RELIABILITY AND VALIDITY OF BULIMIC INVESTIGATORY TEST EDINBURGH IN MEXICAN WOMEN

CONFIABILIDAD Y VALIDEZ DEL TEST DE INVESTIGACIÓN BULÍMICA DE EDIMBURGO EN MUJERES MEXICANAS

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Abstract

The aim of this study was to assess the internal consistency and validity of the Bulimic Investigatory Test Edinburgh (BITE) in Mexican women. The first sample comprised 322 undergraduate women (150 women from Hermosillo, Sonora and 172 women from Ciudad Guzman, Jalisco) with a mean age of 21.24 ($SD = 3.91$). The second sample included 73 women with eating disorders (bulimia nervosa = 23 and binge eating disorder = 50) with a mean age of 28.47 ($SD = 9.65$). The results showed that internal consistency of BITE was .90 for women from Hermosillo, .85 for women from Ciudad Guzman and .83 for women with eating disorders. The best cut-off point of BITE total score was 21 and 15 for symptoms subscale and 6 for severity subscale. The BITE total score and its subscales differentiate between clinical and undergraduate women. Also it was found a significant correlation between BITE and EAT. These findings evidenced that internal consistency of BITE was acceptable across the samples and supported the validity of the questionnaire.

Key words: BITE, reliability, validity, women, Mexico.

Resumen

El propósito de este estudio fue evaluar la consistencia interna y la validez del Bulimic Investigatory Test, Edinburgh (BITE; por sus siglas en inglés) en mujeres mexicanas. La muestra incluyó 322 mujeres estudiantes (Hermosillo = 150 y Ciudad Guzmán = 172) con un promedio de edad de 21.24 años (*DE* = 3.91). La segunda muestra estuvo conformada por 73 mujeres con diagnóstico de trastorno del comportamiento alimentario (bulimia nerviosa = 23 y trastorno por atracón = 50) con una edad promedio de 28.47 (*DE* = 9.65). Los resultados mostraron que la consistencia interna del BITE fue de .90 en las mujeres de Hermosillo, .85 en las mujeres de Ciudad Guzmán y .83 en las mujeres con trastorno del comportamiento alimentario. El punto de corte más apropiado para la puntuación total del BITE fue 21, para la subescala síntomas fue 15 y para la subescala severidad fue 6. La puntuación total del BITE y de sus subescalas diferenciaron entre las mujeres estudiantes y las mujeres con trastorno del comportamiento alimentario. También se encontró una correlación significativa entre el BITE y el EAT en las mujeres de Ciudad Guzmán. Los hallazgos de este estudio mostraron que la consistencia interna del BITE fue aceptable en las diferentes muestras y aportan evidencia respecto a la validez del instrumento.
Palabras clave: BITE, confiabilidad, validez, mujeres, México.

In 1979 the psychiatrist Gerald Russell published the article named Bulimia Nervosa: An omnius variant of anorexia nervosa. This publication represents one of the most important contributions in the field of Eating Disorders since it was realized for the first medical description of the new condition, as a variant of Anorexia Nervosa. This description was considered for the elaboration of the diagnostic criteria for the new disorder that was called Bulimia Nervosa (BN), which was included in the DSM-III (American Psychiatric Association [APA], 1980). Three decades later of Rusell´s paper there is a numerous amount of researches that have been done with rigorous methods, which have allowed to establish the characteristics and epidemiology of BN, also several models and theories has been proposed to increase the knowledge about this psychopathology, and there has been an important progress regarding its treatment and prevention (Russell, 2004)

In the BN evaluation area two instruments have been developed in order to measure the symptoms of this disorder: the Bulimia Test (BULIT; Smith & Thelen, 1984) and the Bulimic investigatory Test, Edinburgh (BITE; Henderson & Freeman, 1987), which two are still being used as screening instruments, useful both in clinical and research fields.

The BITE was created considering that binge eating can not be considered as a clinic state of discrete nature since there are intermediate conditions between normal eating behavior and pathological behavior, therefore it was necessary to developed instruments that allow to identify the binge eating among people in different clinical conditions, even the binge eating in people with anorexia nervosa of the purging compulsive category. The authors of BITE created a list of questions, which were administered to a small sample of binge-eaters and normal controls. The analysis of the items showed that some questions should be eliminated and that other questions were ambiguous. Thus a 40-items version was tested for reliability and validity and was further refined to create the final 33-items version, which was divided into two subscales: symptoms subscale and a severity subscale.

The research of the psychometrics properties of the BITE has shown that the two subscales have an adequate internal consistency. For the symptoms subscale the Alpha coefficients range from .95 to .96, meanwhile for the severity subscale range from .62 to .77 (Henderson & Freeman, 1987; Tseng, Lee & Lee, 1997). The reliability of 1-week test-retest was good (*r* = .86) and 15-weeks temporal stability for a small bulimic sample was less strong (*r* = .68; Waller, 1992). The cut-off point suggested for the symptoms subscale was 20, which indicates the eating behavior pathology and the possible presence of binge eating behavior; for the severity subscale it was suggested a cut-off point of 5, which indicates a clinically significant level of eating behavior pathology. A BITE total score of 25 or above indicates a highly disordered eating pattern and the

presence of binge eating (Henderson & Freeman, 1987). Even though this cut-off point is clinically significant, it has generated a debate. For instance, it has been found that is adequately to identify the presence of BN in people with normal weight; however it tends to misclassify low-weight binge eating people (Waller, 1992).

Rivas, Bersabé and Jiménez (2004) translated the BITE into Spanish and administered it to 1122 adolescents (669 women and 453 men). Rivas et al. (2004) reported an unidimensional structure for the two subscales of the BITE. The internal consistency for severity subscale was *Alpha* = .97 and for symptoms subscale was *Alpha* = .94. The cut-off point suggested for the symptoms subscale was 19, and for the severity subscale was 12. Rivas et al. (2004) also found that individuals with BN have higher scores than control individuals.

Also it has been shown that the BITE subscales moderately correlate with the self-report measures of BN like the BULIT-R (r = .90; Welch, Thompson & Hall., 1993) and the bulimia subscale from the Eating Disorders Inventory (r = .69; Henderson & Freeman, 1987). The BITE correlates less strongly with general measures of eating disorders like the Eating Attitudes Test (r = .70) and the drive for thinness subscale of the Eating Disorders Inventory (r = .59; Waller, 1992). In addition, the two BITE subscales have differentiated between women with BN and women with anorexia nervosa (Orlandi, Mannucci & Cuzzolaro, 2005; Waller, 1992). Women with Binge Eating Disorder (BED) or with obesity problems scored higher than control women (Orlandi et al., 2005). The BITE have demonstrated sensibility to identified any change before and after the intervention of weight reduction for obese people (Tseng et al., 2002) and for binge eating obese people (Tseng et al., 2004).

In Mexico, the BULIT is the only validated measure to assess BN symptoms, and it has been showed appropriate psychometric properties (Alvarez, Mancilla, & Vázquez, 2000), nevertheless the BITE advantage is that provide a symptoms severity indicator. Without doubt, the international researches have showed that BITE is a useful measure, which has been widely used as a screening instrument in epidemiological and longitudinal researches of BN patients; it is also frequently applied in the clinical practice to evaluate patients and developing a treat-

ment plan. Therefore the objective of this research was to assess the internal consistency and validity of the BITE in Mexican women.

Method

Participants
The study utilized two convenience samples. The first sample comprised 322 volunteered university students from two different cities in Mexico, Ciudad Guzman and Hermosillo. The average age of Ciudad Guzman participants (n = 172) was 20.13 years (SD = 3.01) and they were studying in public school. The average age of Hermosillo participants was 22.51 years (SD = 4.41) and they were studying in private schools. Ciudad Guzman is a prosperous small city of 100,000 inhabitants in the south of Jalisco state, and Hermosillo is a city of 700,000 inhabitants in the west of Sonora state, which is located near the border with the United States of America. The second sample, which was called clinical sample, included 73 women with Eating Disorder (BN = 23 and BED = 50) with an average age of 28.47 (SD= 9.65) who assisted to consultation for the first time in an eating disorder clinic located in Hermosillo.

Measurements
The Bulimic Investigatory Test, Edinburgh (BITE; Henderson & Freeman, 1987), it is a self-report questionnaire that evaluates cognitive and behavioral aspects of the BN, specially binge eating behavior. This 33-items measure consists of two subscales: the symptoms subscale (30 items) and the severity subscale (three items). The former is rated with a two- point scale (yes and no) to assess presence or absence of cognitive or behavioral aspects, while the latter is rated with a Likert-type scale to assess the frequency of binge eating and the compensatory behaviors. The BITE showed internal consistencies between .62 for the severity subscale and .96 for the symptom subscale. The BITE moderately correlated with other measures of BN (Henderson & Freeman, 1987; Welch et al., 1993) and it identified therapeutic changes of weight reduction interventions (Tseng et al., 2002; Tseng et al., 2004). The BITE subscales differentiated between specific ED groups and control individuals (Orlandi et al., 2005; Rivas et al., 2004).

The Eating Attitudes Test (EAT; Garner & Garfinkel, 1979).
The EAT is a 40-item self-report developed to assess symptoms of AN. Each item is rated on a Likert-type scale from always to never. Reliability and validity has been documented for Mexican women and the EAT showed internal consistencies between .68 for women without ED and .90 for women with ED. A cut-off point of 28 was recommended to distinguish individuals with ED from controls (sensitivity of 86% and specificity of 94%). The EAT also differentiated between specific ED groups and control individuals (Alvarez et al., 2004).

Procedure
The authors reviewed the Spanish version of BITE in order to identified meaning differences for Mexico, and few words were changed. The participants of the clinical sample and the women from Hermosillo only answered the BITE, meanwhile the women from Ciudad Guzman answered both BITE and EAT. The BITE was not applied in the clinical sample and in women from Sonora because of the short period of time allowed for evaluation. The questionnaires were applied in the classrooms of the educational institutes in which the participants attend class. In the case of the clinical sample the application was carried out during the first session of the initial evaluation that is performed to all of the patients. The aim of the research was explained and the women were asked to participate voluntarily. One of the researchers remained in the place of the application the necessary time to have the questionnaires answered and to answer any questions.

Results

The analysis of variance (*ANOVA*) with the Bonferroni post hoc test was carried out to examine if there was a significant difference between the age of participants. The results revealed that the age of the clinical sample was significant higher than the age of women from Hermosillo and women from Ciudad Guzman ($F(2) = 62.43$, $p <. 001$). Also the age of the women from Hermosillo was significat higher than the age of women from Ciudad Guzman. Considering these differences the following analyses were performed for each group.

Homogeneity of test
The item-total correlation analysis showed that all the items, except 1, 2, 21, and 23, correlated higher than .30 with BITE total score among women from Hermosillo. In the case of the women from Ciudad Guzman, it was found that all items correlated higher than .30 with BITE total score, except items 1, 13, 9, 21 and 23. Meanwhile in the clinical sample the items that did not correlated higher than .30 with BITE total score were 1, 3, 16, 17, 19, and 23.

Internal consistency
The internal consistency of the BITE was evaluated with two procedures: Cronbach Alpha coefficient and split-half orrelation with the Spearman Brown formula (see Table 1). As can be seen the majority of the coefficients were higher or equal than .70, except for the symptoms subscale in Ciudad Guzman sample.

Table 1.
Internal consistency of BITE

Sample	Total		Symptoms		Severity	
	Alpha	Split half	Alpha	Split half	Alpha	Split half
Clinical	.83	.70	.82	.77	.76	.70
Sonora	.90	.77	.88	.76	.72	.74
Guzman City	.85	.77	.83	.79	.60	.60

Comparisons between groups
A covariance analysis (*ANCOVA*) was performed, controlling the age variable, with the purpose to compare BITE total score obtained from the three women groups (see Table 2). As you can see there were not significant differences between women with BN and women with BED on BITE total score and its factors. The two women groups with eating disorders scored significantly higher than women from Hermosillo and Ciudad Guzman on BITE total score and its subscales, and women from Hermosillo scored higher than women from Ciudad Guzman.

Cut-off point of BITE
With the purpose of identifying the appropriated cut-off point for the BITE total score and its factors, it was decided to work only with the samples from Hermosillo in order to prevent a possible effect due to the place of origin. The results of cut-off points

that presented a better balance between sensibility and specificity are shown in Table 3. As can be observed, for BITE total score the cut-off point with the best balance between sensibility and specificity was 21, for the symptoms subscale was 15 and for the severity subscale was 6.

Correlations with oher measures
The grade of correlation between BITE and EAT was evaluated in the sample of women from Ciudad Guzman (see Table 4). The results showed that the BITE total score and the symptoms subscale correlated moderately with EAT total score and four of its factors. The highest correlation was observed between BITE total score and symptoms subscale with drive for thinness ($r = .55$ and $.58$ respectively). Whereas the severity subscale correlated moderately with EAT total score and three of its factors, the highest correlation was with the food restriction factor ($r = .42$).

Table 2.
Comparison between clinical and comunitary women samples

	Bulimia Nervosa		Binge Eating Disorder		Sonora		Guzman City		F
	X	SD	X	SD	X	SD	X	SD	
Total	27.39$_a$	8.04	29.12$_a$	9.33	9.94$_b$	8.48	6.59$_c$	4.55	87.85*
Symptoms	20.09$_a$	4.86	20.53$_a$	5.40	6.67$_b$	5.50	5.14$_c$	3.09	111.45*
Severity	7.30$_a$	4.61	8.59$_a$	5.78	3.51$_b$	4.41	1.45$_c$	2.23	22.59*

*$p < .001$

Table 3.
Sensibility and specificity of cutt-off point

Score		Sensibility	Specificity
Total	20	89	81.3
	21	83.6	83.3
	22	78.1	84
Symptoms	14	93.2	83.3
	15	87.7	86
	16	83.6	87.3
Severity	4	82.2	66
	5	71.2	63.3
	6	63	69.3

Table 4.
Correlation between BITE and EAT

	Total	Eating restraint	Bulimia	Drive for thinness	Food concern	Perceived social pressure
Total	.54**	.50**	.42**	.55**	.33**	.15*
Symptoms	.55**	.48**	.46**	.58**	.41**	.18*
Severity	.40**	.42**	.29**	.40**	15	.09

*p < .05, **p < .001

Discussion

The aim of this research was to assess the internal consistency and validity of the BITE in Mexican women. The analyses of the homogeneity through the item-total correlation revealed that the majority of the items achieved a correlation higher than .30 in all three samples, which indicates that the items of the test are assessing the same construct (Anastasi, 1961; Kline, 1986). The item 1 (do you have a regular daily eating pattern?) and 23 (does how hungry you feel determine how much you eat?) did not correlated with BITE total score in the three samples, it suggests the necessity of further studies to continue analyzing these items.

Internal consistency of BITE total score and its subscales were evaluated with Cronbach Alpha and split-half methods in all three samples. Consistent with previous studies among clinical and communitary samples (Henderson & Freeman, 1987; Tseng et al., 1997; Rivas et al., 2004) the coefficients obtained were higher than .70 suggested by Nunally (1991). These findings showed that internal consistency of BITE was adequate; nevertheless, it is important to consider that the severity subscale obtained a coefficient of .60 in Ciudad Guzman sample; in this case, it is necessary to continue evaluating this subscale.

The construct validity of the BITE is supported by the current study and the findings are consistent with previous research, since the scores of the instrument allowed differentiate between the clinical sample and the community samples (Orlandi et al., 2005; Rivas et al., 2004). Also the study showed that women from Hermosillo scored higher than women from Ciudad Guzman, this result can be explained in two different ways. The first explanation is based on the proximity of Hermosillo with the United States of America, country that has been promoted the culture of thinness. This can cause a

greater influence in women by this model; as a result they are at risk of disordered eating behaviors. On this line of reasoning some research have found that women who lived in cities close to the border with the United States of America developed inappropriate eating behavior (Alvarez et al., 2003; Franco et al., 2007) and scored high in measurements of ED (González, Franco & Mancilla, 2007). The second explanation considers the school type variable because there are evidence that people who attend to private schools showed more attitudes and behaviors related to eating disorders compared to those who attend to public schools.

Regarding the cut-off points indentified for BITE total score (21), for the symptom subscale (15) and for severity subscale (6) they were lower than those obtained initially in the BITE validation (Henderson & Freeman, 1987). It is important to mention that both the sensibility and the specificity of cut-off point for BITE total score and for symptom subscale was higher than .80 which indicates that they are appropriate scores to differentiate between people with BN, BED and healthy people. Nevertheless, in the case of the severity subscale it is necessary to take into account that the cut-off point of 6 presented a minimum sensibility and specificity, so it is recommended to take with caution this result and further research is necessary to evaluate this cut-off point again.

This research, also showed that BITE correlated moderately with EAT, this finding is in line with Waller´s (1992) study. The result indicates that both questionnaires are measuring abnormal eating patterns. This information is relevant since EAT is one of the questionnaires most used in eating disorder field and it has been validated on Mexican samples obtaining favorable evidence regarding its psychometric properties. Nevertheless, it is important to consider that it was designed to measure symptom-

ology related to AN, and the BITE assess the symptomatology of BN.

The findings of this research are important for three reasons. First, the BITE was develop in 1983 with DMS III diagnostic criteria (American Psychiatric Association, 1980), however it has demonstrated good psychometric properties to evaluate the cognitive and behavioral aspects of BN. Second, there was not previous knowledge about psychometric properties of BITE among women with BED, an eating disorder that has received special attention in the last decades because of its high prevalence among people who participated in a lose weight treatment (Stunkard & Costello, 2003; Villagómez, Cortés, Barrera, Saucedo & Alcocer, 2003). Third, this research represents the first evaluation of the BITE psychometric properties in Mexican samples.

In general, these findings showed that internal consistency of BITE was appropriate and there is enough information to consider it valid. Nevertheless, it is necesaary to take into account that the validation of a test is a continuous process and it depends of the agglomeration of evidence, fot that reason it is necessary to develop researches that provide more information regarding psychometric properties of this instrument.

References

Alvarez, G., Franco, K., Vázquez, R., Escarria, A. M., Haro, M., & Mancilla, J. M. (2003). Sintomatología de trastorno alimentario: comparación entre hombres y mujeres estudiantes. Psicología y Salud, 3, 245-255.

Alvarez, G., Mancilla, J. M., & Vázquez, R. (2000). Propiedades psicométricas el Test de Bulimia (BULIT). Psicología Contemporánea, 7, 74-85.

Alvarez, G., Mancilla, J. M., Vázquez, R., Unikel, C., Caballero, A., & Corona, D. (2004). Validity of the Eating Attitudes Test: A study of mexican patients with eating disorders. Eating and Weight Disorders, 9, 243-248.

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorder (3a. ed.). Washington, DC.

Anastasi, A. (1961). Psychological testing. New York: The Macmillan Company.

Franco, K., Luis, P., Mancilla, J.M., Alvarez, G., Vázquez, R., & López, X. (2007). Sintomatología de tras-tornos del comportamiento alimentario en universitarios de cinco estados de la república mexicana (Abstract). Revista Mexicana de Psicología, special number, 162-163.

Garner, D. & Garfinkel, P. (1979). The Eating attitudes test: And index of the symptoms of anorexia nervosa. Psychological Medicine, 9, 273-279.

González, O., Franco, K., & Mancilla, J. M. (2007). Sintomatología de trastornos del comportamiento alimentario en estudiantes de artes de la universidad de Sonora (Abstract). Revista Mexicana de Psicología, special number, 163-164.

Henderson, M. & Freeman, C. P. L. (1987). A self-rating scale for bulimia: The BITE. British Journal of Psychiatry, 150, 18-24.

Kline, P. (1986). A handbook of test construction. New York: Metheun.

Nunally, C.J. (1991). Teoría psicométrica. México: Trillas.

Orlandi, E., Mannucci, E., & Cuzzolaro, M. (2005). Bulimic Investigatory Test, Edinburgh (BITE). A validation study of the Italian version. Eating and Weight Disorders, 10, 14-20.

Rivas, T., Bersabé, R., & Jiménez, M. (2004). Fiabilidad y validez del "Test de Investigación Bulímica de Edimburgo (BITE)" en una muestra de adolescentes españoles. Psicología Conductual, 12 447-462.

Russell, G. (2004). Thoughts on the 25th anniversary of bulimia nerviosa. European Eating Disorders Review, 12, 139-152.

Smith, C. & Thelen, M. (1984). Development and validation of a test for bulimia. Journal of Consulting and Clinical Psychology, 52, 863-872.

Stunkard, A. & Costello, K. (2003). Two forms of disordered eating in obesity: binge eating and night eating. International Journal of Obesity, 27, 1-12.

Tseng, M., Lee, Y., Chen, S., Lee, M, Lin, K., Chen, P. et al. (2002). Psychobehavioral response and weight loss prediction in a hospital-based weight reduction program. Journal Form the Medical Association, 101, 705-711.

Tseng, M., Lee, M., Chen, S., Lee, Y, Lin, K., Chen, P. et al. (2004). Response of Taiwanese obese binge eaters to a hospital-based weight reduction program. Journal of Psychosomatic Research, 57, 279-285.

Tseng, M., Lee, M. B., & Lee, Y.J. (1997). Reliability and validity of Chinese version of the Bulimic Investi-

gatory Test. *Taiwanese Journal of Psychiatry, 11,* 141-155.

Villagómez, L., Cortés, J., Barrera, E., Saucedo, D. & Alcocer, L. (2003). Comorbilidad de la obesidad con los trastornos de la conducta alimentaria. *Revista de Investigación Clínica, 55,* 535-545.

Waller, G. (1992). Bulimic attitudes in different eating disorders: Clinical utility of the BITE. *International Journal of Eating Disorders, 11,* 73-78.

Welch, G., Thompson, L. & Hall, A. (1993). The BU-LIT-R: Its reliability and clinical validity as a screening tool for DSM-III-R bulimia nervosa in a female tertiary education population. *International Journal of Eating Disorders, 14,* 95-105.