Personality subtypes in patients with panic disorder

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Abstract

Objective: This study examined personality subtypes of adults diagnosed with panic disorder (PD).
Methods: As part of a National Institute of Mental Health–funded study on personality in a clinical population, randomly selected psychologists and psychiatrists used a Q-sort instrument to describe 96 adults diagnosed with PD.
Results: Q-factor analysis yielded 4 personality subtypes: high functioning, emotionally dysregulated, inhibited/avoidant, and somatizing. Within the sample, the subtypes differed on Axis I and II pathology, adaptive functioning, and developmental and family history variables. Personality constellations in the sample showed substantial incremental validity in predicting adaptive functioning and treatment response above and beyond the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,* Axis I diagnoses.
Conclusions: These distinctions may elucidate the high rates of comorbidity among patients with PD and are important in understanding treatment choice and outcome.
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1. Introduction

Panic disorder (PD) is a condition defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (*DSM-IV-TR*; APA, 2000) by recurrent unexpected panic attacks followed by at least 1 month of concern about having additional attacks, their implications, or potential significant change in behavior related to the attacks. Major epidemiologic studies estimate lifetime prevalence of PD to be 4.7%, with 12-month rates of 2.8% in the general population [1]. Patients with PD vary in frequency and severity of the panic symptoms they display, as well as in overall global functioning and comorbidity with other disorders, making the diagnosis of PD complex [2].

The most frequently occurring comorbid Axis I disorders are major depressive disorder (MDD; 32%-50%), substance use disorder (36%), and other anxiety disorders, including social phobia (31.1%), posttraumatic stress disorder (PTSD; 21.6%), and generalized anxiety disorder (GAD; 21.3%) [1,3,4]. Likewise, comorbidity between PD and Axis II disorders is also common (35%-40.8%) [5]. High rates of

cluster B (antisocial, borderline, histrionic, and narcissistic) and cluster C (avoidant, dependent, and obsessive-compulsive) disorders are common in PD patients, especially borderline and dependent personality disorders (22.7%) [5]. Panic disorder when linked with comorbid personality disorders is associated with more severe symptomatology, worse prognoses, and worse response to treatment [5].

1.2. The importance of personality in PD

A primary reason for the high rates of comorbidity between the anxiety disorders and other Axis I disorders, especially mood disorders (and likely personality disorders as well), reflects in part a shared personality trait, negative affectivity, which refers to a general tendency to experience negative emotional states such as anxiety and depression [6,7]. Although the importance of this shared trait between these 2 classes of disorders is clear, PD is a highly heterogeneous disorder; and different etiologic pathways to the disorder, different clinical presentations, and different prognoses or likelihood of response to particular treatments may be obscured by focusing on single traits in isolation. For example, clinical experience suggests that some patients with PD have many symptoms of borderline personality disorder; and their panic appears to be part of a broader constellation of personality characteristics that includes emotional dysregulation (emotions that spiral out of control), of which panic

is just one [8]. Other PD patients appear psychologically healthy and function well in the world; and for them, panic seems a distinct symptom.

The goal of the present study is to explore whether patients with PD are heterogeneous with respect to personality characteristics and to see whether we can more meaningfully describe the relationship between PD and panic than simply by listing rates of comorbidity by identifying distinct personality styles common to different kinds of patients with PD. Although treatment of PD using cognitive-behavioral therapy (CBT) has produced high success rates ranging between 50% and 60% [9,10], the high rate of failure (40%-50%) and relapse in treating PD patients [11] suggests a possible personality diathesis not addressed by symptom-focused treatments. Increasing research suggests that person-ality variables represent diatheses for anxiety disorders [12]. The idea of studying PD in the context of personality and through subtypes is to help eliminate random heterogeneity and instead uncover "patterned heterogeneity"—groups of patients with a given disorder who show commonality in personality traits but display distinct differences from others with the same disorder.

1.3. The present study

This article reports on a study drawn from a broader National Institute of Mental Health–funded study of the diagnosis and classification of personality pathology. To identify personality subtypes, we applied an empirical clustering technique, Q-factor analysis, to data from the second edition of the Shedler-Westen Assessment Procedure [13], the SWAP-II. Our general data-analytic strategy was first to see whether personality subtypes emerged and, if so, to use a construct validation approach to provide an initial test of the validity of the diagnostic groupings, comparing the subtypes of variables that should distinguish a valid taxonomy. These include measures of (a) adaptive functioning, (b) Axis I diagnoses, (c) Axis II pathology, (d) etiologic variables such as developmental and family history, and (e) treatment response using contrast analyses. We then used hierarchical linear regression to examine the incremental validity of this subtyping approach above and beyond the Axis I disorders most frequently comorbid with PD, which provides a more conservative test of its potential clinical and empirical utility.

2. Method

We used a practice network approach, in which randomly selected, experienced clinicians provide data on patients that can be aggregated for large-N research on the nature, classification, and treatment of psychopathology [13-17]. A random national sample (N = 1201) of psychiatrists and psychologists with at least 5 years' experience postresidency (MDs) or postlicensure (PhDs) from the membership registers of the American Psychiatric and American Psychological Associations participated in the study.

We asked clinicians to describe "an adult patient you are currently treating or evaluating who has enduring pattern of thoughts, feeling, motivation or behavior—that is, person-ality patterns—that cause distress or dysfunction." To obtain a broad range of personality pathology from relatively minimal to substantial, we emphasized that patients must have problematic personality traits but need not have a personality disorder diagnosis. Patients had to meet the following additional inclusion criteria: at least 18 years of age, not currently psychotic, and known well by the clinician (using the guideline of ≥6 clinical contact hours but ≤2 years to minimize confounds imposed by personality change with treatment). To minimize selection biases, we directed clinicians to consult their calendars to select the last patient they saw during the previous week who met the study criteria, regardless of setting (eg, private practice, residential facility).

Clinicians were given the option of participating using pen and paper (65%) or via the Internet (www.psychsystems. net) (35%). In several studies, including this one, we have found, consistent with the literature on computerized administration of psychologic tests, that the 2 forms of data collection produce equivalent results [18,19]. To avoid compromising patient confidentiality or interfering in any way with ongoing clinical work, we requested no identifying information about the patient (eg, name, initials) and instructed clinicians to use only information already available to them from their contacts with the patient. Each clinician contributed data on only 1 patient to minimize rater-dependent variance. For the purposes of this article, we used data from a subset of clinicians (n = 96) who described a patient that fit the criteria for PD.

2.1. Measures

We describe here the measures relevant to the present study.

2.1.1. PD diagnosis

To determine whether patients had PD, we used data from the Clinical Data Form, which includes a checklist of Axis I disorders coded present/absent. Thus, we selected all patients from the broader sample who clinicians indicated met the criteria for PD. We discuss limitations of this method and future directions in the "Discussion."

2.1.2. Shedler-Westen Assessment Procedure, version II

The SWAP-II is the most recent version of the SWAP-200 [16,20]. The SWAP-II is a 200-item personality pathology Q-sort designed to be used by clinically experienced observers based on longitudinal information over the course of treatment [21-23]. The SWAP-II is a set of 200 personality-descriptive statements, each printed on a separate index card. To describe a patient using the SWAP-II, the clinician sorts the statements into 8 categories based on their applicability to the patient, from those that are least descriptive (assigned a value of 0) to those that are most descriptive (assigned a value of 7). Statements that apply to a

greater or lesser degree are placed in intermediate categories. The SWAP-II shows considerable evidence of reliability and validity, predicting a range of measures of adaptive functioning (eg, history of hospitalizations, school performance, violence), general psychopathology (eg, the Child Behavior Checklist), etiologic variables (eg, childhood history of physical and sexual abuse, family history of internalizing and externalizing disorders), and personality as assessed by independent interviewers blind to clinician data [22]. Empirically, clinicians' theoretical orientation appears to have little impact on factor-analytic solutions that emerge using the instrument [24].

2.1.3. Clinical Data Form

The Clinical Data Form is a clinician-report form developed over several years that assesses a range of variables relevant to demographics, Axis I diagnosis, and etiology [13]. Clinicians first provide demographic data on themselves and the patient. They then rate the patient's adaptive functioning using a number of indices, such as ratings of peer relations and work, as well as relatively objective indicators, such as history of arrests, suicide attempts, and psychiatric hospitalizations. We also obtained information on types of psychotropic medications the patient was taking and ratings of treatment response for both psychotherapy and medication.

Research has demonstrated that clinician ratings of adaptive functioning variables show high interrater reliability and validity (eg, correlations with the same data obtained by independent interview $r > .60$) [22,24,25]. In prior studies with adult samples, clinicians' judgments on these variables have predicted theoretically relevant criterion variables and have reflected reasonable and conservative decision rules [14,26].

2.1.4. Axis II checklist

To generate both categorical and dimensional *DSM-IV* personality disorder diagnoses, we presented clinicians with a randomly ordered checklist of the criteria for all Axis II disorders. In prior studies, this method has produced results that mirror findings based on structured interviews such as the Structured Clinical Interview for DSM-IV-TR Axis II Personality Disorders (SCID-II) [16]. Because we wanted to collect data useful for subsequent structural equation modeling and taxometric analyses, we obtained both present/absent and severity ratings on each symptom using a procedure similar to that used in the Anxiety Disorders Interview Schedule for *DSM-IV* [27]. Clinicians rated each symptom on a 6-point scale, anchored by the poles *absent* and *strongly present or severe*, with the following additional instruction: "Use ratings of 1 through 3 if you would judge the symptom 'absent' if forced to make a present/absent judgment. Use ratings of 4 or higher if you would judge the symptom 'present' if forced to make a present/absent judgment (ie, the patient has the symptom)." To create categorical diagnoses, we then applied *DSM-IV* decision rules to the present/absent data. To generate *DSM-IV* dimensional diagnoses that mirror those widely used in the

personality disorder literature, we summed the number of criteria judged present for each disorder.

2.2. Statistical analyses

To identify possible personality subtypes of PD, we used Q-factor analysis, a technique that has been used effectively in a range of research on normal personality and psychopathology [15,16,28,29]. Q-factor analysis differs from conventional factor analysis because it aggregates patients rather than variables, making it possible to identify people with similar profiles across a set of items. The goal of Q-factor analysis in the present study was to identify groups of PD patients that shared personality characteristics that made them distinct from other individuals with PD. This method has a number of advantages over other cluster-analytic techniques. First, it does not require an assumption of mutually exclusive types, meaning that patients can match different subtypes that are identified to varying degrees. More importantly, it does not assume that subtypes exist and, therefore, can identify unidimensional as easily as multidimensional constructs [28].

We followed standard factor-analytic procedures, first entering the data into a principal components analysis, specifying eigenvalues of at least 1 (Kaiser criteria), and using the scree plot, percentage of variance accounted for, and parallel analysis [30,31] to determine the number of Q-factors to rotate. These procedures suggested a 4- to 6-factor solution. We applied multiple estimation procedures with 4 through 6 factors to increase the likelihood of identifying robust and coherent factors. Once we established an optimal solution, we created dimensional and categorical scores for each patient as follows. We used Q-correlations to create dimensional scores, which reflect the correlation or "match" between each patient's 200-item profile and the empirically generated 200-item Q-factor profiles [28]. For categorical subtype diagnoses, we assigned patients to the group for which they had the highest Q-correlation, similar to a factor loading, using a correlation of at least .30 as a cutoff (selecting the highest correlation to assign categorical scores if the patient had "loadings" ≥.30 on more than 1 Q-factor).

Next, we tested the validity of the subtypes by examining their external correlates. Where appropriate, we tested hypotheses using contrast analysis, which maximizes power and minimizes the likelihood of spurious findings resulting from running multiple analyses by testing focal, 1-tailed questions (about the relative ordering of group means) rather than global questions that are usually of less theoretical interest (eg, whether group means differed in some unspecified way) [32]. Before examining correlations between the Q-scores and external correlations, we generated a priori hypotheses (expressed as contrast weights) based on examination of the item content of the subtypes and previous research. To maximize reliability of external correlates, we aggregated ratings where possible to create composite variables related to adaptive functioning and developmental history (eg, aggregating multiple types of childhood

adversity, such as abuse and separations), first standardizing where appropriate.

Finally, to assess the incremental validity of the 4 personality subtypes over and above *DSM-IV* Axis I diagnoses (ie, MDD, GAD, PTSD, social phobia), we used hierarchical linear regression to examine the extent to which personality subtypes could predict composite variables reflecting adaptive functioning after first holding constant the *DSM-IV* Axis I diagnoses.

3. Results

Patients (N = 96) were 33.3% male, with a mean age of 40.8 years (SD, 10.89) and mean GAF of 52.25 (SD, 9.56). The sample was 81.3% white, with 5.2% African American and 7.3% Hispanic; primarily working class (32.3%) or middle class (33.3%); and primarily seen in private practice (77.1%) or clinic (16.7%) settings (although 6.1% were seen in residential or forensic settings). The clinician sample consisted of 70.5% psychologists, of whom 45.8% were male. Most were highly experienced (mean = 19.84 years; SD, 9.16). Most clinicians reported an eclectic or integrative theoretical orientation (46.5%), followed by psychodynamic (25.8%) and CBT (18.2%). Median length of treatment was 14 months, so clinicians knew the patients well.

With respect to comorbid Axis I diagnoses, the most common included MDD (60.4%), dysthymic disorder (43.8%), GAD (36.5%), and PTSD (35.4%). Table 1 presents patient demographics and clinical characteristics of the PD study sample.

Table 1
Sample characteristics

	PD adults (N = 96)
Sex	
Male	33.3
Female	66.7
Race	
White	81.3
African American	5.2
Hispanic	7.3
Asian	1.0
Other	5.2
SES	
Poor	11.5
Working class	32.3
Middle class	33.3
Upper middle class	19.8
Upper class	3.1
Age (mean, SD)	40.83 (10.89)
Axis I comorbid diagnoses	
GAD	36.5
Dysthymic disorder	43.8
MDD	60.4
Substance use disorder	17.7
Adjustment disorder	8.3
Social phobia	17.7
PTSD	35.4

Data are presented as percentage of patients unless otherwise specified.

3.1. Identifying personality subtypes

Q-factor analysis identified 4 subtypes or Q-factors. We report here the principal axis factoring solution with a 6-factor Varimax rotation, retaining the first 4 Q-factors that accounted for 41.7% of the variance. Table 2 shows the 18 items from the SWAP-II most characteristic of each subtype. We labeled the Q-factors as *high functioning*, *emotionally dysregulated*, *inhibited/avoidant*, and *somatizing*.

High functioning patients, although largely characterized by a healthy personality structure, tended to show personality features and an interpersonal style sharing many features with "type A" personality style (eg, a tendency to be competitive, controlling, angry, and "tight"). Patients who were classified as emotionally dysregulated demonstrated features often characteristic of borderline personality disorder, including a tendency for emotions to spiral out of control, an inability to soothe themselves, as well as difficulty with impulsivity and anger. Inhibited/avoidant subtype was characterized by feelings of inadequacy, self-criticism, guilt, and shame; a deep sense of inner badness; and social anxiety and corresponding avoidance. Somatizing patients were characterized by obsessionality, chronic anxiety, hypochondriasis, feelings of powerlessness, and rigidity.

3.2. Validity analyses

Next, we assessed the validity of the 4 diagnostic groupings. Because we wanted to test specific hypotheses, we used contrast analyses, which allowed us to make highly specific hypotheses about the relative ordering of the means of percentages with a particular disorder for each of the subtypes. We report in the table both the hypotheses (with contrast weights) and our findings. Where the Levene test of inequality of group variances was significant, we tested contrasts using *t* tests for unequal variances (identifiable in the table by the low degrees of freedom). We examined personality subtypes in relation to diagnostic (Axis I and II) variables, adaptive functioning measures, variables of potential etiologic significance, as well as treatment outcome assessed prospectively over the year after initial data collection.

3.2.1. Axis I and Axis II pathology

Table 3 presents Axis I and Axis II pathology in relation to the PD subtypes.

As predicted, the emotionally dysregulated group had the highest rates of borderline personality disorder, PTSD, and bipolar disorder, whereas the high functioning group had the least pathology in terms of MDD, PTSD, and personality disorders. Also as hypothesized, the inhibited/avoidant group had the highest rate of avoidant personality disorder. Our hypotheses were not supported for obsessive-compulsive personality disorder.

3.2.2. Adaptive functioning and etiology

Table 4 presents subtype differences on composite measures of adaptive functioning and etiology. As we hypothesized, the high functioning group was significantly

Table 2
Empirically defined subtypes (Q-factors)

	Mean
High functioning	
Is articulate; can express self well in words	3.3971
Has a good sense of humor	2.2942
Is able to use his/her talents, abilities, and energy effectively and productively	2.2934
Is able to assert him-/herself effectively and appropriately when necessary	2.1981
Tends to get into power struggles	2.0846
Tends to be competitive with others (whether consciously or unconsciously)	1.9217
Has panic attacks (ie, episodes of acute anxiety accompanied by strong physiologic responses)	1.8897
Tends to be energetic and outgoing	1.8858
Tends to be liked by other people	1.7836
Enjoys challenges; takes pleasure in accomplishing things	1.7777
Is psychologically insightful; is able to understand self and others in subtle and sophisticated ways	1.7718
Is capable of hearing information that is emotionally threatening (ie, that challenges cherished beliefs, perceptions, and self-perceptions) and can use and benefit from it	1.7533
Tends to be critical of others	1.699
Tends to be conflicted about authority (eg, may feel she/he must submit, rebel against, win over, defeat)	1.689
Is creative; is able to see things or approach problems in novel ways	1.6867
Tends to be angry or hostile (whether consciously or unconsciously)	1.651
Is empathic; is sensitive and responsive to other peoples' needs and feelings	1.6386
Appears comfortable and at ease in social situations	1.6187
Emotionally dysregulated	
Emotions tend to spiral out of control, leading to extremes of anxiety, sadness, rage, etc	2.9371
Is unable to soothe or comfort him-/herself without the help of another person (ie, has difficulty regulating own emotions)	2.779
Emotions tend to change rapidly and unpredictably	2.5062
Tends to act impulsively (eg, acts without forethought or concern for consequences)	2.2683
Tends to become irrational when strong emotions are stirred up; may show a significant decline from customary level of functioning	2.2152
Expresses emotion in exaggerated and theatrical ways	2.1109
Tends to feel helpless, powerless, or at the mercy of forces outside his/her control	2.1086
Tends to feel unhappy, depressed, or despondent	2.009
Has panic attacks (ie, episodes of acute anxiety accompanied by strong physiologic responses)	1.8813
Is prone to intense anger, out of proportion to the situation at hand (eg, has rage episodes)	1.7554
Tends to feel misunderstood, mistreated, or victimized	1.7309
Tends to fear she/he will be rejected or abandoned.	1.6621
Tends to be needy or dependent	1.6367
Tends to be angry or hostile (whether consciously or unconsciously)	1.6181
Has difficulty maintaining attention and focus on tasks; is easily distracted by sights, sounds, unrelated thoughts, or other competing stimuli	1.6157
Tends to feel anxious	1.6151
Relationships tend to be unstable, chaotic, and rapidly changing	1.5919
Is prone to painful feelings of emptiness (eg, may feel lost, bereft, abjectly alone even in the presence of others)	1.59
Inhibited/avoidant	
Has trouble acknowledging or expressing anger toward others, and instead becomes depressed, self-critical, self-punitive, etc (ie, turns anger against self)	2.7418
Tends to feel ashamed or embarrassed	2.6083
Tends to feel she/he is inadequate, inferior, or a failure	2.5747
Tends to feel guilty (eg, may blame self or feel responsible for bad things that happen)	2.5316
Has a deep sense of inner badness; sees self as damaged, evil, or rotten to the core (whether consciously or unconsciously)	2.3362
Tends to be insufficiently concerned with meeting own needs; appears not to feel entitled to get or ask for things she/he deserves	2.3163
Has difficulty acknowledging or expressing anger	2.2821
Tends to be inhibited or constricted; has difficulty allowing self to acknowledge or express wishes and impulses	2.1796
Tends to be shy or self-conscious in social situations	2.0116
Tends to fear she/he will be rejected or abandoned	1.8789
Is self-critical; sets unrealistically high standards for self and is intolerant of own human defects	1.8243
Tends to feel anxious	1.8204
Tends to be conscientious and responsible	1.7249
Tends to be passive and unassertive	1.6555
Tends to avoid social situations because of fear of embarrassment or humiliation	1.6323
Tends to deny, disavow, or squelch his/her own realistic hopes, dreams, or desires to protect against anticipated disappointment (whether consciously or unconsciously)	1.5895
Tends to feel unhappy, depressed, or despondent	1.5602
Is articulate; can express self well in words	1.4733

Table 2 (*continued*)

	Mean
Somatizing	
Is troubled by recurrent obsessional thoughts that she/he experiences as intrusive	2.6323
Tends to develop somatic symptoms in response to stress or conflict (eg, headache, backache, abdominal pain, asthma)	2.6128
Tends to "catastrophize"; is prone to see problems as disastrous, unsolvable, etc	2.6081
Tends to ruminate; may dwell on problems, replay conversations in his/her mind, become preoccupied with thoughts about what could have been, etc	2.5947
Has moral and ethical standards and strives to live up to them	2.2455
Tends to feel listless, fatigued, or lacking in energy	2.0468
Has panic attacks (ie, episodes of acute anxiety accompanied by strong physiologic responses)	1.8553
Tends to feel anxious	1.7848
Tends to be conscientious and responsible	1.7584
Enjoys challenges; takes pleasure in accomplishing things	1.6993
Tends to become absorbed in details, often to the point that she/he misses what is significant	1.6305
Emotions tend to spiral out of control, leading to extremes of anxiety, sadness, rage, etc	1.4628
Is hypochondriacal; has exaggerated fears of contracting medical illness (eg, worries excessively about normal aches and pains)	1.4526
Religious or spiritual beliefs are central to his/her identity and experience	1.4428
Tends to feel helpless, powerless, or at the mercy of forces outside his/her control	1.3912
Has trouble making decisions; tends to be indecisive or to vacillate when faced with choices	1.346
Tends to be controlling	1.3443
Tends to be overly concerned with rules, procedures, order, organization, schedules, etc	1.3423

healthier in terms of global and work functioning and demonstrated the lowest level of psychiatric impairment (suicide attempts and hospitalizations). Also as predicted, the emotionally dysregulated group was significantly more impaired in terms of global and work functioning and scored significantly higher on psychiatric impairment than the other 3 subtypes.

Table 4 also includes data on developmental and family history. As expected, the emotionally dysregulated group had the most childhood trauma and adverse childhood events, as well as the least stable family environments. Contrary to predictions, the somatizing group showed less childhood trauma and fewer adverse events than the high functioning group and had a more stable family environment.

In examining familial aggregation, we assessed substance abuse and bipolar disorder in first-degree relatives. As predicted, the dysregulated group had a significantly higher rate of substance abuse in first-degree relatives than the other 3 groups. Our hypothesis regarding bipolar disorder was not significant, although the competitive high functioning group had relatively higher rates.

As Table 4 shows, our predictions on psychotherapy efficacy were supported. The high functioning group had the greatest response to psychotherapy, whereas the dysregulated group was least responsive. The inhibited/avoidant and somatizing groups fared similarly in response to treatment.

3.3. Incremental validity of PD personality subtypes

We next examined the incremental validity of dimensional personality subtype scores in predicting criterion variables, holding constant *DSM-IV* Axis I disorder diagnoses commonly comorbid with PD (ie, MDD, GAD, PTSD, and social phobia). To assess whether personality style

Table 3

Axis I and Axis II pathology by adult personality subtype (percentage meeting *DSM-IV* criteria))

	High functioning (n = 12), mean (SD)	Dysregulated (n = 24), mean (SD)	Inhibited/avoidant (n = 34), mean (SD)	Somatizing (n = 13), mean (SD)	Hypotheses	$t(df)$	Significance	r
Borderline personality disorder	.17 (.39)	.75 (.44)	.35 (.49)	.00 (.00)	−2 2 1 −1 D > I > S > H	5.06 (29)	<.001**	.46
Avoidant personality disorder	.25 (.45)	.38 (.49)	.82 (.39)	.15 (.38)	−2 −2 3 1 I > S > D, H	3.44 (46)	<.001**	.37
Obsessive-compulsive personality disorder	.17 (.39)	.00 (.00)	.32 (.47)	.23 (.44)	1 −2 −1 2 S > H > I > D	1.09 (20)	.145	.12
PTSD	.17 (.39)	.46 (.51)	.41 (.50)	.23 (.44)	−2 2 1 −1 D>I>S>H	2.25 (40)	.015*	.22
MDD	.33 (.49)	.58 (.50)	.71 (.46)	.54 (.52)	−2 1 1 0 I, D > S > H	2.01 (79)	.02*	.22
Bipolar disorder	.17 (.39)	.21 (.42)	.00 (.00)	.08 (.28)	1 3 −2 −2 D > H > I, S	2.01 (42)	.01**	.26

* Scores are significantly higher at $P \le .05$.

** Scores are significantly higher at $P \le .01$.

Table 4
Relation between adult personality subtypes and adaptive functioning, etiologic variables, and treatment response

	High functioning (n = 12), mean (SD)	Dysregulated (n = 24), mean (SD)	Inhibited/avoidant (n = 34), mean (SD)	Somatizing (n = 13), mean (SD)	Hypotheses	$t(df)$	Significance	r
Adaptive functioning (SD units)								
Global adaptive functioning	.34 (.60)	−.65 (.49)	−.05 (.80)	.09 (.41)	2 −2 −1 1 H > S > I > D	4.81 (26.1)	<.001**	.43
Global psychiatric functioning	−.19 (.87)	.59 (.99)	.19 (.94)	.02 (.84)	−2 2 1 −1 D > I > S > H	2.39 (79)	.01**	.26
Work functioning	.43 (.75)	−.80 (.90)	.14 (.76)	.06 (.80)	4 −2 −1 −1 H > I, S > D	3.06 (79)	.001**	.33
Developmental variables (SD units)								
Childhood family environment	−.04 (.67)	−.47 (.49)	−.31 (.65)	.30 (1.05)	2 −2 −1 1 H > S > I > D	2.71 (30.4)	.006**	.29
Adverse childhood environment	1.75 (1.14)	2.58 (2.61)	1.88 (1.85)	.92 (1.75)	−2 2 1 −1 D > I > S > H	1.67 (79)	.05*	.18
Childhood trauma	−.01 (.55)	.57 (.83)	.15 (.66)	−.06 (.62)	−2 2 1 −1 D > I > S > H	2.53 (79)	.006**	.27
Childhood attachment disruption	.20 (.59)	.20 (.77)	.05 (.64)	−.20 (.45)	−2 2 1 −1 D > I > S > H	.47 (79)	.32	.05
Family history (1st-degree relative)								
Substance abuse	.06 (.13)	.36 (.41)	.19 (.27)	.13 (.17)	−1 3 −1 −1 D > I, S, H	2.68 (27.2)	.006**	.34
Bipolar disorder	.17 (.39)	.13 (.34)	.03 (.17)	.08 (.28)	3 1 −2 −2 H > D > I, S	1.08 (17.3)	.15	.15
Treatment response								
Psychotherapy efficacy	3.73 (.91)	2.90 (.72)	3.13 (.89)	3.18 (.75)	4 −2 −1 −1 H > I, S > D	2.54 (69)	.007**	.29

Aggregated variables are composed of the following standardized scores: global adaptive functioning—job losses, social support, quality of romantic relationships, quality of general relationships, employment history, and a 5-point rating of personality health-sickness; global psychiatric functioning—Global Adaptive Functioning score, hospitalizations, and suicide attempts; childhood family environment—family warmth and family stability; adverse childhood environment—relationship with mother, relationship with father, pathology of mother, pathology of father and moves; childhood trauma—history of physical and sexual abuse; childhood attachment disruption—significant separations, foster care, sent to live elsewhere, and living with an alcoholic in the house; substance abuse—alcohol abuse, pill abuse, illicit drug abuse.

 * Scores are significantly higher at $P \leq .05$.
 ** Scores are significantly higher at $P \leq .01$.

predicted variance above and beyond *DSM-IV* Axis I disorders (ie, MDD, GAD, PTSD, and social phobia), we selected 2 variables to examine a priori: global adaptive functioning and psychotherapy efficacy.

As can be seen from Table 5, the Axis I diagnoses were predictive of adaptive functioning in step 1. Specifically, PTSD was the Axis I diagnosis that was significantly (negatively) predictive of adaptive functioning ($\beta = −.201$, $P = −.055$). Adding the personality dimensions in step 2 increased predictive validity considerably. Three out of 4 of the subtypes were predictive of adaptive functioning, whereas the Axis I diagnoses all became nonsignificant. Dysregulation predicted poor adaptive functioning, whereas both high functioning and somatizing predicted positive functioning. In assessing psychotherapy efficacy, the Axis I diagnoses did not have a predictive effect in step 1. However, adding the 4 personality dimensions again increased the predictive effect in step 2, with 2 of the 4 subtypes predicting treatment response. Dysregulation predicted lower efficacy, whereas high functioning predicted higher treatment efficacy.

4. Discussion

This study produced results that suggest the importance of personality in understanding the heterogeneity of panic patients. Four coherent subtypes were found in the adult sample: high functioning, emotionally dysregulated, inhibited/avoidant, and somatizing. Our validity analyses produced results demonstrating the differences among the subtypes, with coherent patterns emerging. Subtype dimensional scores showed substantial incremental prediction of adaptive functioning and psychotherapy efficacy, even holding constant common forms of Axis I comorbidity that are often associated with poor functioning. The subgroup differences on external criterion variables in the study make evident that assuming homogeneity among PD patients is not useful. Studies that look at "mean" levels of personality traits or disorders in PD patients appear to be mixing patients with very different kinds of personality constellations.

Contrast analyses testing specific hypotheses about Axis I and Axis II pathology provided strong support for the

Table 5
Hierarchical linear regression predicting global adaptive functioning and psychotherapy efficacy from *DSM-IV* Axis I diagnoses (step 1) and adult personality subtypes (step 2)

Predicting global adaptive functioning (n = 95)	Stand. β	T	P	R	R^2	F change	P change
Step 1: *DSM-IV* Axis I diagnoses				.32	.10	2.61	.04*
Step 2: *DSM-IV* Axis I diagnoses and personality subtypes				.79	.63	30.12	<.001**
Step 1							
MDD	−.12	−1.19	.24				
GAD	−.02	−.24	.81				
PTSD	−.20	−1.94	−.055*				
Social phobia	−.16	−1.61	.11				
Step 2							
MDD	−.03	.434	.665				
GAD	.02	.26	.80				
PTSD	−.082	−1.18	.24				
Social phobia	−.06	−.81	.42				
High functioning	.275	3.68	<.001**				
Dysregulated	−.62	−7.87	<.001**				
Inhibited/avoidant	−.05	−.565	.57				
Somatizing	.155	2.14	.035*				
Predicting psychotherapy efficacy (n = 82)	Stand. β	T	P	R	R^2	F change	P change
Step 1: *DSM-IV* Axis I diagnoses				.24	.06	1.21	.32
Step 2: *DSM-IV* Axis I diagnoses and personality subtypes				.52	.27	5.19	.001**
Step 1							
MDD	−.20	−1.73	.09				
GAD	−.13	−1.18	.24				
PTSD	.043	.366	.715				
Social phobia	.02	.18	.86				
Step 2							
MDD	−.08	−.71	.48				
GAD	−.106	−1.004	.32				
PTSD	.16	1.44	.15				
Social phobia	.15	1.41	.16				
High functioning	.24	2.04	.045*				
Dysregulated	−.39	−3.19	.002**				
Inhibited/avoidant	−.22	−1.60	.11				
Somatizing	.01	.89	.37				

* Scores are significantly higher at $P \leq .05$.
** Scores are significantly higher at $P \leq .01$.

taxonomy, with clear visible patterns emerging in the PD subtypes. With respect to incremental validity, constellation personality dimensions predicted substantial incremental variance in adaptive functioning and treatment response after holding constant *DSM-IV* Axis I diagnoses, which accounted for surprisingly minimal variance on any of these variables identified by Robins and Guze [33] as central to validating a taxonomic distinction. These findings are important because the amount of variance that was accounted for by the subtypes tells us that these personality dimensions may allow us to make better predictions about PD patients, their functioning, and their likely response to treatment, although future clinical trials with large Ns should be used to test differential response of patients matching the different personality subtypes to different treatments.

4.1. Limitations

The primary limitation in these studies was that we obtained information about each patient from a single informant, the treating clinician, creating the potential for rater bias. The fact that we were able to produce subtypes of PD for our adult sample unfamiliar to the clinicians does, however, mitigate the extent to which clinician bias may have influenced our results. In addition, the patients included were part of a study of adult personality pathology; clinicians were not likely thinking about the panic diagnosis as they described these patients, as they were making more than 1000 discriminations across multiple measures and giving them multiple other Axis I and Axis II diagnoses. Future research should attempt to replicate and extend these findings using samples of panic patients studied by

interview, where one interviewer assesses personality and the patient and other interviewers assess Axis I symptoms, adaptive functioning, and other criterion variables such as molecular genetics that might differentiate the subgroups. We hope to conduct such a study using ongoing data collection in a project at Grady Hospital.

4.2. Clinical implications

The findings from these studies indicate preliminary support for the importance of personality subtyping in understanding heterogeneity within a given disorder. Personality subtyping captures meaningful patterns of variation that cannot be accounted for only by distinguishing patients based solely on differences among the symptoms of the disorder itself.

The treatment response data are most suggestive of clinical implications, given the differential treatment response of patients sharing the same diagnosis but differing in personality style. High functioning patients benefited substantially from psychotherapy, whereas dysregulated patients showed much poorer response, suggesting the need to study other types of interventions to see what might work for these individuals, either in lieu of or in addition to standard treatments for PD. Because not all PD patients are high functioning, having a more personality-based treatment may be more useful for many of these other patients. This may be why more personality-focused treatments have recently shown surprising efficacy in PD patients, comparable with that of CBT [34]. Understanding that personality impacts this disorder and focusing on personality within treatment may produce positive results for patients unresponsive to current, symptom-based PD treatment methods.

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