

THE RELATIONSHIP OF THE EATING DISORDERS INVENTORY WITH THE SCL-90 AND MMPI IN COLLEGE WOMEN

TIMOTHY ANDERSON and CHRISTOPHER M. MESHOT

Department of Psychology, Miami University, 104 Benton Hall, Oxford, OH 45056, U.S.A.

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Summary—The eight subscales of the Eating Disorders Inventory (EDI) were correlated with two widely used self-report symptom measures (the MMPI and the SCL-90). A multivariate analysis suggested two general clusters of variables involving the EDI. Subscales of the EDI that purport to measure eating concerns were grouped together on the first variate and were related to Pt, D, Pd, and the Global Severity Index of the SCL-90. Thus, the reporting of these general eating difficulties tended to coincide with complaints of anxiety, depression, and other symptoms. The second variate appeared to measure healthy psychological functioning. Implications for the EDI and its usefulness are discussed.

The Eating Disorders Inventory (EDI; Garner, Olmstead & Polivy, 1983) is a self-report questionnaire that is designed for the measurement of eating disorders. The EDI may become especially useful as a screening instrument in populations such as those at colleges and universities, which are at high risk for eating problems. The 64-item test, with its eight subscales, is primarily designed to measure "the specific cognitive and behavioral dimensions that may meaningfully differentiate subgroups of patients, or that may distinguish those with serious psychopathology from extreme 'dieters'" (p. 17). The EDI was developed, in part, because of clinical observations suggesting that eating disorders are multidimensional and comprised of a wide variety of symptom-specific complaints.

Thus far the validity of the EDI has been studied through behavioral correlates, the comparison of different eating disorder subgroups, and examination of the scale's factor structure. Factor analytic studies of the EDI have found that the empirical dimensions of the test differ from the original, clinically derived, scales. Klemchuk, Hutchinson and Frank (1990) found six factors that include (a) Body Dissatisfaction; (b) Eating Disorders; and four factors that appeared to be similar to (c) Ineffectiveness; (d) Interpersonal Distrust; (e) Maturity Fears; and (f) Perfectionism (from the original scales of the EDI). However, Welch, Hall and Walkey (1988), also using a college population, found only three general factors: (a) Concerns with weight, shape, and eating (mostly comprised of the Thinness, Bulimia, and Body Dissatisfaction subscales); (b) a factor measuring a general loss in self-esteem (from the Ineffectiveness and Interpersonal Distrust subscales); and (c) Perfectionism (from the original EDI). Given these results, Welch *et al.* suggested that the EDI may measure more general deficiencies of self-esteem, eating, and thinness.

Before reaching such a conclusion it is important to explore the construct validity of the EDI with other commonly used and accepted symptom measures. Factor studies are unable to address fully the meaning of these labeled factors. Interpreting factors is often difficult, especially when the loadings vary slightly from study to study. To understand the underlying constructs measured by these factors it is necessary to analyze the EDI with other measures that might be expected to relate to one or more of the suspected factors. This study will attempt to explore which factors (if any) of the EDI are tapping into more traditional symptomatology (e.g. anxiety and depression).

The scale's validity has also been explored with direct behavioral measures (Gross, Rosen, Leitenberg & Willmuth, 1986) and with different groups of eating disorder patients (Willmuth, Leitenberg, Rosen & Cado, 1988). In spite of these demonstrations of the EDI's association with problematic eating behaviors, little is known of its association to other self-report measures of symptomatology. The test's relation to more general symptom measures is important, as an assumption of the EDI is that it measures the assumed multidimensional nature of eating-related

problems. For example, it is not known if the scale's differentiation of bulimia and anorexia (Garner *et al.*, 1983) is based on symptoms shared with other groups of non-eating disorder patients or if this differentiation is based solely on the specific eating behaviors that have characterized eating disorder patients. Thus, it is not clear what other symptoms may be related to these problematic eating behaviors.

The purpose of this study is to examine the degree to which the EDI scales relate to groupings of other, commonly used instruments that measure reported psychological symptoms. Previous attempts to measure eating disorder patients on self-report symptom measures such as the MMPI have yielded inconsistent results (e.g. Williamson, Kelley, Davis, Ruggiero & Blouin, 1985; Rybicki, Lepkowsky & Arndt, 1989). Thus, it remains unclear whether certain MMPI scales are more likely to have higher values with the reporting of eating-related problems. It is also unclear whether individuals who report certain eating problems will display specific configurations on symptom measures such as MMPI. Yet the development of several scales for the EDI is based on the assumption that eating-related problems are multidimensional, and may be expected to be related to a unique symptom configuration on self report measures. Thus, it is important to understand other symptom constructs that the EDI might be measuring (convergent validity).

METHOD

Subjects were 151 female introductory psychology students from a mid-western university. College women were sampled because of their high risk for eating problems (Klemchuk *et al.*, 1990) and because they are at a relatively high risk for eating disorders. All *Ss* were between the age of 17 and 21 yr ($M = 18.5$; $SD = 1.3$), and most were in their first or second year of college. These *Ss* had a mean weight of 127.0 lb ($SD = 14.7$ lb), ranging from 95 to 180 lb; a mean height of 65.3 in. ($SD = 2.5$ in.), ranging from 59 to 71 in. Each *S* completed the EDI, the SCL-90, and the MMPI. The entire procedure required approximately 2 hr. All *Ss* were debriefed after completing the procedure.

To understand the unique manner in which combinations of subscale scores might relate to each other, a canonical correlation analysis was performed. The eight subscales of the EDI comprised an eating problems grouping, the first array of variables for the canonical analysis (i.e. Drive for Thinness, Interoceptive Awareness, Bulimia, Body Dissatisfaction, Ineffectiveness, Maturity Fears, Perfectionism, and Interpersonal Distrust). The second grouping of variables consisted of a general symptomatology grouping, and included the Global Severity Index (GSI) of the SCL-90 and the 10 clinical scales of the MMPI (T-scores were used). The advantage of using a canonical analysis is that the results will provide the best fit for the two combined groups of variables. In this study we hoped to uncover those aspects of the EDI and MMPI that are shared with general symptomatology. Further, this analysis should provide information on whether the EDI is measuring something significantly independent of traditional symptom measures (the MMPI and SCL-90).

RESULTS AND DISCUSSION

Results provide support for the validity of the EDI as a general measure of global distress, including depression and anxiety. In addition, there was some support for the specific measures of eating behaviors being related to these global measures of distress.

The canonical correlation between the first of eight possible pairs of linear composites was 0.79 (62% of the variance), the second was 0.60 (36% of the variance), the third was 0.35 (12% of the variance), the fourth was 0.32 (10% of the variance), the fifth was 0.29 (9% of the variance), the sixth was 0.18 (3% of the variance), the seventh was 0.15 (2% of the variance), and the eighth was 0.12 (1% of the variance). Only the first two of these canonical correlations were statistically significant and thus worthy of further analysis; for the first $F(88, 875) = 3.17$, $P < 0.0001$, and for the second (with the first canonical variate removed) $F(70, 782) = 1.76$, $P < 0.001$. These two significant clusters accounted for a total of 84% of the variance between the two clusters.

Table 1 displays the correlations of each individual variable with each of the two significant composite variates. As can be seen, the first linear composite from the EDI is most strongly comprised of the Ineffectiveness and Interoceptive Awareness subscales. Table 2 displays the

Table 1. Canonical correlation between the EDI subscales and traditional self-report variables and the corresponding canonical variates

Variable	1st canonical variate		2nd canonical variate	
	<i>r</i>	Weight	<i>r</i>	Weight
EDI Set				
Drive For Thinness	0.51	0.10	-0.28	-0.35
Interceptive Awareness	0.72	0.25	-0.57	-0.86
Bulimia	0.51	-0.05	-0.20	0.17
Body Dissatisfaction	0.42	0.12	0.20	0.48
Ineffectiveness	0.94	0.72	0.23	0.72
Maturity Fears	0.32	0.01	-0.27	-0.37
Perfectionism	0.19	0.01	-0.37	-0.25
Interpersonal Distrust	0.49	0.11	-0.19	0.02
MMPI and SCL-90 set				
GSI	0.86	0.46	-0.30	-0.12
Hs	0.66	-0.03	-0.29	-0.55
D	0.87	0.36	0.21	0.32
Hy	0.30	-0.07	0.38	0.40
Pd	0.73	0.18	-0.07	0.37
M-F	-0.11	0.13	0.46	0.39
Pa	0.46	0.05	-0.25	-0.32
Pt	0.90	0.26	-0.06	0.43
Sc	0.70	-0.23	-0.45	-0.61
Ma	0.44	0.07	-0.55	-0.18
Si	0.65	0.13	0.01	0.15
Canonical correlation	0.79		0.60	

zero-order correlations of the EDI with the MMPI and with the GSI. Interceptive Awareness and Ineffectiveness were highly correlated with almost all of the clinical scales, suggesting that these two measures of the EDI appear to be measuring more global psychological distress, common to most people who report psychological difficulties. This is further supported by the fact that these two scales were most highly correlated with the GSI.

Although a relationship of EDI subscales with general symptomatology was expected, some aspects of the relationship in the present findings were not expected. On the EDI, Ineffectiveness, Perfectionism, Interpersonal Distrust, and Maturity Fears are scales that purport to measure the psychological concomitants to eating disorders (as opposed to eating behaviors). These subscales thus might be the most likely to contribute the greatest weight to general symptomatology in a canonical analysis. Of course, it is possible that Maturity Fears and Perfectionism are unique psychological measures, but more needs to be understood about them. However, the Ineffectiveness subscale appeared to be the only one of these more psychological subscales to contribute to the variate relating to general symptomatology.

Surprisingly, Interceptive Awareness also appeared on the first canonical variate. Interceptive Awareness is purported to measure a specific component of eating disordered thinking: to reflect "one's lack of confidence in recognizing and accurately identifying emotions and sensations of hunger or satiety" (Garner *et al.*, 1983, p. 18). How can the relationship with the canonical variate be understood, as Interceptive Awareness should theoretically be more highly related with the more direct measures of eating dysfunction? Upon further examination, only three of the 10 items on the Interceptive Awareness scale mention eating or awareness of hunger. Interestingly, the remaining items on this rationally derived subscale all refer to a general confusion or lack of

Table 2. Correlations between the EDI subscales and the SCL-90 and the MMPI

Measures	EDI subscales							
	DT	IA	B	BD	I	MF	P	ID
GSI	0.38**	0.59**	0.39**	0.27*	0.59**	0.28*	0.26	0.37**
Hs	0.34**	0.51**	0.39**	0.20	0.45**	0.18	0.12	0.18
D	0.35**	0.44**	0.31**	0.34**	0.66**	0.19	-0.01	0.27*
Hy	0.05	0.07	0.09	0.18	0.28*	0.04	-0.07	-0.03
Pd	0.29*	0.46**	0.38**	0.23	0.54**	0.20	0.13	0.28*
M-F	-0.19	-0.22	-0.14	-0.02	-0.01	-0.09	-0.12	-0.08
Pa	0.15	0.33**	0.12	0.07	0.32**	0.27*	-0.01	0.21
Pt	0.37**	0.55**	0.39**	0.29*	0.66**	0.20	0.17	0.33**
Sc	0.32**	0.57**	0.34**	0.19	0.45**	0.25	0.22	0.35**
Ma	0.29*	0.42**	0.21	0.07	0.25*	0.13	0.28*	0.23
Si	0.25	0.35**	0.22	0.20	0.47**	0.17	0.09	0.39**

* $P \leq 0.05$. ** $P \leq 0.01$.

understanding of emotions (e.g. "I worry about what feelings will get out of control", p. 27). By contrast, every item on scales that purport to measure eating behaviors or bodily distress directly (i.e. Drive for Thinness, Bulimia, and Body Dissatisfaction) do so in terms of item content. We believe the most likely interpretation of this finding is that Interoceptive Awareness is more a general measure of symptomatology and does not measure the specific ability to recognize emotions and sensations of hunger.

Those scales that directly measure eating disordered behavior were also highly related to general symptomatology. The Drive for Thinness and Bulimia subscales were highly correlated with the first canonical variate in Table 1. Relatedly, the Pt, D, GSI, and Pd scales on the traditional symptom measures were elevated on the self-report symptom configuration (MMPI and SCL-90), indicating (roughly) the presence of anxiety, depression, anger, as well as other general complaints. Examination of the zero-order correlations (Table 2) indicates that both the Drive for Thinness and Bulimia subscales were related to the same clinical scales. Specifically, these two subscales were highly related with the GSI, Hs, D, Pt, and Sc. This suggests that the Drive for Thinness and Bulimia subscales are tapping similar symptom configurations, providing further support for the assertion of Welch *et al.* (1988) that these subscales may not discriminate the nuances of different eating problems, but may be measuring more general psychological difficulties. Further research is needed to understand the degree to which these scales accurately assess eating problems independent of more general complaints.

The second canonical variate included Interoceptive Awareness and Perfectionism, and these two variables related negatively to their canonical variate. Corresponding to this was a negative relationship with Ma and Sc, and a positive relation with M-F and Hy on the traditional self-report variable cluster. This second grouping of variables may be thought of as indicating more 'healthy' functioning, and it does not appear to include a strong relationship with problematic eating behaviors.

Interpretively, this second canonical cluster might suggest that those who were more genuinely aware of their problems and who were not overly perfectionistic were also reporting fewer bizarre behaviors and a more stable, less erratic mood. In addition, these 'healthy' females reported less stereotypically feminine behaviors and interests.

Maturity Fears did not relate to either canonical variate and Body Dissatisfaction was only marginally related to the first canonical variate. Further, these two EDI subscales were not highly correlated with most of the other self-report measures. This is consistent with the finding that the items of the Maturity Fears subscale did not load on any of the factors of Welch *et al.* (1988). It may be that these subscales of the EDI are not related to any unique symptomatology of eating-related problems, but may be measuring general personality characteristics that are unrelated to reported symptomatology.

It is of interest that two of the subscales (Maturity Fears and Perfectionism) that emerged in factor analysis did not seem to relate to the symptom measures. First, this may be the result of an unclear factor pattern, as is reflected in the differing factors found by Klemchuk *et al.* (1990) and Welch *et al.* (1988). Further factor analytic work on this test is clearly needed. Second, it may be possible that Maturity Fears and Perfectionism scales may not be related to other symptomatology, but may still be unique aspects of eating-related difficulties. The nature of this relationship may be better understood in future clinical study with eating disorder clients.

This study raises several questions about the validity of some of the subscales of the EDI. Essentially, most of what the EDI measures (about 84% of it) may be found within the MMPI and SCL-90. Further investigation of how eating disordered clients score on measures such as the MMPI is warranted, because general symptom measures already contain most of what the EDI measures and the MMPI is more readily available in most clinical settings. Further, when using the EDI it is important for the clinician to know which scales on the EDI are most highly related to general symptoms. A client who scores highly only on Ineffectiveness and Interoceptive Awareness may be more likely to be struggling with general symptoms than with eating-related difficulties. As past work in uncovering a standard MMPI profile for eating disordered clients has led to mixed results (e.g. Williamson *et al.*, 1985; Dykens & Gerrard, 1986; Rybicki *et al.*, 1989), it is suggested that future work should focus on the specific item structure of the MMPI.

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