

Personality subtypes in adolescents with eating disorders: validation of a classification approach

Heather Thompson-Brenner,¹ Kamryn T. Eddy,¹ Dana A. Satir,¹
Christina L. Boisseau,¹ and Drew Westen²

¹Center for Anxiety and Related Disorders, Department of Psychology, Boston University, USA; ²Departments of Psychology and Psychiatry and Behavioral Science, Emory University, USA

Background: Research has identified three personality subtypes in adults with eating disorders (EDs): a high-functioning, an undercontrolled, and an overcontrolled group. The current study investigated whether similar personality prototypes exist in adolescents with EDs, and whether these personality prototypes show relationships to external correlates indicative of diagnostic validity.

Methods: Experienced clinicians from an adolescent practice-research network provided data on ED symptoms, DSM-IV comorbidity, personality pathology, and family and developmental history for 120 adolescent patients with EDs. **Results:** Consistent with the findings from the adult literature, three types of personality pathology emerged in adolescents: High-functioning/Perfectionistic, Emotionally Dysregulated, and Avoidant/Depressed. The High-functioning prototype showed negative associations with comorbidity and positive associations with treatment response. The Emotionally Dysregulated prototype was specifically associated with externalizing Axis I and Cluster B Axis II disorders, poor school functioning, and adverse events in childhood. The Avoidant/Depressed prototype showed specific associations with internalizing Axis I and Clusters A Axis II disorders, poor peer relationships, poor maternal relationships, and internalizing disorders in first-degree relatives. **Conclusions:** These data support the presence of at least three diagnostically meaningful personality prototypes in adolescents with EDs, similar to those found previously in adults. Diagnosis of adolescents with EDs may be usefully supplemented by the assessment of personality style. **Keywords:** Eating disorder, adolescence, personality, comorbidity, classification, family factors. **Abbreviations:** SWAP-II-A: Shedler–Westen Assessment Procedure for Adolescents; CDF-A: Clinical Data Form for Adolescents; PEF: Psychotherapy Effectiveness Form; GAF: global assessment of functioning score.

The empirical literature regarding personality and eating disorders (EDs) is extensive but contradictory. Axis II Cluster B disorders, such as borderline and histrionic personality disorders, are common in patients with bulimia nervosa (BN), while Cluster C disorders, such as avoidant and obsessive-compulsive personality disorders, are common in patients with anorexia nervosa (AN) (Sansone, Levitt, & Sansone, 2005). However, bulimic and anorexic symptoms frequently coexist in the same patient and change over time (Eddy et al., 2002; Tozzi et al., 2005), whereas personality pathology is observed to be fairly consistent (Holtkamp, Muller, Heussen, Remschmidt, & Herpertz-Dahlmann, 2005; Rastam, Gillberg, & Wentz, 2003). In adolescent samples, 'hyper-responsibility' and 'impulsivity,' which are negatively inter-correlated, are both reported to characterize adolescent patients with BN (Cumella, Wall, & Kerr-Almeida, 1999). Similarly, both obsessive-compulsive/perfectionistic and impulsive personality traits have been identified as risk factors for the development of EDs (Anderluh, Tchanturia, Rabe-Hesketh, & Treasure, 2003; Wonderlich, Connolly, & Stice, 2004). Westen & Harnden-

Fischer (2001) suggested one explanation for these inconsistencies, namely that ED patients who share the same diagnosis show patterned heterogeneity in personality – that is, there may be distinct personality constellations that represent separate diatheses for the development of EDs. Efforts to establish relationships between ED diagnosis and personality style may be compromised by the presence of multiple personality subtypes within the population.

Several research groups have recently identified adult personality subtypes of EDs. Westen & Harnden-Fischer (2001) identified three personality subtypes using a personality Q-sort, the SWAP-200 (Westen & Shedler, 1999).¹ The High-functioning/Perfectionistic prototype was characterized by personal and interpersonal strengths as well as a tendency to be self-critical, perfectionistic, and guilty. The Emotionally Dysregulated/Undercontrolled prototype was characterized by intense, labile emotions, emotional interference in thinking and

¹The SWAP 200 Q-sort includes 200 comprehensive items reflective of all aspects of personality functioning and pathology, and directs the assessor to sort items into a fixed distribution that facilitates statistical aggregation. The Q-factor method takes advantage of the Q-sort methodology to aggregate subjects rather than items into groups.

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impulse control, unstable and self-destructive relationships, rejection sensitivity, and suicidality/ parasuicidality. The Constricted/Overcontrolled prototype was characterized by emotional constriction; feelings of anxiety, depression, and inadequacy; and social avoidance. Similar prototypes have been identified in other adult ED samples using different methods (Claes et al., 2006; Holliday, Uher, Landau, Collier, & Treasure, 2006; Wagner et al., 2006; Wonderlich et al., 2005).

Research has indicated that these personality distinctions show incremental validity vis-à-vis ED diagnosis in adult samples, predicting differences in psychological adjustment and treatment outcome after holding constant ED diagnoses (Thompson-Brenner & Westen, 2005; Westen & Harnden-Fischer, 2001). High scores on the Constricted and Dysregulated profiles in adults predict poor adaptive functioning indexed by low global assessment of functioning score (GAF) scores, history of suicide attempts, and psychiatric hospitalizations (Thompson-Brenner & Westen, 2005; Westen & Harnden-Fischer, 2001). Dysregulated patients show the most comorbidity with post-traumatic and substance abuse disorders, while Constricted patients tend to have other comorbid anxiety diagnoses (Thompson-Brenner & Westen, 2005; Wonderlich et al., 2005). Dysregulated patients show the worst, and high-functioning patients the best, treatment outcome (Thompson-Brenner & Westen, 2005). Steiger and colleagues (2004) have linked the Dysregulated and Constricted subtypes with low and high serotonin activity, respectively, while Holliday and colleagues (2006) have linked personality prototypes to family risk variables.

Though no prior personality subtyping studies have been conducted to our knowledge with adolescents, one preliminary pilot investigation from our group (Thompson-Brenner, Satir, Eddy, Boisseau, & Westen, 2005) suggested similar ED personality subtypes may exist in adolescence. In the pilot study, we re-analyzed data concerning adolescents with EDs that were collected as part of a larger study of personality disorders. Subtyping analyses suggested similar types exist, which showed significant relationships to Axis I, Axis II, and family and developmental history variables (Thompson-Brenner et al., 2005). The current study expands upon the pilot by including a larger, random sample of adolescents, not recruited on the basis of personality pathology. Given the explanatory power of personality subtypes in adults, exploration of similar constructs in adolescents with EDs may be important to diagnosis and treatment. The purpose of this study was to investigate the utility of personality subtypes of EDs in adolescence. The specific goals were two-fold: (1) to see if similar personality prototypes exist in adolescents as in adults; and (2) if so, to provide initial data on their validity, by assessing their rela-

tion to external correlates such as Robins and Guze (1970) criteria, notably Axis I and II comorbidity, adaptive functioning, developmental and family history variables of likely etiological significance, and psychotherapy effectiveness.

Method

As in other studies of personality pathology in EDs (e.g., Thompson-Brenner & Westen, 2005), we used a practice network approach, in which randomly selected, experienced clinicians provide data on patients that can be aggregated across large samples (Morey, 1988; Westen, Dutra, & Shedler 2005). Elsewhere we have addressed in detail the rationale for using clinicians as informants, including advantages and limitations (see Westen & Weinberger, 2004). The main advantage of this method is that clinicians are experienced observers who have longitudinal knowledge of their patients, with skills and a normative basis with which to make inferences and recognize nuances in psychopathology; the primary objection to this method is the possibility of bias in clinical judgment. Research suggests that clinicians make reliable and valid judgments if their observations are psychometrically quantified: clinician ratings of adaptive functioning, for example, show high inter-rater reliability and validity (e.g., correlations with the same data obtained by independent interview $r > .60$) (Hilsenroth et al., 2000; Westen et al., 1997). Clinician-reported personality data have good inter-rater reliability with independent observers (Westen & Muderrisloglu, 2006) and predict adaptive functioning, attachment patterns, and family and developmental history suggestive of validity (Dutra, Campbell, & Westen, 2004; Westen, Shedler, Durrett, Glass, & Martens, 2003). Concerns about clinician bias are counteracted by research indicating clinician theoretical orientation and training (e.g., psychiatry vs. psychology) predicts little variance in descriptions of clinical phenomena when clinicians are asked to describe a specific patient using a psychometric instrument designed for clinician-report (Shedler & Westen, 2004).

Sample

In 2003, for an NIMH-funded study of adolescent personality pathology, we contacted all members of the American Psychological Association and American Psychiatric Association with at least 5 years' experience post-residency (MDs) or post-licensure (PhDs) with a stated interest in the treatment of children or adolescents (approximately 3600 individual clinicians), and asked them to join an adolescent practice research network of clinician-informants. Over one-third agreed to participate, though we closed the membership after 950 individuals had completed data collection for financial reasons. In 2004, for this study of adolescent EDs, we sent letters briefly describing the current study and patient subject criteria to 850 randomly selected clinicians from the network. Of the 850 clinicians contacted, 462 indicated willingness to participate, for an overall response rate of 54%. Of these clinicians, 191

indicated they were currently treating a female patient between 15 and 18 years old with an ED, and therefore were invited to participate; of these, 124 returned the measures complete for a completion rate of 65% of the relevant subjects. Four subjects were excluded due to incorrect subject selection or otherwise unsuitable data. Participating clinicians received a consulting fee of \$200 for a procedure requiring 2–3 hours.

We asked clinicians to describe 'a female adolescent patient between the ages of 15–18 with an eating disorder.' Adolescent EDs typically develop in this age range; EDs manifesting earlier may be atypical in presentation. Clinicians were directed to select a patient whose personality was well known to them, using as a guideline ≥ 6 clinical contact hours but ≤ 1 year (to minimize confounds imposed by personality change with treatment); if they had more than one patient meeting study criteria, they were directed to describe the one they saw most recently. Exclusion criteria were chronic psychosis and mental retardation. Clinicians received a packet containing a cover letter, consent form, postage-paid return envelope, and study measures. Clinicians provided informed consent for their study participation but provided no identifying information about the patient and were instructed to use only information already available to them from their regular contacts with the patient.

The procedure for this study was approved by the Institutional Review Board at Boston University.

Measures

Clinician-subjects were directed in each measure (excepting the Psychotherapy Effectiveness Form) to describe the patient as she was at the beginning of treatment and to refer to case notes if necessary to improve reliability.

Adolescent Eating Symptom Form: ED symptoms and diagnoses were assessed by a form listing each criterion of the three ED diagnoses (BN, AN, and ED not otherwise specified [EDNOS]), including frequency and duration criteria, to allow for independent accurate diagnosis by the researchers.

Shedler–Westen Assessment Procedure for Adolescents (SWAP-II-A; Westen et al., 2003, 2005): The SWAP-II-A is the most recent version of the SWAP-200-A personality pathology Q-sort measure for adolescents (see Westen et al., 2003, 2005) and has been used in a recent NIMH-funded study of adolescent personality pathology. The SWAP-II-A includes 200 statements regarding aspects of adolescent personality, phrased in language common to clinicians from any theoretical orientation (e.g., 'Has an exaggerated sense of self-importance', 'Tends to express anger in passive and indirect ways; may make mistakes, procrastinate, forget, become sulky, etc.') (Westen & Shedler, 1999). Clinician-subjects received a deck of SWAP-II-A Q-sort cards, instructions for sorting, a return envelope, and a set of eight small envelopes with a pile number marked on each (from 0–7) in which to place the cards after sorting. The Q-sort fixed distribution requires, for example, 8 cards placed in the '7' pile (most reflective of personality), 10 in the '6' pile (highly reflective), etc., and 100 in the '0' pile (not reflective of the patient's personality). This fixed distribution has statistical

advantages in the use of factor analytic procedures (see Block, 1978). Recent reliability data indicate clinicians and independent observers show good inter-rater reliability ($r = .70-.80$) for personality pathology dimensions using the SWAP-200 (Westen & Muderrisoglu, 2006).

Clinical Data Form for Adolescents (CDF-A): The CDF-A assesses clinician and patient demographic data, patient adaptive functioning (e.g., school performance, peer relations, global assessment of functioning score [GAF], suicide attempts, and psychiatric hospitalizations), and patient developmental and family history, including histories of common internalizing and externalizing disorders (e.g., mood, anxiety, and personality disorders) in close relatives. Additionally, it assesses a wide range of variables of potential etiological relevance (e.g., history of foster care, family stability, physical/sexual abuse). The CDF-A includes a checklist of common Axis I co-morbidity. To maximize reliability, most variables are aggregated to provide composite descriptions of adaptive functioning, externalizing pathology in first and second degree relatives, and family functioning.

Axis II Construct Rating Form: Comorbid Axis II diagnoses were assessed by listing the complete description and criteria for each personality disorder, and asking for a rating of the degree to which the patient matched this prototype. Dimensional assessment of personality pathology has recently received psychometric support (see, e.g., Endler & Kocovski, 2002, for review).

Psychotherapy Effectiveness Form (PEF): The PEF asks clinicians to indicate whether the patient received psychotherapy and/or psychotropic medication, and rate the effectiveness of the psychotherapy to date for the ED and for overall global functioning. For this study, we included a single rating of overall improvement in psychotherapy to date (given treatments were not concluded), because therapy response was not the focus of the study.

Data analysis

Because we assessed multiple variables with measures adapted from other studies, wherever possible we performed validity checks and aggregated items to maximize reliability. Replicating Westen and Harnden-Fischer's (2001) adult study, we first used Q-factor analysis to identify potential personality prototypes. Q-factor analysis is computationally identical to factor analysis, except that the data matrix is transposed, so that patients rather than items are factored, producing clusters of patients with similar pathology rather than clusters of items, or traits. We then derived prototype scores for each patient for each of the three prototypes by correlating each patient's 200-item profile with each of the 200-item empirically derived prototype profiles (see Block, 1978; Shedler & Westen, 2007). These dimensional scores gauge the degree to which the patient matches each prototype and make no assumptions about whether the prototypes are constellational dimensions vs. taxa (see Meehl, 1999). We used Pearson product-moment correlation to assess the bivariate relationships between the prototype scores and three sets of external criterion variables: comorbid Axis I and II diagnoses and symptomatology; adaptive functioning

variables; and childhood and family developmental history. Following the bivariate analyses of personality pathology and adaptive functioning, we conducted hierarchical multiple regression predicting each general adaptive functioning, peer relational functioning, and school functioning using personality pathology as the independent variables, holding constant Axis I ED diagnoses.

Results

Sample characteristics

The sample included 120 clinicians treating adolescent patients with EDs. Approximately two-thirds of clinician respondents were psychologists and the remainder were psychiatrists; 51% were female. Secondary analyses yielded no differences between psychiatrists and psychologists. Nearly half (45.8%) of the clinicians identified with primarily cognitive behavioral theoretical orientation, 35.0% psychodynamic orientation, 8.3% biological orientation, and 5.8% family systems approach. The majority of clinicians reported the main setting in which the patient was treated was private practice (76.7%), although 15.0% reported treating the patient through an outpatient clinic, 5.0% through a residential facility, 2.5% through an inpatient program, and .8% through a school. 17.5% of clinician-respondents were self-described specialists in the treatment of EDs. Clinicians had a mean of 21.7 ($SD = 8.5$) years of clinical experience post-training.

Patients averaged 16.5 years of age ($SD = 1.2$). AN was diagnosed in 15.0% of the sample ($n = 18$); BN in 36.7% ($n = 44$); and EDNOS in 47.5% ($n = 57$); for one patient diagnostic information was missing. Most were described as 'middle class' (42.5%) or 'upper middle class' (40.0%) with an additional 8.3% of the sample described as 'upper class,' 7.5% 'working class,' and 1.7% 'poor.' The sample was 90.8% Caucasian, with limited minority representation (5.0% Hispanic, 1.7% African-American, .8% Asian, and 1.7% other). Patients had been seen in treatment for an average of 8.3 months ($SD = 4.5$).

The mean pre-treatment GAF score was 51.3 ($SD = 8.6$). ED diagnostic groups showed differences in pre-treatment GAF scores ($F(3,df) = 4.41, p = .005$); patients with AN had the lowest scores ($M = 46.6, SD = 13.3$) and those with BN the highest ($M = 54.0, SD = 10.2$). Although the majority of patients were currently receiving outpatient care, 22.5% had a history of psychiatric hospitalization for their ED, and 19.2% had a history of psychiatric hospitalization unrelated to their ED. 24.2% had a history of suicide attempts. The most common co-morbidities included major depression (37.5%), obsessive-compulsive disorder (18.3%), panic disorder (10.8%), and attention-hyperactivity disorder (10.0%).

Personality prototypes

To cluster patients using Q-analysis, we followed standard factor-analytic procedure, beginning with a Principal Components Analysis, the scree plot, percent of variance accounted for, and parallel analysis (Horn, 1965) to identify the number of factors to rotate. Based on these data, we rotated 3–5 factors using Principal Axis Factoring with a Promax rotation.² We report here the most robust solution: the first 3 factors of a 4-factor solution, accounting for 37.5% of the variance. Table 1 shows selected items from the SWAP-200-A that best characterize the three identified personality prototypes, which we titled High-Functioning/Perfectionistic, Dysregulated, and Avoidant/Depressed. The items are arranged in descending order of construct centrality; the second column values are factor scores (presented in standard deviation units) indexing the extent that the item is highly scored among patients loading highly on the Q-factor.

The fourth factor was not retained in part due to item overlap with both the High-functioning/Perfectionistic and the Avoidant/Depressed prototypes. It characterized only 7% of the participants well and explained only 3.2% additional variance. It is worth noting, however, that this prototype showed the inhibited and constricted characteristics expected from adult studies but absent in the Avoidant/Depressed adolescent prototype. This fourth prototype score showed no relationships to comorbidity, developmental/family history, or adaptive functioning variables except obsessive compulsive personality disorder ($r = .33, p < .001$). Therefore we did not investigate this prototype further.

We calculated individual personality scores for each of the subjects for each of the three personality types by correlating every 200-item individual SWAP profile with the characteristic prototype SWAP profile for the cluster derived through Q-factor analysis, using a MANOVA function.

Zero-order Pearson's correlations indicated the Dysregulated style was negatively correlated with both the High-functioning style ($r = -.63, p < 0.001$) and the Avoidant/Depressed style ($r = -.30, p = .01$). To examine differences in personality profile on the basis of ED diagnosis, we conducted an analysis of variance (Table 2). The only difference in personality scores according to ED diagnosis indicated subjects with AN showed lower Dysregulation scores than subjects with BN or EDNOS. Mean scores for High-functioning and Avoidant/Depressed types were very similar for ED diagnostic groups (Table 2).

Comorbidity. To examine the relationship between personality constellations and comorbidity, we used

² Notably, four SWAP items directly related to eating disorder symptoms were omitted prior to cluster analysis.

Table 1 Adolescent personality prototypes (based on Q-factor analysis of SWAP-200-A) ($N = 120$)

	Factor score
High-functioning/Perfectionistic	
Tends to be conscientious and responsible.	3.06
Tends to be liked by other people.	2.72
Is articulate; expresses self well in words.	2.70
Expects self to be 'perfect' (e.g., in appearance, achievements, performance).	2.70
Has areas of accomplishment or achievement other than school (e.g., sports, music, etc.) for which s/he gains considerable recognition.	2.62
Is able to use his/her talents, abilities, and energy effectively and productively.	2.44
Is self-critical; sets unrealistically high standards for self and is intolerant of own human defects.	2.42
Has moral and ethical standards and strives to live up to them.	2.32
Tends to feel guilty (e.g., may blame self or feel responsible for bad things that happen).	2.31
Enjoys challenges; takes pleasure in accomplishing things.	2.28
Is psychologically insightful; is able to understand self and others in subtle and sophisticated ways.	2.15
Has a good sense of humor.	2.08
Is empathic; is sensitive and responsive to other peoples' needs and feelings.	2.04
Dysregulated	
Tends to be manipulative.	2.80
Emotions tend to spiral out of control, leading to extremes of anxiety, sadness, rage, etc.	2.52
Expresses emotion in exaggerated and theatrical ways.	2.44
Tends to become attached quickly or intensely; develops feelings, expectations, etc. that are not warranted by the history or context of the relationship.	2.39
When distressed, tends to revert to earlier, less mature ways of coping (e.g., clinging, whining, tantrums).	2.15
Tends to be impulsive.	2.13
Avoidant/Depressed	
Tends to feel s/he is inadequate, inferior, or a failure.	3.19
Tends to feel unhappy, depressed, or despondent.	2.79
Tends to be passive and unassertive.	2.56
Tends to feel guilty (e.g., may blame self or feel responsible for bad things that happen).	2.38
Tends to feel anxious.	2.29
Tends to be needy or dependent.	2.26
Tends to be shy or self-conscious in social situations.	2.16
Tends to feel helpless, powerless, or at the mercy of forces outside his/her control	2.06

Reported items to the 2.0 cut-off.

Table 2 Comparison of means on personality scores for eating disorder diagnostic groups (ANOVA)

Personality type	Anorexia nervosa M (SD)	Bulimia nervosa M (SD)	EDNOS M (SD)	Test statistic	p
High Functioning	.38 (.24)	.30 (.25)	.36 (.36)	F (2,116) = .887	.42
Dysregulated	-.09 (.19)	.17 (.23)	.12 (.27)	F (2,116) = 7.26	.001
Avoidant-Depressed	.37 (.20)	.33 (.24)	.30 (.23)	F (2,116) = .56	.58

Pearson's r (dummy-coding categorical diagnostic variables 0/1) (Table 3). Generally, the High-Functioning prototype showed negative associations to comorbidity. The Dysregulated prototype showed positive associations with the externalizing disorders, learning disabilities, and the Cluster B personality disorders. The Avoidant/Depressed prototype was positively associated with internalizing Axis I disorders and Cluster C personality disorders.

Adaptive functioning. We then examined the relevance of personality style to adaptive functioning. The High-functioning personality style showed positive associations with adaptive functioning across all measures (GAF $r = .29$, $p = .001$; peer functioning $r = .53$, $p < .001$; school functioning $r = .58$, $p < .001$; history of suicidality (yes/no) $r = -.24$, $p < .001$). Dysregulated style was negatively associ-

ated with global functioning ($r = -.47$, $p < .001$.) and positively associated with a history of suicide attempts ($r = .18$, $p = .05$). Avoidant/Depressed style was negatively associated with peer functioning ($r = -.29$, $p = .001$).

Additionally, we examined associations between the personality styles and psychotherapy effectiveness and found the High-functioning style was positively associated with clinician's rating of the success to date of the psychotherapy for treatment of the patient's overall functioning ($r = .69$, $p = .003$) while the Dysregulated style was negatively associated with the same variable ($r = -.26$, $p = .005$). This analysis represented a preliminary check of whether personality style was associated with treatment response.

We next investigated whether personality style afforded incremental validity in predicting adaptive functioning, above and beyond the importance of ED diagnosis, using a series of hierarchical linear

Table 3 The relation between personality and comorbidity ($N = 120$)

	High-functioning/Perfectionistic	Dysregulated	Avoidant/Depressed
Mood disorders			
Major depression	-.15	.13	.26**
Bipolar I, II	-.15 ¹	.14	-.03
Anxiety disorders			
Panic disorder	-.17 ¹	.08	.14
PTSD	-.02	.17 ¹	-.11
Social phobia	-.14	.01	.19*
OCD	-.05	-.14	.10
Externalizing disorders			
Substance use disorders	.01	.05	.04
Oppositional Defiant Disorder	-.38***	.39***	-.13
ADHD	-.17 ¹	.31***	-.14
Learning disability	-.19*	.28**	-.12
# of Axis I disorders	-.31**	.24**	.18 ¹
Cluster A personality disorders			
Paranoid PD	-.30**	.17	.02
Schizoid PD	-.16 ¹	-.16 ¹	.15 ¹
Schizotypal PD	-.10	-.17 ¹	.16 ¹
Cluster B personality disorders			
Antisocial PD	-.42***	.44***	-.26**
Borderline PD	-.53***	.53***	-.03
Histrionic PD	-.37***	.56***	-.26**
Narcissistic PD	-.25**	.25**	-.42***
Cluster C personality disorders			
Avoidant PD	-.10	-.24**	.48***
Dependent PD	-.16 ¹	-.04	.38***
OCPD	.01	-.21*	.13

*** $p < .001$; ** $p < .01$; * $p < .05$; ¹ $p < .10$.

regressions (Table 4). In several cases the models including personality were more predictive than ED diagnosis alone. In the model predicting total GAF score, both full-syndrome ED diagnoses predicted poor functioning (EDNOS could not be entered in the model separately given that the entire sample was diagnosed with one of the three possible diagnoses). The presence of dysregulated pathology accounted for further variance in global functioning; however, the variable was significant at the trend level. In the models predicting specific peer functioning and school functioning, ED diagnosis was not significant, while both Dysregulated and Avoidant pathology accounted for independent variance, and were each negatively associated with peer and school functioning. In the model predicting suicidality, only Dysregulated pathology was significant at the .05 level.

Family and developmental history

We next ran zero-order correlations to examine the association between personality and childhood and family history variables of potential relevance to etiology, including three aggregate measures of family functioning, one aggregate variable representing the average of mother’s childhood relationship with patient and mother’s functioning in the patient’s childhood, a parallel aggregate variable for the father, and an overall family environment aggregate (the average of clinician ratings

of family warmth and stability in childhood). Additionally, we included an aggregate variable representing adverse life events in childhood (the sum of 0/1 ratings of the incidence of traumatic separations, witnessing domestic violence, multiple geographical moves, physical abuse, sexual abuse, divorce, death of a parent, and living with an alcoholic parent). Finally, we also assessed correlations between patient’s personality style and the incidence of internalizing disorders in first degree relatives and externalizing disorders in first degree relatives (Table 5).

Next we attempted to predict personality style on the basis of family and developmental history. Notably, many of the family/developmental history variables were inter-correlated, which prevented them from being entered together as independent variables in a multiple regression. Thus, we conducted exploratory backward regression analyses, with $p < .05$ as the criterion for significance and $p < .10$ as the criterion for removal, to see what models emerged statistically. The final models are presented in Table 6. These analyses suggest that positive maternal relationship/functioning and absence of adverse childhood events predict a High-functioning personality style. In contrast, history of adverse events is associated with a Dysregulated personality style. Finally, negative maternal relationship/functioning and internalizing disorders in first degree relatives are associated with the Avoidant/Depressed personality style.

Table 4 Predicting adaptive functioning from eating diagnoses and personality styles using hierarchical linear regression ($n = 119$)

	R	R ²	Standardized β	F change (model) or t (β)	p F ² change or coefficient
GAF score					
Model 1 (ED diagnosis)	.35	.13		8.25	<.001
Model 2 (ED diagnosis + personality)	.39	.15		1.76	NS
AN			-.39	-4.05	<.001
BN			-.22	-2.35	.02
Dysregulated			-.17	-1.74	.09
Avoidant/depressed			-.11	-1.18	NS
Quality of peer relationships					
Model 1 (ED diagnosis)	.09	.01		.47	NS
Model 2 (ED diagnosis + personality)	.42	.15		11.75	<.001
AN			-.14	-1.54	NS
BN			-.03	-.36	NS
Dysregulated			-.32	-3.38	.001
Avoidant/depressed			-.39	-4.31	<.001
School functioning					
Model 1 (ED diagnosis)	.21	.04		2.65	.075
Model 2 (ED diagnosis + personality)	.51	.26		17.03	<.001
AN			.02	.19	NS
BN			-.05	-.59	NS
Dysregulated			-.52	-5.79	<.001
Avoidant/depressed			-.20	-2.40	.02
History of suicidality					
Model 1 (ED diagnosis)	.11	.01		.66	.517
Model 2 (ED diagnosis + personality)	.24	.57		2.76	.067
AN			.00	-.03	NS
BN			.05	.53	NS
Dysregulated			.21	2.11	.04
Avoidant/depressed			.15	1.61	.11

Table 5 The relation between personality and family and developmental history ($N = 120$)

	High-functioning/Perfectionistic	Dysregulated	Avoidant/Depressed
Quality of maternal relationship	.33***	-.16 ¹	-.27**
Quality of paternal relationship	-.08	.14	.09
Family environment	.32***	-.19*	-.08
Adverse life events	-.30***	.26**	-.07
Internalizing disorders in 1st degree relatives	.03	.05	.22*
Externalizing disorders in 1st degree relatives	-.01	.18 ¹	-.10

*** $p < .001$; ** $p < .01$; * $p < .05$; ¹ $p < .10$.

Table 6 Regression equations predicting personality style from family and developmental history variables

	R	R ²	Standardized β	F change (model) or t (β)	p
High-functioning/Perfectionistic					
Final Model (df 1, 112)	.38	.15			.001
Maternal relationship and functioning			.26	2.84	.005
Adverse events			-.21	-2.22	.03
Dysregulated					
Final Model (df 1, 113)	.25	.06			.005
Adverse events			.25	2.74	.007
Avoidant/Depressed					
Final Model (df 1, 111)	.38	.15			.003
Maternal relationship and functioning			-.27	-3.04	.003
Internalizing 1st degree relatives			.26	2.92	.004
Externalizing 1st degree relatives			-.17	-1.84	.07

Discussion

The data suggest that adolescent patients treated in the community for EDs show similar personality

patterns to those seen in adults (Thompson-Brenner & Westen, 2005; Westen & Harnden-Fischer, 2001). Adolescents showed a High-functioning/Perfectionistic pattern, characterized by substantial

personality strengths as well as self-criticism, and a Dysregulated pattern, comprising items reflecting borderline and histrionic pathology, each similar to observed adult prototypes. The third identified type we termed Avoidant/Depressed, and the primary observed difference between these adolescents and prior adult samples was that this adolescent prototype included more items reflective of depressive and avoidant personality than the emotional constriction observed in adults. These characteristics of emotional constriction were observed in a very small fourth prototype, which showed no relationships to other variables. Longitudinal data is needed to identify whether the constricted pattern potentially develops from the Avoidant/Depressed group over time, or whether constriction like that seen in prior adult studies is more characteristic of patients who develop EDs later in life. The three prototypes captured a substantial portion of the overall variance in personality, and appear to be robust across samples, item sets, and statistical aggregation procedures.

The three personality constellations, treated dimensionally, have meaningful external correlates indicative of valid diagnostic distinctions using Robins and Guze (1970) criteria. Personality styles showed different personality and eating symptoms, distinct and predictable relationships to Axis I and II comorbidity, and separate and characteristic patterns of adaptive functioning. Most importantly, multivariate analysis suggested that the personality styles explained additional variance in adaptive functioning above and beyond that explained by ED diagnosis, indicating the importance of personality style to adaptive functioning. Furthermore, the three types of personality showed distinct relationships to potential etiological variables, including adverse (traumatic) events, family functioning, and a family history of internalizing or externalizing disorders. These results indicate that a system of differentiation between ED patients based on personality style may be clinically and diagnostically useful in adolescence.

The results also support the possibility that both environmental and genetic factors may contribute the development of particular personality patterns in adolescent EDs. Aggregate variables reflecting the childhood maternal relationship, family environment, presence of adverse events in childhood, and presence of internalizing/externalizing disorders in first degree relatives showed meaningful relationships to personality prototypes. Multivariate regressions produced final models suggesting that adverse events in childhood were of particular importance to the Dysregulated style, while the maternal relationship, the presence of internalizing disorders in first degree relatives (and the absence of externalizing disorders in first degree relatives) were of particular importance to the Avoidant/Depressed style. Analyses of the High-functioning group suggested that in contrast, positive maternal factors and fewer adverse events were associated with this personality style.

These data are both retrospective and cross-sectional, and hence only suggestive vis-à-vis causation; however, they suggest areas of important future research into the possible etiologies of different personality styles. It is also possible that these are interacting forces, such that a genetic vulnerability in combination with adverse or traumatic events yields these outcomes. Highly influential studies of other psychopathology have suggested that gene-by-environment interaction effects may be crucial areas of investigation in the future (Caspi et al., 2003).

The absence of findings regarding differences between ED diagnostic groups on two of the three personality prototypes, High-functioning and Avoidant/Depressed, deserves further consideration. These data support prior analyses suggesting that individuals with AN are less impulsive and emotional than those with BN (Sansone et al., 2005), and further suggest they are less impulsive and emotional than a mixed EDNOS group. However, the mean scores for the High-Functioning and Avoidant/Depressed personality types were very similar in each of the ED diagnostic groups. There are multiple explanations for this finding, which point toward additional research directions. For example, it is possible that more refined ED diagnostic categories (e.g., EDNOS restricting subtype, EDNOS binge/purge) or the severity of particular symptoms (e.g., restriction, bingeing/purging) might show stronger relationships to personality factors than do overall ED diagnostic categories. An alternative possibility is that the same symptoms may serve different functions for people with different personality styles – for example, purging may be primarily an impulsive reaction for a dysregulated individual, but a more deliberate calorie-controlling measure for a highly restrictive individual with EDNOS. Additional research might also usefully investigate the effects and correlates of particular combinations of personality factors, and the overlap between personality subtypes and diagnostic categories.

The personality differences found here have clinical implications that require further investigation. The first generation of treatment studies (for adults) with EDs used manuals for structured treatments (e.g., cognitive behavioral therapy for BN; Fairburn, Marcus, & Wilson, 1993) that primarily address the symptoms of specific ED diagnoses. The most recent generation of treatment manuals, however, is 'transdiagnostic,' with intended applicability to whatever combination of ED symptoms and therapy obstacles the patient experiences (Fairburn, Cooper, & Shafran, 2003). This personality research would suggest that guidance in useful therapeutic strategies targeting emotional reactivity, impulsivity, social avoidance, and self-criticism would be useful additions for certain personality styles, and in fact therapy that incorporates interventions for some of these problems is currently under investigation (Fairburn, 2007).

It is important to consider the reliability and validity of this subtyping system in the context of a similar pilot study using the same methods with a different sample of adolescents (Thompson-Brenner et al., 2005).³ In the pilot data analysis, a different group of clinicians from the practice research network provided data using the same measures for 84 female adolescent patients from a wider age range (13–18) with EDs, including Axis I and II diagnoses, adaptive functioning variables, family and developmental history variables, and psychotherapy outcome. The personality items characteristic of the three main prototypes were virtually identical to those produced in this sample, as were associations to Axis I and Axis II comorbid disorders. This small mixed ED sample again did not have the number of subjects with AN or different types of EDNOS to make strong conclusions regarding the associations between ED symptoms and personality style. However, personality scores again showed incremental validity in predicting types of functioning (global, relational, and school) above and beyond ED diagnosis. In addition, associations with possible etiological factors were similar to those found in this study. Though the samples for both studies were small, and limitations were shared by both, the similarities in the results lend support to the validity of the results.

These data have important limitations. First, data for each patient were provided by a single informant, the treating clinician. Although this is modal in psychiatric research (most commonly the *patient* is the sole informant, responding either to questionnaires or structured interviews), clearly future research should collect independent data from multiple informants. It is worth noting, however, that clinicians could not have been aware of the prototypes we derived empirically, yet these prototypes, unlike ED diagnosis with which they are familiar and are likely to have had hypotheses (e.g., about etiology), were highly predictive of a range of variables, and resembled pilot data analyses. Data did not differ from clinicians of different theoretical orientations or professional training, rendering clinician bias unlikely to account for the findings. As noted in the Methods section, this research group has conducted multiple studies establishing that clinician description of personality (using the measures included in this study) (Westen & Muderrisloglu, 2006), clinician description of adolescent symptomatology (Dutra et al., 2004; Westen et al., 2003), and clinician description of family history variables (Russ, Heim, & Westen, 2003; Wilkinson-Ryan & Westen, 2000) show high inter-rater reliability with independent observer report and methods of third-party corroboration. However, the cross-sectional and retrospective nature of the data requires repli-

cation with prospective methods. These results might fruitfully guide efforts to develop measures for risk factors in pre-adolescents for longitudinal study.

The limitations of the sample size are also considerable. The factor-analytic methodology requires large sample sizes to produce multiple meaningful subtypes, and there may well be a larger number of personality subtypes worthy of consideration. Other studies have found two types of dysregulated personality – behaviorally and emotionally dysregulated (Thompson-Brenner et al., 2007). The constricted type, while too small in this sample for serious consideration, merits further research. True taxonomic research and other investigations of the subtypes using an ordinal rather than dimensional approach, are essential, but will require larger sample sizes. Investigations of subtypes of EDs (such as binge/purge subtype AN) would also necessitate a larger sample. Issues with sample size regularly limit research into EDs, given that AN is rare.

The generalizability of the sample is also worth examining. Although we had a relatively high willingness to participate among recruited clinicians, and a high completion rate among clinicians treating a patient meeting study criteria, the overall number of clinicians treating adolescents with EDs in the community appears to be low. Out of a potential pool of 850 individuals who were willing to participate in studies of adolescents, we were able to identify and collect measures from 120 who currently had an adolescent patient with an ED. Other community-based studies have indicated that many general practitioners do not treat EDs, but rather refer patients with EDs to specialists (Thompson-Brenner & Westen, 2005). It is possible that the smaller number of individuals who treat EDs share some particular bias in terms of reporting symptoms, personality traits, and family history. However, the sample included a substantial range of therapists from different treatment orientations. Furthermore, the sample was largely collected from private practice clinicians. We are aware of no data bearing on the general pattern of what proportion of individuals with EDs are treated in private practice or other settings, so it is difficult to draw conclusions about representativeness. As noted earlier, no significant differences were observed between clinicians of different theoretical orientations, or professional disciplines, supporting the possibility that the results are generalizable beyond particular sub-groups of patients.

In summary, the data have significant clinical and research implications. Clinicians should consider the personality style of adolescent patients with EDs, given observed differences in symptomatology, co-morbidity, etiology, and clinical response. Researchers should also take within-group personality heterogeneity into account when designing studies of adolescent ED groups; this heterogeneity

³Data from these two studies were not combined due to differences in sampling methods.

may reduce the significance of observed differences in comparisons of ED groups and controls, or AN and BN samples.

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Correspondence to

Heather Thompson-Brenner, Center for Anxiety and Related Disorders, Department of Psychology, Boston University, 648 Beacon St., Boston MA 02215, USA; Fax: 617 353 9609; Email: heatherthompson-brenner@gmail.com

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