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Cross-Cultural Validation of the Binge Eating Disorder Screener-7 (BEDS-7) Across 42 Countries

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ABSTRACT

Objective: This study aimed to evaluate the reliability and validity of the Binge Eating Disorder Screener-7 (BEDS-7) across 42 countries and 26 languages, assessing its reliability and validity as a screening tool for binge-eating disorder (BED) in diverse cultural contexts. Specifically, it sought to enhance early recognition of BED symptoms in primary care settings globally, contributing to a standardized framework for assessing BED.

Method: The International Sex Survey, a cross-sectional online study, was conducted in 42 countries and 26 languages. A diverse community sample of 82,243 participants, aged 18 years or older, completed the BEDS-7 and measures of sexuality, mental health, substance use, and sociodemographic characteristics. Confirmatory factor analyses and tests of measurement invariance were employed to evaluate the reliability and validity of the BEDS-7 across languages, countries, genders, and sexual orientations.

Results: The BEDS-7 demonstrated scalar factorial invariance across languages and countries, indicating consistent factor loadings and item intercepts. In contrast, the screener showed residual invariance across gender and sexual orientation groups, supporting

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its robustness across these demographics. Kruskal–Wallis tests revealed significant differences in BED symptoms across languages, countries, genders, and sexual orientations, with the highest BED scores observed among queer, pansexual, and gender-diverse individuals. The BEDS-7 also demonstrated adequate reliability (Cronbach's $\alpha > 0.80$) and moderate criterion validity.

Discussion: The findings provide further evidence of the reliability and validity of the BEDS-7 as a potential screening tool for identifying probable cases of BED globally, facilitating early intervention in primary care settings.

1 | Introduction

Binge eating disorder (BED) is marked by significant mental and physical comorbidities, including functional impairment (Giel et al. 2022; Hilbert 2019; Hudson et al. 2007). Among clinical and community samples, BED is associated with elevated levels of depressive symptoms, anxiety, and stress, which uniquely contribute to binge eating (Rosenbaum and White 2015; Skinner et al. 2012). Additionally, BED frequently co-occurs with substance use due to shared neurobiological pathways, such as the dopamine and opioid systems, which influence compulsive behaviors (Schreiber et al. 2013).

1.1 | Prevalence of BED

The worldwide prevalence of BED for the years 2018–2020 was estimated to be 0.6%–1.8% in women and 0.3%–0.7% in men (Giel et al. 2022). Gender and sexual minority groups display higher rates of eating disorders compared to individuals who identify as cisgender or heterosexual (Calzo et al. 2017). Health disparities among BED may be accounted for by prominent theoretical models including sociocultural and minority stress models (Calzo et al. 2017). Given the global prevalence of BED and the higher prevalence of BED among marginalized groups, there is a growing need to identify screening tools that can promote greater health equity for vulnerable groups.

1.2 | Challenges in BED Treatment and the Importance of Early Identification

Although BED is common, many individuals do not seek treatment (Hart et al. 2011; Hudson et al. 2007). Instead, they may attempt to address other psychiatric (anxiety and depression) and somatic disorders first (Kessler et al. 2013). Therefore, it is important to identify individuals quickly with untreated BED across a wide range of settings. To this end, BED assessments must be appropriately validated cross-culturally, for both mental and public health considerations (e.g., Mehler et al. 2016). The repercussions of BED also impact societies, influencing healthcare systems, socio-economic factors, and community health outcomes (Ágh et al. 2015).

1.3 | Global Health Implications and the Need for Cross-Cultural Assessment

Given the impact of BED globally, the need for a brief screening instrument that operates across cultures and groups is important for accurate and unbiased evaluations, providing a standardized and reliable approach to understanding complex mental health

phenomena. To address this gap and enhance screening for BED (Kornstein et al. 2016), this study provides preliminary evidence of the reliability and validity of the Binge Eating Disorder Screener-7 (BEDS-7) in 42 countries and in 26 languages. When translating and applying questionnaires measuring eating disorders across different cultural contexts, challenges arise due to varying cultural norms related to food, body image, and mental health (Acle et al. 2021), which can affect how individuals interpret and respond to questions. Linguistic differences may also alter the meaning of questions. For instance, the interpretation of key terms related to mental health may vary across regions, as evidenced by differences in prevalence and reporting of eating disorders globally (GBD 2019 Mental Disorders Collaborators 2022). Differences in interpretation underline the importance of cross-cultural validation to avoid misclassification or underdiagnosis in specific cultural groups. Thus, cross-cultural validation is crucial to ensure that measures accurately identify individuals with BED symptoms across diverse populations, preventing biased or inaccurate results and enabling effective comparisons and interventions.

1.4 | The BEDS-7: A Brief Screening Tool for Binge Eating Disorder

The BEDS-7 (Herman et al. 2016) is a concise seven-item self-report screening tool aligned with DSM-5 diagnostic criteria for BED. Developed to identify individuals with probable BED for further evaluation or referral, the BEDS-7 was initially geared towards aiding general practitioners, given their frequent patient interactions and heightened exposure to individuals at elevated risk for binge eating and related mental health concerns (Herman et al. 2016). According to Herman et al. (2016), the BEDS-7 demonstrated 100% sensitivity and 38.7% specificity in identifying BED in a community sample of 97 adults (Cecchetto et al. 2021). The reliability and validity of the BEDS-7 have not been evaluated extensively, but a survey of primary care physicians and psychiatrists found that a majority of these healthcare providers found the BEDS-7 easy to use and valuable (Herman et al. 2017).

1.5 | The Current Study

Considering the global prevalence of BED, it is critical to ensure that screening tools like the BEDS-7 are valid and reliable across diverse cultural contexts and demographic subgroups. Specifically, we assessed scores on the BEDS-7 across different countries, genders, and sexual orientations to determine its ability to provide meaningful and reliable comparisons across a wide range of diverse populations. Moreover, we evaluated its criterion and discriminant validity by examining relationships with established measures of anxiety, depression, and substance use. These measures were selected because

Summary

- Binge-eating disorder (BED) is a prevalent mental health condition associated with significant psychological and physical health risks, often underdiagnosed across diverse cultural and clinical settings.
- This study provides evidence for the reliability and validity of the Binge Eating Disorder Screener-7 (BEDS-7) across 42 countries and 26 languages, supporting its use as a screening tool for identifying probable BED cases in a wide range of populations.
- The BEDS-7 offers a reliable, culturally adaptable screening method that can facilitate early intervention for BED in global primary care settings, potentially enhancing health equity for vulnerable and marginalized groups worldwide.

individuals with BED exhibit significantly higher rates of depression, anxiety, and a history of substance use compared with those without BED (Grucza et al. 2007; Lydecker and Grilo 2022).

2 | Method

2.1 | Procedure

The International Sex Survey is a cross-sectional, self-report study conducted in 42 countries (see study protocol: Bóthe et al. 2021). Egypt, Iran, Pakistan, and Romania were included in the study protocol paper as collaborating countries (Bóthe et al. 2021); however, we could not get timely ethical approval for the study in these countries. Chile was not included as a collaborating country because it joined the study after publishing the study protocol. Therefore, instead of the planned 45 countries, only 42 countries are considered in the present study, see details at <https://osf.io/n3k2c/>. The study design, including the preregistered study protocol, can be found at <https://osf.io/uyfra/>. The International Sex Survey was initiated in February 2021, following ethical approval. Collaborators from each country recruited a community sample of adults, striving for a balanced gender ratio while considering the representation of diverse individuals with respect to sexual orientation (e.g., bisexual individuals) and gender identity (e.g., nonbinary individuals). Data collection took place between October 2021 and May 2022. Participants aged 18 or older (or the legal age of being adult in each country) were recruited through advertisements in various online platforms, including social media networks (Facebook, Instagram, listservs, and popular national news sites), and completed the anonymous survey on Qualtrics (a secure online platform), which took approximately 25–45 min. The survey included mandatory questions on key demographics and study-related behaviors, but respondents were able to skip nonessential or sensitive questions. Attention check questions were implemented to ensure data reliability, and participants failing these checks were excluded (see the detailed data cleaning procedure at <https://doi.org/10.17605/OSF.IO/DK78R>). Incentives included a donation of 50 cents (USD) to nonprofit, sexuality-related international

organizations for each completed survey, with a maximum donation of \$1000. Participants could choose their preferred organization from a list after completing the survey. The list of collaborating countries, detailed information on the translation and data collection procedures, and eligibility criteria are reported in the study protocol (Bóthe et al. 2021).

2.2 | Participants

After data cleaning, 82,243 participants ($M_{\text{age}} = 32.39$ years, $SD = 12.52$) were included in the final dataset. Regarding gender, 32,549 participants (39.6%) identified as men, 46,874 participants (57.0%) identified as women, and 2783 participants (3.4%) identified as gender-diverse individuals. Most participants ($n = 56,125$; 68.2%) identified as heterosexual, while 31.5% ($n = 25,777$) belonged to sexual minority groups. Most participants completed tertiary education (e.g., college or university) ($n = 60,896$; 74.0%), worked full-time ($n = 42,981$; 52.3%), and lived in a city or metropolis (i.e., having a population greater than 100,000) ($n = 56,361$; 68.5%). Over half of the participants were in a romantic relationship ($n = 51,778$; 63.0%). Details on participants' sociodemographic characteristics are and information disaggregated by country can be found at <https://osf.io/n3k2c/>.

2.3 | Measures

Binge Eating Disorder was assessed using the BEDS-7 (Herman et al. 2016), a seven-item self-report measure used to identify participants who endorsed probable risk for BED within the past 3 months, based on the DSM-5 diagnostic criteria for BED. The first two items are rated on a “yes” or “no” dichotomous scale. The remaining five questions inquire about features of binge-eating episodes (per the DSM-5-TR criteria; APA 2022) and are rated on a four-point scale (i.e., 0 = never or rarely; 3 = always). Items 1 to 7 items are summed to provide an overall score that reflects the level of endorsement for BED-related behaviors and symptoms. Item 7 measures frequency of vomiting over the past 3 months as a means of controlling one's weight or shape; this item is included in the total score to maintain face validity (Herman et al. 2016).

Mental Health was assessed using the two subscales (anxiety and depression, six items each) of the Brief Symptom Inventory (BSI; Derogatis and Melisaratos 2004). Individuals were asked to indicate on a 5-point Likert scale how often (0 = not at all to 4 = frequently) they had experienced a symptom within the past month. In this sample, Cronbach's alpha for both subscales were excellent ($\alpha = 0.90$; Quintana et al. 2024).

Substance use was assessed using the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST; Ali et al. 2002; Lee et al. 2023). The ASSIST was used to assess the frequency of substance use over the past 3 months using 10 items. The questionnaire asks about 10 substances, including tobacco products, alcoholic beverages, cannabis, cocaine, amphetamine type stimulants, inhalants, sedatives or sleeping pills, hallucinogens, opioids, and other substances (all not subscribed by a doctor). Participants are asked to report the frequency of use for each

substance, with the following options: Never, once or twice, monthly, or weekly. In this sample, Cronbach's alpha for the ASSIST scale was acceptable ($\alpha = 0.63$; Lee et al. 2023).

2.3.1 | Sociodemographic Questions

The International Sex Survey included a range of sociodemographic questions, such as age, religion, and relationship status (Böthe et al. 2021). However, our analysis focused specifically on gender identity, sexual orientation, and country. Gender identity was assessed using an item encompassing a range of gender identities, including nonbinary and genderqueer identities (Bauer et al. 2017): masculine/man; feminine/woman; indigenous or other cultural gender-minority identity; nonbinary, gender fluid, or genderqueer; other ("If you wish, please describe your gender personally"). Sexual orientation was assessed by allowing participants to choose the expression that best aligned with their sexual orientation (Cwinn et al. 2021; Weinrich 2014): heterosexual/straight; gay, lesbian, or homosexual; heteroflexible; homoflexible; bisexual; queer; pansexual; asexual; I do not know yet or am currently questioning my sexual orientation; none of the above (with an option to provide a personal description). Participants who did not wish to answer the question were given a choice to indicate, "I don't want to answer" or to skip this question.

The English survey battery was translated into 25 other languages following a preestablished procedure for cross-cultural studies (Beaton et al. 2000). The translation of the measures can be found at the following link in all study languages: <https://osf.io/jcz96/>.

2.4 | Statistical Analyses

2.4.1 | Descriptive Analyses

Per the preregistered analysis plan (<https://doi.org/10.17605/OSF.IO/DK78R>), we computed descriptive statistics for all BEDS-7 items, including means with standard deviations, minimum and maximum values, skewness and kurtosis values, and the ratio of "yes" answers. Missing values were observed in country, language, gender, and sexual orientation variables (ranging from 0.0001% to 0.3%) and were not missing completely at random. This was supported by the results of Little's Missing Completely at Random Test (MCAR) ($\chi^2 = 74,692.0$, $df = 79$, $p < 0.0001$; 16 missing patterns). We excluded participants with missing data on all items of the BEDS-7, allowing partial missingness (therefore, we included 73,767 participants). To address the remaining missing data, we used the full-information maximum likelihood (FIML) method based on previous recommendations (Lee and Shi 2021).

2.4.2 | Test of Dimensionality

Confirmatory factor analyses (CFAs) were conducted to examine the structural validity and dimensionality of the BEDS-7 separately for participants' language, country, gender, and sexual orientation. Based on Monte Carlo simulations (see details:

<https://doi.org/10.17605/OSF.IO/DK78R>), a minimum of 485 participants were required to be included in analyses. In the first set of CFAs, participants' language was the grouping variable with 20 languages, as 20 of 26 languages had sufficient participants (i.e., $n > 485$) for these tests. In the second set of analyses, participants' country of residence was the grouping variable with 31 countries, as 31 of 42 countries had sufficient participants for these analyses. In the third set of analyses, participants' gender identity was the grouping variable with three categories (i.e., men, women, gender-diverse individuals), as the number of participants in different gender minority groups did not allow us to use them as separate groups. In the fourth set of analyses, participants' sexual orientation was the grouping variable with eight sexual orientations. Information on creating gender-based and sexual-orientation-based groups can be found in the preregistration document (<https://doi.org/10.17605/OSF.IO/DK78R>).

The CFA models were evaluated using standard goodness-of-fit indices: the Comparative Fit Index (CFI; ≥ 0.90 indicates adequate fit, ≥ 0.95 indicates good fit), the Tucker–Lewis Index (TLI; ≥ 0.90 indicates adequate fit, ≥ 0.95 indicates good fit), the Root Mean Square Error of Approximation (RMSEA) with its 90% confidence interval ($0.10 \leq$ acceptable, ≤ 0.08 indicates adequate fit, and ≤ 0.05 indicates good fit), and the Standardized Root Mean Square Residual (SRMR; ≤ 0.08 indicates good fit) (Sahoo 2019). The CFAs were conducted using Mplus version 8.8. All items were treated as categorical (with items 1 and 2 treated as binary and items 3 through 7 as ordered), and the Weighted Least Squares Mean and Variance adjusted (WLSMV) estimator was employed to accurately model the CFA while accommodating nonnormally distributed variables and categorical data.

2.4.3 | Factorial Invariance

To ensure that comparisons were meaningful and reduce the possibility of measurement biases and invalid comparisons between groups, tests of measurement invariance were conducted using participants' language, country, gender, and sexual orientation as grouping variables.

We specifically tested for several types of invariance: configural (same structure across groups), metric (weak; same factor loadings across groups), scalar (strong; same item intercepts across groups), as well as residuals, latent variances, and latent means invariance. Significant decreases in CFI and TLI (ΔCFI , $\Delta TLI \leq 0.01$) and increases in RMSEA ($\Delta RMSEA \leq 0.015$) would suggest that a level of measurement invariance was achieved. More liberal $\Delta RMSEA$ (i.e., 0.030), ΔCFI , and ΔTLI (i.e., 0.020) were used when evaluating metric invariance (Rutkowski and Svetina 2014). Analyses were performed in R using the semTools package.

2.4.4 | Group Differences

Differences in BEDS-7 scores were examined across language, country, gender, and sexual orientation using Kruskal–Wallis tests and eta-squared effect sizes (> 0.01 weak, > 0.06 medium,

> 0.14 large) followed by Tukey's Honest Significant Differences post hoc tests.

2.4.5 | Tests of Reliability and Validity

Cronbach's alphas and McDonald's omegas were calculated to assess the reliability of the BEDS-7 (> 0.70 good). In cases of low reliability, we calculated coefficients H, serving as the additional, non-preregistered reliability test (> 0.70 good) to appraise whether the low reliability stems from a low factor loading of one of the items. We adopted the multi-trait multimethod analysis to assess criterion and discriminant validity of the BEDS-7. The analysis was conducted within the *psy* package with the *mtmm* (multi-trait multimethod) function. The multi-trait multimethod analysis examines within-cluster and between-cluster correlations such that the unit of analysis is a single item. Good psychometric indices are high within-cluster correlations (e.g., high correlations between all items of the BEDS-7), moderate between-cluster correlations between items from similar theoretical constructs (i.e., criterion validity), and weak between-cluster correlations between items from unrelated theoretical constructs (i.e., discriminant validity). In the current study, the criterion validity within the multi-trait multimethod analysis was estimated between items of the BED (items 1–7) screener and subscales of the BSI scale assessing depressive and anxiety symptoms; the discriminant analysis was appraised by assessing the between-cluster correlations between items of the BED scale and items of substance use (ASSIST scale). We also expected item 7 of the BED to be weakly correlated with the other items, as vomiting is a common feature of binge eating in individuals with bulimia nervosa rather than those with binge eating disorder. Correlations around |0.10| were considered weak, |0.30| moderate, and |0.50| strong (Cohen 1992).

3 | Results

3.1 | Psychometric Properties of the Binge Eating Disorder Scale

3.1.1 | Descriptive Statistics

Descriptive data for the BEDS-7 items are presented in Tables 1 and 2. Detailed normative data, including percentiles for different groups (countries, genders, etc.), are presented in Tables S1–S4. Among all participants, 32% reported episodes of overeating (yes, no) over the last 3 months; referring to these overeating episodes, 19% felt distressed (yes, no) about these episodes over the last 3 months.

3.1.2 | Language-, Country-, Gender-, and Sexual-Orientation-Based Confirmatory Factor Analyses of the BEDS-7

The results are presented in Tables S5–S8, which correspond to language, country, gender, and sexual orientation, respectively. An initial CFA across the entire sample poorly fit the observed data, $\chi^2_{(14)} = 32357.97$, $p < 0.0001$, $CFI = 0.827$, $TLI = 0.741$, $RMSEA = 0.179$ (90% CI 0.177, 0.180). Even though it was not

specified in the preregistered analytic plans, we allowed three pairs of residuals to correlate (items 1 and 2, items 5 and 6, and items 2 and 3) based on the statistical (i.e., inspection of modification indices) and theoretical considerations (e.g., a correlation between item 5 and item 6's residuals was added as both items measured a specific aspect of binge eating and thus this correlation accounted for these items' shared features: experiencing negative emotions such as embarrassment and guilt after an episode of binge eating), and reconducted the model. The modified model achieved an excellent fit, $\chi^2_{(11)} = 657.34$, $p < 0.0001$, $CFI = 0.998$, $TLI = 0.997$, $RMSEA = 0.008$ (90% CI 0.008, 0.009). This modified model supported the structural validity of the BEDS-7 in all languages, countries, genders, and sexual orientations.

3.1.3 | Language-, Country-, Gender-, and Sexual-Orientation-Based Factorial Invariance

Results are presented in Tables S9–S12. The results indicate scalar factorial invariance across languages and countries. This means that both the structure of the measure and the factor loadings and item intercepts are consistent across these groups, allowing for meaningful comparisons of latent means. Regarding gender and sexual orientation, the models demonstrate residual variance, meaning that the measurement errors (or unique variances) are equivalent across these groups, further supporting the robustness of the measure across different demographic variables.

3.1.4 | Group Differences

Kruskal–Wallis tests indicated significant differences in BEDS-7 scores between languages, $\chi^2_{(25)} = 1711.00$, $p \sim 0$ (i.e., approximating zero), $\eta^2 = 0.02$ (95% bootstrap CI 0.02, 0.02), countries, $\chi^2_{(42)} = 1746.2$, $p \sim 0$, $\eta^2 = 0.02$ (95% bootstrap CI 0.02, 0.02), genders, $\chi^2_{(4)} = 1138.15$, $p = 4.07 \times 10^{-245}$, $\eta^2 = 0.013$ (95% bootstrap CI 0.01, 0.02), and sexual orientations, $\chi^2_{(10)} = 840.66$, $p = 3.73 \times 10^{-174}$, $\eta^2 = 0.01$ (95% bootstrap CI 0.01, 0.01). Post hoc results are presented in Tables S13–S16. Figure 1 presents the scores for BEDS-7 by country. The highest scores of BEDS-7 were found in South Korea, Gibraltar, and Bolivia, whereas the lowest were observed in Iraq, Japan, and Taiwan (in Gibraltar, Bolivia, and Iraq, the validity and reliability of BEDS-7 scores were not assessed due to small sample sizes, so the norms should be interpreted with caution). Regarding sexual orientation, the highest BEDS-7 scores were found among queer and pansexual people, whereas the lowest was found among heterosexual/straight individuals. Finally, gender-diverse individuals reported the highest levels of BEDS-7, followed by men and women.

3.1.5 | Reliability and Criterion and Discriminant Validity of the BEDS-7

The BEDS-7 showed adequate reliability in all languages, countries, genders, and sexual orientations (Tables S17–S20). Specifically, Cronbach's alpha values across languages ranged from 0.90 to 0.94, with McDonald's omegas ranging from 0.93 to 0.97. In terms of gender, women showed a

TABLE 1 | Descriptive data for the BEDS-7.

Item		N	Trimmed					MAD	Minimum	Maximum	Range	Skewness	Kurtosis	SE
			Mean	SD	Median	Mean								
BED1	During the last 3 months, did you have any episodes of excessive overeating?	73,767	0.32	0.47	1	1.28	0	1	2	1	0.77	-1.41	0	
BED2	Do you feel distressed about your episodes of excessive overeating?	73,065	0.19	0.39	1	1.12	0	1	2	1	1.56	0.43	0	
BED3	During your episode of excessive overeating, how often did you feel like you had no control over your eating?	73,562	0.36	0.71	2	2.15	0	1	4	3	1.52	1.39	0	
BED4	During your episodes of excessive overeating, how often did you continue eating even though you were not hungry?	73,557	0.44	0.73	2	2.18	0	1	4	3	1.33	1.02	0	
BED5	During your episodes of excessive overeating, how often were you embarrassed by how much you ate?	73,549	0.42	0.66	2	2.07	0	1	4	3	1.51	2.57	0	
BED6	During your episodes of excessive overeating, how often did you feel disgusted with yourself or guilty afterward?	73,550	0.43	0.66	2	2.07	0	1	4	3	1.48	2.66	0	
BED7	During the last 3 months, how often did you make yourself vomit as a means to control your weight or shape?	73,548	0.04	0.26	2	2	0	1	4	3	6.6	48.21	0	

TABLE 2 | Descriptive statistics of Binge Eating Disorder Scale (BEDS-7) items.

Characteristic	N= 82,243 ^a
During the last 3 months, did you have any episodes of excessive overeating?	
No	50,154 (68%)
Yes	23,613 (32%)
Missing values	8476
Do you feel distressed about your episodes of excessive overeating?	
No	58,986 (81%)
Yes	14,079 (19%)
Missing values	9178
During your episode of excessive overeating, how often did you feel like you had no control over your eating?	
Never or rarely	56,696 (77%)
Sometimes	9017 (12%)
Often	5720 (7.8%)
Always	2129 (2.9%)
Missing values	8681
During your episodes of excessive overeating, how often did you continue eating even though you were not hungry?	
Never or rarely	54,297 (74%)
Sometimes	8962 (12%)
Often	7515 (10%)
Always	2783 (3.8%)
Missing values	8686
During your episodes of excessive overeating, how often were you embarrassed by how much you ate?	
Never or rarely	57,380 (78%)
Sometimes	6193 (8.4%)
Often	5375 (7.3%)
Always	4601 (6.3%)
Missing values	8694
During your episodes of excessive overeating, how often did you feel disgusted with yourself or guilty afterward?	
Never or rarely	57,223 (78%)
Sometimes	5895 (8.0%)
Often	5314 (7.2%)
Always	5118 (7.0%)
Missing values	8693
During the last 3 months, how often did you make yourself vomit as a means to control your weight or shape?	
Never or rarely	71,786 (98%)
Sometimes	1073 (1.5%)
Often	472 (0.6%)
Always	217 (0.3%)
Missing values	8695

^an (%).

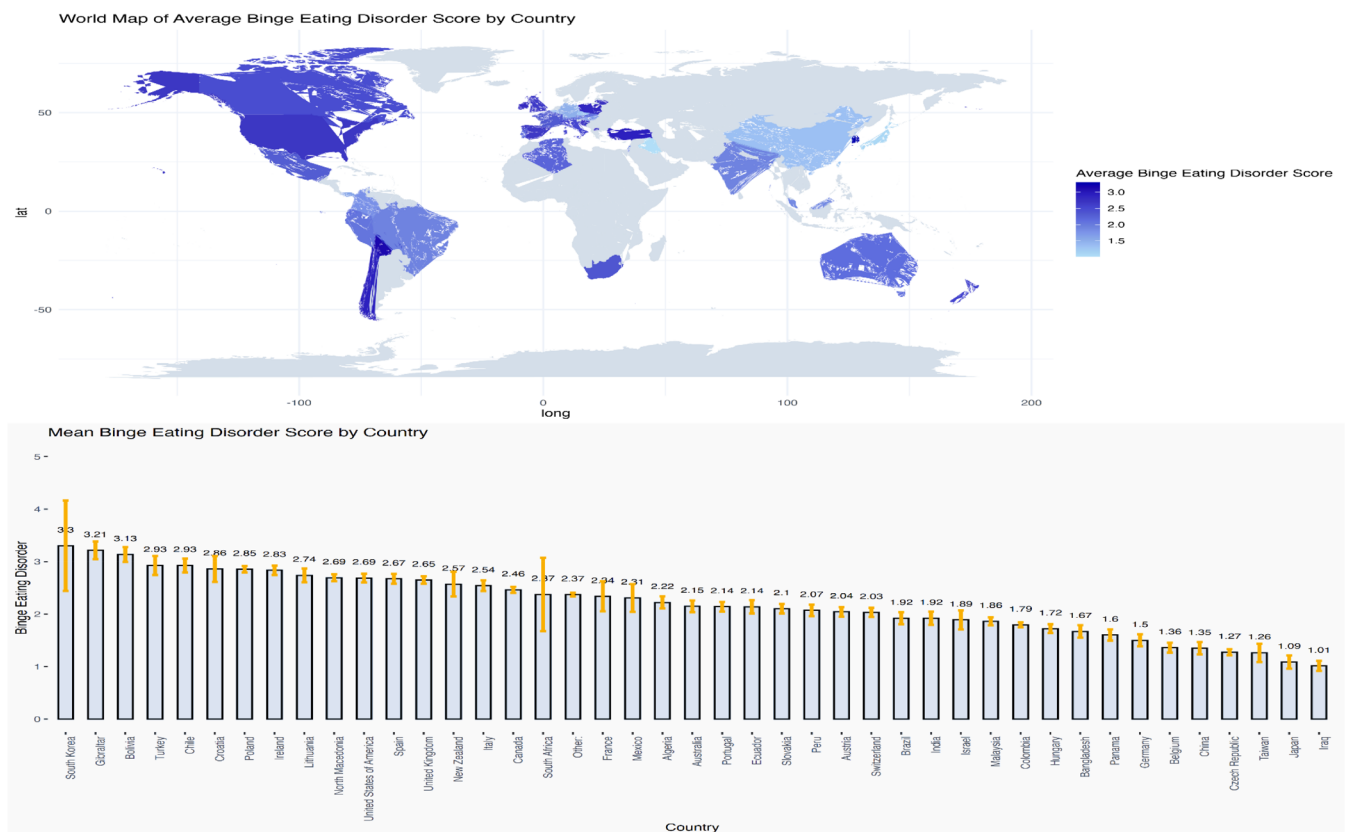


FIGURE 1 | Scores for Binge Eating Disorder by country. *Note:* The results presented on this figure need to be interpreted with caution due to the non-representative nature of data from the collaborating countries as well as the sample size differences between the countries.

slightly lower Cronbach's alpha (0.90) compared with men and gender-diverse individuals (0.93), though McDonald's omega remained consistent (0.93 to 0.95). For sexual orientations, Cronbach's alpha values ranged from 0.92 to 0.93, with McDonald's omega values between 0.95 and 0.96 across all groups.

The analysis provided some support for criterion and discriminant validity (i.e., multi-trait multimethod analysis), which are presented in Figure 2. The average correlation between items of the BEDS-7 and those of the depression or anxiety scales were weak-to-moderate in size ($r_{\text{mean}}=0.23$ for depression, $r_{\text{mean}}=0.22$ for anxiety), and those assessing substance use were weak in size ($r_{\text{mean}}=0.05$). The average correlation between items of the BEDS-7 was $r_{\text{mean}}=0.77$. As expected, item 7 that serves as a face validity showed low correlation with the rest of the BEDS-7 items.

4 | Discussion

BED is a complex mental health condition with significant health implications. The primary focus of the study was to provide information about the reliability and validity of the BEDS-7 (Herman et al. 2016), a concise seven-item self-report screening tool aligned with DSM-5 diagnostic criteria for BED (APA 2022). The present research spans 42 countries and 26 languages, ensuring a cross-cultural psychometric evaluation. Results from CFAs and factorial invariance tests support the structural validity of the BEDS-7 in many languages, countries, genders, and

sexual orientations. The study highlights the importance of measurement invariance, ensuring meaningful comparisons and reducing the possibility of biases in cross-cultural evaluations.

The BEDS-7 also demonstrated sufficient criterion and discriminant validity (i.e., weak-to-moderate positive associations with depressive and anxiety symptoms, and a weak, positive association with substance use). Although we expected stronger correlations between BED and anxiety and depression based on previous research of a patient sample (Lydecker and Grilo 2022), the weaker-than-expected correlations may reflect sample differences (patient versus community sample), demographic diversity of the sample, cross-cultural differences, and variability in mental health constructs across countries, warranting further studies.

The study revealed substantial variations in BEDS-7 scores across different languages and countries. This diversity is not surprising and may reflect cultural nuances, and varied perceptions of disordered eating behaviors (Miller and Pumariega 2001; Song et al. 2023). The evaluation of BED and the appropriateness of screening tools like BEDS-7 across diverse cultures and languages is a complex process. Cultural norms and dietary patterns may influence eating behaviors and perceptions of normality versus pathology (Song et al. 2023). The BEDS-7 should capture the core features of BED without being skewed by cultural dietary norms or stigmatization that may vary across regions. While the clinical manifestation of BED may appear similar within individuals, cultural contexts may shape experiences, expressions, and interpretations of symptoms (Song et al. 2023).

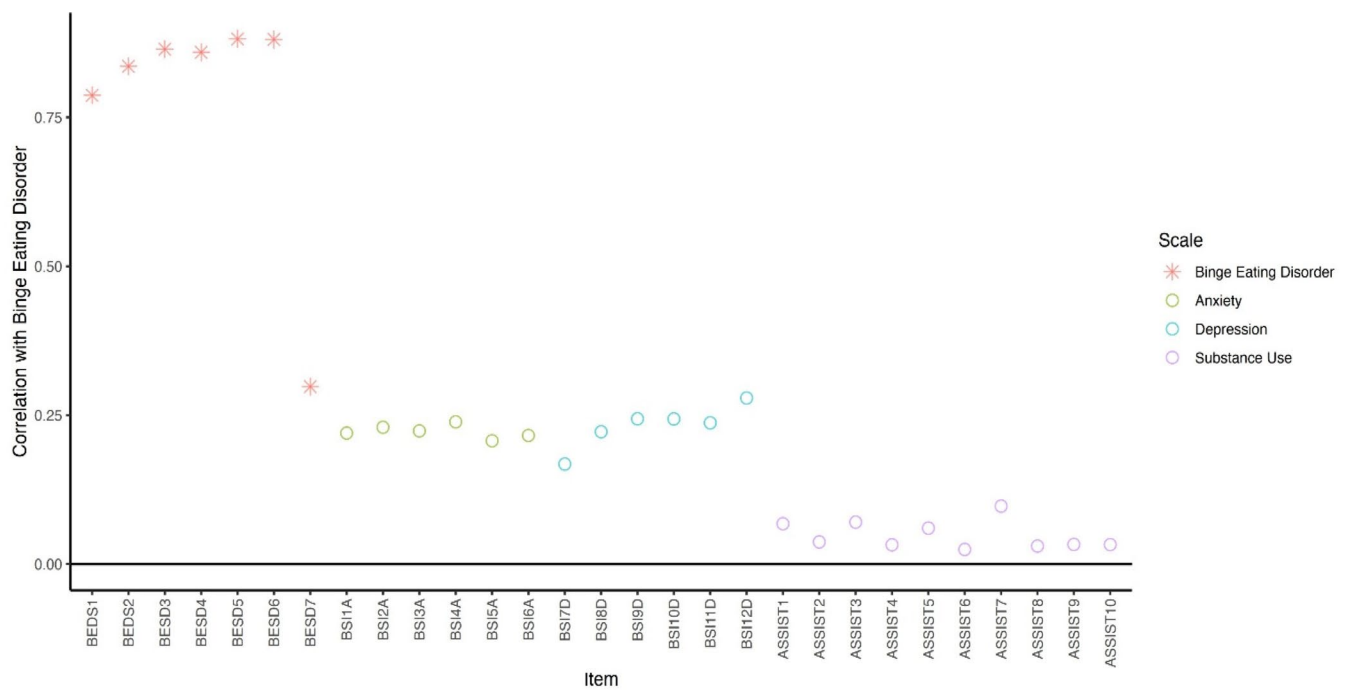


FIGURE 2 | Criterion and discriminant validity.

This variability highlights that while the BEDS-7 was designed to identify core symptoms of BED, cultural factors may influence how symptoms are expressed and perceived across diverse contexts (Lee-Winn et al. 2014; Lydecker and Grilo 2016). To ensure the tool's global reliability, future research is needed to examine whether adaptations are needed to account for cultural differences in BED symptom presentation (Strand and Gustafsson 2020).

Our study identified gender-related variations in BEDS-7 scores, with gender-diverse individuals reporting the highest levels of endorsement for BED-related behaviors, followed by men and women. These differences align with extensive previous research reporting of gender differences in eating disorder symptoms (Breton et al. 2023; Hartman-Munick et al. 2021). Understanding these patterns is important, as societal expectations and stigma linked to gender roles may affect BED symptom presentation and help-seeking behaviors (Joy et al. 2022; Lavender et al. 2017). Future studies should explore whether these factors contribute to differences in BED symptomatology, particularly for gender-diverse populations. For gender-diverse individuals, societal pressures and stigma linked to non-conformity can intensify feelings of dysphoria, isolation, and inadequacy, possibly prompting maladaptive coping mechanisms such as binge eating (Hartman-Munick et al. 2021). On the other hand, women's pursuit of thinness as an ideal can cultivate a sense of constant body surveillance and perpetuate weight stigma, thereby exacerbating issues such as BED. Additionally, societal stigma may deter men from seeking treatment, while women may be more likely to receive a diagnosis due to help-seeking behaviors (McKenzie et al. 2022). Finally, comorbidity with other mental health conditions, such as depression and anxiety, is common and varies by gender (Davis et al. 2020).

The study also explored group differences in BEDS-7 scores based on sexual orientation. Overall, our study corresponds with previous research indicating sexual minority groups demonstrate more eating pathology (Calzo et al. 2017; Parker and Harriger 2020) including BED (Nagata et al. 2020). The experience of belonging to a sexual minority group and simultaneously dealing with BED symptoms could be particularly distressing and stigmatizing for some individuals. These overlapping challenges may exacerbate symptoms and hinder access to treatment, as individuals face both minority stressors and societal discrimination related to their sexual orientation and body image (Breton et al. 2023).

4.1 | Limitations

Despite the strengths of the ISS, such as its novelty, large sample size, rigorous methodology, and following of open-science practices, some general limitations are applicable (see <https://osf.io/n3k2c/>). Limitations include online recruitment, potentially introducing selection bias and limiting generalizability, especially to clinical populations, along with underrepresentation of certain demographics like older adults and individuals of lower socioeconomic status. Additionally, several countries had small sample sizes, which may have introduced bias into the results. The initial CFA model did not fit the data well (i.e., did not have acceptable model fit indices) and thus three pairs of residuals were allowed to correlate based on statistical and theoretical considerations, as described in Section 3. This modification resulted in a significant improvement in the model fit and yielded acceptable fit indices. Bias may exist in favor of discriminant validity due to the inclusion of related measures. However, despite this potential bias, the correlations were still weaker-than-expected. Thus, while they offer

some evidence of discriminant validity, the findings are not definitive and future studies are recommended. In addition, this study lacks criterion validity data for the BEDS-7. Ideally, establishing criterion validity would require comparison with an independent, clinically assessed measure of BED, preferably conducted through evaluations by trained clinicians. Nevertheless, future studies are warranted to further examine the psychometric properties of the BEDS-7, including investigating the necessity of correlations between residuals and validating criterion measures.

Data collection occurred during the COVID-19 pandemic, which may have influenced participants' stress levels, eating behaviors, and overall mental health, potentially affecting the results. While this study provides preliminary support for the validity of the BEDS-7, further research is necessary to corroborate these findings with additional eating disorder measures, which could provide support for establishing convergent validity. Additional research is also needed to assess its psychometric properties in clinical settings with help-seeking clients. Finally, it is important to note that the sample was not fully representative of each country's population, with certain groups being overrepresented (e.g., individuals with higher education levels, those more open to discussing sexuality, or those who were more sexually active). Therefore, the findings should be interpreted with caution and replicated in future studies using nationally representative samples is needed. Specifically, given the current study is not a representative study, it cannot provide accurate estimates of BED symptoms by country or within any subpopulations.

4.2 | Conclusions

The current study contributes to the understanding and identification of BED symptoms from an international perspective. The BEDS-7 is a reliable screening tool, across cultural and linguistic groups. The findings highlight the importance of considering cultural and linguistic differences when assessing BED. While this study provides a valuable foundation for cross-cultural research on BED, its impact on global intervention strategies should be interpreted cautiously, given the nonclinical nature of the sample and the limitations of the online, cross-sectional study design. Moreover, research is needed to evaluate criterion validity by examining the BEDS-7's sensitivity and specificity in studies using trained assessors to independently confirm the presence of a BED diagnosis.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Although the ISS follows open-science practices, the dataset is not publicly available as it includes data on sensitive topics. However, the corresponding author may provide data upon justified request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.