

Personality traits and mental health treatment utilization[†]

CHRISTOPHER J. HOPWOOD¹, BRIAN D. QUIGLEY², CARLOS M. GRILO³, CHARLES A. SANISLOW³, THOMAS H. MCGLASHAN³, SHIRLEY YEN^{4,5}, M. TRACIE SHEA^{4,5}, MARY C. ZANARINI^{6,7}, JOHN G. GUNDERSON^{6,7}, ANDREW E. SKODOL^{8,9}, JOHN C. MARKOWITZ^{10,11} AND LESLIE C. MOREY¹², ¹Department of Psychology, Michigan State University, MI, USA; ²Department of Counseling, Marymount Manhattan College, NY, USA; ³Department of Psychiatry, Yale School of Medicine, CT, USA; ⁴Veterans Affairs Medical Centre, Washington, DC, USA; ⁵Department of Psychiatry, Brown University, RI, USA; ⁶Mclean Hospital, MA, USA; ⁷Department of Psychiatry, Harvard Medical School, MA, USA; ⁸Department of Psychiatry, University of Arizona School of Medicine, AZ, USA; ⁹Institute for Mental Health Research, AZ, USA; ¹⁰New York State Psychiatric Institute, NY, USA; ¹¹Department of Psychiatry, Weill Medical College of Cornell University, NY, USA; ¹²Department of Psychology, Texas A&M University, TX, USA

ABSTRACT

Recent theory and research suggest a relation between five-factor model personality traits and mental health treatment utilization, even after controlling for psychiatric disorders and global functioning. The current report further tests this hypothesis in a large clinical sample, using a wider array of treatment modalities than has been previously studied. Overall, results were limited and inconsistent. Although neuroticism was related to utilization across treatment modalities, many of these relationships resulted from its association with psychiatric diagnoses. Other traits showed limited and inconsistent relations to the use of psychosocial and psychiatric treatments. Copyright © 2008 John Wiley & Sons, Ltd.

Introduction

Several epidemiological studies attempting to understand the utilization of mental health resources have examined the use of treatments by

patients with a variety of psychiatric diagnoses and demographic features (Kessler et al., 1999; Narrow, Regier, Rae, Manderscheid, & Locke, 1993; Olfson & Pincus, 1994). Psychiatric disorders, and particularly personality disorders, appear to reliably

[†]This study is supported by NIMH grants MH 50837, 50838, 50839, 50840, 50850; MH75543 (Hopwood); MH01654; (McGlashan); MH073708 (Sanislow)

This publication has been reviewed and approved by the Publications Committee of the Collaborative Longitudinal Personality Disorders Study.

predict treatment utilization (Ansell, Sanislow, McGlashan, & Grilo, 2007; Bagge, Stepp, & Trull, 2005; Bender et al., 2001; Zanarini, Frankenburg, Hennen, & Silk, 2004). Several researchers have suggested that extradiagnostic variables may also affect treatment utilization (e.g. Beutler et al., 1991). There is growing interest in the possibility that personality traits may affect the utilization, course and effectiveness of various treatments of mental disorders (Costa, 1991; Harkness & Lilienfeld, 1997). Several authors have suggested that the five-factor model (FFM; neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) of personality may be particularly useful in this regard (Anderson, 1998; Costa & McCrae, 1992a).

Some research suggests that conscientiousness is associated with compliance to medication regimens (Christensen & Smith, 1995; Stille, Sereika, Muldoon, Ryan, & Dunbar-Jacob, 2004) and promotes use of social support among people with medical disorders (Moran, Christensen, & Lawton, 1997). Other studies suggest an interaction between FFM traits and treatment modalities. For example, research suggests that extraversion is negatively related to compliance with antidepressant medication (Cohen et al., 2004) but positively related to compliance with a home-based exercise regimen for cancer survivors (Courneya et al., 2002). Some research also suggests relations between FFM traits and psychosocial treatment efficacy (Piedmont & Ciarrocchi, 1999) and patient expectations about treatment (Schaub & Tokar, 1999). Although there is preliminary support for the potential utility of the FFM in treatment planning and application, little research has investigated the role of FFM traits in mental health treatment utilization.

To address this limitation, Miller, Pilkonis and Mulvey (2006) examined the relation of FFM traits to treatment utilization after controlling for overall functioning, depression, anxiety and personality disorders in two psychiatrically ill samples. In the first sample ($N = 99$), they used these indicators to predict the use of medications as well as the number of individual, group or family therapy sessions over

6 months. Personality traits did not significantly predict medication use, but openness to experience and conscientiousness significantly predicted the number of therapy sessions with psychiatric factors covaried. In the second sample ($N = 544$), they assessed medication use and therapy participation five times, with assessments of functioning, anxiety, depression, PDs and FFM traits before the last but after the first assessment of treatment utilization. Medication use was significantly associated with low scores on extraversion and high scores on agreeableness in three of five models. Therapy participation was significantly associated with the same pattern of variables at all five assessment intervals.

The aims of the current study were to replicate this research by testing the influence of FFM traits on the utilization of several kinds of treatment after accounting for global functioning, mood and anxiety disorders and PD symptoms, and to expand on Miller et al.'s study in several ways. First, this study examined a wider array of treatment modalities, including individual psychotherapy, psychiatric hospitalization, medication, group therapy, self-help groups and family therapy. Second, it tested the influence of FFM traits both before and after controlling for other factors. Third, both lifetime treatment participation as well as longer prospective intervals marked treatment utilization. Based on results from Miller et al., we hypothesized that low scores on extraversion and high scores on agreeableness, openness and conscientiousness would be associated with treatment utilization after controlling for other factors. Given the strong relation between neuroticism and psychiatric illness, we hypothesized that this trait would predict utilization before, but not after, controlling for psychiatric disorders.

Methods

Participants

Participants were 733 consenting patients recruited from four clinical sites (Brown, Butler Hospital,

Columbia, New York State Psychiatric Institute, Harvard, McLean Hospital, and Yale Medical School) for the Collaborative Longitudinal Personality Disorder Study project (CLPS; see Gunderson et al., 2000) for recruitment sites and procedures). Although the CLPS study targeted patients with borderline ($N = 196$), schizotypal ($N = 94$), obsessive-compulsive ($N = 164$) and avoidant ($N = 175$) personality disorders, as well as a control group with major depression and no personality disorder ($N = 104$), subsequent reports suggested substantial diagnostic overlap and the representation of co-occurring Axis I and II disorders (McGlashan et al., 2000). Patients with a history of psychotic-spectrum disorder (i.e. schizophrenia, schizophreniform, schizoaffective disorders), organic mental disorder, substance intoxication or withdrawal, or mental retardation were excluded. Notably, the clinical severity of the CLPS sample is very similar to that of the Miller et al. (2006) samples. The sample was 64% female; 69% of subjects were white, 15% black and 13% Hispanic; and the average age was 32.5 years (standard deviation (SD) = 8.1, range = 18–45). Of the original 733 participants, 716 completed the Revised NEO Personality Inventory (NEO PI-R) at baseline, and 552 persisted to 4-year follow-up.

Measures

The NEO PI-R (Costa & McCrae, 1992b) is a self-report questionnaire designed to comprehensively assess the FFM domains. Its 240 items are answered on a 5-point Likert scale. Internal consistency reliabilities for the five domain scales range from 0.86 to 0.95 and mean t -scores were as follows: neuroticism = 69.07, extroversion = 41.25, openness to experience = 54.76, agreeableness = 43.57 and conscientiousness = 37.57 (see Morey et al., 2002) for a detailed description of NEO-PI-R data in the CLPS sample). The temporal stability of the NEO-PI-R scales has been demonstrated over periods spanning several years in the current sample (Morey et al., 2007), and high correlations have

been obtained between self-reports and observer ratings (Costa & McCrae, 1992b). The FFM domains represented independent variables in this study.

The Longitudinal Interval Follow-up Evaluation (LIFE; Keller et al., 1987) is a commonly used interview that assesses past and ongoing treatment utilization. At baseline, participants were asked whether they had participated in several modalities of treatment during their lifetime. Modalities included individual psychotherapy, hospitalizations, medications, group therapy, family therapy and self-help groups. The LIFE was re-administered at 6 months, and 1, 2, 3 and 4 years after baseline; at each interval, participants were asked about treatment since the previous assessment.

To test the relations between participation in modalities, Kendall's tau correlations were computed between the variables representing participation in each modality, past or present. All of these correlations were positive and most were statistically significant but weak. Within past treatments, correlations ranged from 0.11 (individual and family therapy) to 0.24 (individual therapy and medications). Within prospective treatments, they ranged from 0.12 (group and family therapy) to 0.39 (individual psychotherapy and medications). The correlations of past to prospective treatments, within modality, ranged from 0.19 (individual psychotherapy) to 0.39 (self-help groups). Correlations over time and across modalities ranged from 0.02 (past individual psychotherapy with prospective self-help groups) to 0.16 (past individual psychotherapy with prospective medication use).

Treatment utilization also varied across the four data collection sites. Overall, participants utilized significantly ($p < 0.01$) fewer past and prospective treatments at Columbia (mean = 2.17 out of possible six for past, 0.74 for prospective) than the other sites (average means = 3.09, 1.50 respectively; $F = 18.66$, $p < 0.001$ for past utilization, $F = 19.30$, $p < 0.001$ for prospective utilization). Varying utilization rates were also observed within specific modalities; χ^2 tests suggested differences ($p < 0.05$)

across sites for five of six past (all but group therapy) and four of six (all but group and family therapy) prospective treatments.¹

The Structured Interview for Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) Axis I (First, Gibbon, Spitzer, & Williams, 1996) was administered to assess mood and anxiety disorders. As in Miller et al. (2006), the presence vs. absence of any mood or anxiety disorder was used in the current report. Of 733 baseline participants, 599 (82%) were positive for a mood and/or anxiety disorder.

The Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini, Frankenburg, Sickel, & Yong, 1996), a structured interview, assesses each of the 10 personality disorders described on DSM-IV Axis II. The interrater (median $\kappa = 0.92$) and test-retest reliability (median $\kappa = 0.68$) of the original DIPD are acceptable (Zanarini, Frankenburg, Chauncey, & Gunderson, 1987), and reliability testing in the present study (Zanarini et al., 2000) suggested similar results. All symptom criteria met for all personality disorders was summed in the current report to represent personality pathology. The Cronbach's alpha internal consistency for this variable was 0.93. Because borderline PD has shown the most stable relations among PDs to treatment utilization (Bender et al., 2001), the relation of this PD to the composite PD variable is important. The correlation between the sum of all non-borderline symptoms with the sum of borderline symptoms was 0.50 (uncorrected correlation = 0.68), suggesting that this PD total adequately represented that diagnosis.

The *Global Assessment of Functioning* (GAF; DSM-IV, Axis V; APA, 1994) was used as a general indicator of functioning at the time of the assessment. This measure was selected because it was used in Miller et al.'s study. The average baseline

GAF score in the current sample was 58.00 (SD = 11.02).

Analyses

The analytic approach was conducted in two stages. The first was designed to assess the influence of FFM traits on treatment utilization. Point-biserial correlations were computed between each of the FFM traits and participation in various modalities of past and future treatments. The second stage paralleled Miller et al. (2006): the incremental influence of FFM traits on treatment utilization was examined after accounting for the impact of functioning, mood and anxiety disorders and PD symptoms. Hierarchical logistic regression models were constructed to predict the presence vs. absence of participation in each treatment modality, both in the past and prospectively. As in Miller et al.'s study, the first step of these models comprised GAF and Axis 1 disorder ratings, the second step included PD symptoms, and the third FFM traits.

Results

Initial analyses were conducted to test possible differences between those who did and did not continue in the prospective study for 4 years on baseline variables. Individuals who did not complete 4 years of study participation had a significantly ($p < 0.05$) greater number of baseline PD symptoms (Cohen's $d = 0.22$), higher openness to experience ($d = 0.24$) and GAF ($d = 0.21$) scores, and significantly greater likelihood of having a mood or anxiety disorder ($\chi^2 = 108.07$, $p < 0.001$). The distributions of individuals who participated in each treatment modality in the past and following the baseline assessment are shown in Table 1. As discussed above, distributions of participation were roughly even with the exception of individual psychotherapy, in which most patients participated. Individual therapy and medications were the only modalities in which a

¹Data on different rates of treatment utilization across study sites are available from the author upon request.

Table 1: Descriptive statistics for outcome variables among 733 study participants

	Treated	Untreated
Individual psychotherapy		
Past	653 (89%)	80 (11%)
Prospective	522 (95%)	30 (5%)
Inpatient hospitalization		
Past	301 (41%)	432 (59%)
Prospective	133 (24%)	419 (76%)
Medications		
Past	421 (57%)	312 (43%)
Prospective	398 (72%)	154 (28%)
Group psychotherapy		
Past	267 (36%)	466 (64%)
Prospective	157 (28%)	395 (72%)
Self-help groups		
Past	217 (30%)	516 (70%)
Prospective	106 (19%)	444 (81%)
Family therapy		
Past	227 (31%)	506 (69%)
Prospective	86 (16%)	466 (84%)

majority of participants were treated, and in which rates of treatment increased relative to past rates.

Table 2 presents the point-biserial correlations of FFM traits with the utilization of multiple past and future treatment modalities. All of these correlations were non-significant or small. Only neuroticism emerged as a consistent positive predictor of utilization (9/12 significant correlations at a Type I error rate of 0.05). Low extraversion (4/12) and conscientiousness (5/12) were also related to treatment utilization, although less consistently. Openness to experience (3/12) and agreeableness (2/12) showed few significant relations. There was also limited evidence that personality variables differentially predicted treatment utilization modalities. Openness to experience was a positive predictor of past individual and family therapy but a negative predictor of past hospitalizations. Conscientiousness tended to negatively predict

Table 2: Point-biserial correlations of FFM traits with past and prospective treatment utilization

	N	E	O	A	C
Past					
Individual psychotherapy	0.16***		0.12***		
Inpatient hospitalization	0.19***		-0.08*		-0.13***
Medication	0.16***	-0.12**			
Group psychotherapy	0.09**				
Self-help groups					-0.10**
Family therapy	0.08*		0.08*	0.09*	
Prospective					
Individual psychotherapy	0.12***	-0.10**			
Inpatient hospitalization	0.13***				-0.08*
Medication	0.14***	-0.13***			-0.07*
Group psychotherapy	0.15***	-0.10**			-0.08*
Self-help groups					
Family therapy				0.11**	0.08*

Note: $N = 716$ for analyses of past treatment, 522 for analyses of prospective treatment. Blank cells indicate non-significant correlation (i.e. $p > 0.05$).

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

N, neuroticism; E, extraversion; O, openness to experience; A, Agreeableness; C, con; FFM, five-factor model.

Table 3: Hierarchical logistic regression models of Axis I disorders, GAF, personality disorders and FFM traits to postdict treatment utilization

Block	Block χ^2	Significant predictors	β
Individual psychotherapy (0.32)			
1: Axis 1, GAF	2.50		
2: PD	3.59		
3: FFM traits	27.42***	Neuroticism Openness to experience	0.41 0.49
Inpatient hospitalization (0.57)			
1: Axis 1, GAF	173.86***	Axis 1 GAF	0.24 -1.11
2: PD	5.47*	PD	0.28
3: FFM traits	14.23*	Extraversion Agreeableness	0.27 0.23
Medications (0.36)			
1: Axis 1, GAF	62.95***	GAF	-0.59
2: PD	0.34		
3: FFM traits	8.05		
Group psychotherapy (0.24)			
1: Axis 1, GAF	52.94***	GAF	-0.53
2: PD	3.67		
3: FFM traits	11.40*	Agreeableness	0.24
Self-help groups (0.34)			
1: Axis 1, GAF	22.51**	GAF	-0.38
2: PD	1.42		
3: FFM traits	6.28		
Family therapy (0.23)			
1: Axis 1, GAF	3.11		
2: PD	1.53		
3: FFM traits	21.70**	Extraversion Agreeableness	0.23 0.28

Note: $N = 716$. Nagelkerke Multiple Correlation in parentheses by model heading. Axis 1 is a categorical rating indicating the presence of a mood or anxiety disorder.

GAF, DSM Axis V Global Assessment of Functioning; PD, personality disorder symptoms; FFM, five-factor model.

treatment utilization but was positively related to prospective family therapy.

Because of the significant overlap between personality, and particularly neuroticism, and psychiatric variables, further analyses tested the incremental validity of the former after accounting for the latter. Table 3 presents findings from hierarchical logistic regression analyses to postdict (i.e. dependent variables were temporally prior to inde-

pendent variables) participation in each treatment modality. FFM traits significantly incremented functioning, mood/anxiety and personality disorders in four of six modalities. In the final model for individual psychotherapy, neuroticism and openness to experience were the only significant terms, with individuals who were higher on both of these traits most likely to have participated. Greater agreeableness and extraversion, along with

Table 4: Hierarchical logistic regression models of Axis I disorders, GAF, borderline and antisocial personality disorders, and FFM traits to predict treatment utilization over 4 years

Block	Block χ^2	Significant predictors	β
Individual psychotherapy (0.26)			
1: Axis 1, GAF	11.88**	Axis 1	0.32
2: PD	0.08		
3: FFM traits	12.65*		
Inpatient hospitalization (0.40)			
1: Axis 1, GAF	66.15***	Axis 1 GAF	0.35 -0.78
2: PD	0.43		
3: FFM traits	4.86		
Medications (0.38)			
1: Axis 1, GAF	66.73***	Axis 1	0.71
2: PD	0.58		
3: FFM traits	10.41*	Extraversion	-0.26
Group psychotherapy (0.37)			
1: Axis 1, GAF	58.45***	Axis 1 GAF	0.52 -0.56
2: PD	0.01		
3: FFM traits	5.21		
Self-help groups (0.23)			
1: Axis 1, GAF	16.43**	Axis 1	0.44
2: PD	2.77		
3: FFM traits	3.02		
Family therapy (0.25)			
1: Axis 1, GAF	5.65		
2: PD	3.61		
3: FFM traits	14.09*	Neuroticism Agreeableness Conscientiousness	0.38 0.25 0.29

Note: $N = 522$, Nagelkerke Multiple Correlation in parentheses by model heading. Axis 1 is a categorical rating indicating the presence of a mood or anxiety disorder.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Predictors $p < 0.05$ considered significant.

GAF, DSM Axis V Global Assessment of Functioning; PD, personality disorder symptoms; FFM, five-factor model.

PD symptoms, greater dysfunction, and the presence of a mood or anxiety disorder postdicted presentation to an inpatient hospital. Higher scores on agreeableness and GAF were also related to past participation in group psychotherapy; higher scores on agreeableness and extraversion were related to past participation in family psychotherapy.

FFM traits demonstrated limited validity in predicting prospective treatment utilization (Table 4). Traits only incremented functioning and psychiatric disorders in two models: extraversion was negatively related to number of prospective medications, and greater neuroticism, agreeableness and conscientiousness predicted participation in family psychotherapy.

Discussion

The current study extends previous research regarding the relation of FFM personality traits and mental health treatment utilization. It was hypothesized that lower extraversion and higher agreeableness, openness to experience and conscientiousness would relate to treatment utilization, even after controlling for other factors such as functioning and psychiatric disorders. Results provided limited support for this hypothesis. In bivariate analyses, extraversion and conscientiousness both tended to negatively relate to some forms of treatment, whereas agreeableness and conscientiousness showed limited predictive validity. In analyses to test the incremental validity of personality traits, data suggested some capacity to postdict past utilization after accounting for functioning scores and psychiatric diagnoses but more limited validity in predicting future utilization.

In a very similar study, Miller et al. (2006) found that different patterns of FFM traits were related to treatment utilization across two different samples, and in our study, trait-utilization relations differed across modalities and from past to future use. Differences in findings from past and prospective utilization after controlling for psychiatric factors were unexpected and are difficult to interpret, particularly given the similarities across samples in terms of diagnostic characteristics. Traits postdicted the utilization of individual, group and family psychotherapy, and hospitalizations, and predicted medication use and family psychotherapy. In the one modality for which traits were related to both past and future utilization, the traits differed, with extraversion and agreeableness postdicting and neuroticism, agreeableness and conscientiousness predicting family psychotherapy. This inconsistency across studies and across predictions of past and prospective utilization suggests potentially limited incremental utility of FFM traits to understand treatment utilization beyond that represented by the association of these traits with psychiatric diagnoses.

There was stronger support for the second hypothesis. Neuroticism tended to significantly predict before (9/12 correlations) but not after (2/12 logistic regression models) functioning and psychiatric problems were accounted for, consistent with the interpretation that the limited association of this variable with treatment utilization was due to its overlap with psychiatric disorder. Indeed, this association may have been even less had each of the specific disorders been covaried, rather than sums of PD symptoms and mood and anxiety disorder diagnoses.

Treatment referral and utilization decisions are complicated and multi-determined, and include many factors in addition to patient characteristics, such as decisions by medical and mental health professionals as well as access to services. Understanding these practices and measuring and controlling for such factors would likely result in a clearer picture of the relation of personality traits to treatment utilization. Mental health treatment utilization research is further complicated by the fact that, all things being equal, more severely ill populations will tend to seek treatment at greater rates. For example, given the association of overall severity of problems with treatment utilization (Bender et al., 2001), one may expect that utilization across modalities would be positively correlated. This effect was indicated in the current sample by modest positive correlations across treatment categories. Furthermore, even though data were gathered in urban settings at large teaching hospitals with significantly symptomatic patients, perhaps resulting in more referral and treatment options than in other environments, some variability in treatment utilization across study sites was noted. In other settings, it might be expected that participating in one modality would limit the likelihood of participating in others, and rates of use might be substantially different from the current study. The moderating influence of mental health environment and clinical severity on the relation between personality and treatment utilization is thus an important area for further investigation. It is also important to note that many of the

previous studies in this area that have been conducted in general medical settings indicate that medical vs. psychiatric treatment may be another important moderator of FFM-treatment utilization relations. Finally, the current sample consisted largely of patients with personality disorders; results may vary in samples with different diagnoses.

The relation of psychiatric severity and treatment utilization may also differentially influence FFM traits, further complicating this type of research. For example, parsing the influence of traits such as agreeableness and conscientiousness, which are related negatively to severity but perhaps positively to utilization, is complex. It is also difficult to compare results from these traits with those from neuroticism, a trait which may be positively related to both severity and utilization. Variability in the quality of treatments may also exist, and no effort was made in this naturalistic study to control the nature of interventions. Thus, ending ineffective treatment may indicate good patient judgment, whereas ending effective treatment may indicate clinical progress or poor judgment depending on the extent of improvement. Further research that more precisely examines the relation of traits to treatment utilization over time is clearly needed. Efforts should employ multiple reports and records of treatment utilization and diagnostic and personality ratings to control for the possible effects of data collection method on results. In addition, further collection of data on past and future utilization across multiple modalities is needed given differences associated with these factors found in the current study.

Limited findings regarding the relation of personality traits to treatment utilization in the current study do not imply that these traits are irrelevant for a broad array of treatment planning decisions. Traits may prove to be important factors in many decisions influencing outcome or compliance, key variables for which utilization is a highly imperfect indicator. For example, personality traits may interact with certain treatments to predict therapeutic outcomes. Furthermore, there is no

direct index in the current study of the extent to which patients, as opposed to treaters, chose the interventions that were utilized. The extent to which patients fully understood their treatment options is also unclear. The influence of traits on treatment may be direct (e.g. patients seek out certain treatments or clinicians depending on their traits), indirect (e.g. treaters select treatments based on patient traits) or some combination of these and other factors. Further research that assesses patient, clinician and other influences on treatment utilization decisions would therefore be helpful to further understand the potential link between personality traits and mental health treatment utilization.

References

- American Psychiatric Association (APA). (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: APA.
- Anderson, K. W. (1998). Utility of the five-factor model of personality and psychotherapy aptitude-treatment interaction research. *Psychotherapy Research*, 8, 54–70.
- Ansell, E. B., Sanislow, C. A., McGlashan, T. H., & Grilo, C. M. (2007). Psychosocial impairment and treatment utilization by patients with borderline personality disorder, other personality disorders, mood and anxiety disorders, and a healthy comparison group. *Comprehensive Psychiatry*, 48, 329–336.
- Bagge, C. L., Stepp, S. D., & Trull, T. J. (2005). Borderline personality disorder features and utilization of treatment over two years. *Journal of Personality Disorders*, 19, 420–439.
- Bender, D. S., Dolan, R. T., Skodol, A. E., Sanislow, C. A., Dyck, I. R., McGlashan, T. H., Shea, M. T., Zanarini, M. C., Oldham, J. M., & Gunderson, J. G. (2001). Treatment utilization by patients with personality disorders. *American Journal of Psychiatry*, 158, 295–302.
- Beutler, L. E., Engle, D., Mohr, D., Daldrup, R. J., Bergan, J., Meredith, K., & Merry, W. (1991). Predictors of differential response to cognitive, experiential, and self-directed psychotherapeutic procedures. *Journal of Consulting and Clinical Psychology*, 59, 333–340.
- Christensen, A. J., & Smith, T. W. (1995). Personality and patient adherence: correlates of the five-factor model

- in renal analysis. *Journal of Behavioral Medicine*, 18, 305–313.
- Cohen, N. L., Ross, E. C., Bagby, R. M., Farvolden, P., & Kennedy, S. H. (2004). The 5-factor model of personality and antidepressant medication compliance. *The Canadian Journal of Psychiatry*, 49, 106–113.
- Costa, P. T. (1991). Clinical use of the five-factor model: an introduction. *Journal of Personality Assessment*, 57, 393–398.
- Costa, P. T., & McCrae, R. R. (1992a). Normal personality assessment in clinical practice: the NEO Personality Inventory. *Psychological Assessment*, 4, 5–13.
- Costa, P. T., & McCrae, R. R. (1992b). *Professional manual: revised NEO Personality Inventory (NEO-PI-R) and the NEO Five-Factor Inventory (NEO-FFI)*. Odessa, FL: Psychological Assessment Resources.
- Courneya, K. S., Friedenreich, C. M., Sela, R. A., Quinney, H. A., & Rhodes, R. E. (2002). Correlates of adherence and contamination in a randomized controlled trial of exercise in cancer survivors: an application of the theory of planned behavior and the five factor model of personality. *Annals of Behavioral Medicine*, 24, 257–268.
- First, M. B., Gibbon, M., Spitzer, R. L., & Williams, J. B. W. (1996). *Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I)*. New York, NY: Biometrics Research Department, New York State Psychiatric Institute.
- Gunderson, J. G., Shea, M. T., Skodol, A. E., McGlashan, T. H., Morey, L. C., Stout, R. L., Zanarini, M. C., Grilo, C. M., Oldham, J. M., & Keller, M. (2000). The collaborative longitudinal personality disorders study. I: development, aims, design, and sample characteristics. *Journal of Personality Disorders*, 14, 300–315.
- Harkness, A. R., & Lilienfeld, S. O. (1997). Individual differences science for treatment planning: personality traits. *Psychological Assessment*, 9, 349–360.
- Keller, M. B., Lavori, P. W., Friedman, B., Nielson, E., Endicott, J., McDonald-Scott, P., & Andreason, N. C. (1987). The longitudinal interval follow-up evaluation. *Archives of General Psychiatry*, 44, 540–548.
- Kessler, R. C., Zhao, S., Katz, S. J., Kouzis, A. C., Frank, R. G., Edlund, M., Leaf, P. (1999). Past-year use of outpatient services for psychiatric problems in the National Comorbidity Survey. *American Journal of Psychiatry*, 156, 115–123.
- McGlashan, T. H., Grilo, C. M., Skodol, A. E., Gunderson, J. G., Shea, M. T., Morey, L. C., Zanarini, M. C., & Start, R. L. (2000). The collaborative longitudinal personality disorders study: Baseline axis I/II diagnostic co-occurrence. *Acta Psychiatrica Scandinavica*, 102, 256–264.
- Miller, J. D., Pilkonis, P. A., & Mulvey, E. P. (2006). Treatment utilization and satisfaction: examining the influences of axis II psychopathology and the five-factor model personality. *Journal of Personality Disorders*, 20, 369–387.
- Moran, P. J., Christensen, A. J., & Lawton, W. J. (1997). Social support and conscientiousness in hemodialysis adherence. *Annals of Behavioral Medicine*, 19, 333–338.
- Morey, L. C., Gunderson, J. G., Quigley, B. D., Shea, M. T., Skodol, A. E., McGlashan, T. H., Stout, R. L., & Zanarini, M. C. (2002). The representation of borderline, avoidant, obsessive-compulsive and schizotypal personality disorders by the five-factor model. *Journal of Personality Disorders*, 16, 215–234.
- Morey, L. C., Hopwood, C. J., Gunderson, J. G., Skodol, A. E., Shea, M. T., Yen, S., Stout, R. L., Zanarini, M. C., Grilo, C. M., Sanislow, C. A., & McGlashan, T. H. (2007). A comparison of personality disorder models. *Psychological Medicine*, 37/7, 983–994.
- Narrow, W. E., Regier, D. A., Rae, D. S., Manderscheid, R. W., & Locke, B. Z. (1993). Use of services by persons with mental and addictive disorders: findings from the National Institute of Mental Health Epidemiological Catchment Area Program. *Archives of General Psychiatry*, 50, 95–107.
- Olfson, M., & Pincus, H. A. (1994). Outpatient psychotherapy in the United States, II: patterns of utilization. *American Journal of Psychiatry*, 151, 1289–1294.
- Piedmont, R. L., & Ciarrocchi, J. W. (1999). The utility of the revised NEO Personality Inventory in an outpatient, drug rehabilitation context. *Psychology of Addictive Behavior*, 13, 213–226.
- Schaub, M., & Tokar, D. M. (1999). Patterns of expectations about counseling: relations to the five-factor model of personality. *Journal of Counseling and Development*, 77, 177–188.
- Stilley, C. S., Sereika, S., Muldoon, M. F., Ryan, C. M., & Dunbar-Jacob, J. (2004). Psychological and cognitive function: predictors of adherence with cholesterol lowering treatment. *Annals of Behavioral Medicine*, 27, 117–124.
- Zanarini, M. C., Frankenburg, F. R., Chauncey, D. L., & Gunderson, J. G. (1987). The diagnostic interview for PDs: interrater and test-retest reliability. *Comprehensive Psychiatry*, 28, 467–480.
- Zanarini, M. C., Frankenburg, F. R., Hennen, J., & Silk, K. R. (2004). Mental health service utilization by borderline personality disorder patients and axis II comparison subjects followed prospectively for 6 years. *Journal of Clinical Psychiatry*, 65, 28–36.
- Zanarini, M. C., Frankenburg, F. R., Sickel, A. E., & Yong, L. (1996). *The Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV)*. Belmont, MA: McLean Hospital.

Zanarini, M. C., Skodol, A. E., Bender, D., Dolan, R., Sanislow, C. A., Morey, L. C., Grilo, C. M., Shea, M. T., McGlashan, T. H., & Gunderson, J. G. (2000). The collaborative longitudinal personality disorders study: II. reliability of axis I and axis II diagnosis. *Journal of Personality Disorders*, *14*, 291–299.

Address correspondence to: Christopher J. Hopwood, PhD, Assistant Professor in Clinical Psychology, Michigan State University, East Lansing, MI 48824–1116, USA. Email: hopwood2@msu.edu