MEASURING AND DISCRIMINATING DISSOCIATIVE AND BORDERLINE SYMPTOMATOLOGY AMONG WOMEN WITH EATING DISORDERS

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ABSTRACT

To examine the reliability and validity of instruments designed to measure dissociative and borderline symptoms among persons with eating disorders, we administered two indices of dissociative symptoms along with two indices of borderline, depressive, and bulimic symptoms to a sample of 100 women diagnosed as having an eating disorder. We examined internal consistency, convergent and discriminant validity, and factor structure of the instrument/constructs. There was a high degree of convergence between the two dissociation scales (r = .70) and moderate correlations between the dissociation scales and one of the borderline scales. However, the two borderline scales were not highly correlated with one another, calling into question their construct validity. The results of a confirmatory factor analysis also supported the validity of the dissociation scales but failed to identify a distinct borderline factor. These results supported the construct validity of the dissociation scales but failed to support the validity of the borderline scales.

Dissociation has been defined as a disturbance in the normally integrative functions of identity, memory, and consciousness (American Psychiatric Association, 1994). Many researchers suggest that dissociative phenomena occur on a continuum ranging from minor or normative forms to severe or pathologic forms (Putnam, 1991; Ross et al., 1992), although the results of a recent empirical study calls this con-ceptualization into question (Waller, Putnam, & Carlson, 1996). The dissociative disorders included under the current DSM classification system (APA, 1994) are dissociative amnesia, dissociative fugue, depersonalization disorder, dissociative identity disorder, and dissociative disorder not otherwise specified.

Although the nature of the association is unclear, patients with eating disorders have been found to present with significant dissociative symptomatology (Levin, Kahan, Lamm, & Spauster, 1993; Vanderlinden, Vandereycken, van Dyck, & Vertommen, 1993; Torem, 1986). For these individuals, thorough case formulation and treatment planning may be dependent upon recognition and proper assessment of the dissociative condition (Levin et al, 1993; Torem, 1986). However, until recently, there were no objective means of assessing dissociative symptoms.

Recently developed objective assessment instruments for measuring dissociation include the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986), the Questionnaire of Experiences of Dissociation (QED; Riley, 1988), and the Trauma Symptom Checklist-40 (TSC-40; Elliot & Briere, 1992). Data are accumulating that support the reliability and validity of the use of these instruments (see Carlson & Putnam, 1993; Gleaves & Eberenz, 1995a; Gleaves, Eberenz, Warner & Fine, 1995; Zlotnick et al., 1996).

Gleaves and Eberenz (1995a) recently examined the construct validity of two instruments – the DES and the TSC-40 – for use in measuring dissociative symptoms among eating-disordered patients. The convergent validity for the two dissociation scales (r = .73) was found to be approximately equal to that for well validated instruments measuring depressive, anorexic, and bulimic symptomatology (r = .77, r = .71, and r = .70 respectively). The dissociation scales also demonstrated fairly good discriminant validity with each of the other three constructs. The authors noted that, while the results supported the construct validity of the measurement of dissociative symptoms, future research should attempt to examine the ability of the dissociation instruments to discriminate between dissociative and more similar symptomatology.

A common theme in the literature on dissociative disorders, and especially Dissociative Identity Disorder (DID), is the question of differential diagnosis of the disorder(s) with Borderline Personality Disorder (BPD). Dissociative dis-

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orders often exist comorbidly with various personality disorders, and may have a clinical presentation that may be quite similar to BPD (e.g., Fink, 1991). The two disorders often share many characteristics, including affective instability, self-injurious behaviors, identity disturbance, depression, anxiety, and depersonalization (Kemp, Gilbertson, & Torem, 1988). Consequently, researchers in the field are somewhat divided on whether DID is a distinct diagnostic entity or a variation on BPD (Horevitz & Braun, 1984; Lauer, Black, & Keen, 1988).

Studies on the differentiation of the two disorders have yielded fairly similar results. In general, all have found a great deal of similarity in terms of symptomatology and sociodemographic factors, with only a few significant differences. Individuals diagnosed with DID tend to have greater experiences of Schneiderian first-rank symptoms (Boon & Draijer, 1993; Fink & Golinkoff, 1990; Lauer, Black, & Keen, 1988), greater frequency and severity of childhood sexual abuse (Boon & Draijer, 1993; Fink & Golinkoff, 1990), amnestic episodes (Boon & Draijer, 1993; Kemp, Gilbertson, & Torem, 1988; Lauer et al., 1988) and fewer endorsed symptoms of BPD (Boon & Draijer, 1993; Lauer et al., 1988). These findings have been interpreted as evidence both supporting and disconfirming the diagnostic distinction between DID and BPD (Horevitz & Braun, 1984; Lauer et al., 1988).

Another approach to studying the connection/distinction between dissociative and borderline conditions is to examine the relationship between the core symptomatology of the disorders rather than the diagnosis of the disorders per se. That is, if the two phenomena are truly distinct, then instruments measuring each of the respective phenomena should demonstrate good convergent and discriminant validity. The availability of objective assessment instruments that measure both dissociative and borderline symptomatology allows for such an examination. In a preliminary investigation, Gleaves and Eberenz (1995b) administered the DES and TSC-40 along with the MMPI and examined the correlations between dissociative experiences and personality disorder symptomatology. Neither scale was highly correlated with the borderline scale from the MMPI (r = .22 and r = .11). However, given that only one measure of borderline symptomatology was used, the authors were unable to examine discriminant *and convergent* validity of instruments measuring both dissociative and borderline symptomatology.

The purpose of this study was thus to further investigate the relationship between dissociative and borderline symp-

toms within a sample of women diagnosed with eating disorders. Specific goals were: 1) to further examine the convergent and discriminant validity of instruments measuring both dissociative and borderline symptomatology; 2) to examine the association between dissociative and borderline pathology; and 3) to examine the validity of the dissociative and borderline constructs through factor analysis.

METHOD

Participants

Participants were 100 women who were in treatment at a residential facility for women with eating disorders. Their ages ranged from 14 to 57 with a mean of 25.6 and a standard deviation of 9.4. Based on a semi-structured interview and using *DSM-III-R* criteria, the women were diagnosed as having anorexia (n = 32), bulimia nervosa (n = 45) or eating disorder not otherwise specified (n = 23). Participants' scores on the Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) and the Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) are presented in Table 1. These data suggest that participants were in the typical to severe range of severity for persons with anorexia and/or bulimia nervosa (see Williamson, Anderson, & Gleaves, 1996) and support the validity of the clinical interviews.

Assessment Measures

As measures of dissociative symptoms we used the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) and the dissociation scale from the Trauma Symptom Checklist-40 (TSC-40-DIS; Elliot & Briere, 1992. To measure bulimic symptomatology we used the Bulimia Test-Revised (BULIT-R; Thelen, et al., 1991) and the "bulimia and food preoccupation" scale from the Eating Attitudes Test-26 (EAT-BUL; Garner, et al., 1982). We used the Beck Depression

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TABLE 1
Eating Disorders Groups' Means and (standard deviations)
on the BULIT-R and EAT-26

Measure	Anorexia Nervosa n = 33	Bulimia Nervosa n = 45	EDNOS n = 22
BULIT-R	88.81 (24.79)	115.30 (17.94)	100.19 (18.62
EAT-26	44.50 (11.10)	40.33 (11.22)	29.47 (11.12)

Note: BULIT-R = Bulimia Test-Revised; EAT-26 = Eating Attitudes Test-26

TABLE 2
Intercorrelations Among Measures of Dissociative and Borderline Symptomatology

	1	2	3	4	5	6	7	8
1. DES	.92	.70**	.47**	.17	.08	.23	.49**	.40**
2. TSC-40-DIS		.70	.55**	.22	.18	.31*	.57**	.55**
3. BSI			.90	.26	.38**	.28*	.66**	.59**
4. MMPI-BDL				.71	.09	.08	.27*	.26*
5. BULIT-R					.92	.70**	.23	.22
6. EAT-BUL						.85	.28*	.29*
7. BDI							.89	.72**
8. TSC-40-DEP								.62

Note 1: Values on the diagonal are reliability [alpha] coefficients; these should generally be above .80 (e.g., Anastasi, 1988). Values in bold type are convergent validity coefficients and should be substantially higher than all other values (discriminant validity coefficients).

Note 2: For correlations, * = p < .01 and ** = p < .001.

Note 3: DES = Dissociative Experiences Scale; TSC-40-DIS = Dissociation Scale from the Trauma Symptom Checklist-40; BSI = Borderline Syndrome Index; MMPI-BDL = Borderline Scale from the MMPI Personality Disorder Scales; BULIT-R = Bulimia Test-Revised; EAT-BUL = Bulimia and food preoccupation from the Eating Attitudes Test-26; BDI = Beck Depression Inventory; TSC-40-DEP = Depression Scale from the Trauma Symptom Checklist-40.

Inventory (BDI; Beck, Steer, & Garbin, 1988) and the depression scale from the Trauma Symptom Checklist (TSC-40-DEP; Elliot & Briere, 1992) as measures of depression, and used the MMPI Borderline scale[1] (MMPI-BDL; Morey, Waugh & Blashfield, 1985) and the Borderline Syndrome Index (BSI; Conte, Plutchik, Karasu, & Jarrett, 1980) as measures of borderline symptomatology.

RESULTS

Preliminary Analyses

To determine if it would be appropriate to combine the three diagnostic groups in subsequent analyses, we performed a multivariate analysis of variance (MANOVA) and examined Box's M test of the homogeneity of group covariance matrices. Based on Wilk's criterion, the MANOVA was statistically significant, Wilk's = .56, $F(16, 178) = 3.88$, $p < .001$; however, Box's M test was non-significant, $F(72, 17133) = 1.07$, $p = .32$. These findings suggested that, although there were some group differences on the dependent variables, the relationships *among* the variables (i.e., the covariance matrices) did not differ across groups. Because group dif-

ferences would be expected (examination of discriminant functions suggested these were severity of bulimic symptoms), and the relationships among the variables was deemed most critical for the purposes of this investigation, we concluded that it was justifiable to combine groups for subsequent analyses.

Internal Consistency

To examine the internal consistency of each instrument, we calculated alpha coefficients. These values, presented in the diagonal of Table 2, ranged from .62 (for the depression scale from the TSC-40) to .92 for the DES and BULIT-R. Because the TSC scales were much shorter than the other instruments (six items for the dissociation scale and nine for the depression scale), we also used the Spearman-Brown prophecy formula to calculate an estimate of what their reliability would be at a length equal to that of the longest instrument being used (the BSI). Doing so led to an estimated reliability of .95 for the dissociation scale and .90 for the depression scale.

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TABLE 3
Goodness-of-Fit Indices for Sequence of CFA Models

Model	chi^2	df	p	GFI	AGFI	TLI	BBI
					Index		
Null	362.17	28	<.001	.45	.30	*	*
1	105.61	20	<.001	.82	.68	.64	.70
2	49.19	19	<.001	.89	.79	.87	.86
3	39.02	17	.002	.90	.80	.89	.89
4	45.27	17	<.001	.90	.78	.86	.88
5	21.86	17	.19	.95	.90	.97	.94
6	15.65	14	.33	.96	.91	.99	.96

Note: Models: 1 = all variables loading on one factor; 2 = two factors with eating measures on one and depression, dissociation, and borderline on second; 3 = three factors, as above but with depression as a separate dimension; 4 = three factors, as in #2 but with borderline as separate factors; 5 = three factors, as in #2 but with dissociation as a separate factor; 6 = four separate factors.

Correlation Analyses

To examine the convergent and discriminant validity of the assessment instruments, we calculated Pearson correlations among all variables. These correlations are presented in Table 2. As can be seen, the instruments measuring dissociative, bulimic, and depressive symptomatology all demonstrated fairly good convergent validity. However, the correlation between the BSI and the MMPI-BDL was only r = .26. The BSI actually correlated more highly with several instruments designed to measure other constructs (as high as r = .66 for the BDI) than it did with the other borderline scale.

For the measures of dissociative, depressive, and bulimic symptoms, the discriminant validity coefficients were all substantially lower than those for convergent validity. The highest of the discriminant validity coefficients was the r = .57 correlation between the TSC-40-DIS and the BDI; however, this was still substantially lower than the convergent validity coefficients for either the dissociation or depression scales. The BSI demonstrated poor discriminant validity in that it correlated moderately to highly with measures of both depression and dissociation. The MMPI borderline scale was not highly correlated with any of the other instruments.

Confirmatory Factor Analysis

To further examine the construct validity of the assessment instruments, we performed a confirmatory factor analysis (CFA) (using LISREL 7.2) with maximum likelihood estimation. To determine the appropriateness of the data for a factor analysis, we examined Kaiser's measure of sampling adequacy (MSA). The overall MSA was .74, which is acceptable (Kaiser, 1974). MSAs for individual variables were all above .50 and six of the eight variables were above .70. Thus, the data seemed appropriate for a factor analysis. To examine goodness of fit for the CFA, we examined indices including the chi-square test, goodness-of-fit and adjusted goodness-of-fit indices generated by LISREL (GFI and AGFI), the Bentler-Bonett index (BBI), and the Tucker-Lewis index (TLI). See Marsh, Balla, and McDonald (1988) for a discussion of these indices. We also performed chi-square difference tests to compare the fit of nested models.

We tested a sequence of nested factor models. Goodness-of-fit indices for the sequence of models are presented in Table 2. To first rule out the possibility that all of the variables could be represented by a single factor, we first tested a one-factor model. The fit for this model was poor, suggesting that a multidimensional model was necessary. We then separated the variables into two dimensions, one measuring specific eating disorder symptoms (the two bulimia scales) and one measuring additional psychopathology (the depression, dissociation, and borderline scales). All goodness-of-fit indices suggested an improvement in fit, and the drop in chi-square was statistically significant, chi^2 (1, N=100) = 56.42, p < .001. However, the overall fit for the two-dimensional model was still somewhat poor (i.e., a significant chi-square and other goodness-of-fit indices of less than .90).

We then tested three three-dimensional models in which we varied the way the depression, dissociation, and borderline variables factored together. That is, with model three, we constrained the dissociation and borderline variables loaded on a single factor with depression on a separate factor. In models four and five, we respectively allowed the borderline and dissociation scales to load on a separate, independent factor, with the other constrained to load with depression scales. Finally, we tested a four-factor model with the bulimia, depression, dissociation, and borderline vari-

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FIGURE 1
Three Factor Model With Standardized Parameter Estimates
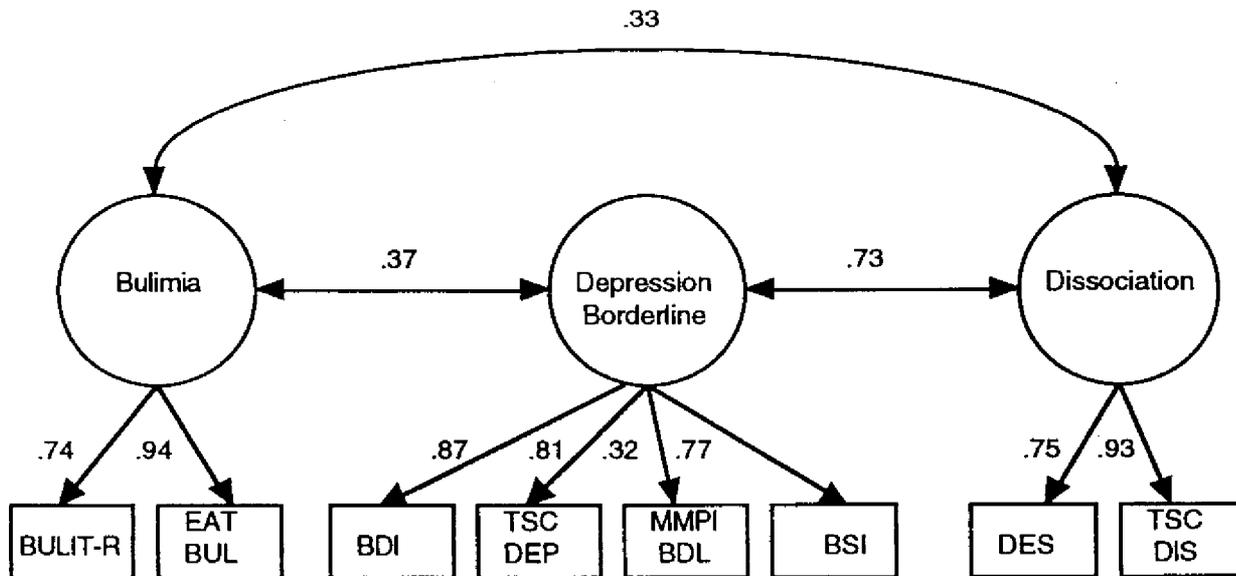
ables all loading on separate factors.

As can be seen in Table 3, the best of the three-factor models was the one with a separate dissociation factor (with the depressive and borderline scales factoring together - model 5). A chi-square difference test suggested that the fit of this model was significantly better than the two-factor model, chi^2 (2, N=100) = 27.33, $p < .001$. The overall chi-square statistic was non-significant, and the goodness-of-fit indices were all greater than .90. The fit of model 4 (with a separate borderline factor) was not significantly better than the two-factor model, chi^2 (2, N=100) = 3.92, $p > .10$. Although the fit of the model with a separate depression factor (with borderline and dissociative symptoms factor together - model 3) was better than that of the two dimensional model, chi^2 (2, N=100) = 10.07, $p < .01$, it was still poor relative to that with a separate dissociation factor.

The fit of the four-factor model (# 6) was the best of those tested. The chi-square statistic was non-significant, and all other goodness-of-fit indices were greater than .90. However, the fit of this model was not significantly better than model #5, chi^2, (3, N=100) = 6.21, $p > .1$, suggesting that separating the depression and borderline instruments on to separate factors did not significantly improve the fit of the model. Thus, model 5, with a separate dissociation factor, but depressive and borderline symptoms loading on a single factor, appeared to be the most parsimonious. To further examine the fit of models 5 and 6, we examined t-values and con-

fidence intervals (plus or minus two standard errors) of individual parameters as well as squared multiple correlations for individual indicators. T-values for all individual parameters of the Lambda X (factor loadings) and Phi (factor correlations) matrices were statistically significant for both models. However, the squared multiple correlation for the MMPI-BDL was quite low in both (.10) suggesting that this variable was not well accounted for by either factor model.

Regarding confidence intervals, Anderson and Gerbing (1988) noted that discriminant validity can be further established if the confidence interval around the correlation does not include 1.0. In model 6, the critical confidence interval was that around the correlation between the "Depression" and "Borderline" factors ($r = .85$). The standard error of .09 led to a 95% confidence interval that did include 1.0 (this was the only confidence interval that included 1.0). This finding suggested, as did the chi-square difference test, that the "depression" and "borderline" measures did not demonstrate discriminant validity and should load on one factor (as in model 5). With model 5, the critical confidence interval was that around the correlation between the "Dissociation" and "Depression/Borderline" factors ($r = .73$). The standard error estimate for that parameter of .108 led to a 95% confidence interval that did not include 1.0. These results supported the superiority of model 6, which is depicted in Figure 1, along with standardized LISREL estimates.

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DISCUSSION

We found moderately strong correlations (convergent validity coefficients) between the pairs of scales measuring dissociative, bulimic, and depressive symptomatology. The results were similar to those of Gleaves and Eberenz (1995a). However, there was only a weak correlation between the two scales measuring borderline symptoms. Thus, the first three types of instruments, but not the borderline scales, demonstrated good convergent validity. Thus, based on these analyses, it is questionable if the two borderline scales are measuring the same construct. For that reason, further analyses including these variables should be interpreted with caution.

The bulimia, dissociation, and depression instruments also demonstrated fairly good discriminant validity, with the results being similar to those of Gleaves and Eberenz (1995a). In the current sample, the correlations between the dissociation and depression scales (.36-.55) were similar to those from the previous sample (.37-.58). The BSI was moderately to highly correlated with both depression scales. There were, however, modest correlations between each of the two depression measures and both the BSI and one measure of dissociative symptomatology (the TSC-40-DIS). The TSC-40-DIS and the BSI were also modestly correlated, suggesting either some overlap in the constructs or that the BSI is confounded by also measuring dissociative symptoms.

There were several important findings in the confirmatory factor analyses. First, a unidimensional model was inadequate to explain the psychopathology being studied. This finding supports that of previous studies suggesting the need for multifactorial models of the psychopathology of eating disorders (e.g., Tobin, Johnson, Steinberg, Staats, & Dennis, 1991; Gleaves & Eberenz, 1993; Gleaves, Williamson, & Barker, 1993).

Second, consistent with conclusions drawn from examining the correlation matrix, the measures of bulimic, depressive and dissociative symptoms appeared to represent relatively separate factors. However, the borderline measures, particularly the BSI, did not demonstrate good discriminant validity with the depression measures and loaded on the same factor. The MMPI-BDL, which did not correlate highly with any other instrument, did not load highly on any factor in any of the models.

This finding that measures of depressive and borderline symptomatology (the BSI) factored together is consistent with the findings of both Tobin et al. (1991) and Gleaves et al. (1993). Thus, the finding that it loaded along with the depression scales rather than the dissociation scales suggests that there may be greater symptom overlap between scales measuring borderline and depressive symptoms than between those measuring borderline and dissociative symptoms.

What is less clear is whether it is the constructs (borderline and depression) that actually overlap or if the instruments are simply confounded by measuring more than one construct. The studies in which borderline and depressive symptoms factored together used either the BSI (the current study and Tobin et al., 1991) or the Millon Clinical Multiaxial Inventory to measure borderline symptomatology. It is possible that these instruments are somewhat confounded by also measuring affective symptoms. In a different recent factor analytic investigation, Gleaves and Eberenz (1995c) included frequency of self-injury and suicide attempts in the analyses, and these variables loaded on a factor separate from measures of depression. Thus, when measures are less confounded by affective symptoms, less of an overlap between depressive and borderline symptomatology is found.

It is also unclear whether the current findings of low convergence between the two borderline scales suggests a problem with the borderline construct or with the instruments that we used in the current study. We should note that other investigators have found a higher degree of convergence between indices of borderline personality. Kurtz, Morey, and Tomarken (1993) found a correlation of $r = .63$ between the MMPI-BDL scale and borderline scale from the Personality Assessment Inventory (PAI; Morey, 1991). This could suggest that the BSI is simply a poor measure of borderline symptomatology, perhaps (as noted above) confounded by its also measuring depressive symptoms.

In the current investigation, the MMPI-BDL scale was not highly correlated with any of the other instruments. While this may support its discriminant validity, such a conclusion would be premature because convergent validity was not also established. One might wonder if perhaps the MMPI-BDL scale did not correlate with anything else (including the BSI) because its reliability was too low (i.e., it was measuring only error). However, the reliability estimates presented in Table 1 would suggest otherwise. The alpha coefficient of .71, although not exceptional, was actually higher that of the two scales from the TSC-40, both of which demonstrated good convergent validity. A future investigation using other measures of borderline symptomatology would be useful to further examine the validity of the borderline instruments and the borderline construct.

The finding of a separate dissociation factor was consistent with that of Gleaves and Eberenz (1995a), who performed an exploratory factor analysis and found a separate dissociation factor. The current findings are an advancement over those of the previous study in that we currently also included measures of borderline symptomatology. In the current study, we also demonstrate that dissociative symptomatology is still highly correlated with depressive symptomatology even if the two types of symptoms represent separate factors.

Although one needs to exercise caution when interpreting analyses using the two borderline scales, the current findings do not support the position that borderline and dissociative symptoms are highly related (at least within this population). Correlations between both dissociation scales and

the MMPI-BDL scale were quite low ($r = .16$ and $r = .26$). The dissociation scales correlated more highly with the measures of depression. The BSI correlated more highly with both dissociation instruments than did the MMPI-BDL. However, the meaning of this finding is again somewhat unclear, due to the lack of convergence between the two borderline scales. While it may suggest a moderate association between dissociative and borderline symptomatology, it may also be that BSI is also simply confounded by also measuring dissociative symptoms. Examination of the individual items of the two borderline scales does suggest that there are items on the BSI that may be dissociative in nature (e.g., "I have trouble remembering things," "I feel as if I were watching myself play a role," "Sometimes I am not myself"). The correlation between the BSI and the two dissociation scales may also have been artifactual, due to the association between depression and dissociation. Similar research using other measures of borderline symptomatology are needed to is needed to more thoroughly examine the relationship between borderline and dissociative symptomatology.

These data, along with those of Gleaves and Eberenz (1995b), do not support the recent addition of "severe dissociative symptoms" to the list of possible *DSM-IV* (APA, 1994, p. 654) diagnostic criteria of borderline personality disorder. Our data, although limited in scope, do not support the association between borderline and dissociative symptomatology. Although there has been traditionally assumed diagnostic confusion between dissociative and borderline personality disorders (e.g., Lauer et al., 1988), we suggest that the recent addition may do nothing more than lead to increased diagnostic confusion. More research on the convergence and/or lack of convergence of dissociative and borderline symptomatology in general samples is needed.

The results of this study need to be interpreted with some caution. First, the data came from one specific population (women with eating disorders in a residential facility). Therefore, the generalizability of the findings is limited unless further studies are able to replicate these results using different populations. Also, it should be noted that the findings may indicate some degree of a distinction between borderline and dissociative symptomatology, not necessarily dissociative disorders or borderline personality disorder per se. More research on discriminating borderline personality disorder from dissociative disorders is needed. These data support, but do not conclusively demonstrate, differentiation of these two types of conditions.

In conclusion, these findings provide additional evidence for the reliability and construct validity of the DES and the TSC-40 for use in measuring dissociative symptoms among persons with eating disorders. The findings to not support the validity of the use of BSI and the MMPI-BDL and do not support the hypothesis that dissociative and borderline symptomatology are highly related. ∎

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Footnotes

[1] *Items for this scale were extracted from the MMPI-2 rather than the MMPI, using the items listed by Colligan, Morey, and Offord (1994). The items were extracted for research purposes with the permission of the publisher.*