

Construct Validation of an Eating Behavior Checklist

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The study aimed to provide evidence for construct validity of the Eating Behavior Checklist. The EAT26, a self-report questionnaire which is an established measure in assessing eating attitudes was administered alongside the Eating Behavior Checklist to 258 female college students. Results showed convergent validity of the subscales where they positively correlated with each other. Discriminant validity was also established for some subscales where participants reported eating large amount of food, binge eat, force vomit, take laxatives and being treated for eating disorder. Confirmatory Factor Analysis showed significant relationship between Eating Behavior Checklist and EAT26. The CFA also showed the factors of each mean were significant. It was found that the model fits the observations (N=258) as indicated by $\chi^2=77.42$, $df=13$, RMS Standardized Residual=.05, PGI=.91, Joreskog GFI=.93, Bentler-Bonett Normed Fit Index=0.90, and Bentler-Bonett Non-Normed Fit Index=0.89. The present findings and future research directions and limitations are discussed.

The literature is replete with instruments that have been developed to measure eating attitudes and behaviors of young women who are considered most vulnerable to eating disorders and disordered eating patterns. Cooper and Fairburn (1987) developed the Eating Disorder Examination, a semi-structured interview that assesses the full range of the specific psychopathology of eating disorders, including concerns about shape and weight. Several studies compared self-report questionnaires with interview-based measures. Wilson and Smith (1989) did a comparative study on Eating Disorder Examination (EDE) and self-report questionnaires such as Eating Disorder Inventory (EDI) and Restraint Scale (RS). The EDI is a test designed to measure attitudes, feelings and behaviors common to anorexia nervosa and bulimia nervosa (Garner, 1995) while the Restraint Scale (RS)

measures weight fluctuation and subjective concern for dieting (Herman & Polivy, 1980). Wilson and Smith confirmed that the interview is a superior measure in assessment of bulimia nervosa than the standardized self-report questionnaires. Pyle, Halvorson, Newman and Mitchell (1986) also found that results from self-report questionnaires on identification of binge eating and fear of loss of control over eating behaviors may be less accurate when compared with interview assessment. Furthermore, Carter, Aime and Mills (2001) had similar findings on comparing the interview assessment and self-report version. The EDE showed higher scores in measuring binge and vomiting frequencies. Although both measures generated similar results in assessing laxative and diuretic use, shape and weight issues and binge episodes, they concluded that in assessing the core features of eating disorder, the EDE interview showed more accuracy. A 2003 study by Tanofsky-Kraff, Morgan, Yanovski, Marmarosh, Wilfley and Yanovski also reiterates the accurate results of a structured interview. However, Fairburn and Beglin (1994) suggest that a self-report questionnaire generated higher scores than the interview in the assessment of binge eating and body shape concerns. Parallel results were found by Wilfley, Schwartz, Spurrell and Fairburn in 1997. Their study confirmed that the self-report questionnaire showed greater levels of disturbance than the interview measure. In 1998 another comparison study was done by Black and Wilson to assess the validity of EDE-Q. It is a self-report questionnaire based directly on the Eating Disorder Examination (EDE) interview (Fairburn & Beglin, 1994). They reported that the self-report questionnaire seems to be more efficient than the EDE, a semi-structured interview, in identifying eating disorder symptoms. Similar findings emerged in a 2005 study by Wolk, Loeb and Walsh which reiterated that a self-report questionnaire generates higher frequencies in assessing binge eating, overall diagnosis and other specific features such as vomiting and laxative use than an interview-based measure. Furthermore, Field, Taylor, Celio and Colditz found substantial results in a 2004 comparative study of self-report and interview assessment of bulimic behaviors among adolescents. When purging behavior on the questionnaire was compared with the interview measure the sensitivity increased from 0.73 to 0.93.

The objective of the study is to develop and validate a brief self-report questionnaire designed for college women that will assess the presence of eating disorder symptoms and disordered eating patterns. The instrument is intended to provide a reliable and valid measure that will cater to the general college-aged women population.

Method

Participants

A total of 258 female college students in an urban college participated in the study. Purposive sampling was used and confidentiality was guaranteed verbally. Their ages range from 15 to 26 with a mean age of 18.42. Their mean height is 5'3" while their mean weight is 118.89. The ethnicity breakdown is as follows: Filipino, 244; Chinese, 6; Japanese, 3; Filipino-American, 2; American, 1; Korean, 1; Filipino-German, 1. Respondents who divulged or were suspected of an eating disorder or disordered eating were provided referral information to seek professional assistance from the college counselors.

Measures

Eating Attitudes Test (EAT 26). The EAT-26 is one of the most commonly used self-report instruments, measuring attitudes about food and dieting behaviors that are similar to clinically diagnosed eating disorders (Kirk, Singh, & Getz, 2001). It has been validated and used in many different countries to explore eating attitudes mainly among adolescents and young people (Lynch et al., 2007). It is divided into three subscales, namely, Dieting, which consists of 13 items, Bulimia and Food Preoccupation which consists of 6 items and Oral Control, which consists of 7 items. The EAT has high criterion validity in discriminating between those with and without eating disorders for males and females (Gila *et al.*, 2005; Mintz and O'Halloran, 2000). The EAT-26 has been used extensively with both early adolescents (e.g., Gila *et al.*, 2005; Pendley and Bates, 1996) and with high school samples (e.g., Gila *et al.*, 2005; Rosen *et al.*, 1988), and it has shown good construct validity when validated against other eating behavior measures (Rosen *et al.*, 1988)

Eating Behavior Checklist. The Eating Behavior Checklist is a new test, developed and pilot tested by the researcher in this study to assess eating patterns of college women. It is composed of 18 items and 4 subscales namely Self Starvation (SS), 5 items; Food Restraint, 6 items; Eating Concern, 3 items; Bulimic Behaviors, 4 items. Responses are based on the duration of six months up to present. The choices are always(5), usually(4), often(3), sometimes(2), rarely(1), and never(0). Two behavioral questions that deal on drinking to avoid eating and eating large amount of food when sad or depressed are included at the end of the checklist. Both questions are answerable by Yes or No and if answered Yes, frequency in a week is also filled up. Demographic information is required such as age, sex, height, weight, ideal weight and nationality.

Procedure

The two questionnaires, EB Checklist and EAT26 were administered individually and in small groups. The respondents were given information that

the study results will be used in program development to address eating and body image concerns of college women. There was no compensation offered and they were assured that the data would be treated with utmost confidentiality.

The Eating Behavior Checklist was developed to identify eating disorder/disordered eating patterns specifically in female, college-aged population. Items used for the development of the EB Checklist were based on disordered eating signs and symptoms discussed by college students who were suspected and/or treated for eating disorder in the past. The EB Checklist took approximately 5 minutes to complete. Subjects responded by using a Likert-type scale: Always(5), Usually(4), Often(3), Sometimes(2), Rarely(1), and Never(0) in completing the questionnaire.

Data Analysis

Descriptive statistics (means and standard deviations) of the subscales in the two questionnaires was utilized to come up with a description of the eating attitudes of the respondents and to obtain convergent correlation of the subscales and discriminant validity of the EB Checklist and EAT26. A measurement model using Confirmatory Factor Analysis was also constructed and tested to further establish construct validity of the EB Checklist and the EAT26.

Results

Table 1
Means, Cronbach's alpha, and Correlations of the Factors of EB Checklist and EAT26

	N	M	SD	Cronbach's alpha	1	2	3	4	5	6
1 Self-Starvation	258	1.79	1.12	0.8	---					
2 Food Restraint	258	1.63	0.78	0.65	.55**	---				
3 Eating Concerns	258	1.29	0.78	0.23	.43**	.33**	---			
4 Bulimic Behaviors	258	0.31	0.53	0.58	.55**	.41**	.27**	---		
5 Diet	258	0.53	0.55	0.86	.71**	.54**	.57**	.57**	---	
6 Bulimia/ Food Preoccupation	258	0.18	0.34	0.71	.45**	.32**	.43**	.45**	.62**	---
7 Oral Control	258	0.43	0.47	0.64	.25**	.45**	.23**	.30**	.43**	.45**

* $p < .05$

** $p < .01$

Means for all the subscales of the EB Checklist and EAT26 are low ranging from .34 to 1.79 (4 point scale). Adequate internal consistencies were obtained for each subscale of the EAT26. Although low internal consistencies were found for the subscales of the EB checklist as influenced by the small number of items for each.

The results of the correlations show convergent validity of the subscales of the EB Checklist and EAT26. According to Weiner et al. (2003) convergent validity is reflected when tests measuring the same constructs are highly correlated. The convergence is indicated by the significant and positive intercorrelations among the subscales. This indicates that the EB Checklist and EAT26 are fairly measuring the same construct.

To test for the discriminant validity of the subscales, significant differences were tested between those who eat large and small amounts, engage in binge eating and those who do not, experience vomiting and those who do not, take laxatives or pills and those who do not, treated for eating disorders and those who do not, and attempted suicide and those who do not. It is hypothesized in the present study that larger means will be obtained for those who affirmed answers for eating large amounts of food, engage in binge eating, experience vomiting, take pills and laxatives, treated for eating disorder, and attempted suicide. The t-test for independent means was used to compare the means for each subscale of the EB Checklist and EAT26.

Table 2
Discriminant Validity of the EB Checklist and EAT26

	<i>M</i>	<i>M</i>	t-value	df	p
Eat large amount of food	Yes	No			
Self-Starvation	1.97	1.68	2.07*	256	0.04
Food Restraint	1.69	1.59	0.99	256	0.32
Eating Concerns	1.57	1.12	4.72**	256	0.00
Bulimic Behaviors	0.36	0.28	1.21	256	0.23
Diet	0.61	0.49	1.75	256	0.08
Bulimia/Food Preoccupation	0.25	0.14	2.57**	256	0.01
OC	0.42	0.43	-0.20	256	0.84
Engaged in Binge Eating	Yes	No			
Self-Starvation	2.03	1.69	2.26*	256	0.02
Food Restraint	1.76	1.58	1.71	256	0.09
Eating Concerns	1.62	1.15	4.66**	256	0.00
Bulimic Behaviors	0.42	0.26	2.23*	256	0.03
Diet	0.70	0.46	3.28**	256	0.00
Bulimia/Food Preoccupation	0.26	0.15	2.56**	256	0.01
Oral Control	0.48	0.41	1.15	256	0.25
Force Vomited	Yes	No			
Self-Starvation	2.72	1.70	4.33**	256	0.00
Food Restraint	2.17	1.58	3.52**	256	0.00
Eating Concerns	1.41	1.28	0.72	256	0.47
Bulimic Behaviors	1.15	0.23	9.11**	256	0.00
Diet	1.06	0.48	5.04**	256	0.00
Bulimia/Food Preoccupation	0.41	0.16	3.51**	256	0.00
Oral Control	0.64	0.41	2.25*	256	0.03

Cont. Table 2

Pills/Laxatives					
	Yes	No			
Self-Starvation	2.75	1.67	5.16**	256	0.00
Food Restraint	2.14	1.57	3.85**	256	0.00
Eating Concerns	1.56	1.26	1.99*	256	0.04
Bulimic Behaviors	0.80	0.25	5.58**	256	0.00
Diet	0.89	0.49	3.84**	256	0.00
Bulimia/Food Preoccupation	0.19	0.18	0.14	256	0.89
Oral Control	0.51	0.42	0.99	256	0.32
Treated for Eating Disorder					
	Yes	No			
Self-Starvation	2.30	1.75	1.90	256	0.06
Food Restraint	1.85	1.62	1.18	256	0.24
Eating Concerns	1.40	1.29	0.54	256	0.59
Bulimic Behaviors	0.52	0.29	1.61	256	0.11
Diet	0.84	0.51	2.31*	256	0.02
Bulimia/Food Preoccupation	0.28	0.17	1.22	256	0.22
Oral Control	0.50	0.43	0.61	256	0.54
Attempted Suicide					
	Yes	No			
Self-Starvation	2.13	1.75	1.55	256	0.12
Food Restraint	1.92	1.60	1.94*	256	0.04
Eating Concerns	1.26	1.30	-0.20	256	0.84
Bulimic Behaviors	0.52	0.29	2.06*	256	0.04
Diet	0.63	0.52	0.95	256	0.34
Bulimia/Food Preoccupation	0.19	0.18	0.20	256	0.84
Oral Control	0.46	0.43	0.31	256	0.76

* $p < .05$ ** $p < .01$

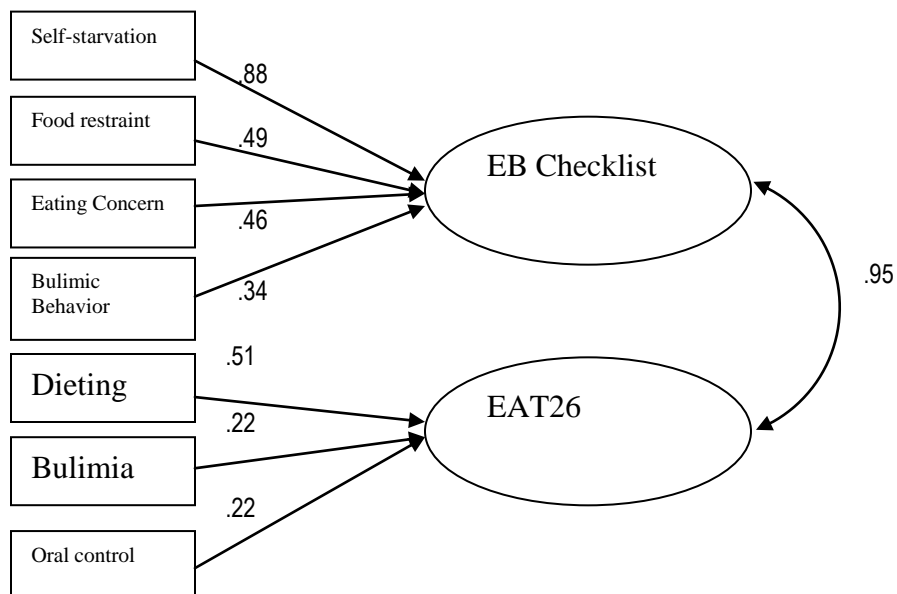
The hypothesis for the discriminant analysis for the subscales of the EB Checklist and EAT26 were confirmed for majority of the subscales. For eating large, significantly higher means were found for Self Starvation, Eating Concerns, and Bulimia/Food Preoccupation. For those who engage in binge eating, significantly larger means were obtained for all subscales except for Food Restraint and Oral Control. For those who experience vomiting, significantly larger means were obtained for all subscales except for Eating Concerns. For the ones who take pills and laxatives, significantly larger means were obtained for all subscales except for Bulimia/Food Preoccupation and Oral Control. For the ones treated for eating disorder, it only discriminated for diet. For the ones who attempted suicide, significantly larger means were only found for Food Restraint and Bulimic Behaviors. Generally, the EB checklist effectively discriminates behavior for taking pills and laxatives.

A measurement model using a Confirmatory Factor Analysis (CFA) was constructed and tested to further establish the construct validity of the EB Checklist and EAT26. The measurement model represents EB Checklist and

EAT26 as two separate latent factors were correlated and the indicators are their specific subscales. The correlation in between EB Checklist and EAT26 as two latent constructs indicates construct validity of the two scales. Factor validity is also proven by testing whether their respective indicators will turn out to be significant.

The results of the CFA showed that a significant relationship between EB Checklist and EAT26 was found. This further supports the construct validity of the EB Checklist and EAT26 that they are measuring the same behavior. All indicators of the EB Checklist and EAT26 had significant paths. This indicates that a three factor structure is appropriate for the EB checklist and a four factor structure for the EAT26. The model's goodness of fit was also tested and it was found that the observations (N=258) were fit for the structured common factors of EB Checklist and EAT26. The adequate fit was indicated by $\chi^2=77.42$, $df=13$, RMS Standardized Residual=.05, PGI=.91, Joreskog GFI=.93, Bentler-Bonett Normed Fit Index=0.90, and Bentler-Bonett Non-Normed Fit Index=0.89.

Figure 1
Measurement Model for EB Checklist and EAT26



The 18-item Eating Behavior Checklist subscales displayed adequate internal consistencies, particularly 0.8 for Self-Starvation (SS) and 0.65 for Food Restraint (FR). The small number of items for each subscale accounts for the low consistencies. Majority of the subscales of the EB Checklist and EAT26 showed discriminant validity. Higher means were found in Self-Starvation (SS) (2.07), Eating Concern, (EC) (4.72) and Bulimia/Food Preoccupation (BFP) (2.57) for respondents who eat large amount of food when sad or depressed. For

those who engage in binge eating, significantly larger means were seen in all subscales except for Food Restraint (FR) (1.71) and Oral Control (OC) (1.15). Those respondents who experience food vomiting, all subscales have significant larger means except for Eating Concern (EC) (0.72). For those who take pills and laxatives, significant larger means were obtained for all subscales except for Bulimia/Food Preoccupation (BFD) (0.14) and Oral Control (OC) (0.99). Those who are being treated for eating disorder, it only discriminated for Diet. For the ones who attempted suicide, significantly larger means were only found for Food Restraint (FR) (1.94) and Bulimic Behaviors (BB) (2.06). The study constructed and tested a measurement model using Confirmatory Factor Analysis to establish construct validity of the EB Checklist and EAT26. CFA results showed that there is a significant relationship between the EB Checklist and EAT26.

Discussion

It is apparent that those respondents who tend to starve themselves and adopt bulimic behaviors may eat large amount of food with a sense of lack of control when sad or depressed. Findings are consistent that those who engage in binge eating have less control over food intake. But for those who force vomit to lose weight, they seem to be those who are not preoccupied with food or who do not eat more than is expected. Another unexpected finding is that those who take pills and laxatives tend to exhibit less bulimic behaviors. Those who were treated for eating disorder, dieting was found as the most significant behavior. Lastly, those who divulged that they have thought or attempted suicide were found to have bulimic behaviors and restrained food intake.

The primary purpose of this study is to develop, evaluate and validate a self-report questionnaire that will assess disordered eating patterns in college-aged women across all groups, i.e., athletes, dancers or artists. Descriptive statistics showed that the EB Checklist measured the factors that it purports to evaluate. The significant relationship of the EB Checklist and the EAT26 as shown in the Confirmatory Factor Analysis supports the construct validity of the two instruments. It is also indicated that a three factor structure is appropriate for the EB Checklist and a four factor structure for the EAT26. One limitation is the low internal consistencies of the subscales that were found in the EB Checklist, as influenced by the small number of items for each subscale. Another concern is that the EB Checklist was developed and validated in a sample population in one college. It is recommended that the EB Checklist will be administered and validated in other colleges and universities in the future. This will help other counselors identify the prevalence of eating disordered patterns among their female clientele and eventually develop programs for them. It is primarily an attempt to widen the radius of eating disorder awareness among Filipino adolescent women.

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