

## The Utility of the Revised NEO Personality Inventory in an Outpatient, Drug Rehabilitation Context

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This study evaluated the psychometric properties of the Revised NEO Personality Inventory (NEO-PI-R) in a mostly African American clinical sample and determined if these qualities provided useful information about their motivational characteristics that were germane to treatment. Eighty-two men and 50 women entered a 6-week outpatient drug rehabilitation program, completed the NEO-PI-R, and received counselor ratings of personality at admission. The 99 who finished the program completed a 2nd NEO-PI-R. Counselors provided ratings of treatment responsiveness. The cross-observer, cross-method, cross-time correlations indicated that the NEO-PI-R can be a useful tool for organizing clinical information about clients.

Clinical research has demonstrated that effective treatment for substance abuse now exists for this devastating condition (Hester & Miller, 1989; Project MATCH Research Group, 1997). As such, research is now challenging our current clinical technology to address more empirically sophisticated issues. Specifically, the question remains as to who benefits from what types of treatment intervention. Despite a long history of

substance abuse research using personality measurements, little has emerged that has consistently captured a broad range of individual differences relevant to this question. The purpose of this article is to describe some of the reasons for this and to introduce the five-factor model (FFM) of personality as a potential solution to these problems. Specifically, we evaluate the utility of the Revised NEO Personality Inventory (NEO-PI-R), a measure of the FFM, in providing useful clinical information about persons with substance abuse problems and the treatments to which they are likely to respond.

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A draft of this article was presented as a poster for Division 50 at the 105th Annual Convention of the American Psychological Association, Chicago, August 1997. This study was supported in part by a grant from the Association for Spiritual, Ethical, and Religious Values in Counseling and by a junior faculty sabbatical award. We would like to acknowledge the efforts of the Cathedral House Re-Entry Project clinical staff—John Cooper, Thomas Trigg, Marilyn Clark, and Lynn Lavin—whose efforts in data collection and treatment implementation made all of this possible. Thanks are extended to John P. Allen and Robert R. McCrae for their helpful comments on a draft of this article.

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The attempt to incorporate personality characteristics in understanding substance abuse has evolved through at least three major phases. Phase 1 searched for the alcoholic or addiction-prone personality. The consensus emerged shortly that no such personality exists (Pattison, Sobell, & Sobell, 1977). Despite this conclusion, research found that persons entering treatment for alcohol- or other drug-related problems often had similar features. These included characteristics such as impulsiveness and negative affect (Cox, 1987). Phase 2, therefore, subjected these commonalities to cluster analysis with the purpose of identifying subtypes of substance abusers (Babor et al., 1992; Loberg, 1981; Morey & Blashfield, 1981; Morey, Skinner, & Blashfield, 1984; Skinner, 1982; Sutker, Brantley, & Allain, 1980). This

second phase relied heavily on findings on the Minnesota Multiphasic Personality Inventory (MMPI). Typical clusters in the case of alcohol problems included subtypes characterized predominantly by lack of impulse control and those whose patterns reflected coping with intense negative affect. Cluster analysis, therefore, confirmed the earlier distinction between primary and secondary alcoholism (loss of control drinking and drinking to cope with stress, respectively).

At the same time as investigators were reaching these restricted conclusions about personality assessment, a parallel movement in substance abuse treatment greatly expanded the range of individual differences viewed as important. These differences included the person's substance abuse pattern, social environmental factors, genetic variables, and the substance's physical-neurobiological effects. A new biopsychosocial model of substance abuse positioned traditional personality traits as one set of person variables among many that were relevant to understanding substance abuse. During this phase, treatment-outcome research pointed to the effectiveness of multiple-treatment techniques (Hester & Miller, 1989).

All these forces converged to form a Phase 3, which looked toward tailoring individual treatment through a process of matching select person variables with designated treatments to ensure optimal benefits (Beutler et al., 1993; Longabaugh, Wirtz, Beattie, Noel, & Stout, 1995). The following question succinctly describes this most recent phase: "Which kinds of individuals, with what kinds of alcohol problems, are likely to respond to what kinds of treatments by achieving which kinds of goals when delivered by which kinds of practitioners?" (Institute of Medicine, 1990, p. 143). Although intuitively appealing, this strategy remains a promise as yet unfulfilled. One-year results from the largest psychotherapy outcome study ever undertaken found no major differences among three different therapy strategies with problem drinkers (Project MATCH Research Group, 1997). Nor did any major treatment by person interaction effect occur for the 10 person variables hypothesized to have main effects.

At least one reason for the failure of treatment matching may relate to relying on assessment

instruments and models for substance abuse that sample too restrictive a range of personality. Perhaps the most widely used instrument in this area is the MMPI, and several researchers have noted that the instrument may not be ideally suited for this type of population given its initial derivation sample and its rather singular focus on psychopathology (Allen, Fertig, & Mattson, 1994; Owen & Butcher, 1980). As a result, Allen et al. (1994) have argued that traditional personality inventories may be more useful for gaining a broad-based understanding of clients. In a large clinical sample of substance-dependent men and women undergoing residential treatment, Allen et al. found several subtypes emerge from cluster analysis with the Jackson Personality Research Form (Jackson, 1974) that had clear face validity regarding treatment implications as well as concurrent validity for patterns of drug use.

Reliance on the MMPI may not reflect the field's fondness for it as much as lack of agreement on the core characteristics of personality and how to measure them. Despite the existence of numerous models, both empirical and theoretical, no major conceptual framework existed for organizing the myriad factors generated in personality research on nonclinical groups. This situation has gradually changed as theorists from varying conceptual viewpoints are reaching consensus on the utility of the FFM as representing an adequate lens for viewing the broad personality features that characterize individual differences (Digman, 1990; Goldberg, 1993; McCrae & John, 1992; Wiggins, 1996).

The FFM represents a relatively comprehensive taxonomy of individual differences. It includes the domains of Neuroticism (the tendency to experience negative affect, such as anxiety, depression, and hostility); Extraversion (the quantity and intensity of interpersonal interactions); Openness to Experience (the proactive seeking and appreciation of new experiences); Agreeableness (the quality of one's interpersonal interactions along a continuum from compassion to antagonism); and Conscientiousness (the amount of persistence, organization, and motivation in goal-directed behaviors). Because much of the variance of these dimensions has been found to be heritable (Heath, Neale, Kessler, Eaves, & Kendler,

1992), these five dimensions are not mere summary descriptions of behavior, but genotypic tendencies of individuals to think, act, and feel in consistent ways (McCrae & Costa, 1995). These five dimensions have been shown to be quite stable among normal adults and predict a wide range of relevant life outcomes, including well-being, coronary heart disease, burnout, and job success (Costa, McCrae, & Dembroski, 1989; Magnus, Diener, Fujita, & Pavot, 1993; Ormel & Wohlfarth, 1991; Piedmont, 1993; Piedmont & Weinstein, 1994). Brooner, Herbst, Schmidt, Bigelow, and Costa (1993) have illustrated the potential utility of the FFM in substance abuse assessment and treatment. In two separate studies, they found that FFM patterns of substance abuse were related to typical clinical issues in the population. These patterns related to the diagnosis of specific personality disorders and suggested strategies for clinical management and treatment.

In the present study, we explore the value of this emerging consensus on the FFM through extension to a clinical sample of mostly African American men and women. First, we evaluate the model for its basic psychometric properties related to reliability and factor structure recoverability. This process is essential given the standardization history with the FFM on non-clinical samples (Costa & McCrae, 1992b). Second, we attempt to replicate Brooner et al.'s (1993) findings to determine whether similar configurations of extreme scores emerge in a different group of substance abusers. Third, we investigate whether the scales predict relevant clinical variables. Fourth, we examine the temporal stability of personality in substance abuse through examining change over time. After extensive research with large numbers of normal persons, Costa and McCrae (1994) stated that beyond the age of 30, the features measured in the FFM are "set like plaster." This statement may require modification for clinical samples that experience extensive benefits from treatment. For example, substance abuse in its acute phase has major effects on negative affectivity, yet once removed, results in rapid psychological improvement (Owen & Butcher, 1980). Fifth, we explore whether including a broad set of personality features can indicate any relationship between treatment strategies and qualities of the individuals.

## Method

### Participants

Participants consisted of 82 men and 50 women, age 23 to 52 years ( $M = 35$ ), who were consecutive admissions to a 6-week, outpatient drug rehabilitation program between October 1993 and July 1995. Most had a high school diploma, and 84% were African American. These individuals constituted a lower socioeconomic category, and many carried dual diagnoses (most secondary diagnoses were related to affective disorders or were characterological). Most were alcohol (65%), heroin (42%), and cocaine (73%) abusers, with an average of 15 years of substance involvement (range 1 to 35 years). All members of the program were volunteers, having been recommended by local shelters and social agencies. To be accepted to the program, an individual had to be at least 30 days drug free. Any usage of substances during the program was grounds for immediate dismissal. On average, participants had been unemployed for 19 months prior (range = 1 month to over 8 years) and had their last rehab experience 4 months previous to entering the current program; on average, individuals had two previous detox experiences. Thirty-one percent were on probation at the time of entering.

Of the 132 who began the program, only 99 successfully completed (40 women and 59 men). These individuals serve to evaluate the test-retest reliability of the NEO-PI-R. Of the 33 who dropped out of the program, 8 relapsed, 9 lost interest, 1 had legal difficulties, 10 violated program rules (e.g., missed several sessions or did not comply with regimen), and the reason for leaving for the remaining 5 is unknown. The variety of reasons for leaving the program as well as the relatively small sample size in each category makes any comparison of these terminators with those who completed tenuous at best.

### Measures

**NEO-PI-R.** This 240-item questionnaire was developed by Costa and McCrae (1992b) through rational and factor analytic methods to measure the five major factors of personality: Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). For each factor, there are six facet scales, which are designed to capture more specific traits. Items are answered on a 5-point scale ranging from *strongly agree* (1) to *strongly disagree* (5), and scales are balanced to control for the effects of acquiescence. The items themselves are simple statements describing general tendencies (e.g., "It's often hard for me to make up my mind" or "I often crave excitement").

There are two forms to this measure, the self-report (Form S) and observer rating (Form R), only the self-report version was used here. Normative internal consistency estimates for the self-report scales for adults range from .59 to .92 (Costa & McCrae, 1992b). Six-year stability coefficients range from .68 to .83 in both self-reports and observer ratings for N, E, and O. Three-year retest coefficients of .63 and .79 were seen for brief versions of the A and C domain scales (Costa & McCrae, 1988). The NEO-PI-R has been validated in studies with other self-reports (Costa, McCrae, & Dye, 1991; McCrae & Costa, 1992; Piedmont & Weinstein, 1993). Scales have shown evidence of convergent and discriminant validity across instruments, methods, and observers and have been related to a number of life outcomes, including frequency of somatic complaints, ability to cope with stress, and burnout (Costa & McCrae, 1989; Piedmont, 1993). Following the convention of the manual, *T* scores above 55 are considered high, whereas *T* scores below 45 are considered low.

**Brief Symptom Inventory (BSI).** Developed by Derogatis (1993), this 53-item, self-report inventory was designed to capture psychological symptom patterns over nine primary clinically relevant dimensions and three global indexes. Each item is responded to on a 4-point Likert scale ranging from *not at all* (0) to *extremely* (4). The symptom scale includes Somatization (distress arising from perceptions of bodily dysfunction), Obsessive-Compulsive (thoughts, feelings, and actions that are experienced as unremitting and irresistible), Interpersonal Sensitivity (feelings of personal inadequacy), Depression (dysphoric mood and affect), Anxiety (nervousness, tension, panic attacks, and feelings of terror), Hostility (thoughts, feelings, and actions characteristic of anger), Phobic Anxiety (persistent fear response that is irrational and disproportionate to the stimulus, which leads to avoidance behavior), Paranoid Ideation (disordered thinking, including projective thought, hostility, suspiciousness, and grandiosity), and Psychoticism (withdrawal and isolation). There are three global scales, but only one was used in this study, the Global Severity Index, which is the sum of the nine symptom clusters divided by the total number of responses. Alpha reliabilities range from .71 for Psychoticism to .85 for Depression. Derogatis, Rickels, and Rock (1976) have shown the BSI to converge well with scores on the MMPI. Other research has shown the BSI to be useful in detecting symptomological distress in clients in a drug treatment context (Buckner & Mandell, 1990; Royse & Drude, 1984). Following guidelines provided in the manual, the scores from participants in this study were evaluated relative to norms provided for the adult nonpatient sample.

**Coping Resources Inventory (CRI).** Developed by Hammer and Marting (1988), this 60-item questionnaire attempts to identify resources currently available to individuals for managing stress. Items are responded to on a 4-point Likert scale ranging from *never or rarely* (1) to *always or almost always* (4). There are six scales: Cognitive (degree to which an individual maintains a positive sense of self-worth and an optimistic view of life in general), Social (the degree to which an individual is embedded in social networks that are able to provide support), Emotional (the degree to which an individual can accept and express a range of affect), Spiritual/Philosophical (the degree to which the actions of a person are guided by stable and consistent values derived from religious, familial, or cultural tradition), Physical (the extent to which an individual enacts health-promoting behaviors believed to contribute to increased physical well-being), and Total (the aggregated score of an individual over the previous five scales, which provides a global index of the overall number of resources an individual has available to draw on in times of stress). Alpha reliabilities for the scales are all within acceptable limits (from .71 for the Physical to .91 for Total). Scores on the CRI have been longitudinally linked to the number of physical and psychological symptoms associated with stress (Elkind, 1981). The manual provides additional validity information showing the CRI to be related to diverse outcome measures of stress and coping.

**Personal Problems Checklist for Adults (PPQ).** Developed by Schinka (1985), this 208-item checklist was designed for adults age 18 to 60. Respondents simply check those items that represent an area of distress currently being faced. Items are grouped into 13 areas: Social (e.g., being shy or not having close friends), Appearance (e.g., being overweight or having scars), Vocational (e.g., not having a job or job having no future), Family/Home (e.g., children misbehaving or not getting along with neighbors), School (e.g., getting bad grades or not having good study habits), Financial (e.g., wasting money or depending on others for financial support), Religion (e.g., feeling guilty about religion or failing to support church), Emotional (e.g., feeling anxious or uptight or being unhappy all the time), Sexual (e.g., not knowing enough about sex or disliking sex), Legal (e.g., being sued or facing criminal charges), Health/Habits (losing temper and hurting someone or having poor eating habits), Attitude (e.g., not having any interest in things or having a poor attitude toward self), and Crises (e.g., pet dying or being robbed). This instrument served as an actuarial index of the number and types of problems and/or stressors being encountered by clients in their current life.

**Adjective Checklist (ACL).** Developed by Gough and Heilbrun (1983), this measure consists of 300

adjectives from which individuals select those that are viewed as most self-descriptive. This instrument was completed by the counselors after meeting with clients for a 20–40 min preprogram interview. Counselor ratings on this instrument were scored for the dimensions of the FFM. Using a panel of experts familiar with the FFM, John (1990) created adjective marker scales for each dimension of the FFM by having these experts identify ACL items representative of each dimension. These rational judgments were supported by empirical analyses that demonstrated both the convergence of these markers with other measures of the FFM (McCrae, 1990) and with relevant scales from the ACL (Piedmont, McCrae, & Costa, 1991). These five-factor marker scales also are used in this study. Scores for each domain are calculated by adding a point (or subtracting a point) for items endorsed on each domain. Total scores are then adjusted for the number of items checked and gender, using normative values obtained from Piedmont (1989).

*Evaluation of treatment efficacy.* At the end of treatment, a counselor completed an outcome evaluation of each client. This form presented a listing of 30 different types of therapeutic processes and treatments from which the counselor checked those that were found to be helpful with the client. Treatment items included gestalt, vocational, spiritual direction, cultural trips, client centered, group sessions, problem solving, journaling, cognitive treatment, relaxation training, art therapy, insight, systematic desensitization, and Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) programs. The list of therapeutic subprocesses included support and reassurance, advice–problem solving, experiencing techniques, interpretation: early life, interpretation: current life, stress management techniques, cognitive restructuring, free association, prayer–meditation, and spiritual readings. We included these items to determine any differential response of the personality domains to the various program interventions.

### Procedure

Before beginning the treatment program, all clients met with a counselor for a 20–40-min interview, which was designed to evaluate the suitability and level of impairment of each client. Within 1 week of this initial contact, counselors completed the ACL for each participant. Each client was rated by only one counselor.

After being interviewed, clients would then complete the NEO-PI-R, CRI, BSI, and PPQ. This was accomplished in one sitting, either after their interview with a counselor or on the 1st day of the program. Counselors did not have access to clients' responses to these instruments before making their

own assessments. Clients were told that the purpose of the assessments was for program evaluation only.

The program lasted for 6 weeks. Clients would report 5 days a week, 6 hours a day. The program itself provided a broad-based, multimodal intervention. The major focus of the program was to develop useful vocational skills, and participants worked toward finding gainful employment by the end of treatment. In addition, participants received individual and group counseling, attended AA and NA groups, and engaged in a number of therapeutic activities centering on personal and spiritual growth and development. During the last week of the program, clients were again asked to complete the battery of materials. NEO-PI-Rs collected at this point served in the test–retest analyses. Counselors also provided ratings of treatment efficacy at the end of the program.

## Results

### *Reliability and Recoverability of NEO-PI-R Information*

Table 1 presents descriptive statistics and alpha reliabilities for the NEO-PI-R scales in this sample. Again, these data were obtained before treatment.

The alpha reliabilities for the domains scores were all quite high (.83–.89). However, greater variability was found for the facet scales, with values ranging from a low of .40 for the Actions facet to .75 for Hostility ( $Mdn = .61$ ). Although item homogeneity was not the sole criterion for item selection, some of these values were quite low. It must be determined whether these scales are unreliable for use in a clinical sample or whether they represent more complex psychological qualities in an outpatient context. An evaluation of factor structure may shed more light on this issue.

To determine if the five-factor structure of the NEO-PI-R was recoverable in this data set in a form comparable to normative values, scores on the 30 facet scales were factor analyzed using a principal-components analysis, extracting five orthogonal factors. These factors were then subjected to an orthogonal Procrustes rotation (Schönemann, 1966) using the normative data presented by Costa and McCrae (1992b) as the target. This is the method recommended by the test authors for examining factor replicability (McCrae, Zonderman, Costa, Bond, & Paunonen, 1996) and has been used by other authors

Table 1  
*Descriptive Statistics and Reliabilities  
 for NEO-PI-R Scales*

NEO-PI-R scale	<i>M</i>	<i>SD</i>	$\alpha$
Neuroticism	61	9.86	.89
Anxiety	57	9.97	.61
Hostility	58	11.02	.75
Depression	60	9.90	.74
Self-Consciousness	58	10.26	.60
Impulsiveness	56	8.44	.41
Vulnerability	59	12.85	.74
Extraversion	51	8.86	.83
Warmth	46	10.92	.68
Gregariousness	49	10.29	.71
Assertiveness	49	8.90	.61
Activity	50	8.50	.45
Excitement Seeking	56	8.43	.44
Positive Emotions	51	9.87	.73
Openness to Experience	54	9.35	.83
Fantasy	52	9.62	.66
Aesthetics	56	9.35	.73
Feelings	54	10.64	.61
Actions	51	9.12	.40
Ideas	52	9.08	.69
Values	50	9.39	.58
Agreeableness	43	11.02	.83
Trust	37	11.32	.71
Straightforwardness	41	9.67	.56
Altruism	47	12.13	.66
Compliance	45	10.94	.52
Modesty	50	9.58	.51
Tendermindedness	54	10.70	.49
Conscientiousness	41	11.55	.89
Competence	42	11.09	.54
Order	49	9.71	.58
Dutifulness	36	11.55	.66
Achievement Striving	48	12.39	.71
Self-Discipline	43	11.76	.74
Deliberation	44	10.43	.65

*Note.* Revised NEO Personality Inventory (NEO-PI-R) scores presented as *T* scores (*M* = 50, *SD* = 10), based on normative data presented by Costa and McCrae (1992b). According to the manual, *T* scores above 55 are considered high, whereas *T* scores below 45 are considered low. Those in between are considered normative. *N* = 132.

(Katigbak, Church, & Akamine, 1996). The results of this analysis are presented in Table 2.<sup>1</sup>

We calculated congruence coefficients (Gorsuch, 1983) for each factor and for each facet scale. These values determine the degree to which the rotated solution matches the target matrix. McCrae et al. (1996) presented values for determining the significance of these coeffi-

cients. As can be seen in Table 2, the overall congruence coefficient of .94 shows that the expected five-factor solution was very accurately recovered in this clinical sample. The factor congruence coefficients all show that the five factors obtained in this sample could be considered comparable to those found in the normative data. An inspection of the facet congruence coefficients shows that 27 of the 30 facets have loadings parallel to their normative counterparts. Congruence coefficients for Self-Consciousness and Excitement Seeking were just below the 95% threshold (which was .86); perhaps a larger sample size would have increased their fit. These scales did have their largest loadings on the intended factor, and there were no large secondary loadings. However, the Actions facet appeared more problematic. It did not load primarily on its intended factor and appeared to be independent of all the dimensions. Item analyses did not identify any particular item(s) that would explain this; all the items appeared to have little in common with one another. Future research may want to evaluate this scale more closely in clinical samples. In any event, the relatively lower alphas noted previously do not seem to have compromised the structural integrity of the scale.

To provide a counterpoint to the self-reports, scores on the NEO-PI-R were correlated with counselor ratings on the ACL. These associations speak to the construct validity of the five personality domains in this sample. Each client was rated by only one counselor after only a single 20-40-min interview. These results are presented in Table 3.

Correlations between counselor ratings on the ACL five-factor marker scales and self-ratings on the NEO-PI-R converged quite well. There was also reasonable discriminant validity: The

<sup>1</sup> We conducted a standard principal-components analysis, which resulted in seven factors emerging with an eigenvalue greater than unity (the eigenvalues were: 6.72, 3.99, 2.98, 1.85, 1.54, 1.21, and 1.06). A scree test indicated that five factors would be an appropriate number to extract, accounting for 57% of the variance. Five factors were rotated orthogonally. All the facet scales loaded above .35 on their intended factor, and in all but six instances, this was their highest loading.

Table 2  
Principal-Components Analysis Using an Orthogonal Procrustes Rotation of the  
NEO-PI-R Facet Scales

NEO-PI-R facet scale	Procrustean factor loadings					Facet congruence
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	
N1: Anxiety	<b>.82</b>	-.06	-.16	.15	-.11	.96 <sup>b</sup>
N2: Hostility	<b>.50</b>	-.04	-.10	<b>-.63</b>	-.02	.96 <sup>b</sup>
N3: Depression	<b>.84</b>	.02	-.11	.05	-.21	.97 <sup>b</sup>
N4: Self-Consciousness	<b>.60</b>	-.08	.22	-.16	-.25	.85
N5: Impulsiveness	<b>.56</b>	.32	.05	-.21	-.38	.99 <sup>b</sup>
N6: Vulnerability	<b>.64</b>	.02	-.33	.02	<b>-.43</b>	.93 <sup>a</sup>
E1: Warmth	-.16	<b>.75</b>	.22	.33	.03	.99 <sup>b</sup>
E2: Gregariousness	.02	<b>.69</b>	-.12	.26	.06	.90 <sup>a</sup>
E3: Assertiveness	-.26	<b>.49</b>	.12	<b>-.42</b>	.26	.97 <sup>b</sup>
E4: Activity	.04	<b>.57</b>	.15	-.25	.15	.94 <sup>b</sup>
E5: Excitement Seeking	.11	<b>.45</b>	.34	-.13	-.20	.82
E6: Positive Emotions	-.19	<b>.55</b>	.26	.11	.18	.94 <sup>b</sup>
O1: Fantasy	.17	.23	<b>.41</b>	-.09	-.11	.96 <sup>b</sup>
O2: Aesthetics	-.01	.03	<b>.76</b>	.15	.03	.97 <sup>b</sup>
O3: Feelings	.16	.29	<b>.66</b>	-.12	.05	.91 <sup>a</sup>
O4: Actions	-.10	.04	.29	.33	.01	.71
O5: Ideas	.03	.25	<b>.63</b>	-.01	.26	.89 <sup>a</sup>
O6: Values	-.14	.11	<b>.65</b>	.24	-.04	.87 <sup>a</sup>
A1: Trust	-.30	<b>.47</b>	.02	<b>.51</b>	-.01	.92 <sup>a</sup>
A2: Straightforwardness	-.21	.06	-.19	<b>.67</b>	.27	.93 <sup>a</sup>
A3: Altruism	-.08	<b>.48</b>	.19	<b>.63</b>	.21	.95 <sup>b</sup>
A4: Compliance	-.12	-.17	.00	<b>.75</b>	.05	.99 <sup>b</sup>
A5: Modesty	.14	.00	.11	<b>.59</b>	-.20	.87 <sup>a</sup>
A6: Tendermindedness	.02	.33	.28	<b>.43</b>	.09	.92 <sup>a</sup>
C1: Competence	<b>-.41</b>	.22	.06	.02	<b>.67</b>	.99 <sup>b</sup>
C2: Order	.08	-.07	-.10	-.10	<b>.72</b>	.95 <sup>b</sup>
C3: Dutifulness	-.24	.00	-.01	.29	<b>.68</b>	.99 <sup>b</sup>
C4: Achievement Striving	-.11	.23	-.02	.00	<b>.76</b>	.96 <sup>b</sup>
C5: Self-Discipline	-.38	.04	-.02	.20	<b>.77</b>	.97 <sup>b</sup>
C6: Deliberation	-.38	-.34	.11	.24	<b>.60</b>	.97 <sup>b</sup>
Factor congruence	.96 <sup>b</sup>	.94 <sup>b</sup>	.86 <sup>b</sup>	.93 <sup>b</sup>	.97 <sup>b</sup>	.94 <sup>b</sup>

Note. NEO-PI-R = Revised NEO Personality Inventory.  $N = 132$ . Loadings above  $|\cdot40|$  are in bold.  
<sup>a</sup>Congruence coefficient higher than that of 95% of rotations from random data. <sup>b</sup>Congruence coefficient higher than that of 99% of rotations from random data (from McCrae, Zonderman, Costa, Bond, & Paunonen, 1996).

convergent correlations along the diagonal were the highest values in 4 of the 5 columns and in 3 of the 5 rows. This cross-observer cross-method agreement provided strong evidence of the validity of the NEO-PI-R domain scores in a clinical context.

#### Normative Profile of Sample

Table 1 also contains the mean  $T$  scores for the sample at Time 1.  $T$ -score values are based on norms presented by Costa and McCrae (1992b). As recommended in the manual, values

greater than 55 are considered high, values lower than 45 are considered low, whereas those in-between are average. As can be seen, this group scored high on N, indicating a high level of negative affect. Similar elevations were found on all of the facets for this domain, indicating that this emotional dysphoria was generalized and pervasive. High N is a characteristic expected of clinical samples. Low A reflects more of an antagonistic attitude toward others, especially in regard to trust and straightforwardness. This suggests the sample to be suspicious of the motives of others and to find it easy to be

Table 3  
*Correlations Between NEO-PI-R Self-Ratings and Counselor Ratings on the ACL  
 Five-Factor Marker Scales*

Counselor rating scale	Self-rated NEO-PI-R domain				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
ACL five-factor markers					
Neuroticism	<b>.35***</b>	-.03	-.21*	-.09	-.20*
Extraversion	-.09	<b>.28***</b>	.19*	.17*	.10
Openness	-.08	.21*	<b>.46***</b>	-.11	.09
Agreeableness	-.31***	-.09	.16	<b>.28***</b>	.24**
Conscientiousness	-.26**	-.11	.10	.12	<b>.23**</b>

Note. ACL = Adjective Checklist; NEO-PI-R = Revised NEO Personality Inventory.  $N = 132$ . Convergent correlations are given in bold.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ , all two-tailed.

guarded in their interactions. Finally, this sample scored in the low range on C, suggesting a more lackadaisical attitude. An inspection of the facets for this domain shows that Competence, Dutifulness, Self-Discipline, and Deliberation were low. These scores indicated that participants had a low opinion of their abilities, tended to be unreliable and unprepared, and acted hastily. Overall, the profile for this group indicated individuals experiencing a high level of emotional distress; there was a general feeling of being unable to cope with the stresses of life (e.g., high N6: Vulnerability). These individuals see others as potential threats (low A1: Trust), and they lack the motivation and commitment (low C3: Dutifulness and low C5: Self-Discipline) necessary to work at building more permanent, emotionally fulfilling relationships. Lacking the building blocks of intimacy may serve to exacerbate their emotional dysphoria and add to their sense of estrangement. The elevated scores on Impulsiveness and Excitement Seeking, as well as low scores on Self-Discipline and Deliberation, reflected an impulsive personality orientation (see Piedmont, 1998) that is characteristic of a substance abuse disorder (Brooner et al., 1993). Scores on E and O were average.

#### *Clinical Correlates*

Table 4 contains correlations between the NEO-PI-R and self-reported scores on the BSI, CRI, and PPQ, assessed pretreatment. As can be seen, there are numerous correlations between

the NEO-PI-R domain scores and these other instruments. Not surprisingly, scores on the N domain correlated significantly with all the dimensions of the BSI, reinforcing the conclusion that this sample was experiencing a wide range of emotional distress. The negative correlations with C suggested an inability of this sample to control their impulses and manage their desires. As such, individuals high on the BSI dimensions may attempt to find succor for their distress through some type of hedonistic outlet (e.g., sexual activity, drug usage).

High scores on the CRI suggest that an individual has various resources available to draw on to manage and cope with stress. The many moderate-to-large correlations with the NEO-PI-R suggest that these resources, no matter how they may be labeled, all refer to assets of a psychological nature. Individuals low on N and high on E possess a variety of coping resources, and it is not surprising that individuals with this five-factor profile have been found to experience high levels of well-being (Costa & McCrae, 1980, 1984). There was also some evidence of discriminant validity here. For example, the Physical and Emotional scales were chiefly related to N, whereas the Social scale was primarily related to E and A, those dimensions that define the interpersonal circumplex (McCrae & Costa, 1989).

Correlations with the PPQ appeared to be fewer and smaller than those found with the previous two instruments. This might have been due to the relatively small number of items checked by participants. On average, about 38



Table 4  
*Correlations Between the NEO-PI-R and Self-Ratings on the Brief Symptom Inventory, Coping Resources Inventory, and the Personal Problems Checklist*

Scale	NEO-PI-R domain				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
<b>Brief Symptom Inventory</b>					
Somatization	.23**	-.02	-.13	-.05	-.11
Obsessive-Compulsive	.46***	-.08	.02	-.10	-.39***
Interpersonal Sensitivity	.59***	-.24**	-.03	-.35***	-.35***
Depression	.47***	-.16	.01	-.18*	-.25**
Anxiety	.47***	-.15	-.08	-.19*	-.28***
Hostility	.47***	-.02	-.03	-.32***	-.22**
Phobic Anxiety	.34***	-.21*	-.18*	-.13	-.11
Paranoid Ideation	.53***	-.17	-.08	-.41***	-.20*
Psychoticism	.49***	-.13	.03	-.14	-.20*
Global Severity Index	.56***	-.16	-.05	-.25**	-.29**
<b>Coping Resources Inventory</b>					
Cognitive	-.51***	.32***	.16	.37***	.50***
Social	-.36***	.52***	.35***	.60***	.34***
Emotional	-.40***	.30***	.14	.25**	.37***
Spiritual/Philosophical	-.37***	.23**	.18*	.27**	.36***
Physical	-.45***	.05	.07	.20*	.38***
Total	-.54***	.38***	.24**	.45***	.51***
<b>Personal Problems Checklist</b>					
Social	.47***	-.12	-.11	-.38***	-.26**
Appearance	.17	.11	.02	-.18*	-.12
Vocational	.09	-.02	-.08	-.12	.04
Family/Home	.14	-.01	-.06	-.19*	-.03
School	.18*	-.02	-.14	-.10	-.08
Financial	.15	.09	-.06	-.11	-.21*
Religion	.27**	-.09	-.20*	-.21*	-.15
Emotional	.42***	-.11	-.11	-.12	-.29***
Sexual	.37***	.10	.05	-.08	-.20*
Legal	.06	.04	-.06	.00	-.05
Health/Habits	.31***	.08	.02	-.12	-.18*
Attitude	.53***	-.06	-.05	-.18*	-.27**
Crises	.15	.08	-.06	-.02	.01

Note. NEO-PI-R = Revised NEO Personality Inventory.  $N = 132$ .  
 \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ , all two-tailed.

items (18%) were selected, creating a possible floor effect. Nonetheless, 10 of the 13 scales correlated with at least one of the five factors (only the Vocational, Legal, and Crises scales did not).<sup>2</sup> High N was associated particularly with problems of a Social, Emotional, Sexual, or Attitudinal nature. High A was related to Social, Family, Religion, and Attitudinal problems. Low O also was associated with a higher incidence of Religion-related problems. E was not related to any types of problems. The correlations in Table 4 indicated that many of a client's presenting problems might represent

problems in living arising from underlying motivational dispositions.

### Temporal Stability

To determine the retest reliability for the NEO scales, clients were again assessed on the

<sup>2</sup>One explanation for the lack of associations for the Legal and Crises scales might have been participants selecting, on average, one or two items, respectively, from these scales. Thus, infrequency of item selection might have been responsible for the null results.

NEO-PI-R at the end of the 6-week program. As noted above, only 99 of the original 132 completed the program and were available for assessment. Retest coefficients are presented in Table 5 for all 35 scales. As can be seen, retest coefficients for the domains ranged from .52 for N to .79 for O. Facet coefficients were slightly lower, ranging from .42 for Order to .72 for Aesthetics. All values were significant and indicated that scores on the NEO-PI-R were

relatively stable. However, because these values were lower than corresponding normative values, some individuals might have benefited more from the treatment than others. Also presented in Table 5 are the pre- and posttreatment means. Significant shifts on all the major domains of personality occurred. Individuals decreased their overall levels of emotional dysphoria and increased feelings of conscientiousness, particularly feelings of competence,

Table 5  
*Six-Week Pre-Post Stability Coefficients for NEO-PI-R Domain and Facet Scales and t Tests Evaluating Mean-Level Change*

NEO-PI-R domains and facets	Time 1	Time 2	Test-retest correlation	t difference
Neuroticism	61.34	54.22	.52***	-6.98***
Extraversion	50.36	52.75	.73***	3.68***
Openness to Experience	54.00	56.25	.79***	3.70***
Agreeableness	41.69	44.44	.77***	3.77***
Conscientiousness	41.27	46.72	.66***	5.59***
Anxiety	57.39	53.08	.45***	-4.24***
Angry Hostility	58.84	55.58	.63***	-3.44***
Depression	59.64	53.60	.47***	-5.88***
Self-Consciousness	59.66	52.82	.47***	-6.21***
Impulsiveness	56.38	50.90	.45***	-6.08***
Vulnerability	60.10	53.15	.49***	-5.41***
Warmth	45.75	47.58	.55***	1.73
Gregariousness	47.95	50.42	.68***	3.05**
Assertiveness	49.42	51.15	.67***	2.44*
Activity	50.07	52.28	.57***	2.89**
Excitement Seeking	56.10	55.14	.66***	1.33
Positive Emotions	51.16	53.85	.57***	3.10**
Fantasy	52.56	52.96	.69***	0.54
Aesthetics	55.97	58.99	.72***	4.68***
Feelings	54.12	53.81	.68***	-0.38
Actions	50.31	52.80	.52***	2.77**
Ideas	51.75	52.59	.67***	1.18
Values	50.23	52.11	.64***	2.63**
Trust	35.85	40.80	.58***	5.00***
Straightforwardness	40.71	43.57	.59***	3.04**
Altruism	45.89	48.69	.71***	2.97**
Compliance	44.90	44.73	.56***	-0.17
Modesty	49.25	48.62	.60***	-0.76
Tendermindedness	52.56	53.29	.60***	0.78
Competence	42.27	47.03	.53***	4.15***
Order	49.58	50.12	.42***	0.45
Dutifulness	35.65	39.80	.52***	3.80***
Achievement	48.13	52.06	.67***	3.91***
Self-Discipline	42.04	47.91	.63***	5.76***
Deliberation	43.49	48.37	.53***	4.79***

Note. Revised NEO Personality Inventory (NEO-PI-R) scores presented as *T* scores ( $M = 50$ ,  $SD = 10$ ), based on normative data presented by Costa and McCrae (1992b).  $N = 99$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ , all two-tailed.

dutifulness, self-discipline, and deliberation. Significant increases in openness were found, particularly on the Aesthetics, Actions, and Values facets. Finally, there were changes toward an interpersonal style characterized by greater enthusiasm and trust.

### *Relations to Treatment Strategy*

Finally, Time 1 NEO-PI-R self-ratings were correlated with Time 2 counselor evaluations of treatment efficacy. Counselors merely checked those techniques that appeared to work well with clients. These dichotomous ratings were used in all analyses. For N, positive correlations were found for Vocational Techniques,  $r(99) = .20, p < .05$ , and Journaling,  $r(99) = .20, p < .05$ , and a negative association was found with advice-problem solving,  $r(99) = -.24, p < .05$ . Those high on O seemed to benefit from client-centered techniques,  $r(99) = .19, p < .05$ . Those low on A appeared to benefit from problem solving,  $r(99) = -.26, p < .01$ , art therapy,  $r(99) = .24, p < .01$ , and AA-NA programs,  $r(99) = -.22, p < .05$ . Those higher on A appeared to benefit from insight techniques,  $r(99) = .25, p < .01$ . Finally, those high on C appeared to benefit from gestalt techniques,  $r(99) = .21, p < .05$ . No significant correlations were found for E. These cross-method, cross-observer, cross-time correlations showed that the NEO-PI-R domains might be useful markers for identifying potential intervention strategies.

### *Discussion*

First and foremost, these results provide encouraging support for using the NEO-PI-R in a clinical context. The instrument remained reliable and structurally valid in this substance abuse sample. Significant convergent correlations between self-reported scores and counselor ratings on a different instrument provide strong evidence of the NEO-PI-R's construct validity. Despite being developed and normed on nonclinical samples, the dimensions assessed by this instrument continue to be psychometrically sound in this clinical context. These data support Costa and McCrae's (1992a) contention that the assessment of normal personality dimensions adds valuable information to the

traditional clinical evaluation that relies solely on standard measures of symptomatology (Costa, Busch, Zonderman, & McCrae, 1986).

Second, in replicating Brooner et al.'s (1993) profile of substance abusers, the NEO-PI-R demonstrates additional strength in consistently measuring individual differences in a substance abusing population. Given that the profile holds now for a predominately African American sample as well as a Caucasian sample, the profile is one that most likely describes a robust constellation of traits that may describe a more general impulsive personality orientation.

Third, this study replicates previous research on changes in levels of distress over treatment for substance abuse. Studies using the MMPI and the BDI (Owen & Butcher, 1980) indicate that negative affect normalizes relatively soon after treatment for substance abuse. This study confirms this trend using a measure of normal personality. An additional issue concerns the temporal stability of these domains. As noted in Table 5, scores appeared to remain relatively stable over the 6-week program. However, these values are noticeably lower than the normative sample (in which 6-year stability coefficients range from .68 to .83). Clearly, some shifts in relative standing were occurring, indicating that some individuals were more responsive to treatment than others. Greater attention needs to be given to potential change on these dimensions as a result of therapy. Costa and McCrae (1994) have argued strongly that these dispositions do not change in normal adults, although they leave open the possibility that events such as major trauma, religious conversion, and psychotherapy may have an impact. As the data in Table 5 indicate, participants' scores changed significantly from pre- to posttest, suggesting that individuals who are looking for change may be able to find it. If these changes are robust, the advantage of the NEO-PI-R over purely clinical scales is that it samples a much broader range of personal dispositions that are relevant to adaptive functioning.

Finally, these results provide some additional clinical validity to the NEO-PI-R scales. Scores on the five domains measured initially predicted staff-perceived client responsiveness to various treatment strategies at termination, such as advice giving, vocational counseling, and problem solving, as well as client-centered, gestalt,

and insight counseling methods. These findings support our contention that broad-based personality inventories may be useful for identifying motivational patterns that are consistent with the demands of certain treatment modalities (see Miller, 1991). Tests that measure only emotional adaptation or symptomatology may miss these broader motivational links with treatment responsiveness.

Overall, this study provides a first step in evaluating the psychometric value of the NEO-PI-R in a clinical sample. The correlations with clinical measures provide some suggestive findings of the instrument's clinical utility. However, there are four important limitations to this study that need to be considered when evaluating these results. First, the lack of explicit clinical outcome measures in this study preempts any full evaluation of the NEO-PI-R's worth in this setting and outlines the next step for future study. The therapist ratings of treatment responsiveness are certainly encouraging findings and add to the construct validity of the scales. But the lack of both a psychometric foundation and a priori hypotheses for these ratings makes them best seen as a set of exploratory clinical hypotheses in need of further testing.

Second, the failure to find any significant personality differences between those who dropped out and those who continued the program is a concern. As noted earlier, the reasons for termination were quite varied and the numbers in each category too small to enable any meaningful analyses. Overall multivariate analyses of variance comparing those who dropped out for any reason with those who completed failed to show any significant differences for the groups over both the domains and the facets. Whether this is a product of low statistical power or poor predictive validity needs to be determined in a larger sample.

Third, the generalizability of these results needs to be considered. The current sample represented substance abusers who were at least 30 days postdetox (the average length was 3.8 months). Thus, it is not clear how well these results may generalize to more acute clients. Will the NEO-PI-R continue to maintain its factorial integrity in such a context? Will it continue to correlate with other clinical instruments?

Finally, one must be cautious concerning the magnitude of change noted on the personality domains over the course of treatment. Previous clinical research with the NEO-PI (a precursor to the current instrument) has shown much more modest treatment changes (Bagby, Joffe, Parker, Kalembe, & Harkness, 1995; Trull, Useda, Costa, & McCrae, 1995). Although these studies used different types of participants (e.g., depressed outpatients and a community sample appearing at a college counseling center) and varied in terms of the intensity of treatment (e.g., weekly visits over 3 months), it is not clear if the current findings are due to sample-specific features or may be reflective of more superficial, and temporary, change (e.g., enhanced self-confidence as a result of feeling more assured and supported). The magnitude of changes noted here are indeed noteworthy given both this literature and the putative immutability of these constructs in adulthood (Costa & McCrae, 1994). Thus, these results need to be considered cautiously until more longitudinal research with clinical samples can be undertaken to determine the long-term durability of these findings. Whether these changes are found to be robust will have important theoretical and clinical implications for the field.

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Received April 14, 1997

Revision received July 7, 1998

Accepted July 14, 1998 ■