als falsch, nicht perfekt oder nicht ganz richtig wahrnehme.	1	2	3	4	5	6	7
13. Es gibt vieles, was mir peinlich ist und worüber ich mich schämen sollte.	1	2	3	4	5	6	7
14. Ich habe keine Wahl als auf meine Dränge und Impulse hin zu handeln, wenn sie auftreten.	1	2	3	4	5	6	7

Interpretation der Items

Items 1, 4, 6, 9, 11, 14: Niedrige Bewältigungswirksamkeit (LCE) (Low Coping Efficacy).
Items 2, 5, 7, 10, 13: Negative Selbstüberzeugungen (NSB) (Negative Self-Beliefs).
Items 3, 8, 12: Perfektionismus (P) (Perfectionism).

Auswertung

Für jede Subskala sowie für den Gesamtwert wird der Mittelwert der entsprechenden Items berechnet.
Höhere Mittelwerte weisen auf eine stärkere Zustimmung zu bzw. Bindung an nicht hilfreiche Überzeugungen hin.