

EARLY MALADAPTIVE SCHEMAS OF PERSONALITY DISORDER SUBTYPES

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This investigation attempted to examine the cognitive schemas of five distinct clusters that emerged from a cluster analysis of the personality disorder scales of the Millon Clinical Multiaxial Inventory-II (Millon, 1987). Specifically, the degree to which early maladaptive schemas, as measured by the Cognitive Schema Questionnaire-Short Form (Young, 1994), could correctly identify empirically derived patterns of personality disorders was examined. Between-cluster differences centered on five personality components and five schemas. Discriminant analyses revealed two significant functions composed of cognitive schemas, which correctly identified 61.2% of the entire sample in terms of cluster group membership. The total proportion of variance in the two significant functions associated with cluster group differences was 76.8%. Findings are discussed in relation to the domain theory of personality disorders posited by Millon and Davis (1996).

The role of cognitive schemas in personality disorders has been of interest to researchers and therapists for some time (Beck, Freeman, & Associates, 1990). Within the domain theory of personality disorders posited by Millon (1990) and Millon and Davis (1996), each personality disorder is believed to be associated with a particular pattern of cognitive styles and object representations. Cognitive styles are defined as the content of and the manner in which perceptions, interpretations, and conclusions about the self and the world are formed. Object representations are defined as those memories and attitudes, largely influenced by significant experiences from the past, that continue to serve as a set of dispositions that mediate the perceptions and reactions to life's ongoing events. Similar to some components of both cognitive styles and object representations, Young (1990) broadly defined early maladaptive schemas as the unconditional and dysfunctional underlying beliefs about the self, in relation to beliefs about the environment, which are developed during childhood and are often activated by situations or events in one's environment. Bricker, Young, and Flanagan (1993) and Young (1994) have reported that 15 maladaptive cognitive schemas tend to

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characterize the range of personality disorders that are clinically treated today.

Millon (1987) encouraged practitioners to interpret personalities from a profile perspective, whereas complimentary empirical methods that are used more appropriately to investigate complex theory have continued to develop (Skinner, 1981). With respect to Millon's (1987) recommendation, idiosyncratic needs of clients, and the advent of statistical methods to examine cluster profiles, it is useful to know about the specific content of the domains for existing subtypes.

Magnusson (1999) has advocated the study of personality from a multidimensional approach. Cluster analytic techniques may be used to consider a number of dimensions simultaneously by grouping a heterogeneous sample into more homogenous subgroups on the basis of preselected variables (Aldenderfer & Blashfield, 1984).

The current investigation was designed to gain a deeper understanding of empirically derived personality disorder subtypes by examining the early maladaptive schemas measured by the Cognitive Schema Questionnaire-Short Form (CSQ-SF; Young, 1994). Personality disorder subtypes were identified by cluster analyzing the personality disorder scales of the Millon Clinical Multiaxial Inventory-II (MCMI-II; Millon, 1987). The present study is interested in the relationship between personality disorders and the content and process of cognitive functioning. In addition, we sought to identify those schemas that were most important in differentiating existing subtypes and the degree to which they could be correctly identified. Rather than using multiple regression procedures to examine one personality disorder at a time, cluster and discriminant analyses were used to discern the relationships among cognitive schemas and personality disorder patterns. Unlike previous investigations, the present research focuses on the role that schemas serve in patterns of personality disorders. This investigation also serves as a validation of this role by using a more statistically sound procedure for examining the differences between empirically derived patterns of personality disorders.

Differences exist in breadth of schemata when comparing the cognitive styles and object representations described by Millon and Davis (1996) with the schemas described by Young (1990, 1994). However, it is believed that personality disorder subtype-specific information, with regard to early maladaptive schemas, may have some implications for theories of personality disorders, such as those proposed by Millon and Davis (1996). Because of the limitation of potential predictions derived from the literature, the current study was designed as a preliminary effort to understand components of psychopathology that distinguish among empirically derived personality disorder subtypes.

METHOD

SAMPLE

The data were collected from 129 (93 women and 36 men) outpatients who were receiving psychotherapy treatments as part of the services provided

through a university psychotherapy training clinic. The mean age of the participants was 28.83 years ($SD = 7.79$, range = 18 to 50 years).

MEASURES

Millon Clinical Multiaxial Inventory-II. The Millon Clinical Multiaxial Inventory-II (MCMI-II; Millon, 1987) is a standardized, self-report inventory consisting of 175 true-false statements that assess a wide range of information in regards to an individual's personality, emotional adjustment, and attitude. The entire inventory consists of four modifying indices that serve as validity measures, 10 clinical personality pattern scales, three severe personality pathology scales, six clinical syndrome scales, and three severe syndrome scales. It is notable that the MCMI-II was chosen to identify personality subtypes in our investigation not only to test theoretical postulates for subtypes, but because it is the most reliable of all major personality disorder inventories (Dyer, 1997). It is the only major personality disorder inventory with documented internal consistency above .80 for all scales (Millon, 1987). Results of factor-analytic studies have supported the scale structure and suggested particular subtypes (Choca, Shanley, & Van Denburg, 1996; Hyer, Brandsma, & Boyd, 1997; McCann, 1991; Retzlaff, 1997; Retzlaff, Lorr, Hyer, & Ofman, 1991). Raw scores are converted to base rate (BR) scores to interpret the relative clinical meaning of profiles. Clinically meaningful BR ranges have been identified, although BR scores at or below 60 are rarely interpreted (Millon, 1987). BR scores of 85 and above signify "most prominent" disorder, scores of 75 to 84 indicate "moderate" or the "presence of characteristics" of the disorder, and scores of 60 to 74 reflect "mild" or "some of the traits" defined by the scale. For the clustering solution, we used only the clinical personality pattern and severe personality pathology scales.

Cognitive Schema Questionnaire-Short Form. The Cognitive schema Questionnaire-Short Form (CSQ-SF; Young, 1994) is a 75-item instrument that assesses the extent to which an individual retains particular early maladaptive (cognitive) schemas. The questionnaire consists of 15 scales, each consisting of five items:

1. abandonment/instability;
2. dependence/incompetence;
3. defectiveness/shame;
4. emotional deprivation;
5. overcontrol;
6. enmeshment/undeveloped self;
7. entitlement/self-centeredness;
8. failure;
9. insufficient self-control/self-discipline;
10. mistrust/abuse;
11. subjugation;
12. social isolation/alienation;
13. self-sacrifice;
14. unrelenting standards; and
15. vulnerability to danger/random events.

Respondents rate items in terms of how they have felt throughout their lives on a 6-point Likert scale ranging from 1 (*completely untrue of me*) to 6 (*describes me perfectly*). According to the scoring procedure for this instrument, items are recoded where an endorsement of a 5 or 6 on an item translates to a score of 1 and a score of 1 through 4 translates to a score of 0. Each scale has a minimum score of zero and a maximum score of five. The factor structure has been supported and further developed by hierarchical factor analysis (Lee, Taylor, & Dunn, 1999; Schmidt, Joiner, Young, & Telch, 1995). Considerable internal consistency has been found for all 15 of the schema scales. The average α coefficient has been reported at .86 (Schmidt et al., 1995). For the current study, α coefficients ranged from .71 to .93.

PROCEDURE

The administration of the assessment measures was conducted during an intake session for each participant. Each participant was asked to complete an informed consent, MCMI-II, and CSQ-SF. No additional assessment measures were conducted during or after the intake session.

RESULTS

Ward's (1963) hierarchical agglomerative minimum variance technique and the iterative k-means procedure (Wishart, 1999) were applied to the standardized scores on the 13 personality disorder measures of the MCMI-II. Mojena's (1977) stopping rule for determining the number of clusters from an index of fusion coefficients was used and tested for statistical significance. A five-cluster solution appeared to best represent the data. Each of the five clusters attained fusion coefficients significant from the expected coefficient at the .05 level of significance; k-means revealed an agreement with the Ward solution in 96% of the cases. Only 5 cases were reassigned.

The derived clusters were compared with the five clusters derived by Donat, Geczy, Helmrich, and LeMay (1992) to provide another source of reliability for the cluster solution. This correlational method was described by Donat, Walters, and Hume (1991) and Fals-Stewart (1992) where the cluster centroids of one sample are correlated with the cluster centroids of another. The attained Pearson correlation between the current investigation centroids and the centroids of Donat et al. (1992) was .89, $p < .01$. This result indicates a strong degree of correspondence between the two samples.

To validate the cluster solution further, a multivariate analysis of variance (MANOVA), was performed where participants' scores on variables used in the cluster solution varied by cluster group: Wilks' $\Lambda = .054$, $F(52, 435) = 9.46$, $p < .001$, $\eta^2 = .52$. Although the examination of between-cluster differences among variables used in the cluster solution is beyond the purposes of the current investigation, standardized means of each cluster are represented in graphic form in Figure 1.

Results of a second MANOVA, in which CSQ-SF scales served as the dependent variables, also revealed cluster membership differences: Wilks' $\Lambda =$

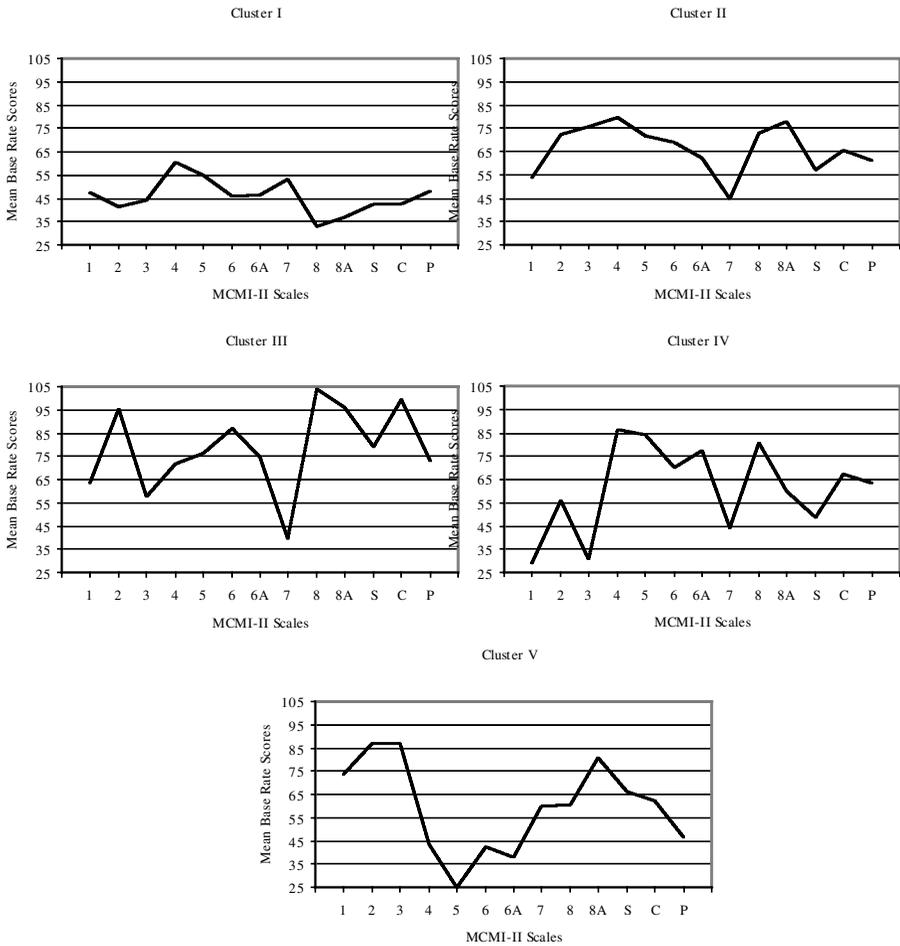


FIGURE 1. MCMII -II Mean Base Rate Scores of Clusters.

Note. MCMII-II Scales are defined as follows: 1 = Schizoid; 2 = Avoidant; 3 = Dependent; 4 = Histrionic; 5 = Narcissistic; 6 = Antisocial; 6A = Aggressive/Sadistic; 7 = Compulsive; 8 = Passive-Aggressive; 8A = Self-Defeating; S = Schizotypal; C = Borderline; P = Paranoid.

.257, $F(60, 431) = 3.00, p < .001, \eta^2 = .29$. Means, standard deviations, and results of univariate ANOVAs for the CSQ-SF scales by cluster group are displayed to convey essential between-cluster differences in Table 1.

When it is necessary to categorize participants into groups or categories that will be predicted by a combination of variables, discriminant analyses are frequently used (Betz, 1987; Huberty, 1984). One advantage of using discriminant analyses is that information about the dimensionality of group differences is provided while statistically controlling for each predictor simultaneously. In the current investigation, it was necessary to categorize participants into five groups (clusters). We chose to use discriminant analysis rather than logistic regression because logistic regression violates a

TABLE 1. Mean Cognitive Schema Questionnaire-Short Form Scale Scores and Standard Deviations for Five Clusters of MCMI-II

CSQ-SF Scale	Cluster 1 (n = 40)		Cluster 2 (n = 31)		Cluster 3 (n = 9)		Cluster 4 (n = 21)		Cluster 5 (n = 28)		Univariate ANOVAs F(4, 124)
	M	SD	M	SD	M	SD	M	SD	M	SD	
AB	.40 ^a	.98	1.06 ^{ab}	1.36	2.56 ^b	2.29	.90 ^a	1.58	1.21 ^{ab}	1.79	4.29*
AM	.05	.32	.48	1.06	.89	1.62	.19	.51	.46	.92	2.71
DI	.07 ^a	.26	.19 ^a	.54	1.44 ^b	1.67	.14 ^a	.36	.25 ^a	.52	10.23**
DS	.05 ^a	.32	.65 ^{ab}	1.08	1.67 ^b	2.06	.04 ^a	.22	.82 ^b	1.54	6.31**
ED	.73 ^a	1.35	1.29 ^{ab}	1.75	2.33 ^{ab}	2.00	1.14 ^{ab}	1.46	1.86 ^b	1.96	2.90*
EI	.10 ^a	.38	.58 ^a	1.09	1.67 ^b	2.06	.19 ^a	.51	.54 ^a	.92	6.10**
ET	.15 ^a	.36	.71 ^b	.78	1.44 ^c	1.13	.86 ^{bc}	1.01	.18 ^a	.39	10.54**
EU	.05 ^a	.22	.87 ^b	1.15	.67 ^{abc}	1.65	.09 ^{ac}	.30	.21 ^{ac}	.49	6.36**
FA	.00 ^a	.00	.06 ^a	.25	1.56 ^b	1.88	.00 ^a	.00	1.07 ^b	1.80	9.89**
IS	.33 ^a	.80	1.39 ^b	1.49	2.00 ^b	2.35	.38 ^a	.80	.50 ^a	.96	6.85**
SB	.05 ^a	.22	.81 ^{bc}	1.33	1.67 ^b	1.87	.29 ^{ac}	.72	.71 ^{ab}	1.24	5.85**
SI	.28 ^a	.78	.74 ^a	1.41	3.11 ^b	2.15	.62 ^a	1.16	.96 ^a	1.59	8.67**
SS	.55 ^a	.85	1.48 ^{ab}	1.73	1.78 ^{ab}	1.72	1.00 ^{ab}	1.58	1.57 ^b	1.71	3.08*
US	.80 ^a	1.24	1.68 ^{ab}	1.62	2.67 ^b	2.12	1.67 ^{ab}	1.91	1.79 ^{ab}	1.62	3.47*
VD	.05 ^a	.32	.81 ^b	1.35	2.00 ^c	2.06	.09 ^a	.44	.57 ^a	1.10	8.34**

Note. Means in the same row with different superscripts are significantly different at $p < .05$ in the Tukey honestly significant difference comparison. Cognitive Schema Questionnaire-Short Form Scales: AB = abandonment/instability; AM = Abuse/Mistrust; DI = dependence/incompetence; DS = defectiveness/shame; ED = emotional deprivation; EI = emotional inhibition; ET = entitlement/self-centeredness; EU = enmeshment/underdeveloped self; FA = failure to achieve; IS = insufficient self-control/self-discipline; SB = subjugation; SI = social isolation/alienation; SS = self-sacrifice; US = unrelenting standards; VD = vulnerability to danger/random events.

* $p < .05$; ** $p < .001$.

TABLE 2. Correlation of Predictor Variables With Discriminant Functions and Standardized Discriminant Function Coefficients

Predictor Variable	Correlation with Discriminant Functions		Standardized Discriminant Function Coefficients	
	Function 1	Function 2	Function 1	Function 2
AB	.14	-.01	.21	-.01
AM	-.56	-.02	-.47	-.01
DI	.84	-.44	.50	-.26
DS	-.01	-.03	-.01	-.03
ED	-.02	.08	-.03	.13
EI	.29	.01	.27	.01
ET	.24	.88	.16	.60
EU	-.26	.58	-.20	.44
FA	.35	-.75	.34	-.73
IS	-.35	.35	-.42	.41
SB	-.01	.28	-.01	.30
SI	.43	-.03	.57	-.04
SS	-.01	-.02	-.01	-.03
US	-.02	-.03	-.03	-.04
VD	.32	.21	.32	.22

Note. Cognitive Schema Questionnaire-Short Form Scales: AB = abandonment/instability; AM = abuse/mistrust; DI = dependence/incompetence; DS = defectiveness/shame; ED = emotional deprivation; EI = emotional inhibition; ET = entitlement/self-centeredness; EU = enmeshment/underdeveloped self; FA = failure to achieve; IS = insufficient self-control/self-discipline; SB = subjugation; SI = social isolation/alienation; SS = self-sacrifice; US = unrelenting standards; VD = vulnerability to danger/random events.

greater number of multivariate normality assumptions and tends to overestimate the accuracy of classification results (Cizek & Fitzgerald, 1999).

A direct discriminant analysis was conducted to reveal the degree to which cognitive schemas serve to discern cluster group differences. The scores of the cognitive schemas served as predictors and cluster group membership served as the categorical criterion. Using this analysis plan rather than *F* tests as a follow-up procedure to a significant MANOVA controls for experiment-wise error and provides information on the dimensionality of group differences from simultaneous examination of the predictor variables (Betz, 1987). Results revealed two significant discriminant functions: (a) Function 1, Wilks' $\Lambda = .257$, $\chi^2(60) = 160.54$, $p < .001$, eigenvalue = .72, canonical correlation = .65; and (b) Function 2, Wilks' $\Lambda = .441$, $\chi^2(42) = 96.67$, $p < .001$, eigenvalue = .59, canonical correlation = .61. The total proportion of variance in the two significant functions associated with cluster group differences was 76.8%.

Taken collectively, salient (i.e., $\geq .35$) loadings for Function 1 indicated abuse/mistrust, dependence/incompetence, failure, insufficient self-control/self-discipline, and social isolation/alienation dimensions, whereas Function 2 indicated dependence/incompetence, entitlement/self-centeredness, enmeshment/underdeveloped self, failure, and insufficient self-control/self-discipline, dimensions that differentiated between the five empirically derived clusters (see Table 2). The group centroids of the two

functions are (-.48, -.48); (-.42, 1.10); (2.79, .59); (-.14, .22); and (.36, -.89) for the five clusters, respectively. The first function maximally differentiated Cluster 3 from Clusters 1, 2, and 4. Function 2 maximally differentiated Cluster 5 from Clusters 2 and 3. Using classification analysis, it was found that 61.2% of the cases were correctly classified in terms of cluster group as a function of the cognitive schemas (see Table 3).

The degree of accuracy was further examined in terms of chance probability. Cohen's κ coefficient between the predicted and actual group membership was .49, $p < .001$. Six standard normal statistics (Huberty, 1994) were also computed to find whether the observed classification accuracy was better than what may be expected by chance for each group and the entire sample. These statistics were calculated using estimated prior probabilities, group participant sizes, and observed frequencies. For instance, the prior probability of correctly predicting Cluster 1 participants using the significant functions was .31 and the percentage of cluster 1 participants correctly classified was 70.0%. Thus, (a) Cluster 1: $z = 5.33$, $p < .001$; (b) Cluster 2: $z = 5.28$, $p < .001$; (c) Cluster 3: $z = 8.32$, $p < .001$; (d) Cluster 4: $z = 5.14$, $p < .001$; and (e) Cluster 5: $z = 2.66$, $p < .05$ revealed similar results. For the entire sample, where .50 was held as the estimated prior probability of correctly classifying cluster group membership, 61.2% of the cases were correctly classified, $z = 2.55$, $p < .05$. These findings provide support for the notion that personality disorder subtypes may be classified by information about schemas (or cognitive styles and object representations) at a rate that exceeds chance probability. However, the results are statistically significant in terms of classification, although the degree of overall accuracy is not great, especially for Clusters 4 and 5.

DISCUSSION

The five-cluster solution was quite similar to the five clusters derived by Donat et al. (1992). Although the Donat et al. study was the only investigation comparable to the present study with respect to the variables clustered and the populations sampled, derived clusters do resemble those identified in other studies (Craig & Olson, 1995; Fals-Stewart, 1992; Lorr & Strack, 1990).

Examining the personality disorder scales across each of the clusters suggests that dependent, narcissistic, and antisocial characteristics play a key role in differentiating the clusters in terms of personality pathology. It is also important to note a considerable overlap among the clusters on the avoidant, dependent, histrionic, passive-aggressive, and self-defeating scales. As Aldenderfer and Blashfield (1984) argue, cluster analysis is designed to maximize between-cluster differences. Those between-cluster differences among variables used in the clustering procedure are not as sufficient in providing validity for the existence of the clusters as are between-cluster differences among variables not used in the clustering procedure. In parallel with an assertion of Millon and Davis (1996) that personality disorders are associated with unique patterns of cognitive schemata, we examined the clusters with respect to the 15 subscales of the CSQ-SF. This analysis revealed significant between-cluster differences on

TABLE 3. Classification Analysis for Cluster Group Membership

Actual Cluster Group Membership	n	Predicted Cluster Group Membership				
		1	2	3	4	5
1	40					
n		28	1	0	8	3
%		70.0	2.5	0	20.0	7.5
2	31					
n		3	20	1	6	1
%		9.7	64.5	3.2	19.4	3.2
3	9					
n		1	0	7	1	0
%		11.1	0	77.8	11.1	0
4	21					
n		8	0	0	12	1
%		38.1	0	0	57.1	4.8
5	28					
n		12	2	2	0	12
%		42.9	7.1	7.1	0	42.9

Note. Overall percentage of correctly classified cases = 61.2%.

each of the schemas except for abuse/mistrust. It is notable that a substantial overlap among the clusters was found across the abandonment, emotional deprivation, insufficient self-control/self-discipline, self-sacrifice, and unrelenting standards scales.

Other than Cluster 1, each cluster that emerged appeared to have its own unique pattern of personality disorder characteristics. Cluster 1 participants ($n = 40$) comprised 31% of the sample. These participants did not score within the clinical range on any of the personality scales of the MCMI-II or the schema scales of the CSQ-SF. In contrast to the other four cluster profiles, it is no surprise as to why this particular cluster was most accurately predicted with the linear classification functions. Furthermore, the absence of any apparent schemas in the absence of personality disorders does provide some support for the notion that cognitive schemas play important roles in associated psychopathology.

Cluster 2 participants ($n = 31$) comprised 24% of the sample. On average, these participants scored within the moderate clinical range on the dependent, histrionic, and self-defeating scales and markedly low on the compulsive scale. Cluster 2 participants also scored moderately on (a) abandonment/instability (expectation that those available for support will be unstable or unreliable, or that they will leave for someone better); (b) emotional deprivation (expectation that desired emotional support will not be met by others); (c) insufficient self-control/self-discipline (difficulty in restraining from excessive expression of emotions and impulses); (d) self-sacrificing (excessive focus on meeting the needs of others at the cost of meeting one's own needs); (e) and unrelenting standards (the belief that one must strive for perfection to have self-worth and to avoid criticism).

Cluster 3 participants ($n = 9$) comprised the smallest group of the entire sample (7%). On average, these participants scored within the most prominent clinical range on the avoidant, antisocial, passive-aggressive, self-defeating, and borderline scales, and markedly low on the compulsive scale. Cluster 3 participants also scored high on the abandonment/instability, emotional deprivation, social isolation/alienation (feeling that one is isolated and different from others), and unrelenting standards subscales of the CSQ-SF.

Cluster 4 participants ($n = 21$) comprised 16% of the sample. On average, these participants scored within the most prominent clinical range on the histrionic and narcissistic scales, within the moderate clinical range on the aggressive/sadistic and passive-aggressive scales, and markedly low on the dependent and compulsive scales. These participants also scored moderately on the emotional deprivation, self-sacrificing and unrelenting standards subscales of the CSQ-SF.

Cluster 5 participants ($n = 28$) comprised 22% of the sample. On average, these participants scored within the most prominent clinical range on the avoidant and dependent scales, within the moderate clinical range on the passive-aggressive scale, and markedly low on the narcissistic and aggressive/sadistic scales. Similar to Cluster 2, Cluster 5 participants attained moderate scores on the abandonment/instability, emotional deprivation, self-sacrificing and unrelenting standards scales. However, Cluster 5 participants attained a moderate failure scale score rather than a moderate score on the insufficient self-control/self-discipline scale. Participants that comprised this cluster were more likely to perceive themselves as unworthy by focusing on past, present, and future themes of inferiority.

After examining the between-cluster schema differences, we were interested in identifying those schemas that were most statistically responsible for the variance in cluster membership in addition to the degree of accuracy to which such variables could discriminate between the clusters. Unlike some of the suggestions offered by cluster group means, discriminant analyses showed that abuse/mistrust, dependence/incompetence, entitlement/self-centeredness, enmeshment/underdeveloped self, and failure are schema characteristics that play the greatest role in determining the pattern of personality disorders. Of course, these variables provided a better chance of playing discriminating roles because of the overlap between Cluster 2, 3, 4, and 5, among the abandonment/instability, emotional deprivation, insufficient self-control/self-discipline, self-sacrifice, and unrelenting standards schemas. However, it is interesting to find that these same later variables were also suggested to play mediating roles in the relationship between the self-defeating personality and depression in a study that preceded the current investigation (Petrocelli, Glaser, Calhoun, & Campbell, 2000). Most of the overlap among these schemas was found between Clusters 2, 3, and 5. The only personality disorder characteristic they all share is self-defeating personality. Thus, with respect to earlier findings and the results reported here, the overlap among these five schemas appears to make considerable sense.

The overlap of these five schemas, across Clusters 2, 3, 4, and 5, may be further understood by considering the five-associated schema domains or-

ganized by Young (1994). Abandonment/instability and emotional deprivation are contained by the disconnection and rejection domain. An impaired limits domain encapsulates the insufficient self-control/self-discipline schema, whereas the self-sacrifice and unrelenting standards schemas are included in the other-directedness and overvigilance/inhibition domains, respectively. The only domain not represented here is the impaired autonomy/performance domain. A wide range of early maladaptive schemas are represented and seem to account for components of an even wider range of personality components.

Because the research in the area of personality disorder subtypes and cognitive schemas is limited, it is not entirely clear as to why so much overlap was observed among the aforementioned variables. Another possible explanation may be that individual personality disorders do have separate and distinct patterns among schemas and that the observed overlap is a function of the overlap among the personality disorders that composed the clusters.

A substantial relationship appears to exist between personality disorder characteristics, measured by the MCMI-II, and early maladaptive schemas. With respect to the great breadth of schemata described by Millon and Davis (1996) in the cognitive style and object representation domains, it was interesting to learn through between-cluster and discriminant analyses that five early maladaptive schemas accounted for a considerable degree of variance among five empirically derived personality disorder subtypes. Again, the examination of early maladaptive schemas does not serve as a systematic test of the cognitive styles and object representations proposed by Millon and Davis (1996). However, the results found here may reveal a different domain, in addition to the eight described by Millon and Davis, which focuses more clearly on core beliefs that were developed during childhood and continue to be activated by specific situations or environments. Still, almost 40% of the participants were incorrectly classified by the discriminant functions. This lack of discrimination may be considered reflective of the overlap found among clinical observations and diagnoses of associated psychopathology. Furthermore, if early maladaptive schemas are considered as a valid domain of personality disorders, it is likely that a more diverse set of schemas will need to be identified.

The contribution of the current investigation has its greatest implications in the diagnosis and appropriate treatment of individuals with personality disorders or with strong personality disorder characteristics. Individuals that seek clinical services have several varying beliefs about themselves, the world, and the future. It makes sense to investigate personality disorders from a profile perspective rather than to ignore several relationships between constructs that are built into the same measure. Retzlaff (1995, 1997) argued that personality disorders are typically ignored by training and practice and that any attention given to them only enhances treatment planning. Perhaps, personality disorders deserve more attention in treatment even if they are not the most salient of disturbances. For example, an individual diagnosed with major depression may also have elevated scores on the avoidant, dependent, self-defeating, or borderline personality disorder scales. This information is important because not all individuals with

major depression are the same. An individual with depression and a MCMI-II profile similar to that of Cluster 4 (with high histrionic and narcissistic scale scores), is much different than someone with a profile similar to that of Cluster 5 (with high avoidant and dependent scale scores).

With exception to Cluster 3, each emerged subtype appeared to reflect similar patterns of cognitive schemas. An examination of the cognitive schemas for each subtype provides useful information as to how individuals may perceive past and present events, process information, organize thoughts, communicate emotions, and form attitudes (Millon and Davis, 1996; Retslaff, 1995, 1997). Much of the research surrounding specific cognitions and psychopathology has centered around individual disorders that do not encompass the full spectrum of pathology that has become common to clinicians (Hammen, Burge, Daley, Davila, Paley, & Rudolph, 1995). The present investigation may also provide relevant implications for clinicians who identify maladaptive schemas as a component of schema-focused cognitive therapy (Sperry, 1999).

A study involving cluster analysis inherits its own methodological limitations. The number of variables included in the clustering solution must be regarded as all other independent variables would be but needs to be done simultaneously. Although this may be difficult, one advantage of this investigation is that all clustered variables are contained within the same measure.

Although cluster-analytic methods are considered appropriate for investigating patterns of personality data (Magnusson, 1999), they have been criticized for producing widely varying results that appear dependent upon clustering methodology (Grove & Andreasen, 1986) and separate samples (Blashfield, 1989). The former criticism has not been supported with respect to investigations that have used more than one cluster analysis method, such as Ward's method and the k-means method, on MCMI-II personality scales (Donat et al. 1992; Lorr & Strack, 1990; Loughhead, Spurlock, & Ting, 1998). With respect to the re-emergence of four distinct clusters across several populations, including the current study sample, the latter criticism has not held for the investigation of MCMI-II subtypes (Donat et al., 1992; Donat, Walters, & Hume, 1991; Lorr & Strack, 1990).

Another limitation of the present study is the small sample size. Although the number of significant internal and external validators does not suggest spurious findings, a larger sample size would be advantageous to such an investigation. Larger sample sizes may reveal other rare subtypes not identified through small samples. Limitations inherent in the use of the measures used in the present study, such as reliability and validity, should also be recognized.

We collected data from our participants during the intake procedure. Because self-descriptions and perceptions are often influenced by degrees of anxiety, depression, low self-esteem, confusion, and anger, data representing ways in which individuals think, feel, act, and react in real-life situations may be most inaccurate during the intake procedure (Widiger, 1993; Widiger & Sanderson, 1995). Conversely, the fact that these were real clients with real presenting problems seems likely to enhance external validity. The fact that 38.8% of the cases were not correctly identified reveals a limitation of the present study and suggests the need for improved predic-

tive models that may include other variables, such as self-reported symptoms, defense styles, and coping styles.

In conclusion, this research suggests that there are different patterns of cognitive schemas across different personality disorder subtypes. The current examination is offered as only one component of a potential series of investigations that should be performed to provide empirical validation of domain theories of personality disorders and to identify those domains that are most pertinent to the development of personality disorders.

Future investigations that consider similar questions investigated here should attempt to control for additional domains. Multiple regression procedures may be used to examine the role of more than one domain simultaneously; however, this is likely to distract from a profile perspective of investigation, which certainly does not lend as much to understanding the full range of personality disorders and the interactions and relationships between them.

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