Development and Initial Validation of a Multi-Domain Self-Report Measure of Work Functioning

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Abstract

The need for a self-report measure of work functioning that is flexible to involvement in work across three domains (employment, school, and home) led to the development of the Work History Inventory (WHI). The WHI was administered to 185 patients who participated in psychotherapy studies and to 110 community control respondents who were not in treatment. The WHI Total score and subscales (Performance and Interpersonal) demonstrated adequate to good reliability. WHI scores correlated moderately with symptom measures and strongly with another work functioning measure. Changes across treatment indicated that the WHI Total and Performance scores increased significantly across psychotherapy. The WHI appears to be a reliable and valid instrument for measuring treatment related changes in work functioning.

Keywords

work functioning; work performance; interpersonal; psychotherapy; self-report measure

Work functioning has become increasingly important for the evaluation of psychotherapy outcome. Work functionality, work productivity, and satisfaction with one's work are fundamental elements of well being. One typically associates the word "work" with paid employment; but, the broader concept of work is a phenomenon that enters into, and affects, adjustment and well being in multiple domains of life. Most individuals spend a substantial amount of time engaging in activities that are work related, and these activities occur in places of employment, in school settings, and in the home. The purpose of the present study is to develop and evaluate a measure of work functioning that is flexible to differences in functioning and satisfaction with work across three life domains.

Past research that has focused on work functioning shows that the symptoms of mental illness lead to vocational disability. For instance, persons with schizophrenia or other psychotic disorders tend to experience lower work productivity and are more incapacitated in work related activities than controls (Massel et al., 1990). Similarly, it has been found that individuals with even low levels of depression tend to experience impairment in the vocational domain

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(Judd et al., 2000). Depression and other mental disorders contribute to an increase in absenteeism at work and a reduction in both efficiency and effectiveness while on the job. Both Kessler and Frank (1997) and Lim, Sanderson, and Andrews (2000) found that absenteeism and cutback days (number of days where an individual was unable to perform usual activities) were high for individuals with affective disorders. In addition, Lim et al. (2000) found that loss in productivity was particularly associated with having a mental disorder. Treatment for depression often results in improvements in work functioning (Mintz, Mintz, Arruda, & Hwang, 1992). However, several investigators (e.g., Hammen, Gitlin, & Altshuler, 2000; Hirschfeld et al., 2000) report that improvement in symptoms of depression is not necessarily predictive of improvement in various functional domains, such as performance at work. Consequently, an individual may indicate improvements in certain symptoms while daily work problems persist. Thus, it is important to separately assess work functioning in addition to symptoms.

The economic impact of mental disorders for the individual is felt through work loss and work cutback. The impact on the larger economy is felt when symptoms become so disabling that a person is forced to leave his or her job and begin collecting unemployment or disability checks. Government funding for treatment programs to reduce symptoms of mental disorders has the primary goal of improving social functioning, including occupational performance (Hirschfield, et al., 2000). In an age where managed care dominates the mental health industry, it is imperative to provide the least costly and most effective treatment option that is possible. Therefore, it is necessary to better understand the concept of work functioning in order to provide results to the public that address economic costs and benefits.

There are several measures of work functioning that have been introduced in the research literature, but most of them define the work domain more narrowly than will be done here. Work functioning has often been measured as a single item within instruments designed to assess social functioning and adjustment more broadly, as with the Role Functioning Assessment (Hammen et al., 1987), the Role Functioning Scale (Goodman, Sewell, Cooley, & Leavitt, 1993), and the LIFE Range of Impaired Functioning Tool (Leon et al., 1999). Several other work functioning scales are completed by clinicians after conducting interviews with the patient, such as the Social Adjustment Scale (Weissman & Paykel, 1974), the Strauss Carpenter Level of Function Scale (Strauss & Carpenter, 1974), and the Multidimensional Scale of Independent Functioning (Jaeger, Berns, Czobor, Lieberman, & Stroup, 2003). Clinician rated scales are time consuming and costly methods of assessment, and there is no evidence that the information gathered is more valid than information that can be obtained via self-report questionnaires (Halari, Mehrota, Sharma, & Kumari, 2006; Zimmerman et al., 2007).

Self-report measures of social functioning often fail to capture the complexities of work productivity and satisfaction by using only one item relating to work functioning, such as the Sheehan Disability Scale (Leon, Olfson, Portera, Farber, & Sheehan, 1997) and the Work and Social Adjustment Scale (Mundt, Marks, Shear, & Greist, 2002). Other scales, such as the Social Adjustment Scale by Patient Self-Report (SAS-SR; Weissman & Bothwell, 1976), the Short-Form Health Survey (SF-36; Ware & Sherbourne, 1992), the Life Functioning Questionnaire (LFQ; Altshuler, Mintz, & Leight, 2002), and the World Health Organization Health and Work Performance Questionnaire (HPQ; Kessler et al., 2003), include multiple items regarding work functioning, but not enough items to gain complete insight into the construct. The primary goal behind these measures is to assess social functioning broadly without a specific focus on the work domain. Therefore, there remains a need for a comprehensive self-report measure of work functioning that attends to work experiences in the home, at school, and in paid employment settings.

The Endicott Work Productivity Scale (EWPS; Endicott & Nee, 1997) is one of the first comprehensive tools to focus solely on a person's functioning at work. It is a 25 item self-report measure that is used with patients who present with a psychiatric condition, specifically depression. It measures the degree of difficulty experienced with work related tasks as well as behavioral changes in productivity (Endicott & Nee, 1997). Most of the items on the EWPS, however, are limited in that they focus specifically on work in an employment setting and neglect work roles at home or as a student. Thus, the EWPS fails, like most work functioning measures, to recognize that people have multiple roles that are considered "work." Moreover, many work functioning measures are designed for individuals with severe psychopathology or physical disabilities. This focus excludes the possibility of applying these measures to persons without physical disabilities or severe mental disorders (e.g., schizophrenia) who are nonetheless experiencing significant problems with work functioning.

The current article presents preliminary development of the Work History Inventory (WHI). This instrument was designed to address the problems with previous instruments. The WHI is a self-report measure that focuses exclusively on work functioning. A fundamental concept in the construction of the WHI is that functioning in any life domain is affected by both the individual and the environmental context. The WHI reflects these two factors in subscales labeled Work Performance, which measures the respondent's sense of productivity and satisfaction with tasks and responsibilities, and Work Interpersonal, which measures the respondent's sense of support and the quality of feedback from persons in the workplace. That is, Work Performance assesses how the respondent performs independently, while Work Interpersonal assesses how the respondent affects the larger organizational system. These two factors may provide distinctive information about workplace functioning. For example, an individual may meet deadlines and effectively perform duties, but he or she may also contribute to conflict and poor communication among coworkers.

The WHI also seeks to address the multi-faceted nature of work in paid employment settings, at home, and at school. By using the same items across the domains of employment, home, and school, and averaging over these three domains, the WHI produces overall work functioning scores for individuals regardless of where the primary work effort lies. This allows the scale to be used for typical samples in mental health treatment research that will often include students, homemakers, and employed individuals. Another goal was to create a flexible instrument which could be used to assess a wide variety of patients so that it was not restricted to certain disabilities or categories of mental disorder. Finally, the WHI was created to encompass an assortment of problems within various work domains, including those that could be affected by pharmacological or psychological treatment. The purpose of this report is to describe the development of the WHI and to provide preliminary evidence of its reliability and validity as a measure of work functioning.

METHODS

Scale Description and Development

The Work History Inventory (WHI) is a self-report questionnaire consisting of demographic and occupational questions followed by three sections corresponding to specific work roles: Employment (12 items), Student (12 items), and Household (11 items). The items of the WHI are rated on a 5 point scale in which higher scores reflect higher levels of functioning. Respondents are asked to complete all sections that are relevant to their work experiences over the past month. For example, a respondent who was a student and was employed would complete both of these sections. Some respondents have responsibilities in all three domains, and others have responsibilities in one or two of the three domains. Respondents complete any or all of the three sections that they perceive as work domains in their current life situation. A respondent would not complete the student section if he or she was not enrolled in school. A

respondent would not complete the employment section if he or she was not employed full- or part-time. A respondent would not complete the household section if someone else (e.g., a spouse or parent) was responsible for maintaining the household in which he or she resides. The employment, student, and household sections all have questions that pertain to the respondent's perceptions of his or her work performance and quality of interpersonal relationships in the work setting. For example, one of the performance items in the employment domain reads: "How would you describe your ability to accomplish work tasks?" One of the interpersonal relationship items from the employment domain reads: "Overall, how do you get along with people at work?" The items use parallel wording to build corresponding subscales (Interpersonal Subscale and Performance Subscale) across all three work domains. The Employment and Student domains have one additional item regarding getting along with one's boss or teacher, respectively, for which no parallel item in the Household domain was created. The WHI was rationally constructed; that is, item content was based on a review of the literature on psychiatric-related work dysfunction and some of the existing measures of work functioning. In addition to items asking about the context of each domain (employment, student, household), there is a single Importance item asking the respondent to rate how important is it for them to be good at that particular domain (on a 1 to 5 scale from not important to very important).

The WHI Total is a composite work functioning score that represents the mean item ratings across the Performance and Interpersonal subscales using all domains completed by the respondent. The Importance item is not included in the calculation of the WHI Total score or the subscale scores. The WHI Performance and WHI Interpersonal subscales are computed by averaging responses on the seven performance items and the four interpersonal items (three Interpersonal items in the Household section), respectively, for each of the three domains, and then averaging across the domains completed by each individual. WHI subscale scores within each domain can also be retained to represent work performance or interpersonal functioning within a particular domain (e.g., Performance in employment setting, Interpersonal in school setting, etc.).

Participants

The WHI was administered to 295 respondents, consisting of a clinical sample of 185 outpatients evaluated for various clinical trials of psychotherapy and a community control sample of 110 adults participating for monetary compensation.

The clinical sample consisted of 185 patients who were evaluated for potential inclusion into one of six psychotherapy studies conducted at the Center for Psychotherapy Research at the University of Pennsylvania. The psychotherapy studies consisted of: Supportive-Expressive Therapy vs. Supportive Therapy for Generalized Anxiety Disorder ($n = 27$; Crits-Christoph et al., 2005); Supportive-Expressive Therapy, Cognitive Therapy, or wait list control for Panic Disorder ($n = 37$; Connolly Gibbons, Crits-Christoph, Hearon, & Worley, 2006); Cognitive Therapy for Borderline Personality Disorder ($n = 21$; Brown, Newman, Charlesworth, Crits-Christoph, & Beck, 2004); Treatment as usual, training cases, or Alliance-Enhancing Psychotherapy for Major Depressive Disorder ($n = 27$; Crits-Christoph et al., 2006); treatment of adolescent anxiety ($n = 8$); and Self-Concept Focused Behavior Therapy alone for treatment of obesity ($n = 16$). Forty-nine patients (27%) had baseline assessments but were not assigned to a study; their WHI responses were included in the psychometric analyses reported below for the clinical sample.

Sixty-eight percent of the clinical sample was female and the patients ranged in age from 14 years to 60 years, with a mean age of 38. Sixty-two percent of the sample had graduated from college. Regarding marital status, 42% reported being single, 39% were currently married, 12% divorced, 5% separated, and 1% cohabitating. Less than one-fifth of the clinical sample

was a member of an ethnic minority group (11% African American, 3% Hispanic, 2% Asian or Pacific Islander, 3% other or unknown).

Diagnostic information on all patients was collected at intake using DSM-IV SCID interviews (First, Spitzer, Gibbon & Williams, 1994) conducted by trained PhD-level diagnosticians. The most frequent intake diagnoses included major depressive disorder (63%), panic disorders (36%), specific phobia (15%), social phobia (16%), post-traumatic stress disorder (12%), generalized anxiety disorder (31%), borderline personality disorder (15%), avoidant personality disorder (13%), obsessive-compulsive personality disorder (14%), and dependent personality disorder (18%).

One-hundred forty-one patients (76%) completed the Employment domain items, 31 (17%) completed the Student domain items, and 106 (57%) completed the Household domain items of the WHI. One hundred thirteen (61%) considered their paid employment to be the primary work role.

The community control sample consisted of staff and students who were affiliated with the University of Pennsylvania. Participants were recruited at various places throughout the campus. After an explanation of the study, participants were asked to provide informed consent. The control respondents were asked to complete the assessment measures and then were paid $5 for their participation. A total of 112 students and staff completed the study measures. This sample was 40% female and 51% had obtained a college degree. The ages ranged from 18 years to 53 years, with a mean age of 24. Sixty-six control respondents (60%) completed the Employment domain items, 80 (73%) completed the Student domain items, and 21 (19%) completed the Household domain items of the WHI. Seventy-two (65%) considered their student responsibilities to be the primary work role.

Measures

After providing informed consent, subjects were asked to complete measures of symptoms, interpersonal problems, social adjustment, and quality of life in addition to the WHI.

Measures of symptoms included (1) the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988), a 21-item self-report instrument that assesses common features of anxiety, with a focus on cognitions, using a four-point response format; (2) the Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988), a 21-item self-report measure that surveys cognitive, affective, and somatic symptoms of depression using a four-point response format; (3) the Hamilton Rating Scale for Anxiety (HAM-A; Hamilton, 1959), a structured interview with a 14-item rating scale that assesses the severity of common symptoms of anxiety; (4) the 17-item Hamilton Rating Scale for Depression (HAM-D; Hamilton, 1960), a commonly used interview measure of depressive symptoms, administered using the Structured Interview Guide to enhance reliability (Williams, 1988); and (5) the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), a 53-item self-report inventory designed to measure general severity of psychiatric distress and nine symptom dimensions, including somatization, obsessive-compulsive features, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychosis. Interpersonal problems were assessed with the Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, & Ureno, 1988), a 127-item self-report inventory that assesses eight types of interpersonal problems that the respondent experiences in relationships with others. Also administered was the Social Adjustment Scale by Self-Report (SAS-SR; Weissman & Bothwell, 1976), a 42-item self-report measure used to assess performance and functioning in various areas of the patient's life, including work, social/leisure activities, relationships with extended family, and family roles as spouse, parent, and a member of a family unit. The overall SAS-SR Total score and the SAS-SR Work scale were utilized for the current study. In contrast to the WHI, higher scores on the SAS-SR Total

and Work scales are indicative of lower levels of functioning. General quality of life was assessed with the Quality of Life Inventory (QOLI; Frisch, Cornell, Villanueva, & Retzlaff, 1992), a 17-item self report scale that is relevant to overall life satisfaction, including items related to work, love relationships, friendships, self-regard, standard of living, recreation, community, home, etc. Respondents rate each item on its importance to overall happiness and satisfaction.

RESULTS

Table 1 reports the internal consistency reliability (Cronbach's alpha) of the WHI for scores computed by averaging over the three domains and for within-domain scores in both the clinical and control samples. The overall work functioning score (averaging across the three domains and averaging performance and interpersonal items) showed high internal consistency reliability in both the clinical (alpha = 0.86) and control (alpha=0.82) samples. Internal consistency reliability was higher in the clinical sample compared to the control sample for the across-domain scores, as well as within all three domains. In the clinical sample, the Performance subscales obtained good alpha coefficients (> 0.84) in all three domains and across-domain. The alpha coefficient for the across-domain Interpersonal subscales was adequate (0.70) in the clinical sample. Within domains, the Interpersonal subscale was adequate (0.70) in the Employment and Student domains and less than adequate (0.55) in the Household domain. In the control sample, alpha for the Performance subscale was good (0.79) for the across-domain score. Within domain, the Performance subscale was good in the Household domain and adequate in the Student and Employment domains. Among control respondents, the alpha coefficients for the Interpersonal subscales indicated relatively poor internal consistency both across and within the three domains.

To validate the *a priori* grouping of the items into the Intepersonal and Perfomance subscales, a principal components analysis (varimax rotation) was conducted using the clinical sample and the items averaging across the Employment, Student, and Household domains. Results indicated that two factors had eigenvalues greater than 1 (explaining 56% of the variance), and therefore rotation was performed with a two factor solution. All four of the items in the Interpersonal subscale loaded most highly on one factor; all of the items of the Performance subscale except one loaded most highly on the other factor. One item ("What was your level of upset, worry, or discomfort at work?") of the Performance subscale loaded about equally on the two factors (0.36 on the performance factor; 0.44 on the interpersonal factor). Such upset or worry about work could be a function of either performance difficulties or interpersonal problems. But it should also be noted that performance difficulties and interpersonal problems at work are not likely to be independent (ie, performance difficulties can lead to concern about criticism from a supervisor or co-worker, both of which contribute to upset and worry about work). However, because this item that loaded on both factors did not specifically mention interpersonal relationships, the *a priori* grouping was retained with this item included on the Performance subscale.

The two across-domain WHI subscales (interpersonal and performance) were moderately correlated in both the clinical ($r = 0.59$, $p < 0.001$, n=185) and community control samples ($r = 0.60$, $p < 0.001$, n=110).

Table 2 presents the correlations between WHI Total and subscale scores gathered pre-treatment and the other measures of anxiety and depressive symptoms, interpersonal problems, and social adjustment also gathered at intake. Relatively better work functioning, as reflected in high WHI Performance scores, was associated with lower anxiety, lower depressive symptoms, fewer interpersonal problems, increased social adjustment, and better quality of life. The WHI Interpersonal scores were also negatively and significantly related to measures

of anxiety symptoms, depressive symptoms, interpersonal problems, social adjustment, and quality of life. In particular, the WHI Total score correlated moderately ($r = -0.55$, $p < 0.01$) with the SAS-SR Work scale. Correlations of the WHI with symptom measures were small to moderate in size (r's from -0.16 to -0.41).

The pre and post-treatment means and standard deviations for the WHI Total scores, the average subscale scores averaged across domains, and the average (across domain) importance rating are given in Table 3. Also in Table 3, shown for comparison, are the means and standard deviations for the control sample. The WHI Total scores increased significantly between pre-treatment assessment at intake and the post-treatment assessment at termination of treatment, t (66) = 3.68; $p < 0.01$. Both WHI subscores, averaged across domains, also increased significantly from intake to termination (Performance t (66) = 4.02; $p < 0.01$; Interpersonal t (66) = 2.25; $p = 0.03$). The importance rating, however, showed essentially no change from pre to post treatment and no difference between the clinical and community samples. Analyses of covariance (post scores as dependent variable, pre scores as covariate, study as between-group factor) indicated that change in work functioning across treatment did not vary significantly across the six psychotherapy studies.

DISCUSSION

The current study introduced a self-report measure of work functioning that is flexible to differences in participation across the domains of paid employment, duties at home, and school work. The WHI goes beyond previous measures of work functioning by assessing multiple domains of work, yet arrives at overall scores that allow application to diverse samples. These preliminary data indicate that the WHI scores averaged across work domains created internally reliable measures of work functioning. Moreover, validity correlations show good convergence with an alternate measure of work performance, the SAS-SR.

The WHI Total scores and the Performance subscale scores increased significantly after treatment compared to pre-treatment, with medium effect sizes. The WHI Interpersonal subscale scores increased significantly after treatment, but with a small effect sizes. Interpersonal functioning may change more gradually than general performance during the typical course of psychological intervention. Perhaps, it is more difficult to change how one manages encounters with people than how one completes assignments and handles responsibility. It may be that work has more concrete aspects (e.g., tasks, deadlines, etc.,) that are more easily improved upon than the complex and more nebulous elements of social relationships. Moreover, one may be highly motivated by the risk of termination (thus one's livelihood) should performance at work fall below an acceptable threshold.

Although the WHI scores were correlated with symptom measures, the small to moderate correlations found show that work functioning is relatively distinct from psychiatric symptoms. Thus, work functioning assessments using measures like the WHI may provide additional information about positive changes resulting from psychotherapy or other mental health treatment approaches. It is worth noting that the importance of work to the respondent does not differ between patients and community adult controls. Thus, the WHI serves as a specific measure of functioning at work and not a measure of how valued (i.e. important) work is to the individual. These findings collectively support the importance of assessing work functioning in mental health patients and the construct validity of the WHI for making these assessments.

The limitations in this preliminary validation study point to worthwhile avenues for future research with the WHI. The current study sampled outpatients from six separate psychotherapy studies to create a diagnostically heterogeneous sample. The validity of the WHI for distinct

diagnostic groups and treatment modalities remains to be tested. The correlations between the WHI and other measures of work functioning, especially clinician rated instruments, should be obtained in future studies. These correlations would be useful to investigate the incremental validity of the WHI over existing methods to predict psychotherapy outcome and the unique value of including interpersonal relationships at work to assess work functioning. Work functioning in volunteer roles may also be assessed in further studies of the WHI to enhance the instrument's coverage of non-paid domains of work functioning, The clinical sample used here to develop the WHI had fewer member of ethnic minority groups than may be expected in clinical settings. Further research should explore the generalizability of the WHI for work with diverse ethnic groups. The control sample used here for the construction of the WHI was not representative of the community, with a high proportion of students and younger adults. Large and representative samples from the community would provide clinically valuable norms for the assessment of work functioning impairments in individual patients or diagnostic samples. Finally, further research to validate the WHI should employ informant raters, such as supervisors at work, instructors at school, and members of the patient's household, to corroborate the levels of functioning reported by patients across the three domains of work.

CONCLUSIONS

The WHI appears to be a reliable (internally consistent) and valid instrument for measuring work functioning in clinical samples. By measuring work functioning in employment, household, and student contexts, and yielding scores on both the performance and interpersonal aspects of work, the WHI provides information beyond that in other existing measures of work functioning.

Acknowledgments

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TABLE 1

Internal Consistency Reliability for WHI Subscales in Clinical and Control Samples

	Clinical Sample	Control Sample
Overall Scores		
(Averaged Across Domains)		
Average of Performance and Interpersonal	0.86 (*n*=185)	0.82 (*n*=110)
Performance	0.86	0.79
Interpersonal	0.70	0.55
Employment Domain		
Average of Performance and Interpersonal	0.86 (*n*=141)	0.73 (*n*=66)
Performance	0.85	0.70
Interpersonal	0.70	0.48
Student Domain		
Average of Performance and Interpersonal	0.90 (*n*=31)	0.77 (*n*=80)
Performance	0.89	0.74
Interpersonal	0.72	0.46
Household Domain		
Average of Performance and Interpersonal	0.85 (*n*=106)	0.82 (*n*=21)
Performance	0.84	0.80
Interpersonal	0.55	0.43

Cronbach's alpha coefficients are given.

TABLE 2

Pearson Correlations of WHI with Measures of Symptoms, Interpersonal Distress, Social Adjustment, and Quality of Life at Intake for Clinical Sample

	WHI Score		
	Performance	Interpersonal	Total Score
Symptom Measures			
BAI	−0.15	−0.09	−0.16
BDI	−0.39[*]	−0.27[*]	−0.41[*]
HAM-A	−0.29[*]	−0.26[*]	−0.35[*]
HAM-D	−0.33[*]	−0.28[*]	−0.38[*]
Interpersonal Problems			
IIP	−0.35[*]	−0.25[*]	−0.36[*]
Social Adjustment			
SAS-SR Total	−0.50[*]	−0.34[*]	−0.52[*]
SAS-SR Work	−0.51[*]	−0.29[*]	−0.55[*]
Quality of Life			
QOLI	0.38[*]	0.30[*]	0.42[*]

[*]
$p < 0.01$.

Sample size varies due to missing data.

The Performance and Interpersonal subscales are averaged across domains completed.

TABLE 3

WHI Scores for Control Group Patients and Pre and Post Treatment for Psychotherapy Patients

| | Pre-Treatment | | Post-Treatment | | Control Group | | Effect Size | | |
| | | | | | | | Pre-Post | Pre-Control | Post-Control |
WHI Score	M	SD	M	SD	M	SD	Cohen's *d*	Cohen's *d*	Cohen's *d*
Total	3.2	0.6	3.5	0.6	3.7	0.5	−0.45	−0.69	−0.44
Performance	3.0	0.8	3.3	0.7	3.5	0.6	−0.49	−0.74	−0.34
Interpersonal	3.4	0.6	3.6	0.6	3.8	0.5	−0.27	−0.47	−0.43
Importance Rating	4.2	0.7	3.1	0.8	4.3	0.7	0.04	−0.11	−0.17

N = 67 for patients with pre-treatment and post-treatment WHI.

Performance and Interpersonal subscale scores are averaged across domains completed.

Cohen's *d* = the difference between means divided by the control group SD (or pre SD for the pre-post effect size).