Published in final edited form as:

Eat Behav. 2013 April ; 14(2): 167–170. doi:10.1016/j.eatbeh.2013.02.003.

Readability and Comprehension of Self-Report Binge Eating Measures

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Abstract

The validity of self-report binge eating instruments among individuals with limited literacy is uncertain. This study aims to evaluate reading grade level and multiple domains of comprehension of 13 commonly used self-report assessments of binge eating for use in low-literacy populations. We evaluated self-report binge eating measures with respect to reading grade levels, measure length, formatting and linguistic problems. Results: All measures were written at a reading grade level higher than is recommended for patient materials (above the 5th to 6th grade level), and contained several challenging elements related to comprehension. Correlational analyses suggested that readability and comprehension elements were distinct contributors to measure difficulty. Individuals with binge eating who have low levels of educational attainment or limited literacy are often underrepresented in measure validation studies. Validity of measures and accurate assessment of symptoms depends on an individual's ability to read and comprehend instructions and items, and these may be compromised in populations with lower levels of literacy.

Keywords

Binge Eating; Assessment; Literacy; Ethnic Minority; Underserved; Validity

1. Introduction

Limited literacy is highly prevalent in the US (Kutner, Greenber, & Baer, 2005) and is particularly elevated in psychiatric populations (Christensen & Grace, 1999; Currier,

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Contributors

R. Kathryn McHugh and Elizabeth M. Pratt designed the study. Lauren K. Richards performed the literature search and data analyses. Lauren K. Richards and R. Kathryn McHugh wrote the first draft of the manuscript. Heather Thompson-Brenner revised the first manuscript, and all authors have contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

Sitzman, & Trenton, 2001). Consideration of the reading grade level of healthcare materials is crucial to the ability of patients to comprehend this information. However, studies of self-report symptom measures for depression (Berndt, Schwartz, & Kaiser, 1983; McHugh & Behar, 2009; Shumway, Sentell, Unick, & Bamberg, 2004), anxiety (McHugh & Behar, 2009; McHugh, Rasmussen, & Otto, 2011), and other psychiatric symptoms (Andrasik, Heimber, Edlund, & Blankenberg, 1981; Beckman & Lueger, 1997) suggest that many of these measures are difficult to comprehend with reading grade levels for most exceeding recommendations (e.g., 5th-6th grade) (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, AMA, 1999).

Binge eating disorder (BED) is characterized by recurrent out-of-control eating episodes (APA, 2000). A large proportion of individuals with BED have less than a high school education (e.g., 14-23%) (Pike, Dohm, Striegel-Moore, Wilfley, & Fairburn, 2001; Striegel-Moore et al., 2000; Striegel-Moore et al., 2005). These rates are particularly elevated in ethnic and racial minority groups (Franko et al., 2012), with one study estimating that more than 70% of Hispanic and more than 20% of African American women with BED had less than high school education (Marcus, Bromberger, Wei, Brown, & Kravitz, 2007). These data may indicate particularly lower reading ability, given that actual reading grade level is often lower than reported education level (Davis et al., 1993; Manly, Jacobs, Touradji, Small, & Stern, 2002).

Moreover, given the under-representation of racial and ethnic minorities in clinical trials for BED (Franko et al., 2012), the effectiveness of psychosocial treatment for these individuals is unknown. To meet the important public health goal of enhancing access and quality of treatment for this population, measures that accurately assess symptoms are needed. Valid self-report assessment requires the ability of patients to comprehend measures; however, no published studies have examined the body of published binge eating symptom measures to characterize their applicability to individuals of differing education and literacy levels. A prior study of measures of bulimia nervosa and anorexia nervosa suggests that many measures approximated recommended grade levels, with 68% of measures falling in the 5th-7th grade range (Petty, Rosen & Michaels, 2000). However, this study did not provide a comprehensive review of binge eating measures, and it only examined reading grade level, despite the importance of other factors to the comprehension of written materials.

The aim of the current study was to examine the readability of self-report measures of binge eating symptoms. We evaluated reading grade level, and several other factors that may influence comprehension including measure length, format and linguistic problems. We hypothesized that the reading grade level of these measures, on average, would exceed American Medical Association (AMA) recommendations for patient materials (5th-6th grade).

2. Methods

2.1 Selection of Measures

A thorough search for self-report measures was conducted to identify all published measures related to the assessment of binge eating. We selected measures that (1) assessed binge eating symptoms, (2) were written in English, and (3) had been validated in at least 2 samples. First, we included self-report measures from the following sources: *The Handbook of Assessment and Treatment Planning for Psychological Disorders* (Craighead & Smith, 2011); *The Assessment of Addictive Behaviors* (Collins & Ricciardelli, 2008); and *The Assessment of Eating Disorders* (Mitchell & Peterson, 2005). Second, we performed a literature search of the *PsycINFO* and *PubMed* databases, using the search words *self-report*, *self-report measure*, and *self-report instrument*, combined with *binge eating*, *BED*, and

bulimia to identify measures not included in the chapters. Finally, we included a measure developed by the authors (Richards, Pratt & Thompson-Brenner, unpublished manuscript) designed to assess the frequency and associated distress of loss of control eating (i.e., one of the central features of binge eating).

These methods resulted in the identification of 22 measures, 9 of which were later excluded because they did not meet the above inclusion criteria or were not obtainable. Of these 13 measures, two did not include standard instructions and thus were excluded from analyses involving instructions.

2.2 Readability Assessment

Reading grade level was calculated separately for measure instructions and items using three readability formulas: Flesch Reading Ease (Flesch, 1948); SMOG (McLaughlin, 1969); and FORCAST (Kern, Sticht, Welty, & Hauke, 1976). These indices were averaged to provide a composite reading grade level for each scale's instructions and items, separately and in combination. We excluded response scales from our analyses because the majority were Likert type scales or repeated response choices, and two of the readability formulas require full sentences in order to calculate a grade level.

2.3 Comprehension Assessment

Consistent with previous work (McHugh, et al., 2011), our comprehension analyses included the following three domains: a) measure length (word count); b) format score, based on a dichotomous rating of the presence or absence of 4 formatting elements that may negatively influence comprehension (reverse scoring, presence of instructions to skip items based on a particular response, shifting of response sets, and the use of double negatives or negative qualifiers prior to a verb); and c) linguistic problems identified using the Question Understanding Aid (QUAID), a validated computer-based program that identifies 5 core linguistic problems related to wording, syntax and semantics (Graesser, Wiemer-Hastings, Kreuz, Wiemer-Hastings & Marquis, 2000). For QUAID scores, we divided the total number of challenging linguistic elements by the word count to adjust for measure length. For this adjusted index, higher scores indicate a greater number of challenging elements.

2.4 Composite Comprehension Assessment

Correlations between readability and comprehension indices were calculated to evaluate their degree of overlap. We also created a composite comprehension score by creating and summing standardized values (z scores) for each comprehension domain (word length, format, and QUAID score) in order to rank measures by comprehension difficulty, and to facilitate comparison with rankings by reading grade level. Finally, we combined the two validated measures (readability and QUAID) to provide an overall index of comprehension that was used to rank measures based on level of difficulty.

3. Results

A summary of reading grade levels and comprehension results is presented in Table 1. The mean reading grade level of instructions was 10.7 (SD = 2.3, range = 7.4-14.7). The mean reading grade level for the items was 8.2 (SD = 0.7, range = 7.2-9.4). The mean length of the measures was 576 words (SD = 304.7, range = 174-1,218). All the measures examined had at least one challenging formatting element, with the majority of the measures (77%) having two or more challenging elements. Of the eleven scales for which instructions were included, linguistic problems were common in all but two measures; the QUAID tool identified at least one linguistic problem in 80% of measure instructions. For measure items,

the QUAID tool identified several linguistically challenging elements in 100% of the measures.

The correlations between composite comprehension scores and the mean readability for items and instructions were nonsignificant ($r = -.06$, *ns*), suggesting that these indices measure independent factors. When we compared measure rankings based on comprehension indices versus average reading grade level, a very different pattern emerged. For example, the top two easiest measures relative to readability were the two most difficult measures relative to comprehension. We computed a total composite score by summing the standardized QUAID scores and standardized readability scores (because they are both validated indices of text comprehension), in order to evaluate the relative difficulty of each measure. Measure rankings by readability score, comprehension score and total composite score are displayed in Table 2.

4. Discussion

These results confirm our hypothesis that, on average, binge eating measures are written at a reading grade level higher than the 5th-6th grade reading level recommended by the AMA for patient materials. Our comprehension analyses similarly revealed many challenging elements that may compromise patient comprehension. All of the measures contained at least one difficult formatting component and linguistic problems were common.

Our finding that the additional evaluation of comprehension yielded different results than readability alone is consistent with previous multidimensional assessments of measure complexity (McHugh et al., 2011; Shumway et al., 2004), and suggests that each index measures distinct aspects of measure difficulty. In general, our data support the idea that indices of comprehension should be considered in addition to readability when developing and evaluating self-report measures. Further research is needed to confirm the relative contributions of these variables to measure validity.

To contextualize these findings, we examined the education levels of the samples used in validation studies of the measures included in our analysis. Of the 42 validation studies identified for which education levels were reported, half ($n = 21$) were conducted exclusively among undergraduate or post-graduate students. The remaining studies included samples recruited from treatment studies, specialty eating disorder or weight loss clinics, community and medical settings. Across these settings, the proportion of subjects with less than a high school level of education ranged from 6%-15.5% (Barnes, Masheb, White, & Grilo, 2011; Celio, Wilfley, Crow, Mitchell, & Walsh, 2004; Dymek-Valentine, Rienecke-Hoste, & Alverdy, 2004; Grilo, Masheb, & Wilson, 2001; Hrabosky et al., 2008; Mond, Hay, Rodgers, Owen, & Beumont, 2004; Mond et al., 2008; Peterson et al., 2007). Notably, two measures (the Eating Disorders Diagnostic Scale and the Eating Attitudes Test) were validated in middle school samples (Stice, Fisher, & Martinez, 2004; Wells, Coope, Gabb, & Pears, 1985). Despite these outliers, overall, the proportions of individuals with low educational attainment included in validation studies are much smaller than those reported in community and epidemiological studies of binge eating (Marcus et al., 2007; Striegel-Moore et al., 2005). Although education level can only serve as a proxy for literacy, this discrepancy suggests that the validity of these instruments for low literacy individuals is uncertain.

Of note, our readability findings are inconsistent with a previous study of readability that included some overlapping measures with the present investigation (Petty et al., 2000). The previous study found that some measures of binge eating had reading levels that fell within the 5th-6th grade, while our analyses suggest a higher range (8th-11th grade). This

discrepancy may be due to differences in readability formulas used. In our study, we used multiple indices of readability in order to minimize the limitations of any one formula, whereas the previous study relied exclusively on the Flesch reading grade level indices. In our analyses, the Flesch formula consistently yielded lower reading levels across measures than the other two formulas, suggesting that an exclusive reliance on Flesch formulas may underestimate the readability level of measures.

Our results should be interpreted in the context of the following limitations. First, there are inherent limitations in both readability and comprehension assessments, and there is no “gold standard” for the evaluation of comprehension. Further research is necessary to standardize the selection and weight of elements used to interpret comprehension scores. Second, our exclusive focus on binge eating measures precludes any conclusions drawn about the readability and comprehension of other eating disorder measures. Further research utilizing a similar multidimensional method to assess self-report measures of other eating disorder symptoms is necessary to evaluate whether readability and comprehension scores of measures differ by eating disorder diagnostic category. Third, our readability and comprehension analyses do not assess for linguistic difficulty associated with the use of culturally specific terms or phrases. Measure development and validation should also include an analysis of which items may be linguistically problematic because of cultural differences.

The results of this study suggest that self-report binge eating measures do not approach the recommended reading grade levels for patient materials, and contain many elements that may render them difficult to understand. Given the lower levels of educational attainment of individuals with binge eating, and ethnic minorities with BED in particular, existing measures may be particularly challenging for these individuals. Our findings suggest that including the evaluation of readability and comprehension in basic psychometric analysis is needed to ensure valid and reliable assessment of binge eating symptoms among diverse low-literacy patient groups.

Acknowledgments

Role of Funding Sources

Funding for this study was provided by NIH/NIMH Grant 1R36MH095395-01A1

NIH/NIMH had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

References

- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (Text Revision). American Psychiatric Press; Washington, DC: 2000.
- Anderson DA, Williamson DA, Duchmann EG, Gleaves DH, Barbin JM. Development and validation of a multifactorial treatment outcome measure for eating disorders. *Assessment*. 1999; 6:7–20. [PubMed: 9971879]
- Andrasik F, Heimber RG, Edlund RS, Blankenberg R. Assessing the reliability levels of self-report assertion inventories. *Journal of Counseling and Clinical Psychology*. 1981; 49:142–144.
- Assessment of Eating Disorders. Guilford Press; New York, NY: 2005.
- Barnes RD, Masheb RM, White MA, Grilo CM. Comparison of methods for identifying and assessing obese patients with binge eating disorder in primary care settings. *Int J Eat Disord*. 2011; 44:157–163. [PubMed: 20143322]
- Beckman HT, Lueger RJ. Readability of self-report clinical outcome measures. *J Clin Psychol*. 1997; 53:785–789. [PubMed: 9403379]

- Berndt DJ, Schwartz S, Kaiser CF. Readability of self-report depression inventories. *J Consult Clin Psychol.* 1983; 51:627–628. [PubMed: 6619373]
- Celio AA, Wilfley DE, Crow SJ, Mitchell J, Walsh BT. A comparison of the binge eating scale, questionnaire for eating and weight patterns-revised, and eating disorder examination questionnaire with instructions with the eating disorder examination in the assessment of binge eating disorder and its symptoms. *Int J Eat Disord.* 2004; 36:434–444. [PubMed: 15558644]
- Christensen RC, Grace GD. The prevalence of low literacy in an indigent psychiatric population. *Psychiatric Services.* 1999; 50:262–263. [PubMed: 10030488]
- Collins, LR.; Ricciardelli, LA. Assessment of Eating Disorders and Obesity.. In: Donovan, DM.; Marlatt, AG., editors. *Assessment of Addictive Behaviors.* Guilford Press; New York, NY: 2008. p. 305-333.
- Craighead, LW.; Smith, L. Obesity and Eating Disorders.. In: Antony, MM.; Barlow, DH., editors. *The Handbook of Assessment and Treatment Planning for Psychological Disorders* 2nd Edition. Guilford Press; New York: 2011. p. 390-438.
- Currier GW, Sitzman R, Trenton A. Literacy in the psychiatric emergency service. *Journal of Nervous and Mental Disease.* 2001; 189:56–58. [PubMed: 11206666]
- Davis TC, Jackson RH, George RB, Long SW, Talley D, Murphy PW, Mayeaux EJ, Truong T. Reading ability in patients in substance misuse treatment centers. *Int J Addict.* 1993; 28:571–582. [PubMed: 8098019]
- Dymek-Valentine M, Rienecke-Hoste R, Alverdy J. Assessment of binge eating disorder in morbidly obese patients evaluated for gastric bypass: SCID versus QEWP-R. *Eat Weight Disord.* 2004; 9:211–216. [PubMed: 15656016]
- Fairburn, CG.; Beglin, SJ. Eating Disorder Examination Questionnaire (EDE-Q 6.0).. In: Fairburn, CG., editor. *Cognitive behavior therapy and eating disorders.* Guilford Press; New York: 2008.
- Flesch RF. A New Readability Yardstick. *Journal of Applied Psychology.* 1948; 32:221–233. [PubMed: 18867058]
- Flesch, RF. *The art of readable writing.* Harper; New York: 1949.
- Franco DL, Thompson-Brenner H, Thompson DR, Boisseau CL, Davis A, Forbush KT, Roehrig JP, Bryson SW, Bulik CM, Crow SJ, Devlin MJ, Gorin AA, Grilo CM, Kristeller JL, Masheb RM, Mitchell JE, Peterson CB, Safer DL, Striegel RH, Wilfley DE, Wilson GT. Racial/ethnic differences in adults in randomized clinical trials of binge eating disorder. *J Consult Clin Psychol.* 2012; 80:186–195. [PubMed: 22201327]
- Garner, DM. *Eating Disorder Inventory-3: Professional manual.* Psychological Assessment Resources; Odessa, Florida: 2004.
- Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The eating attitudes test: psychometric features and clinical correlates. *Psychol Med.* 1982; 12:871–878. [PubMed: 6961471]
- Gormally J, Black S, Daston S, Rardin D. The assessment of binge eating severity among obese persons. *Addictive Behaviors.* 1982; 7:47–55. [PubMed: 7080884]
- Graesser AC, Wiemer-Hastings K, Kreuz R, Wiemer-Hastings P, Marquis K. QUAID: a questionnaire evaluation aid for survey methodologists. *Behavior Research Methods, Instruments, & Computers.* 2000; 32:254–262.
- Greenfield SF, Sugarman DE, Nargiso J, Weiss RD. Readability of patient handout materials in a nationwide sample of alcohol and drug abuse treatment programs. *Am J Addict.* 2005; 14:339–345. [PubMed: 16188714]
- Grilo CM, Masheb RM, Wilson GT. Different methods for assessing the features of eating disorders in patients with binge eating disorder: a replication. *Obes Res.* 2001; 9:418–422. [PubMed: 11445665]
- Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, American Medical Association. Health literacy: report of the Council on Scientific Affairs. *JAMA.* 1999; 281:552–557. [PubMed: 10022112]
- Henderson M, Freeman CP. A self-rating scale for bulimia. The 'BITE'. *Br J Psychiatry.* 1987; 150:18–24. [PubMed: 3651670]

- Hrabosky JI, White MA, Masheb RM, Rothschild BS, Burke-Martindale CH, Grilo CM. Psychometric evaluation of the eating disorder examination-questionnaire for bariatric surgery candidates. *Obesity* (Silver Spring). 2008; 16:763–769. [PubMed: 18379561]
- Kern, R.; Sticht, T.; Welty, D.; Hauke, R. Guidebook for the development of Army training literature. Human Resources Research Organization; Alexandria, VA: 1976.
- Kutner, M.; Greenber, E.; Baer, J. NCES Report 2006-470. Department of Education, National Center for Education Statistics; Washington, D.C: 2005. A first look at the literacy of America's adults in the 21st century..
- Manly JJ, Jacobs DM, Touradji P, Small SA, Stern Y. Reading level attenuates differences in neuropsychological test performance between African American and White elders. *J Int Neuropsychol Soc*. 2002; 8:341–348. [PubMed: 11939693]
- Marcus MD, Bromberger JT, Wei HL, Brown C, Kravitz HM. Prevalence and selected correlates of eating disorder symptoms among a multiethnic community sample of midlife women. *Ann Behav Med*. 2007; 33:269–277. [PubMed: 17600454]
- McHugh RK, Behar E. Readability of self-report measures of depression and anxiety. *J Consult Clin Psychol*. 2009; 77:1100–1112. [PubMed: 19968386]
- McHugh RK, Rasmussen JL, Otto MW. Comprehension of self-report evidence-based measures of anxiety. *Depress Anxiety*. 2011; 28:607–614. [PubMed: 21618668]
- McLaughlin G. SMOG grading: A new readability formula. *Journal of Reading*. 1969; 12:639–646.
- Mitchell, JE.; Peterson, CB, 7. Assessment of Eating Disorders. Guilford Press; New York, NY: 2005.
- Mond JM, Hay PJ, Rodgers B, Owen C, Beumont PJ. Validity of the Eating Disorder Examination Questionnaire (EDE-Q) in screening for eating disorders in community samples. *Behav Res Ther*. 2004; 42:551–567. [PubMed: 15033501]
- Mond JM, Myers TC, Crosby RD, Hay PJ, Rodgers B, Morgan JF, Lacey JH, Mitchell JE. Screening for eating disorders in primary care: EDE-Q versus SCOFF. *Behav Res Ther*. 2008; 46:612–622. [PubMed: 18359005]
- Paeratakul S, Lovejoy JC, Ryan DH, Bray GA. The relation of gender, race and socioeconomic status to obesity and obesity comorbidities in a sample of US adults. *Int J Obes Relat Metab Disord*. 2002; 26:1205–1210. [PubMed: 12187397]
- Peterson CB, Crosby RD, Wonderlich SA, Joiner T, Crow SJ, Mitchell JE, Bardone-Cone AM, Klein M, le Grange D. Psychometric properties of the eating disorder examination-questionnaire: factor structure and internal consistency. *Int J Eat Disord*. 2007; 40:386–389. [PubMed: 17304585]
- Petty LC, Rosen EF, Michaels S. Nineteen eating disorder scales: Comparison by focus, ease, response format, and readability. *Eating Disorders: The Journal of Treatment & Prevention*. 2000; 8:311–329.
- Pike KM, Dohm FA, Striegel-Moore RH, Wilfley DE, Fairburn CG. A comparison of black and white women with binge eating disorder. *Am J Psychiatry*. 2001; 158:1455–1460. [PubMed: 11532731]
- Richards, LK.; Pratt, Elizabeth M.; Thompson-Brenner, Heather. Development of a Dimensional Assessment of Loss of Control Eating: DALC. Boston University; Boston, MA: 2012.
- Schoenborn, CA.; Adams, PF.; Barnes, PM. Body Weight Status of Adults: United States, 1997-98. Vol. 330. Advance Data, Center for Disease Control; 2002.
- Shumway M, Sentell T, Unick G, Bamberg W. Cognitive complexity of self-administered depression measures. *J Affect Disord*. 2004; 83:191–198. [PubMed: 15555713]
- Smith CF, Williamson DA, Womble LG, Johnson J, Burke LE. Psychometric development of a multidimensional measure of weight-related attitudes and behaviors. *Eat Weight Disord*. 2000; 5:73–86. [PubMed: 10941605]
- Spitzer RL, Devlin MJ, Walsh BT, Hasin D. Binge eating disorder: A multisite field trial of the diagnostic criteria. *International Journal of Eating Disorders*. 1992; 11:191–203.
- Stice E, Fisher M, Martinez E. Eating disorder diagnostic scale: additional evidence of reliability and validity. *Psychol Assess*. 2004; 16:60–71. [PubMed: 15023093]
- Stice E, Telch CF, Rizvi SL. Development and validation of the Eating Disorder Diagnostic Scale: a brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychol Assess*. 2000; 12:123–131. [PubMed: 10887758]

- Striegel-Moore RH, Dohm FA, Solomon EE, Fairburn CG, Pike KM, Wilfley DE. Subthreshold binge eating disorder. *Int J Eat Disord.* 2000; 27:270–278. [PubMed: 10694712]
- Striegel-Moore RH, Fairburn CG, Wilfley DE, Pike KM, Dohm F-A, Kraemer HC. Toward an understanding of risk factors for binge-eating disorder in black and white women: A community-based case-control study. *Psychol Med.* 2005; 35:907–917. [PubMed: 15997611]
- Striegel-Moore RH, Franko DL. Epidemiology of binge eating disorder. *Int J Eat Disord.* 2003; 34(Suppl):S19–29. [PubMed: 12900983]
- Stunkard AJ, Messick S. The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *J Psychosom Res.* 1985; 29:71–83. [PubMed: 3981480]
- Thelen MH, Farmer J, Wonderlich SA, Smith MC. A revision of the bulimia test: BULIT-R. *Psychol Assess.* 1991; 3:119–124.
- Walfish S, Pinholster K. Reading level of Overeaters Anonymous primary educational material. *Eat Disord.* 2008; 16:212–216. [PubMed: 18443979]
- Wells JE, Coope PA, Gabb DC, Pears RK. The factor structure of the Eating Attitudes Test with adolescent schoolgirls. *Psychol Med.* 1985; 15:141–146. [PubMed: 3991828]
- Williamson DA, Davis CJ, Bennett SM, Goreczny AJ, Gleaves DH. Development of a simple procedure for assessing body image disturbances. *Behavioral Assessment.* 1989; 11:433–44.

Highlights

- We evaluated reading and comprehension levels of self-report binge eating measures
- All measures exceeded reading level recommendations and had linguistic problems
- Reading level and comprehension measure distinct aspects of measure difficulty
- Accurate assessment of binge eating in low literacy populations may be compromised
- Measure development should include the evaluation of readability and comprehension

Table 1

Reading Grade Level and Comprehension of Binge Eating Measures (N=13)

Measure	Mean Reading Grade Level			QUAID score (Adjusted)				Composite Score
	Instructions	Items	Total	Word Count	Format Score	Instructions	Items	
Binge Eating Scale(Gornally, et al., 1982)	9.5	8.8	9.1	1218	1	.05	.09	.46
Bulimia Investigatory Test [*] (Henderson & Freeman, 1987)		7.4	7.4	428	3		.09	1.42
Bulimia Test-Revised(Thelen, et al., 1991)	14.7	8.6	11.7	554	2	.06	.09	-.06
Dimensional Assessment of Loss of Control Eating(Richards, 2012)	9.5	7.4	8.5	363	2	.12	.05	-.03
Eating Attitudes Test-26(Garner, Olmsted, Bohr, & Garfinkel, 1982)	9.5	7.4	8.5	389	1	.08	.08	-1.88
Eating Disorder Diagnostic Scale(Stice, Telch, & Rizvi, 2000)	12.2	9.4	10.8	408	2	.00	.11	-1.32
Eating Disorder Examination-Questionnaire(Fairburn & Beglin, 2008)	9.2	8.5	8.8	767	1	.07	.10	-.42
Eating Disorder Inventory-III(Garner, 2004; Garner, et al., 1982)	9.3	7.4	8.3	618	2	.11	.06	.70
Eating Questionnaire-Revised(Williamson, Davis, Bennett, Goreczny, & Gleaves, 1989)	12.7	9.2	11.0	174	2	.06	.17	1.39
Multiaxial Assessment of Eating Disorder Symptoms(Anderson, Williamson, Duchmann, Gleaves, & Barbin, 1999)	11.8	7.3	9.5	379	2	.09	.03	-1.45
Questionnaire on Eating and Weight Patterns-Revised(Spitzer, Devlin, Walsh, & Hasin, 1992)	7.5	8.5	8.0	1016	2	.06	.09	1.45
Three-Factor Eating Questionnaire(Stunkard & Messick, 1985)	13.0	8.3	10.6	850	3	.00	.07	.89
Weight Loss Behavior Scale [*] (Smith, Williamson, Womble, Johnson, & Burke, 2000; Stunkard & Messick, 1985)		8.4	8.4	344	2		.07	-1.15

^{*} Measure did not include instructions

Table 2Measure Rankings by Readability Score, Comprehension Score, and Composite Score in Ascending Order^{*}

Average Reading Grade Level	Comprehension Composite (Standardized word count, format, and QUAID)	Total Composite (Standardized QUAID and Readability)
1. Bulimia Investigatory Test	1. Eating Attitudes Test-26	1. Multiaxial Assessment of Eating Disorder Symptoms
2. Questionnaire on Eating and Weight Patterns-Revised	2. Multiaxial Assessment of Eating Disorder Symptoms	2. Eating Attitudes Test-26
3. Eating Disorder Inventory-III	3. Eating Disorders Diagnostic Scale	3. Eating Disorder Inventory-III
4. Weight Loss Behaviors Scale	4. Weight Loss Behaviors Scale	4. Questionnaire on Eating and Weight Patterns-Revised
5. Dimensional Assessment of Loss of Control Eating Scale	5. Eating Disorder Examination-Questionnaire	5. Dimensional Assessment of Loss of Control Eating Scale
6. Eating Attitudes Test-26	6. Bulimia Test-Revised	6. Bulimia Investigatory Test
7. Eating Disorder Examination-Questionnaire	7. Dimensional Assessment of Loss of Control Eating Scale	7. Three Factor Eating Questionnaire
8. Binge Eating Scale	8. Binge Eating Scale	8. Weight Loss Behaviors Scale
9. Multiaxial Assessment of Eating Disorder Symptoms	9. Eating Disorder Inventory-III	9. Binge Eating Scale
10. Three Factor Eating Questionnaire	10. Three Factor Eating Questionnaire	10. Eating Disorder Examination-Questionnaire
11. Eating Disorders Diagnostic Scale	11. Eating Questionnaire Revised	11. Eating Disorders Diagnostic Scale
12. Eating Questionnaire Revised	12. Bulimia Investigatory Test	12. Bulimia Test-Revised
13. Bulimia Test-Revised	13. Questionnaire on Eating and Weight Patterns-Revised	13. Eating Questionnaire Revised

^{*} Lower numbers indicate easier measures