Treatment Intervention Inventory
Reliability, Validity and Accuracy

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Abstract

The validity of the Treatment Intervention Inventory (TII) was investigated in a sample of 3,414 participants. The TII has nine scales for measuring risk of substance (alcohol and drugs) abuse, anxiety, depression, self-esteem, distress, stress coping problems and family issues. Reliability analyses showed that all nine TII scales had alpha reliability coefficients of between .88 and .94. The Alcohol and Drugs scales identified all participants who had been treated for alcohol and drug problems. Clients who admitted having emotional and family problems were identified: Anxiety Scale (100%), Depression Scale (98%), Distress Scale (93%) and Family Issues Scale (100%). TII classification of risk was shown to be within 2.6% of predicted risk range percentile scores for all TII scales. This is very accurate assessment.

Treatment Intervention Inventory: Reliability, Validity and Accuracy

Over the past couple of decades we have seen changes in health care systems, particularly in mental health, chemical dependency and counseling. There is renewed emphasis upon objective problem identification, appropriate referral and documented outcome. Decisions regarding the type of intervention needed, changes in inpatient-outpatient status, continuation or completion of treatment and effectiveness of treatment are now subject to review. Provider accountability, utilization review and substantiation of decision-making are the order of business for community counseling centers.

Researchers are recognizing the importance of identifying clients' risk and needs as well as evaluating program effectiveness (Deacon & Piercy, 2000). Community counseling centers often evaluate clients who present multiple problems. Yet, in everyday assessment settings, practitioners do not have time to administer and score multiple tests A multidimensional test can provide them with relevant assessment on a number of dimensions easily, efficiently and timely. For this purpose, a reliable and valid test is essential. The present study investigated a test developed for this purpose called the Treatment Intervention Inventory (TII).

The TII was designed to help meet assessment needs in counseling, intake, psychotherapy, HMO and EAP referral settings. Assessment tests give therapists a working framework upon which to develop intervention and treatment plans based on client self-reported problems. Such client-oriented ready-information at the outset can aid in establishing a strong therapist-client relationship, which many believe to be a powerful predictor of treatment outcome (Hubble, Duncan, & Miller, 1999, Sprenkle, Blow, & Dickey, 1999). As Ulenhuth, Lipman, Chassan, Hines and McNair (1970) observed, "it is the patient's opinion with all its biases that is most relevant for the initiation and maintenance of treatment." The TII combines objective assessment with the client's own perceptions of his or her problems and enables staff to compare patient's opinions with empirically based objective measures. It is also desirable to test

clients at various time intervals to assess client progress, treatment effectiveness and continuation or completion of treatment.

The present study investigated the validity of the Treatment Intervention Inventory (TII). The TII is a multidimensional test that was developed to meet the needs of clinical practitioners screening and assessment. The TII has nine scales that measure alcohol and drug abuse severity, anxiety, depression, self-esteem, distress, stress coping abilities and family problems. In addition, there is the Truthfulness Scale to measure client truthfulness, denial and problem minimization while completing the TII. Truthfulness Scale scores are used for truth-correcting other scale scores.

This study sought to validate the TII in a sample of clients who were processed as part of intake procedures in community service programs. The data for this study was obtained from the agencies that used the TII in their assessment programs. The method for validating the TII was to examine the accuracy at which the TII identified problem drinkers and problem drug abusers, and clients who admitted having anxiety, depression, distress and family issues problems. In the TII, alcohol and drug treatment information is obtained from the participants' responses to test items. Undoubtedly, there are some clients who have an alcohol or drug problem but have not been in treatment. Nevertheless, clients who have been in treatment would be expected to score in the corresponding scale's problem range. For treatment information the following test items were used, "I have been treated for an alcohol problem." "I have been treated for a drug problem."

For the Anxiety, Depression, Distress and Family Issues scales clients' self-admissions of problems were derived from their responses to test items. These items asked respondents to rate the level of their problems on a scale from 1 to 10 with 10 being severe problem. The test items consisted of "level of anxiety," "depression," "distress," "marital situation or relationship." Admission of problems consisted of a response rating of 9 or 10 (severe problem).

For the predictive validity analyses, participants were separated into two groups, those who had treatment and/or admitted problems and those who did not have treatment or admit to problems. Then, participant scores on the relevant TII scales were compared. It was predicted that clients with treatment histories and admissions of problems (problem group) would score in the problem risk range (70th percentile and above) on the relevant TII scales. Clients who did not have treatment or admitted to problems (non-problem group) would score the low risk range (39th percentile and below). Participants who had problems and also scored in the 70th percentile range and above was considered a correct identification of problems. High percentages of participants with problems (treatment and/or admission of problems) and elevated problem risk scores would indicate the scales were valid.

Method

Subjects

There were 3,414 participants tested with the TII. Data for this study was provided by professional community service agencies that use the TII. Test data were collected during the year 2001. There were 2,334 males (68.4%) and 1,080 females (31.6%). The ages of most participants ranged from 21 through 50 as follows: 20 & Under (18.1%); 21-30 (29.5%); 31-40 (30.4%); 41-50 (16.8%); 50 & Over (5.3%). The average age of males was 32.0 (Standard Deviation = 10.79) and the average age of females was 32.4 (Standard Deviation = 10.41). The demographic composition of the participants was as follows. Race/Ethnicity: Caucasian (71.8%); Black (7.0%), Hispanic (16.1%), Native American (3.6%) and Other (1.5%). Education: Eighth

grade or less (3.5%); Some high school (21.2%); High school graduate/GED (51.4%); Some college (17.0%) and College graduate (5.2%). Marital Status: Single (54.0%); Married (23.9%); Divorced (15.0%); Separated (6.0%) and Widowed (1.1%).

Procedure

Participants completed the TII as part of their intake evaluation for referral in community service programs. The TII was administered to participants for the purpose of selecting appropriate levels of intervention and before treatment was initiated.

The TII contains nine measures or scales. These scales are briefly described as follows. The Truthfulness Scale measures respondent's truthfulness, denial and problem minimization while taking the TII. The Alcohol Scale measures severity of alcohol use or abuse. The Drugs Scale measures severity of drug use or abuse. The Anxiety Scale measures the client's unpleasant emotional experiences that are characterized by non-directed fear. General symptoms such as nervousness, apprehension and tenseness are included in this definition, as are panic, terror, and somatic correlates of anxiety. The Depression Scale measures the client's dejected or self-depreciating emotional state that varies from normal to pathological proportions. General symptoms such as melancholy and dysphoric mood are included in this definition, as are impaired social-vocational functioning and loss of interest in usual activities. In addition, thoughts of suicide and other cognitive as well as somatic correlates of depression are included. The Distress Scale measures sorrow, misery, pain and suffering. Distress incorporates pain (physical and mental), physical and mental abuse, agony and anguish. The Family Issues Scale measures family problems, concerns and stability. The Self-Esteem Scale measures a client's explicit valuing and appraisal of self. The Stress Coping Abilities Scale establishes how well the client copes with stress.

Results and Discussion

The inter-item reliability (alpha) coefficients for the nine TII scales are presented in Table 1. All scales were highly reliable. All of the alpha reliability coefficients for all TII scales were at or above 0.88. These results demonstrate that the TII is a reliable test for adult counseling client assessment.

Table 1. Reliability of the TII

TII Scale	Number of Items	Alpha
Truthfulness Scale	19	.88
Alcohol Scale	17	.93
Drugs Scale	18	.90
Anxiety Scale	17	.92
Depression Scale	19	.89
Distress Scale	26	.90
Family Issues Scale	13	.88
Self-Esteem Scale	25	.91
Stress Coping Abilities	30	.94

Predictive validity results for the correct identification of problems (drinking, drug abuse,

anxiety, depression, distress and family problems) is presented in Table 2. Table 2 shows the percentage of participants who had problems and who scored in the problem risk range on the selected TII scales in comparison to participants who scored in the low risk range. For the Alcohol and Drugs Scales problem behavior means the participant had alcohol or drug treatment. For the Anxiety, Depression, Distress and Family Issues scales, clients' responses to test items indicating severe problems represented problem behavior.

For the Alcohol Scale comparisons between problem risk and low risk clients, there were 1,001 participants who reported having been in alcohol treatment. These participants were considered problem drinkers. Of these 1,001 participants, all 1,001 individuals, or 100 percent, had Alcohol Scale scores at or above the 70th percentile. The Alcohol Scale correctly identified all of the participants classified as problem drinkers. These results validate the TII Alcohol Scale.

The TII Drugs Scale also correctly identified participants who had drug problems. There were 910 participants who reported having been in drug treatment. All 910 individuals, or 100 percent, had Drugs Scale scores at or above the 70th percentile. These results support the validity of the TII Drugs Scale.

Of the 187 clients who admitted having severe anxiety, all 187 were identified by the Anxiety Scale. Of the 204 clients who admitted having severe depression the Depression Scale identified 98.1 percent of them. The Distress Scale identified 93.1 percent of the 277 clients who admitted having severe distress. And the Family Issues Scale identified all 312 clients who admitted having severe marital or relationship problems. These results validate the Anxiety, Depression, Distress and Family Issues scales.

Table 2. Predictive Validity of the TII

TII Scale	Correct Identification of Problem Behavior
Alcohol	100%
Drugs	100%
Anxiety	100%
Depression	98.1%
Distress	93.1%
Family Issues	100%

For ease in interpreting participant risk, TII scale scores were divided into four risk ranges: low risk (zero to 39th percentile), medium risk (40 to 69th percentile), problem risk (70 to 89th percentile), and severe problem risk (90 to 100th percentile). By definition the expected percentages of participants scoring in each risk range (for each scale) is: low risk (39%), medium risk (30%), problem risk (20%), and severe problem risk (11%). Scores at or above the 70th percentile would identify participants as having problems.

The above predictive validity results lend support for using these particular percentages. The 70th percentile cut off for problem identification correctly classified nearly 100 percent of problem participants. The low risk level of 39 percent avoids putting a large percentage of participants into a "moderate" range. Putting low risk clients into intervention programs aimed at higher risk clients would over-burden counseling programs and may be counter-productive, unnecessarily alarm clients and result in clients exhibiting more problems than they originally

had. This undesirable outcome of inappropriate level of intervention selection has been found in the corrections area (Andrews, Bonta, & Hoge, 1990).

Risk range percentile scores were derived by adding points for test items and truth-correction points, if applicable. These raw scores are converted to percentile scores by using cumulative percentage distributions. These results are presented in Table 3. Risk range percentile scores represent degree of severity. Analysis of the TII risk range percentile scores involved comparing the participant's obtained risk range percentile scores to predicted risk range percentages as defined above. These percentages are shown in parentheses in the top row of Table 3. The actual percentage of participants falling in each of the four risk ranges, based on their risk range percentile scores, was compared to these predicted percentages. The differences between predicted and obtained are shown in parentheses.

As shown in Table 3, the objectively obtained percentages of participants falling in each risk range were very close to the expected percentages for each risk category. All of the obtained risk range percentages were within 2.6 percentage points of the expected percentages and many (26 of 36 possible) were within one percentage point. Only six obtained percentages were more than two percent from the expected percentage classification. These results demonstrate that risk range percentile scores are accurate.

Table 3. Accuracy of TII Risk Range Percentile Scores

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness Scale	36.8	(2.2)	30.7	(0.7)	22.4	(2.4)	10.1	(0.9)
Alcohol Scale	39.4	(0.4)	30.5	(0.5)	19.1	(0.9)	11.0	(0.0)
Drugs Scale	41.6	(2.6)	27.5	(2.5)	19.4	(0.6)	11.5	(0.5)
Anxiety Scale	38.0	(1.0)	31.1	(1.1)	19.9	(0.1)	11.0	(0.0)
Depression Scale	41.5	(2.5)	29.2	(0.8)	19.1	(0.9)	10.2	(0.8)
Distress Scale	39.9	(0.9)	28.5	(1.5)	19.9	(0.1)	11.7	(0.7)
Family Issues Scale	41.1	(2.1)	28.7	(1.3)	18.9	(1.1)	11.3	(0.3)
Self-Esteem Scale	39.0	(0.0)	29.5	(0.5)	20.5	(0.5)	11.0	(0.0)
Stress Coping Abilities	38.8	(0.2)	30.3	(0.3)	19.7	(0.3)	11.2	(0.2)

Gender differences between male and female scale scores are shown in Table 4. These results demonstrated that males scored significantly higher than females on the Truthfulness and Alcohol Scales. The Anxiety, Depression, Distress, Family Issues, Self-Esteem and Stress Coping Abilities Scales showed that females scored significantly higher than males. The differences between males and females on the Drugs Scale were not significant. On all TII scales the maximum scale scores of the females were very close to those of the males.

Males tended to have more drinking problems than females and they tended to minimize their problems more. Females had more emotional, self-esteem and stress coping problems than did males. These findings suggest that separate male and female scoring procedures are needed in order to accurately measure clients' problems. Without taking into account gender differences clients' problems could be either over- or under-identified.

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Table 4. Comparisons between Males and Females

TII	Males			Females			T-value
Scale	Mean	SD	Max	Mean	SD	Max	
Truthfulness Scale	8.38	5.49	19	7.68	5.73	19	t = 3.40*
Alcohol Scale	9.26	10.17	39	7.89	9.79	40	t = 3.75*
Drugs Scale	8.33	9.35	41	8.81	10.13	43	t = 1.31
Anxiety Scale	5.66	6.45	33	7.90	7.83	34	t = 8.20*
Depression Scale	5.75	6.05	35	7.84	7.65	34	t = 7.92*
Distress Scale	10.94	9.40	44	14.55	10.80	43	t = 9.46*
Family Scale	4.35	5.26	25	5.76	5.77	24	t = 6.81*
Self-Esteem Scale	25.00	16.08	75	23.83	16.64	75	t = 1.94**
Stress Coping Abilities	120.01	53.21	240	104.82	52.49	240	t = 7.79*

* Significant at the $p < .001$ level. ** Significant at the $p < .05$ level.

Note: The Self-Esteem and Stress Coping Abilities Scales are reversed in that higher scores are associated with higher self-esteem and better stress coping abilities.

Conclusions

This study demonstrated that the TII is a reliable and valid assessment test for counseling clients. Reliability results showed that all nine TII scales were highly reliable. Reliability is necessary in screening tests for accurate measurement of client risk and need.

Predictive validity analyses demonstrated that the TII identified participants who had substance abuse problems as well as emotional and family issues problems. The Alcohol and Drugs scales correctly identified all participants who had been in treatment for alcohol and drugs, respectively. The Anxiety, Depression, Distress and Family Issues scales were accurate in identifying anxiety, depression, distress and family relationship problems. Furthermore, obtained risk range percentages on all TII scales very closely approximated predicted percentages. These results support the validity of the TII.

One of the most important decisions regarding a counseling client is what intervention program is appropriate for the client. The TII can be used to tailor intervention (treatment) to each client, based upon his or her assessment results. Low scale scores are associated with low levels of intervention and treatment, whereas high scale scores relate to more intense intervention/treatment recommendations. Placing counseling clients in appropriate treatment can enhance the likelihood that a client will complete treatment, benefit from program participation and change their behavior.

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