
PROGRESS REPORT: RESEARCH ACTIVITY 2001

A. SPECIFIC AIMS

There are three specific study aims for the three years of funding from the BPDRF:

1. To further our understanding of the psychopathology of borderline personality disorder (BPD) with data on phenotypic features of aggression and impulsivity, temperament, interpersonal interactions, concepts of self and other, attachments, and neurocognitive functioning.
2. To determine the nature and extent of treatment gains related to three different forms of standardized psychotherapy treatment. The three treatments include a supportive treatment, dialectical behavior therapy (DBT), and transference-focused therapy (TFP). All patients receive medication if clinically indicated.
3. To examine the relationship of diagnostic membership (BPD criteria/phenomenology and treatment type), with moderator variables (e.g., comorbid Axis I and Axis II disorders, temperament and personality traits) in predicting the dependent variables (clinical state, social functioning, service use) at the end of one year of treatment.

B. BACKGROUND AND SIGNIFICANCE

BPD constitutes one of the most important sources of long-term impairment in both treated and untreated populations (Widiger & Weissman, 1991). Approximately 11% of psychiatric outpatients and 19% of inpatients meet the *Diagnostic and Statistical Manual (4th ed.)* criteria for BPD (Kass, Skodol, Spitzer, & Williams, 1985), the majority of whom are women. BPD is a prevalent, chronic, and debilitating syndrome associated with high rates of medical and psychiatric utilization of services (Skodol, Gunderson, Livesley, Pfohl, Siever, & Widiger, in press). Regarding the population prevalence of BPD, Lenzenweger et al (1997) found a prevalence of 0.3% for diagnosed definite or probable BPD in a nonclinical population using a conservative diagnostic interview (IPDE). A similar figure (0.7%) was found subsequently by Torgersen et al (2001) in a Norwegian population-based study using a somewhat less conservative interview (SIDP). Suicidal (McGlashan, 1986; Stone, 1993) and self-injurious behavior is particularly prevalent with BPD patients, with rates ranging from 69% to 75% (Cowdry, Pickar, & Davies, 1985; Clarkin, Widiger, Frances, Hurt, & Gilmore, 1983). BPD is substantially comorbid with other personality disorders (Nurnberg et al., 1991; Zimmerman & Coryell, 1990) and with Axis I disorders (Fyer et al., 1988). BPD negatively affects the treatment efficacy for a number of Axis I disorders (see Clarkin, 1996), and is less responsive to pharmacotherapy (Soloff, 2000).

That BPD symptomatology is characterized by several major dimensions of psychopathology has long been established. The empirical clusters or primary dimensions of BPD have been discussed by researchers (e.g., Clarkin, Hull, & Hurt, 1993) and clinicians since the seminal multivariate work by Grinker (Grinker, Werble, & Drye, 1968). BPD is diagnosed if the individual has any 5 or more of a set of 9 criteria in DSM-IV, Axis II (APA, 1994) including items relating to identity diffusion, impulsivity, and affect dysregulation. A burgeoning literature has suggested that impulsivity and negative affectivity/emotional dysregulation are the two core personality traits that characterize much of the phenotypic variation seen in BPD (Gurvits, Koenigsberg, & Siever, 2000; Linehan, 1993; Paris, 2000; Seiver & Davis, 1991; Silk, 2000; Trull, 2001; Trull, Sher, Minks-Brown, Durbin, & Burr, 2000).

Theoretical literature has only recently begun to address the manner in which these dimensions are linked to major underlying personality or temperament processes and how these processes yield BPD through as yet unspecified interactions among the processes themselves and environmental/developmental inputs. We consider briefly the two major domains of temperament and personality processes with respect to the development of BPD.

Models of Personality Disorder: Moving Beyond Description of Feature Dimensions to Mechanism and Processes

Temperament and implications for BPD. The constructs emerging from the field of temperament research may have considerable utility in articulating the causes and emergence of personality disorders, particularly BPD. Within academic psychology and particularly within developmental laboratories, extensive research on temperament, and its relationship to biological systems, has matured into a rich and powerful corpus. Derived principally from the study of children, the contemporary framework for temperament provides an important new organizing scheme for the investigation of the development of personality disorders. In one view, temperament refers to individual differences in motor and emotional reactivity and self-regulation (Posner & Rothbart, 2000). Temperament arises from genetic endowment (Rothbart, Ahadi, & Evans, 2000), but temperamental systems are clearly influenced by the environment and follow a developmental course (Rothbart, 1989; Rothbart & Bates, 1998). The interaction of temperament and environment appears to be central to the development of self-control, emotional control, empathy, and social behavior (Posner & Rothbart, 2000), and one of its outcomes is adult personality and personality pathology.

Our research on BPD has been guided by a model of temperament. However, we have come to view temperament as central to the development of BPD via a different path, namely some of the theoretical conjectures offered by Kernberg (1996) with respect to temperament. Despite our different route, we have come to see the importance of the negative affect and defective self-control systems in the development of BPD.

Dominance of negative affect and affect dysregulation. Negative affect, especially hostility and aggression, with little presence of positive affect is an essential aspect in understanding the individual with BPD (Kernberg, 1984; Depue & Lenzenweger, 2001). Negative affect invades the information processing of the individual (Silbersweig, et al, 2001), and the organization of the individual's interpersonal and personal experience.

Another central feature of borderline pathology is poor self-regulation. This relative inability to self-regulate is manifested in impulsive behaviors, including impulsive self-destructive behaviors, and difficulties in the monitoring and modulation of affect. Impulsivity and/or impulsive aggression are considered to be underlying dimensions in BPD (Siever & Davis, 1991; Zanarini, 1993; Links et al., 1999). The construct of impulsivity has been defined differently in a variety of studies, involving the following elements: 1) rapid, unplanned reactions to stimuli, 2) decreased sensitivity to negative consequences of behavior, and 3) lack of regard for long-term consequences of behavior (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). BPD has been examined in several studies in relationship to impulsivity. In a stepwise multiple regression model, the impulse action score from the DIB best predicted borderline psychopathology at follow-up (Links, Heslegrave, & van Reekum, 1999). Impulsivity combined with other factors has been related to suicidal behavior in BPD patients. For example, Soloff et al () found impulsive actions, comorbid antisocial personality disorder, and depression related to a history of suicidal behavior in BPD patients. In a diagnostically mixed group of patients, aggression and impulsivity were higher in suicide attempters as

compared to those without suicide attempts (Mann, Waternaux, Haas, & Malone, 1999).

There is evidence of the link between impulsivity and underlying biological systems. Both impulsive aggression and affective instability show a stronger familial relationship than the diagnosis of BPD itself (Silverman, et al., 1991). In twins, impulsivity and affective instability are heritable (Torgersen, 1984; Torgersen et al, in press). Biological, neuroendocrine, and imaging studies provide evidence for the involvement of serotonergic activity in impulsive aggression (Coccaro et al., 1989; Siever & Trestman, 1993; Gurvits et al., 2000).

Affect dysregulation or emotional instability has been described as involving unpredictability of responses to stimuli, increased lability of baseline, unusual intensity of responses, and unusual responses (Spoont, 1996), all characteristics of a poorly constrained biobehavioral regulatory system (Mandell, Knapp, Ehlers, & Russo, 1984; Spoont, 1992). Patients with affective disorders have dysregulation of positive affectivity (Depue & Spoont, 1986; Spoont, 1992), whereas BPD patients have dysregulation of negative affect (Spoont, 1996).

The evolution of self-regulation in the developing child—the antidote to aggression, impulsivity, and affect dysregulation—is a central issue in understanding both the development of normal personality and its organization and personality pathology (Posner & Rothbart, 2000). Studies suggest that effortful control has a developmental course in which some children by age 3 are capable of using executive control systems to efficiently make choices in conflict situations, especially those involving the suppression of dominant response modes.

Identity diffusion. There is a general recognition that the developing individual evolves a sense of self that, in turn, influences the self in relation to information processing and reactions to the environment. Influenced by temperamental disposition, environmental (traumatic) events or a combination of both, a secondary level of intrapsychic organization takes place that determines the clinical syndrome of identity diffusion (Kernberg, 1996) which is reflected in the DSM-IV diagnostic criteria for BPD. Identity diffusion is characterized by a lack of integration of the concept of self and the concept of significant others. These poorly integrated conceptions of self and others are derived from an excessive splitting, often referred to as black and white thinking, or primitive dissociation between positive and negative affective investment of self and other representations, leading to the chronic deficiency in the assessment of self and self-motivations. The clinical characteristics of BPD show chronic, severe pathology of object relations and immaturity in judgments of emotional relationships, difficulties in the commitment to work or to a profession, difficulties in the commitment to intimate relations and disturbances in sexual and love life.

Attachment Recently, clinical researchers and theorists have understood fundamental aspects of BPD such as unstable, intense interpersonal relationships, feelings of emptiness, bursts of rage, chronic fears of abandonment and intolerance for aloneness, as stemming from impairments in the underlying attachment organization (Blatt, 1995; Fonagy et al., 1996; Gunderson, 1996). Fonagy developed a scale to measure Reflective Function (RF), a tool that is applied to the Adult Attachment Interview (Main et al., 1985) narratives and assesses the individuals's ability to evoke feelings, beliefs, intentions, and other psychological states in their account of current attachment experiences. Fonagy et al (1996) found that patients rated as preoccupied on the AAI were less likely to show significant change after one-year of psychotherapy and had a higher drop-out rate than patients rated as dismissing. Fonagy has also found that borderline patients with relatively higher RF fare better in treatment than those with low RF.

A Working Model of Borderline Personality Disorder and Model-based Considerations for a Study of Therapeutic Response

Our working model of BPD draws upon the temperament, neurobehavioral, and other theoretical literatures noted briefly above to include the constructs of temperament (negative affect and self-regulation or constraint or effortful control), environmental influences, and evolving conceptualization of self and significant others. We do not assume that a temperamental disposition of negative affect and poor effortful control will, of necessity, result in BPD. Rather, it is assumed that these temperamental dispositions in the context of an environment involving early separations, physical and/or sexual abuse, and/or parental neglect can lead to identity diffusion and impulsive, self-destructive behavior. We note that other neurobehavioral systems could also interact with the basic high negative affect / low control (constraint) to potentiate the expression of a BPD-prone temperament. The unique feature of this proposal in following over time both BPD patients (temperamental disposition plus the symptoms of the disorder) and non-BPD matched for temperament will enable us to disentangle the influence of temperament and the disorder.

Thus, in our investigations we assess the influence of treatment in reference to the central temperamental features of negative affect (i.e., lowered negative affect) and effortful control (i.e., increased effortful control/constraint), in addition to the changes in the BPD Axis II criteria themselves. The advantage of assessing change in these two key temperament dimensions is their close relationship to underlying neurobehavioral systems of the organism on the one hand, and their obvious impact on everyday functioning on the other. We postulate that decrease in negative affect (or change in the balance of positive and negative affect) and increase in effortful control would be features of any successful treatment of BPD patients. Focus on these variables provides a context in which we can judge the relative success of different types of psychosocial treatment. It also provides us with a highly unique opportunity to determine if there are highly specific gains that maintain or accrue with each of the three treatments. For example, there may be notable gains associated with one of the three treatments in one area of psychosocial functioning, which are themselves seen in correlation with changes in negative affect or effortful control.

Other Determinants or Modifiers of Change

It is likely that the course of patients with BPD treated extensively or sporadically, is modified in important ways by patient characteristics beyond baseline differences in the severity of negative affect and poor effortful control. For example, comorbid Axis I and Axis II disorders, personality traits and service use are likely to impact the longitudinal course of these subjects as well as the maintenance of the therapeutic gains. We do not view this reality as an undesirable aspect of this line of inquiry; rather we embrace these factors as a source of influences that are well-known to impact patient functioning over time. Failure to attend to these factors would reduce the ecological validity of our follow-along assessments during one year of treatment.

Comorbid Axis I and Axis II disorders. All models of personality disorder are, by necessity, faced with understanding the relationship between personality pathology and other major forms of psychopathology, such as affective and anxiety disorders and substance abuse (Lenzenweger & Clarkin, 1996). Both clinical practice and available research data indicate that an individual can suffer simultaneously from both a major Axis I condition and a personality disorder. This is a clinical reality typically discussed under the rubric of "comorbidity." The

comorbidity issue is laden with a number of complex questions that speak not only to description, diagnosis, and classification, but also to etiology (Clarkin & Kendall, 1992).

In our review (Lenzenweger & Clarkin, 1996), we suggested that research is needed to focus on the careful dissection of putatively highly comorbid conditions such as major depression, dysthymia (Loranger et al., 1991; Klein et al., 1993) and borderline personality disorder along a variety of meaningful dimensions such as phenomenology, familiarity, medication response, psychobiology, and pathogenesis (Gunderson & Phillips, 1991). Careful descriptions of comorbid conditions will likely enhance our understanding not only of the boundaries existing between personality pathology and other major syndromes, but also our notions regarding their relationship across time and relationship to the maintenance of treatment gains.

Jonas & Pope (1992) have reviewed studies assessing the co-morbidity of Axis II BPD and Axis I disorders. Summarizing over some 14 cross-sectional studies, these authors conclude that: 1) those with BPD have frequently been diagnosed with depressive affective disorder, 2) only a few studies, including our own (Fyer, et al, 1988) have found frequent Axis I disorders but no particular pattern, or when Axis I depression does occur it is mild (Frances, Clarkin, Gilmore, Hurt & Brown, 1984; Zanarini et al, 1989); 3) no group has found an overlap with schizophrenia. Follow-up studies of Borderline PD patients indicate that: 1) the diagnosis of BPD remains stable over time (Pope et al, 1983; McGlashan, 1983, 1987; Barasch, Frances, Hurt, Clarkin & Cohen, 1985); 2) depression occurs frequently in these patients (Pope et al, 1983). The causal connection between BPD and depression remains unclear. A review (Gunderson & Phillips, 1991) examines four hypotheses about the relationship between cluster BPD and Axis I depression. The authors conclude that family prevalence data strongly support the conclusion that Axis I depression and BPD are causally unrelated, i.e., the two disorders co-exist, but are otherwise unrelated.

Finally, overlap between the Axis II personality disorders is the rule rather than the exception, and this may reflect meaningful groupings of patients rather than simply difficulty in defining the disorders at the criterion level. Given the relatively high degree of overlap that can be found among the currently defined Axis II personality disorders, both the form of correlations among symptom dimensions and/or rates of co-occurrence of categorical diagnoses (Korfine & Lenzenweger, 1991) may be predictors of maintenance of treatment gain.

Treatment Studies

Psychotherapy is the recommended primary technique for treating BPD patients (Oldham, et al, 2001) and is the most widely practiced approach to their treatment. A recent meta-analysis (Perry et al., 1999) suggests that psychotherapy is an effective treatment for personality disorder and may be associated with up to a sevenfold faster rate of recovery in comparison with the natural history of the disorders. While findings like Perry's are encouraging, few studies have actually examined the efficacy of particular treatments for BPD patients.

In contrast to the extensive use of psychotherapy, only two treatments--a psychodynamic day hospital program and dialectical-behavioral therapy--have shown acute efficacy for treating BPD (Bateman & Fonagy, 1999; Linehan, Armstrong, Suarez, Allmon, & Heard, et al., 1991). Additionally, only the Linehan study examined outpatient psychotherapy for BPD patients, but only for that subgroup who exhibited suicidal behavior. Linehan and colleagues compared DBT with community treatment as usual (TAU) and found that compared to TAU, DBT led to a reduction in the number and severity of suicide attempts and a decrease in the length of inpatient admissions.

Among several other common and promising treatment approaches to BPD is the object relations approach based on Kernberg's clinical theorizing (Kernberg, 1984). Kernberg and his colleagues call this treatment Transference-Focused Psychotherapy (TFP; Clarkin, Yeomans, & Kernberg, 1999) because it relies principally on the techniques of clarification, confrontation and interpretation within the evolving transference relationship between the patient and the therapist. Although Kernberg's techniques are widely practiced in treating BPD, this approach has not received adequate research attention. With the assistance of an NIMH treatment development grant (John Clarkin, PI), we have provided evidence that TFP is effective using patients as their own controls (Clarkin, et al, 2001), as in comparison to a treatment-as-usual BPD group (Levy, et al., under review).

C. PROGRESS REPORT FOR 2001

Organization of Our Research Effort

Dr. Otto Kernberg is the Principle Investigator (PI) and Dr. John Clarkin is the Co-PI. We have organized our efforts around cores headed by senior investigators, as indicated in our initial site visit (April 7, 1999). Our psychotherapy study is used as a platform upon which we can recruit, assess, and provide treatment for borderline patients. Upon this basic structure, we have build a data collection procedure that provides data on pathology and neurocognitive functioning.

Dr. James Hull is head of the **Infomatics and Statistical Core**. This is a service core which recruits and evaluates patients for assignment to our various studies.

Dr. David Silbersweig is head of the **Neuroscience Core**. He coordinates the data collection on attention systems (Dr. Michael Posner), fMRI, neurocognitive functioning (Dr. Mark Lenzenweger), and cortisol functioning (Dr. Marty Altemus). Dr. Kenneth Levy, who is funded by his own NIMH F award, is also a key figure in recruiting and assessing non-borderline subjects to participate in our research as temperamental controls and normal controls.

Dr. Otto Kernberg and Dr. John Clarkin are heads of the **Treatment Core**. They meet on a regular basis with the heads of the three treatment programs (DBT, Dr. Barbara Stanley; TFP, Dr. Frank Yeomans; Supportive treatment, Dr. Anne Appelbaum; Psychopharmacology, Dr. Judit Gordon-Lendvay).

Sample and Methods

Patients. The BPD patients have been recruited from the New York City and Westchester County areas, referred by private practitioners, clinics, family members and self-referred. These are males and females between the ages of 18 and 50. Based on our data to date, the sample will be weighted toward females. The patients are 11.5% Hispanic, 9.8% African American, 3.7% Asian, and 3.3% mixed, and the remainder Caucasian.

Patients with comorbid schizophrenia, schizoaffective disorder, bipolar disorder, delusional disorder, and/or delirium, dementia, and amnesic and other cognitive disorders are excluded because of the influence of brain pathology and thought disorder on the ability to provide meaningful self-report data. The exclusion of psychotic patients from a study of personality disorder is a common research standard at many centers and allows for a "cleaner window" on personality pathology. We include patients with other comorbid Axis I disorders, as issues of

comorbidity across time with these Axis I disorders is a focus of investigation. In order to foster subject retention over the duration of the study, we will recruit patients who live within a 50 mile radius of the study site.

Temperament-matched Controls. We have begun to recruit and will continue to recruit non-BPD comparison subjects from local universities and their adult education programs. These individuals are characterized by the absence of the diagnosis of BPD and the presence of temperament aspects of high negative affect and low effortful control as measured on the ATQ, similar to the BPD patients.

These individuals have temperamental aspects of negative affect, and low effortful control, but do not have the diagnosis of BPD. We know from current data that many of these individuals do have sub-threshold BPD, i.e., have one or several of the criteria. This contrast group provides a comparison to a group of people who have similar biology and psychological features to the BPD patients, but do not have the disorder. One might raise the question as to whether or not the temperamental controls might become BPD with time. This is possible, but in general, seems unlikely because they are beyond the typical age of onset of the disorder.

Preliminary Data

Neuroscience Core

Temperament and temperamental controls. To date, we have assessed over 600 subjects with the ATQ and the IPDE screener. Of that total group, 10% have been identified as similar to BPD patients on temperamental aspects of negative affect and effortful control. By the use of a group of non-BPD individuals with the temperamental characteristics of negative affect and low effortful control, we hope to disentangle the influence of the disorder from the influence of temperament on clinical course during the period of investigation.

We have assessed the temperament of the patients and non-patient control groups with the Adult Temperament Questionnaire (ATQ). As hypothesized, we have found BPD patients to be characterized by negative affect and low effortful control on this instrument. In comparison to non-BPD controls, BPD patients have significantly higher negative affect ($t=12.77$; $p<.001$) and significantly lower positive affect ($t=-3.12$; $p<.003$). As hypothesized, BPD subjects scored significantly lower on overall effortful control ($t= -6.47$; $p<.001$), as well as on the subscales of activation control ($t= -6.16$; $p<.001$), inhibitory control ($t= -4.20$; $p<.001$), and attentional control ($t= -5.39$; $p<.001$).

A preliminary cluster analysis was carried out using 44 BPD patients who had completed the Adult Temperament Questionnaire (ATQ). K-means clustering was based on the three subscales of Effortful Control (Activation Control, Inhibitory Control, Attentional Control), with three clusters specified in advance. Cluster I ($n=17$) consisted of subjects high in all three subscales of Effortful Control, while Cluster III ($n=17$) contained subjects low on all of these scales. By contrast, Cluster II ($n=10$) contained subjects low on Attentional Control, moderate on Inhibitory Control, and high on Activation Control.

Once these clusters had been established, profile analyses were used to identify differences among clusters in the areas of Symptomatology, Interpersonal Problems, Moral Functioning and Personality Organization. Symptomatology was investigated using four scales of the Brief Symptom Inventory (Depression, Anxiety, Hostility and Psychoticism). Significant level differences between clusters were observed ($p<.01$), accounted for by increased Anxiety

($p < .01$) and Psychoticism ($p < .01$) in Cluster III patients. Cluster II patients had levels of Psychoticism midway between Clusters I and III on these scales. In the area of Interpersonal Problems significant level differences also were observed ($p < .01$), accounted for by increased Alienation in Cluster III subjects. Shape differences among clusters were significant for Moral Functioning ($p < .05$), with the most pronounced difference being increased Coldheartedness in Cluster I patients. Shape differences were observed in the area of Personality Organization ($p < .02$), accounted for by significant differences between clusters on Identity Diffusion ($p < .01$) and Primitive Defenses ($p < .01$). In both cases, Cluster III showed the highest level of difficulties, followed by Cluster II, with Cluster I patients reporting the least problems in these areas. These findings are consistent with the relationship between low effortful control, and negative affect, poor development of conscience, and poor social skills found in developmental studies (Posner & Rothbart, 2000).

We hypothesize that these attentional functions have direct relevance to treatment compliance and response, and activities of everyday living. For example, in our sample of BPD patients there is a positive and significant correlation between inhibitory control and work function. We will examine the impact of effortful control as a predictor of treatment response and as a mediating variable in treatment.

Neuocognitive Functioning. We have preliminary data from the Attention Network Task (ANT), ATQ, comparing borderline patients, temperamental controls (non-borderlines with negative affect and low effortful control), and controls that are not similar to borderlines in terms of temperament.

We have preliminary data from neuroimaging (fMRI) comparing borderline patients with control subjects. Patients and controls were studied with 3T GE echo-planer fMRI and a block-design, emotional language go-no go task. The task incorporates matched sets of visually presented negative-borderline, neutral and positive words, and requires a button-press response or a response inhibition depending upon font-related cues. Within scanner reaction time and accuracy data were analyzed by Wilcoxon rank-sum one tail testing. fMRI data were reconstructed, processed, and analyzed with linear mixed-effects models in the context of statistical parametric mapping (SPM 99).

Borderline patients had increased reaction times, especially to emotional words (negative vs. neutral words: $p = .0014$; positive vs. neutral words: $p = .017$). Patients had a trend of more errors during non-go trials, especially with negative valence words. IN the no-go condition, patients had decreased activation in dorsolateral prefrontal ($p < .01$), right lateral orbitofrontal ($p < .05$), and striatal ($p < .01$) regions compared with control subjects. In the go condition, patients but not controls had increased right amygdalar activity with negative words ($p < .05$), and patients had increased right amygdalar activity compared with control subjects even with neutral words ($p < .01$). These preliminary behavioral and neuroimaging findings suggest plausible neural substrates associated with decreased inhibition and increased emotional responses, particularly to negative emotional stimuli, in BPD patients. This suggests that the current paradigm is suited to test for changes during a one year outpatient treatment.

In year 3 we will continue to assess patients prior to treatment with the Attention Network Task (ATQ), and fMRI, along with controls and temperamental controls. In year 3 we will begin to assess patients a second time following one year of treatment with the ANT and the fMRI. With Dr. Marty Altemus as the study director, we have collected some data, in coordination with Dr. Bruce McEwen at Rockefeller, on non-medicated borderlines on cortisol functioning. However, in year 3 this data collection will continue

but without funding from the BPDRF grant, as we have obtained funding for this work elsewhere.

Treatment Core

Attachment patterns. We have administered the Adult Attachment Interview (AAI) to all borderline patients in the treatment study. We have also given the AAI to 40 nonclinic individuals, 20 of whom are matched with borderlines temperamentally with negative affect and low effortful control. The categories of adult attachment and related dimensional scores are being used as prognostic variables in the treatment study, and as covariates in the fMRI studies.

Personality Features. We have utilized the Multidimensional Personality Questionnaire (MPQ) to obtain measures of positive and negative affect and control factors such as constraint in BPD patients. On the MPQ the mean of our sample of BPD patients analyzed to date (N=61) was below that of the normative sample on well-being ($z = -2.15$), but above the normative sample on stress reaction ($z = 1.27$) and alienation ($z = 1.08$). As predicted, positive affect was on average low ($z = -1.01$) while negative affect was high ($z = 1.04$) compared to the normative group.

Preliminary Results of the Treatment Trial. Patients are randomized to one of the three treatment conditions for one-year outpatient treatment. Two treatments, a cognitive-behavioral treatment called DBT (Linehan, 1993), and a psychodynamic treatment called TFP (Clarkin, Yeomans, & Kernberg, 1999), have received preliminary empirical support for their effectiveness. The mechanisms of change in these two treatments are conceived in very different ways. DBT is hypothesized to operate through the learning of emotion regulation skills in the validating environment of the treatment (Linehan, 1993). TFP is hypothesized to operate through the integration of conflicting, affect laden conceptions of self and others via the understanding of these conflicts as they are actualized in the here-and-now relationship with the therapist. A third treatment, supportive treatment (Rockland, 1992), is used in contrast to these two active treatments as a control for attention and support.

Therapists in each of the three treatment conditions were selected based on prior demonstration of competence in the treatment. In order to ensure on-going therapist adherence and competence, all treatments are supervised on a weekly basis by experts in each treatment. Barbara Stanley, Ph.D., an acknowledged expert in DBT and NIMH funded researcher in this area, is the supervisor for DBT. Otto Kernberg, a psychoanalyst of international stature, is the supervisor of TFP. Ann Appelbaum, expert therapist, is supervisor of the supportive treatment.

This treatment study of BPD patients is unique and goes beyond all existing treatment studies in a number of ways: 1) this is the first BPD treatment study to include males, 2) includes not only borderlines with suicidal behavior, but all who meet the diagnosis, 3) first study to compare two forms of active treatment to a supportive treatment, 3) therapists are not located at a university clinic or hospital but located in the community, 4) medication is carefully delivered, when needed, by medication algorithm; patients with and without medication provide a contrast in the data analysis.

As the treatment of most of our subjects is still in progress, we have not examined the data at this point for differential treatment effects. However, we have examined changes across 32 patients who had completed four month assessments (i.e., following 4 months of treatment) as

of November 1, 2001. We carried out preliminary data analyses focused on change in patient functioning over the period from baseline to four months. Change from baseline to four months was assessed using paired-comparison t-tests, while possible effects of medication were assessed through linear regression models using four month scores as the dependent variable, and baseline scores and whether or not the subject was on medication as predictors.

Patients' overall level of functioning improved significantly, as reflected on the GAF ($p < .02$). There were consistent decreases in patients' anger and aggression. On the OASM decreases were significant for Total Score ($p < .00$), Aggression ($p < .01$) and Irritability ($p < .05$). They approached significance for Suicidality ($p < .08$). Significant differences also were observed on the AIAQ for Irritability ($p < .03$), Anger ($p < .01$) and Verbal Assault ($p < .05$). However, change in the AIAQ areas of Direct and Indirect Assault was not significant. On the STAXI significant decreases in State Anger ($p < .02$), Trait Anger ($p < .05$) and Anger-Out ($p < .03$) were observed. The STAXI areas of Angry Temperament, Angry Reaction and Anger-In did change. Levels of impulsivity did not change significantly, as assessed by the Barrett Impulsiveness Scale. This was true for the subscales of Activity Level, Careful Planning and Future Orientation & Stability. Psychiatric Symptom decrease was significant in some areas and not in others. Significant change was observed in the areas of Depression ($p < .01$) and Hostility ($p < .01$), while decreases in Interpersonal Sensitivity ($p < .08$), Anxiety ($p < .06$), Psychoticism ($p < .07$) and Global Severity ($p < .08$) approached significance. Changes in Somatization, Obsessive Compulsiveness, Phobia and Paranoia were not significant.

There was little evidence that observed changes were associated with the presence of medication. The only suggestive evidence occurred on the subscales of the Barrett Impulsiveness Scale, where Activity Level and Attention ($p < .03$) and Careful Planning ($p < .02$) showed some medication effects. However, since the overall level of change on these scales was not significant, the potential role of medication in altering impulsivity remains unclear.

In year 3, we will continue the data collection in the studies listed above. We will continue to recruit and evaluate patients for diagnosis (Axis I and Axis II), phenotypic features (aggression, impulsivity), temperament, and attachment. We will continue to finish one year of treatment for those patients recruited and randomized in year 2. We will continue to randomize patients to the treatment study.

Applications for Other Funding Sources

One indication of utilization of the BPDRF funding is the extent to which this data source stimulates research applications with other agencies and foundations. An important element in this progress report is, therefore, an indication of the additional funding sources that we are applying for and have obtained.

Active grants:

- 1) Kenneth Levy has obtained an NIMH F award with the focus on examining the changes in attachment representations as a function of psychotherapy for borderline patients.
- 2) Kenneth Levy has just obtained a NARSAD two year award to examine the neurocognitive underpinnings of attachment organization of patients with BPD.
- 3) Dr. Gary Brendel has obtained a research fellowship funded by the Readers Digest Foundation to investigate the relationship of quality of interpersonal relations and fMRI findings in borderline patients assessed in the BPDRF study.
- 4) Dr. Eric Fertuck, with the mentorship of Dr. John Clarkin, has obtained a Glass Fellowship that will allow him to spend 50% effort on neurocognitive functioning of borderline patients.

Grants under review:

- 5) With Kenneth Levy as the PI and John F. Clarkin, Marty Altemus and Michael Posner as the co-investigators, we have responded to an NIMH request for applications (RFA) with a protocol "Social Cognition and Stress Reactivity in BPD." This study would examine the relationship between social cognition and stress reactivity. Additionally, it is planned to tie findings from this study to brain functioning.
- 6) With John F. Clarkin as the PI, and Kenneth Levy and Mark Lenzenweger as the Co-PIs, we have applied for an NIMH RO-1 award to follow the patients treated in our study for two years following the completion of the one year of treatment.

Grants in preparation:

- 7) David Silbersweig is in the planning stages of an RO-1 application to NIMH to further the investigation of neurocognitive functioning in borderline patients.

References

American Psychiatric Association (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author.

Baltes, P. & Nesselroade, J. (1973). The developmental analysis of individual differences on multiple measures. In J. Nesselroade & H. Reese (Eds.), Life-span developmental psychology: Methodological issues. New York: Academic Press.

Baltes, P. et al. (1977). Life-span developmental psychology: Introduction to research methods. Monterey, CA: Brooks/Cole.

Barasch, A., Frances, A., Hurt, S., Clarkin, J., & Cohen, S. (1985). Stability and distinctness of borderline personality disorder. American Journal of Psychiatry, 142(12), 1484-1486.

Barratt, E.S., & Stanford, M.S. (1995). Impulsiveness. In: Personality Characteristics of the Personality Disordered Client, (Ed.) Costello, C.G. New York: Wiley, pp 91-118.

Bateman, A. & Fonagy, P. (1999). Effectiveness of partial hospitalization in the treatment of borderline personality disorder: A randomized controlled trial. American Journal of Psychiatry, 156, 1563-1569.

Bennun, I. & Simpson, D. (1992). Who uses community mental health centres? A study of one health district. Journal of Community and Applied Social Psychology, 2, 209-215.

Bentler, P. (1980). Multivariate analysis with latent variables: Causal modeling. Annual Review of Psychology, 31, 419-456.

Bentler, P. (1984). Structural equation models in longitudinal research. In S. Mednick et al. (Eds.), Handbook of longitudinal research. New York: Praeger.

Bongar, B., Peterson, L.G., Golann, S., & Hardiman, J.J. (1990). Self-mutilation and the chronically suicidal patient: An examination of the frequent visitor to the psychiatric emergency room. Annals of Clinical Psychiatry, 2, 217-222.

Blatt, S. J. (1995). Representational structures in psychopathology. In D. Cicchetti & S. Toth (Eds.), Rochester Symposium on Developmental Psychopathology, Vol. 6: Emotion, Cognition and Representation (pp. 1-33). Rochester, NY: University of Rochester Press.

Clarkin, J.F., Foelsch, P.A., Levy, K.N., Hull, J.W., Delaney, J.C., & Kernberg, O. F. (2001). The development of a psychodynamic treatment for patients with borderline personality disorder: A preliminary study of behavioral change. Journal of Personality Disorders, 15, 487-495.

Clarkin, J.F., Friedman, R.C., Hurt, S.W., Corn, R., & Aronoff, M. (1984). Affective and character pathology of suicidal adolescent and young adult inpatients. Journal of Clinical Psychiatry, 45, 19-22.

Clarkin, J.F., Hull, J.W., Cantor, J., & Sanderson, C. (1993). Borderline personality disorder and personality traits: A comparison of SCID-II BPD and NEO-PI. Psychological Assessment, 5(4), 472-476.

Clarkin, J.F., Hull, J.W., & Hurt, S.W. (1993). Factor structure of borderline personality disorder criteria. Journal of Personality Disorders, 7, 137-143.

Clarkin, J.F., Hull, J.W., Yeomans, F., Kakuma, T., & Cantor, J. (1994). Antisocial traits as modifiers of treatment response in borderline patients. Journal of Psychotherapy Practice and Research, 3, 307-312.

Clarkin, J.F. & Kendall, P. (1992). Comorbidity and treatment planning: Summary and future directions. Journal of Consulting and Clinical Psychology, 60, 904-908.

Clarkin, J.F., Yeomans, F., & Kernberg, O.F. (1999). Psychotherapy of borderline personality. New York: Wiley.

Clarkin, J.F., Widiger, T., Frances, A., Hurt, S.W., & Gilmore, M. (1983). Prototypic topology and the borderline personality disorder. Journal of Abnormal Psychology, 92, 263-275.

Cloninger, C.R. (1987). A systematic method for clinical description and classification of personality variants: A proposal. Archives of General Psychiatry, 44, 573-588.

Coccaro, E.F., Siever, L.J., Lkar, H., Maurer, G., Cochrane, K., Cooper, T.B., Mohs, R.C., Davis, K.L. (1989). Serotonergic studies in patients with affective and personality disorders: Correlates with suicidal impulsive aggressive behavior. Archives of General Psychiatry, 46, 587-599.

Coccaro, E.F., Harvey, P.D., Kupsaw-Lawrence, E., et al. (1991). Development of neuropharmacologically based behavioral assessments of impulsive aggressive behavior. Journal of Neuropsychiatry and Clinical Neuroscience, 3, S44-S51.

Collins, L., & Horn, J. (Eds.), (1991). Best methods for the analysis of change: Recent advances, unanswered questions, future directions. Washington DC: American Psychological Association.

Costa, P. & McCrae, R. (1988). Personality in adulthood: A six-year longitudinal study of self-reports and spouse ratings on the NEO personality inventory. Journal of Personality and Social Psychology, 54, 853-863.

Cowdry, R.W., Pickar, D., & Davies, R. (1985). Symptoms and EEG findings in the borderline syndrome. International Journal of Psychiatry in Medicine, 15, 201-211.

Depue, R.A., & Lenzenweger, M.F. (2001). A neurobehavioral dimensional model. In Livesley, W.J. (Ed.), Handbook of personality disorders: Theory, research, and treatment (pp. 136-176). New York: Guilford.

Depue, R.A., & Spont, M.R. (1986). Conceptualizing a serotonin trait: A behavioral dimension of constraint. Annals of the New York Academy of Sciences, 487, 47-62.

Derogatis, L.R. (1993). Brief Symptom Inventory (BSI): Administration, Scoring, and Procedures Manual, Third Edition. Minneapolis, MN, National Computer Systems.

First, M.B., Gibbon, M., Spitzer, R.L., & Williams, J.B.W. (1996). User's Guide for the Structured Clinical Interview for DSM-IV Axis I--Research Version (SCID-1, Version 2.0, February 1996, Final Version)

Fonagy, P., Leigh, T., Steele, M., Steele, H., Kennedy, R., Mattoon, G., Target, M. & Gerber, A. (1996). The relation of attachment status, psychiatric classification and response to psychotherapy. Journal of Consulting and Clinical Psychology, 64, 22-31.

Frances, A., Clarkin, J.F., Gilmore, M., Hurt, S.W., & Brown, R. (1984). Reliability of criteria for borderline personality disorder: A comparison of DSM-III and the Diagnostic Interview for Borderline patients. American Journal of Psychiatry, 141(9), 1080-1084.

Friedman, R.C., Aronoff, M., Clarkin, J.F., Corn, R., & Hurt, S.W. (1983). History of suicidal behavior in depressed borderline inpatients. American Journal of Psychiatry, 140, 1023-1026.

Fyer, M.R., Frances, A.J., Sullivan, T., Hurt, S.W., & Clarkin, J.F. (1988). Comorbidity of borderline personality disorder. Archives of General Psychiatry, 45, 348-352.

Fyer, M.R., Frances, A.J., Sullivan, T., Hurt, S.W., & Clarkin, J.F. (1988). Suicide attempts in patients with borderline personality disorder. American Journal of Psychiatry, 145(6), 737-739.

Goldstein, H. (1995). Multilevel statistical models. Halstead Press.

Grinker, R.R., Werble, B., & Drye, R.C. (1968). The borderline syndrome: A behavioral study of ego-functions. New York: Basic Books.

Grove, W.M. & Tellegen, A. (1991). Problems in the classification of personality disorders. Journal of Personality Disorders, 5, 31-41.

Gunderson, J.G. & Phillips, K.A. (1991). A current view of the interface between borderline personality disorder and depression. American Journal of Psychiatry, 148(8), 967-975.

Gurvits, I.G., Koenigsberg, H.W., Siever, L.J. (2000). Neurotransmitter dysfunction in patients with borderline personality disorder. In Borderline Personality Disorder. Edited by Joel Paris, M.D. The Psychiatric Clinics of North America, W.B. Saunders Company, Philadelphia, PA, Volume 23(1), 27-40.

Hoermann, S., Clarkin, J.F., Levy, K., & Hull, J. Temperamental variables: An approach to borderline heterogeneity. Manuscript under review.

Hull, J.W., Clarkin, J.F., & Kakuma, T. (1993). Treatment response of borderline inpatients: A growth curve analysis. Journal of Nervous and Mental Disease, 181(8), 503-508.

Hull, J.W., Yeomans, F., Clarkin, J.F., Li, C., & Goodman, G. (1996). Factors associated with multiple hospitalizations of patients with borderline personality disorder. Psychiatric Services, 47(6)3, 638-641.

Hurt, S.W., & Clarkin, J.F. (1990). Borderline personality disorder: Prototypic topology and the development of treatment manuals. Psychiatric Annals, 20(1), 1-6.

Hurt, S.W., Clarkin, J.F., Frances, A., Abrams, R., & Hunt, H. (1985). Discriminate validity of the MMPI for borderline personality disorder. Journal of Personality Assessment, 49, 56-61.

Hurt, S.W., Clarkin, J.F., Koenigsberg, H.W., Frances, A., & Nurnberg, N. (1986). The Diagnostic Interview for Borderlines: Psychometric properties and validity. Journal of Consulting and Clinical Psychology, 54, 256-260.

Hurt, S.W., Haler, S., Frances, A., Clarkin, J.F., & Brent, R. (1984). Assessing borderline personality disorder with self-report, clinical interview, or semistructured interview. American Journal of Psychiatry, 141(10), 1228-1231.

Jonas, J.M., & Pope, H.G. (1992). Axis I comorbidity of borderline personality disorder: Clinical implications. In: J.F. Clarkin, E. Marziali, & H. Munroe-Blum (Eds.), Borderline personality disorder: Clinical and empirical perspectives. New York: Guilford Press.

Joreskog, K. (1979). Statistical estimation of structural equations in longitudinal - developmental investigations. In J. Nesselroade & P. Baltes (Eds.), Longitudinal research in the study of behavior and development. New York: Academic Press.

Kagan, J. (1980). Perspectives on continuity. In O. Brim & J. Kagan (Eds.), Constancy and change in human development. Cambridge, MA: Harvard.

Kass, F., Skodol, A., Charles, E., Spitzer, R., Williams, J. (1985). Scaled ratings of DSM-III personality disorders. American Journal of Psychiatry, 142: 627-630.

Kernberg, O.F. (1984). Severe personality disorders: Psychotherapeutic strategies. New Haven, Yale University Press.

Kjernberg, O. F., Selzer, M. A., Koenigsberg, H. W., et al., (1989). Psychodynamic psychotherapy of borderline patients. New York: Basic Books.

Kernberg, O.F. (1996). A psychoanalytic theory of personality disorders. In: J.F. Clarkin & M. F. Lenzenweger (Eds.), Major theories of personality disorder. New York: Guilford, pp. 106-140.

- Kernberg, O.F. & Clarkin, J.F. (1993). Developing a disorder--specific manual: The treatment of borderline character disorder. In N.E. Miller, L. Luborsky, J.P. Barber, & J.P. Docherty (Eds.), Psychodynamic treatment research. New York: Basic Books.
- Kessler, R. & Greenberg, D. (1981). Linear panel analysis: Models of quantitative change. New York: Academic Press.
- Klein, M.H., Wonderlich, S., & Shea, M.T. (1993). Models of relationships between personality and depression: Toward a framework for theory and research. In: M.H. Klein, D.J. Kupfer, & M.T. Shea (Eds.), Personality and depression: A current view. New York, Guilford Press, pp. 1-54.
- Korfine, L., & Lenzenweger, M.F. (1991, December). The classification of DSM-III-R Axis II personality disorders: A meta-analysis. Presented at the 6th annual meeting of the Society for Research in Psychopathology, Harvard University, Cambridge, MA.
- Krueger, R.F., Caspi, A., Moffitt, T.E., Silva, P.A., & McGee, R. (1996). Personality traits are differentially linked to mental disorders: A multitrait-multidiagnosis study of an adolescent birth cohort. Journal of Abnormal Psychology, 105, 299-312.
- Krupnick, J.L., & Pincus, H.A. (1992). The cost-effectiveness of psychotherapy: A plan for research. American Journal of Psychiatry, 149, 1295-1305.
- Lenzenweger, M.F. (1989). Longitudinal study of personality disorders. Funded R29 Grant Application MH45448. Public Health Service, National Institute of Mental Health.
- Lenzenweger, M.F. (1999). Stability and change in personality disorder features: The Longitudinal Study of Personality Disorders. Archives of General Psychiatry, 56, 1009-1015.
- Lenzenweger, M.F., Clarkin, J.F., Kernberg, O.F., & Foelsch, P. (2001). The Inventory of Personality Organization: Psychometric properties, factorial composition and criterion relations with affect, aggressive dyscontrol, psychosis-proneness, and self domains. Psychological Assessment, 4, 577-591.
- Lenzenweger, M.F., & Clarkin, J.F. (1996). The personality disorders: history, classification, and research issues. In J.F. Clarkin & M.F. Lenzenweger (Eds.), Major theories of personality disorder (pp. 1-35). New York: Guilford.
- Lenzenweger, M.F., Loranger, A.W., Korfine, L., & Neff, C. (1997). Detecting personality disorders in a nonclinical population: Application of a two-stage procedure for case identification. Archives of General Psychiatry.
- Linehan, M.M. (1987). Treatment History Interview (THI). Seattle: University of Washington.
- Linehan, M.M. (1993). Cognitive-Behavioral Treatment of Borderline Personality Disorder. New York: Guilford
- Linehan, M.M., Armstrong, H.E., Suarez, A., Allmon, D. & Heard, H. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. Archives of general Psychiatry, 48, 1060-1064.
- Linehan, M.M., Heard, H.L., & Armstrong, H.E. (1993). Naturalistic follow-up of a behavioral treatment for chronically parasuicidal borderline patients. Archives of General Psychiatry, 50, 971-974.
- Livesley, W.J. (1991). Classifying personality disorders: Ideal types, prototypes, or dimensions. Journal of Personality Disorders, 5, 52-59.
- Links, P.S., Heslegrave, R., van Reekum, R. (1998). Prospective follow-up study of borderline personality disorder: prognosis, prediction of outcome, and axis II comorbidity. Canadian Journal of Psychiatry, 43, 365-270.
- Links, P.S., Heslegrave, R., van Reekum, R. (1999). Impulsivity: core aspect of borderline personality disorder. Journal of Personality Disorders, 13, 1-9.
- Links, P.S., Mitton, J.E., Steiner, M. (1993). Stability of borderline personality disorder. Canadian Journal of Psychiatry, 38, 255-259.

Loranger, A.W. et al. (Eds.) (1996). Assessment and Diagnosis of Personality Disorders: The International Personality Disorder Examination (IPDE). New York, Cambridge University Press.

Loranger, A.W. et al., (1994). The International Personality Disorder Examination (IPDE). The World Health Organization/Alcohol, Drug Abuse, and Mental Health Administration International Pilot Study of Personality Disorders. Archives of General Psychiatry, *51*, 215-224.

Loranger, A.W. (1990). The impact of DSM-III on diagnostic practice in a university hospital: A comparison of DSM-II and DSM-III in 10,914 patients. Archives of General Psychiatry, *47*(July), 672-675.

Loranger, A.W. (1999). International Personality Disorder Examination (IPDE) manual. Odessa, FL: Psychological Assessment Resources, Inc.

Loranger, A.W. et al. (1987a). The Personality Disorder Examination: A preliminary report. Journal of Personality Disorders, *1*, 1-13.

Loranger, A.W. et al. (1987b). An update on the Personality Disorder Examination. Paper presented at the annual meeting of the American Psychiatric Association, Chicago.

Loranger, A.W., Lenzenweger, M.F., Gartner, A.F., Susman, V.L., Herzig, J., Zammit, G.K., Gartner, J.D., Abrams, R.C., & Young, R.C. (1991). Trait-state artifacts and the diagnosis of personality disorders. Archives of General Psychiatry, *48*, 720-728.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), Growing points in attachment theory and research. Monographs of the Society for Research in Child Development, *50*, 66-104.

Mandell, A., Knapp, S., Ehlers, C., & Russo, P.V. (1984). The stability of constrained randomness: Lithium prophylaxis at several neurobiological levels. In R. Post & J.C. Ballenger (Eds.), Neurobiology of mood disorders (pp. 744-776). Baltimore, MD: Williams & Williams.

Mann, J.J., Waternaux, C., Haas, G.L., Malone, K.M. (1999). Toward a clinical model of suicidal behavior in psychiatric patients. American Journal of Psychiatry, *156*, 181-189.

McGlashan, T.H. (1985). Prediction of outcome in BPD. In: McGlashan, T.H., editor. The Borderline: Current Empirical Research. Washington, D.C. American Psychiatric Press, 61-98.

McGlashan, T.H. (1986). The Chestnut Lodge follow-up study: III. Long-term outcome of borderline personalities. Archives of General Psychiatry, *43*, 20-30.

McGlashan, T.H. (1987). Borderline personality disorder and unipolar affective disorder. Long-term effects of comorbidity. Journal of Nervous Mental Disorder, *175*: 467-473.

McGlashan, T.H. (1992). The longitudinal profile of BPD: contributions from The Chestnut Lodge Follow-Up Study. In: Silver D., Rosenbluth, M., editors. Handbook of the Borderline Diagnosis. International University Press. _____

Miller, M.A., & Rahe, R.H. (1997). Life changes scaling for the 1990s. Journal of Psychosomatic Research, *43*, 279-292.

Moeller, F.G., Barratt, E.S., Dougherty, D.M., Schmitz, J.M., & Swann, A.C. (2001). Psychiatric aspects of impulsivity. American Journal of Psychiatry, *158*, 1783-1793.

Mortimer, J. et al. (1982). Persistence and change in development: The multidimensional self-concept. In P. Baltes & O. Brim (Eds.), Life-span development and behavior (Vol. 4). New York:Academic Press.

Mueller, T., Keller, M.B., Leon, A., Solomon, D., Shea, M.T., Coryell, W., & Endicott, J. (1996). Recovery after 5 years of unremitting major depressive disorder. Archives of General Psychiatry, *53*, 794-799.

Nagin, D.S. (1999). Analyzing developmental trajectories: A semiparametric, group-based approach. Psychological Methods, *4*, 139-157.

Nagin, D.S., & Tremblay, R.E. (2001). Analyzing developmental trajectories of distinct but related behaviors: A group-based method. Psychological Methods, 6, 18-34.

Nesselroade, J. & Baltes, P. (1974). Adolescent personality development and historical change:1970-1972. Monographs of the Society for Research in Child Development, 39(1), Whole No. 154).

Nesselroade, J. & Baltes, P. (1979). Longitudinal research in the study of behavior and development. New York: Academic Press.

Nesselroade, J. & Baltes, P. (1984). From traditional analysis to structural causal modeling in developmental research. In V. Sarris & A. Parducci (Eds.), Perspectives in psychological experimentation: Toward the year 2000. Hillsdale, NJ: Erlbaum.

Nesselroade, J., et al. (1980). Regression toward the mean and the study of change. Psychological Bulletin, 88, 622-637.

Nurnberg, H.G., Raskin, M., Levine, P.E., Pollack, S., Siegel, O., Prince, R. (1991). The comorbidity of borderline personality disorder and other DSM-III-R Axis II personality disorders. American Journal of Psychiatry, 148: 1371-1377.

Oldham, J.M., Gabbard, G.O., Goin, M.K., Gunderson, J., Soloff, P., Spiegel, D., Stone, M., & Phillips, K.A. (2001). Practice guideline for the treatment of patients with borderline disorder. Supplement to American Journal of Psychiatry, 158, 1-52.

Paris, J. (2000). The classification of personality disorders should be rooted in biology. Journal of Personality Disorders,14, 127-136.

Perry, J.C. (1993). Longitudinal studies of personality disorders. Journal of Personality Disorders, 7(Suppl.Spring), 63-85.

Pope, H.G., Jr., Jonas, J.M., Hudson, J.L., Cohen, B.M., Gunderson, J.G. (1983): The validity of the DSM-III borderline personality disorder: a phenomenologic, family history, treatment, and long-term follow-up study. Archives of General Psychiatry, 40: 23-30

Posner, M.I., & Rothbart, M.K. (2000). Developing mechanisms of self-regulation. Development and psychopathology, 12, 427-441.

Raudenbush, S., & Bryk, A. (2001). Hierarchical linear models (2nd ed). Thousand Oaks, CA: Sage Publications.

Robins, L. (1966). Deviant children grown up. Baltimore: Williams & Wilkins.

Robins, L. (1978). Sturdy childhood predictors of adult antisocial behavior: Replications from longitudinal studies. Psychological Medicine, 8, 611-622.

Rockland, L. (1992). Supportive therapy for borderline patients. New York: Guilford.

Rogosa, D. (1979). Causal models in longitudinal research: Rationale, formulation, and interpretation. In J. Nesselroade & P. Baltes (Eds.), Longitudinal research in the study of behavior and development. New York: Academic Press.

Rogosa, D. (1988). Myths about longitudinal research. In K. Shaie, R. Campbell, W. Meredith, & S. Rawling (Eds.), Methodological issues in aging research (pp. 171-209). New York: Springer.

Rothbart, M.K. (1989). Temperament and development. In G.A. Kohnstamm, J.E. Bates, & M.K. Rothbart (Eds.), Temperament in childhood. (pp. 187-247). New York: Wiley.

Rothbart, M.K., Ahadi, S.A., & Evans, D.E. (2000). Temperament and personality: Origins and outcomes. Journal of Personality and Social Psychology, 78, 122-135.

Rothbart, M.K., & Bates, J.E. (1998). Temperament. In W. Damon & N. Eisenberg (Eds.), Handbook of child psychology: Vol. 3. Social emotional and personality development (5th ed., pp. 105-176). New York: Wiley.

Russ, M.J., Shearin, E.N., Clarkin, J.F., Harrison, K., & Hull, J.W. (1993). Subtypes of self-injurious patients with borderline personality disorder. American Journal of Psychiatry, 150(12), 1869-1871.

Shea, T. (1995). Interrelationships among categories of personality disorders. In W.J. Livesley (Ed.), The DSM-IV personality disorders (pp. 397-416). New York: Guilford press.

Shea, T. (1997). Core battery conference: Assessment of change. In H.H. Strupp, L.M. Horowitz, & M.J. Lambert (Eds.), Measuring patient changes in mood, anxiety, and personality disorders. Washington DC: American Psychological Assn.

Silbersweig, D.A, Pan, H., Beutel, M., Epstein, J., Goldstein, M., Thomas, K., Posner, M., Hochberg, H., Brendel, G., Yang, Y., Kerberg, O., Clarkin, J., & Stern, E. Neuroimaging of inhibitory and emotional function in borderline personality disorder. Presented at the ACNP, January, 2001.

Siever, L.J., & Davis, K.L. (1991). A psychobiological perspective on the personality disorders. American Journal of Psychiatry, 148(12), 1647-1658.

Siever, L.J., Trestman, R.L. (1993). The serotonin system and aggressive personality disorders. International Clinical Psychopharmacology. 8 Suppl. 2, 33-39.

Silk, K. R. (2000). Overview of biological factors. In J. Paris (Ed.), The Psychiatric Clinics of North America: Borderline Personality Disorder. (pp 61-75) Philadelphia: W. B., Saunders

Silverman, J.M., Pinkham, L., Horvath, T.B., Coccaro, E.F., Klar, H., Schear, S., Apter, S., Davidson, M., Mohrs, R.C., Siever, L.J. (1991). Affective and impulsive personality disorder traits in the relatives of patients with borderline personality disorder. American Journal of Psychiatry, 148, 1378-1385.

Skodol, A.E. Gunderson, J.G., Livesley, W.J., Pfohl, B. Siever, L.J., & Widger, T.A. (2000). The borderline diagnosis from the perspectives of psychopathology, comorbidity, personality structure, biology, genetics, and course. Manuscript submitted for publication.

Soloff, P.H. (1981). Affect, impulse and psychosis in borderline disorders: A validation study. Comprehensive Psychiatry, 22(3), 7-350.

Soloff, P.H. (1990). Borderline disorders. In: M.E. Thase, B.A. Edelstein & M. Hersen (Eds.), Handbook of outpatient treatment of adults (pp. 309-332). New York: Plenum.

Soloff, P.H., Lis, J.A., Kelly, T., Cornelius, J., Ulrich, R. (1994). Risk factors for suicidal behavior in borderline personality disorder. American Journal of Psychiatry, 151, 1316-1323.

Soloff, P.H., Lynch, K.G., Kelly, T.M., Malone, K.M., Mann, J.J. (2000). Characteristics of suicide attempts of patients with major depressive episode and borderline personality disorder: a comparative study. American Journal of Psychiatry, 157, 601-608.

Soloff, P. H. (2000). Psychopharmacology of borderline personality disorder. Psychiatric Clinics of North America, 23, 169_192.

Spielberger, C. (1996). State-Trait Anger Expression Inventory (STAXI) Professional Manual. Odessa, Fla.: Psychological Assessment Resources.

Spoont, M.R. (1992). Modulatory role of serotonin in neutral information processing: Implications for human psychopathology. Psychological Bulletin, 112, 330-350.

Spoont, M.R. (1996). Emotional instability. In: C.G. Costello (Ed.), Personality characteristics of the personality disordered. New York: Wiley.

Stone, M.H. (1990). The fate of borderline patients: Successful outcome and psychiatric practice. New York: Guilford.

Stone, M.H. (1993). Long-term outcome in personality disorders. British Journal of Psychiatry, 162, 299-313.

Tellegen, A. (1982). Brief manual for the Multidimensional Personality Questionnaire (MPQ). Unpublished manuscript, University of Minnesota, Minneapolis.

Tellegen, A. & Waller, N.G. (in press). Exploring personality through test construction: Development of the Multidimensional Personality Questionnaire. In S.R. Briggs & J.M. Cheek (Eds.), Personality measures: Development and evaluation. Greenwich, CT: JAI Press.

Torgersen, S. (1984). Genetic and nosological aspects of schizotypal and borderline personality disorders: a twin study. Archives of General Psychiatry, 41, 546-554.

Torgersen, S., Kringlen, E., & Cramer, V. (2001). The prevalence of personality disorders in a community sample. Archives of General Psychiatry, 58, 590-596.

- Torgersen, S., Lygren, S., Oien, P.A., Skre, I., Onstad, S., Edvardsen, J., Tambs, K., Kringlen, E. (In press). A twin study of personality disorders. Comprehensive Psychiatry.
- Trull, T. J. (2001). Structural relations between borderline personality disorder features and putative etiological correlates. Journal of Abnormal Psychology, 110, 471-481.
- Trull, T. J., Sher, K. J., Minks_Brown, C., Durbin, J., & Burr, R. (2001). Borderline personality disorder and substance use disorders: A review and integration. Clinical Psychology Review, 20, 235_253.
- Widiger, T.A., Corbitt, E.M., & Millon, T. (1992). Antisocial personality disorder: In A. Tasman & M.B. Riba (Eds.), American psychiatric press review of psychiatry, volume 11. Washington DC: American Psychiatric Press.
- Widiger, T.A., Hurt, S.W., Frances, A., Clarkin, J.F., & Gilmore, M. (1984). Diagnostic efficiency and DSM-III. Archives of General Psychiatry, 41, 1005-1012.
- Widiger, T. A., & Weissman, M. M. (1991). Epidemiology of borderline personality disorder. Hospital and Community Psychiatry, 42, 1015-1021.
- Widiger, T.A., Trull, T.J., Hurt, S.W., Clarkin, J.F., & Frances, A. (1987). A multidimensional scaling of the DSM-III personality disorders. Archives of General Psychiatry, 44, 557-563.
- Yeomans, F.E., Gutfreund, J., Selzer, M.A., Clarkin, J.F., Hull, J.W., & Smith, T.E. (1994). Factors related to drop-outs by borderline patients: Treatment contract and therapeutic alliance. Journal of Psychotherapy Practice and Research, 3(1), 16-24.
- Yeomans, F.E., Selzer, M.A., & Clarkin, J.F. (1992). Treating the borderline patient: A contract-based approach. New York: Basic Books.
- Zanarini, M.C., Gunderson, J.G., Frankenburg, F.R., Chauncey, D.L. (1989). The Revised Diagnostic Interview for Borderlines: discriminating borderline personality disorder from other Axis II disorders. Journal of Personality Disorders, 3: 10-18.
- Zanarini, M.C. (1993). BPD as an impulse spectrum disorder. In Borderline Personality Disorder: Etiology and Treatment. Edited by Joel Paris, M.D. American Psychiatric Press, Washington, D.C., 67-85.
- Zimmerman, M., Coryell, W. (1990). Diagnosing personality disorders in the community. A comparison of self-report and interview measures. Archives of General Psychiatry, 47: 527-531.

